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# Maladaptive Schemas and Depression Severity: Support for Incremental Validity When Controlling for Cognitive Correlates of Depression

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To the Graduate Council:

I am submitting herewith a thesis written by Lindsey K. Colman entitled "Maladaptive Schemas and Depression Severity: Support for Incremental Validity When Controlling for Cognitive Correlates of Depression." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Michael Nash, Major Professor

We have read this thesis and recommend its acceptance:

Kristina Coop Gordon, Jenny Macfie

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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**Maladaptive Schemas and Depression Severity:  
Support for Incremental Validity When Controlling for Cognitive Correlates of Depression**

A Thesis Presented for  
the Master of Arts  
Degree  
The University of Tennessee, Knoxville

Lindsey K. Colman  
May 2010

## Abstract

Limited research has explored relationships between specific Early Maladaptive Schemas (EMS) and depression, with equivocal findings. This study examined the incremental validity of EMS domains in accounting for depression severity among college undergraduates (N = 82) after controlling for gender, cognitive vulnerability, rumination, experiential avoidance, social problem-solving ability, and trait anxiety. Based on the Beck Depression Inventory—II (Beck, Steer, & Brown, 1996), self-reported depression among students ranged from 0-47 (no depression to severely depressed). Based on hierarchical regression analyses, gender, rumination, and EMS Domains I (Disconnection and Rejection) and II (Impaired Autonomy and Performance) significantly predicted self-reported depression severity, with the latter two variables accounting for the most variance. Post hoc analyses indicated the Abandonment/Instability, Social Isolation/Alienation, Defectiveness/Shame (Domain I) and Failure, Dependence/Incompetence, and Vulnerability to Harm schemas (Domain II) were most predictive of depression severity. Results strongly support the incremental validity of EMS Domains in that these domains accounted for significant additive variance in predicting depression severity (Domain I: 7%, Domain II: 8%, combined Domains I and II: 10%). Implications for the conceptualization, assessment, and treatment of depression are discussed.

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## Maladaptive Schemas and Depression Severity: Support for Incremental Validity When Controlling for Cognitive Correlates of Depression

According to the American College Health Association, the prevalence of college students with depression increased from 10% in 2000 to 16% in 2006 (ACHA, 2006). College depression is in part related to environmental stressors that include academic demands, a new living environment, financial responsibilities, changes in familial, romantic, and peer relationships, and preparing for post-graduation (Kerr, Johnson, Gans, & Krumrine, 2004). Depression is highly coexistent with anxiety disorders (Mineka, Watson, & Clark, 1998) and substance abuse (Grant & Harford, 1995; Lenz, 2004), and independently or in combination with these conditions may result in substantial functional impairment. For example, college students with depression engage less frequently in social, physical, and educational behaviors (Hopko & Mullane, 2008), and academic performance and retention are negatively impacted by depression (Brooks & Dubois, 1995; Fazio & Palm, 1998; Gallagher, 2007; Pritchard & Wilson, 2003).

In general, there is ample support for the efficacy of cognitive therapy in the treatment of depression (Butler, Chapman, Forman, & Beck, 2006; Hollon, Thase & Markowitz, 2002; Young, Weinberger, & Beck, 2001; Wolf & Hopko, 2008), and relapse rates for depressed individuals treated with cognitive therapy are significantly lower than those treated with antidepressant medications (Hollon et al., 2002; Young et al., 2001). Despite the prevalence of depression in college students, however, there is a paucity of empirical support for depression interventions in the context of university settings (Gawrysiak, Nicholas, & Hopko, 2009; Lee, 2005). This current status establishes a pressing need to conduct carefully controlled treatment outcome research in college settings. At a more preliminary level, however, more systematic research is required to explore vulnerabilities and etiological factors that may elicit and increase

depression severity in college students. Conducting such research will be critical toward informing the development of efficacious treatment protocols.

A number of risk factors are associated with the development, persistence, and severity of depression. These factors include female gender, marital separation or divorce, unemployment, exposure to trauma, physical, emotional, and sexual abuse, other stressful or adverse life events, poor problem-solving skills, family history of depression, genetic predispositions, hormonal influences, poor physical health and medical illness, functional limitations, socioeconomic status, poor social support, limited coping skills, and maladaptive cognitive styles (Alloy, Abramson, Walshaw, & Neeren, 2006; Gibb & Abela, 2008; Kessler, 1997; Klein & Santiago, 2003; Lorant, Croux, Weich, Deliege, Mackenbach, & Ansseau, 2007; Mazure & Keita, 2006; Person, Tracy, & Galea, 2006; Spasojevic & Alloy, 2001; Vink, Aartsen, & Schoevers, 2008; Vredenburg, Krames, & Flett, 1986). Although broad research exists examining vulnerabilities to depression, research has been limited in examining these vulnerabilities with Early Maladaptive Schemas and depression. Thus, the current study examined the significance of maladaptive cognitive schemas in predicting depression severity in college students. Specifically, the primary objective was to assess the incremental significance of early maladaptive schemas in accounting for depression severity, controlling for cognitive variables known to be associated with depression such as cognitive vulnerability, rumination, experiential avoidance, deficient problem solving skills, and trait anxiety.

### *Cognitive Vulnerability, Schemas, and Depression*

Beck proposed that cognitive structures (i.e., negative self-schemas) based on themes of inadequacy, failure, loss, and worthlessness increase cognitive vulnerability to depression (Beck, 1967; Clark, Beck, & Alford, 1999; Beck, 2008). Cognitive vulnerability is the tendency to make

negative inferences about the causes, consequences, and self-worth implications of stressful events, with individuals attributing negative events to stable, global, and internal factors (Abramson, Metalsky, & Alloy, 1989, 2002; Haefffel et al., 2008). Cognitive vulnerability has informed influential etiological models of depression including hopelessness theory, where the interaction of cognitive vulnerability and negative life events creates hopelessness and associated depression symptoms (Abela & Seligman, 2000; Abramson et al., 1989, 1998; Alloy et al., 2000; Alloy, Lipman, & Abramson, 1992; Sturman, Mongrain, & Kohn, 2006; Haefffel et al., 2003).

Contemporary schema theory views the above ‘cognitive vulnerability’ to exist in the form of maladaptive schemas, asserting that depression involves the activation of interlocking schemas dealing with primal concerns of loss or deprivation (Young, Klosko, & Weishaar, 2003). These schemas are shaped during childhood, elaborated upon through life experiences and interpersonal interactions, and function to organize one’s perceptions of the world (Festinger, 1957; Harris & Cutin, 2002; Wellburn, Cristine, Dagg, Pontefract, & Jordan, 2002; Wellburn, Dagg, Cristine, & Pontefract, 2000). Early Maladaptive Schemas (EMS) evolve from unmet emotional needs and dysfunctional relationships in childhood and are pervasive and automatic patterns of memories, emotions, cognitions, and bodily sensations (Young et al., 2003). EMS consist of 18 specifically labeled schemas that fall within five ‘broader’ schema domains that are as follows: *Disconnection and Rejection (I)*, *Impaired Autonomy and Performance (II)*, *Impaired Limits (III)*, *Other-Directedness (IV)*, and *Overvigilance and Inhibition (V)*: Young et al., 2003). EMS represent a core cognitive vulnerability to depression as well as other problems such as anxiety and personality disorders, which, when activated, lead to further issues that render individuals vulnerable to depression (Calvete, Estevez, Lopez de Arroyabe, & Ruiz, 2005; Glaser, Campbell, Calhoun, Bates, & Petrocelli, 2002; Harris & Cutin, 2002; Lumley &

Harkness, 2007; Petrocelli, Glaser, Calhoun, & Campbell, 2001; Schmidt, Joiner, Young, & Telch, 1995; Welburn et al., 2002).

A small number of studies have examined the relation of depression and EMS. In an initial study using an undergraduate student sample, the dependence and defectiveness/shame schemas (i.e., Domains 1 and II) best predicted depression severity (Schmidt et al., 1995). Also using an undergraduate sample, the defectiveness/shame, subjugation, and self-sacrifice schemas (i.e., Domains 1 and IV) were most highly correlated with depressive symptoms (Harris & Curtin, 2002). This work has extended to patient samples with variable findings. For example, the abandonment/instability, defectiveness/shame, social isolation (Domain I: Calvete et al., 2005; Glaser et al., 2002; Petrocelli et al., 2001; Wellburn et al., 2002), failure (Domain II; Calvete et al., 2005), insufficient self-control (Domain III: Welburn et al., 2002) and self-sacrifice schemas (Domain IV: Calvete et al., 2005) all have been associated with increased depression severity. Given the minimal and equivocal data in this area, and the fact that previous studies generally have not controlled for potentially confounding variables, this study advanced this research program by examining EMS in relation to other cognitive risk-factors for depression.

#### *Rumination, Problem-Solving, and Depression*

In addition to general cognitive vulnerability described earlier, rumination is well established as a vulnerability factor in depression. Rumination is defined as repetitive and passive thinking about life events and the causes and consequences of depression symptoms (Nolen-Hoeksema, 1991). According to Nolen-Hoeksema (1991), rumination prolongs depression via increased frequency, severity, and focus on negative thoughts, by interfering with effective coping mechanisms such as problem-solving skills and instrumental behaviors, and

through negatively impacting relationship quality and social support. Individuals prone to rumination exhibit higher levels of negative affect following stressful life experiences, are more susceptible to feelings of hopelessness, self-criticism, and low self-esteem, and are significantly more likely to develop major depression (Abramson et al., 1989; Beck, 1967, 1987; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Nolen-Hoeksema, 2004; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Morrow, 1991, 1993; Nolen-Hoeksema & Larson, 1999; Skith & Abela, 2008; Lyubomirsky & Tkach, 2004; Papagoergiou & Siegle, 2003; Robinson & Alloy, 2003; Wells & Matthews, 2004; Just & Alloy, 1997).

Rumination is associated with poorer problem-solving ability in college students with increased depression severity (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky et al., 1999). The ruminative “self-focused” tendency is proposed to increase focus on personal problems, heighten negative affect, and decrease cognitive resources, self-confidence, optimism, and perceived control, a pattern that inhibits the problem-solving process (D’Zurilla, Chang, Faccini, & Nottingham, 1998; Goddard, Dritschel, & Burton, 1996; Lyubomirsky et al., 1999; Wells & Matthews, 2004). Deficient problem-solving ability is both a predictor and consequence of depression (Goddard et al., 1996; Marx, Williams, & Claridge, 1992; McMurrin & Christopher, 2009; Raes et al., 2005; Watkins & Barcacia, 2002) and increases depression vulnerability for individuals experiencing stressful events (Argus & Thompson, 2008; Chang, 2002; Heppner, Reeder, & Larson, 1983; Lyubomirsky & Tkach, 2004; Nezu, Maguth, & Clark, 2008; Nolen-Hoeksema & Morrow, 1991).

### *Experiential Avoidance and Depression*

Experiential avoidance (EA) occurs when a person is unwilling to remain in contact with private experiences (e.g. sensations, memories, emotions, thoughts) and attempts to alter the

form or frequency of these events and the contexts that elicit them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). EA is associated with rumination and reduced concrete thinking abilities (Cribb, Moulds, & Carter, 2006), with rumination functioning to limit distressing affect and avoid greater worry and distress (Borkovec, & Roemer, 1995; Wells & Papageorgiou, 1995). Paradoxically, however, EA is associated with various forms of psychopathology that include increased severity of trichotillomania (Begotka, Woods, & Wetterneck, 2004), self-harm in borderline personality disorder (Chapman, Specht, & Cellucci, 2005), dissociation in trauma victims (Marx & Sloan, 2005), and anxiety and panic (Eifert & Heffner, 2003; Tull, Gratz, Salters, & Roemer, 2004). Pertaining to depression, higher EA is associated with less perceived control, increased rumination, and heightened depression severity (Forsyth, Parker, & Finlay, 2003; Hayes et al., 1996, 2006; Moulds, Kandris, Starr, & Wong, 2007; Tull et al., 2004; Wegner & Zanakos, 1994).

### *Gender and Depression*

Almost twice as many females meet criteria for depression than males, with a lifetime prevalence of 21% in women compared to 13% of men (Kessler et al., 2003). Risk factors that contribute to this well-researched gender discrepancy have biological, social, and environmental underpinnings. Biologically, research suggests hormonal cycling (e.g. puberty, menstruation, menopause, and postpartum) may trigger dysregulation in neurotransmitter systems, increasing depressive symptoms (Nolen-Hoeksema & Hilt, 2009). Socially, women tend to be less assertive, more prone to helplessness, and more likely to overvalue relationships as sources of self-worth, which are all contributing risk factors to depression (Radloff, 1975; Nolen-Hoeksema & Hilt, 2009). Environmentally, women report more chronic stress, abuse histories, emotion regulation difficulties, and exhibit cognitive styles characterized by negative self-evaluation. These risk

factors have also been linked to women developing a tendency to ruminate, and consequently, women are more likely to respond to negative affect by rumination, potentially predisposing them to depression (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema et al., 1999; Radloff 1975).

### *Current Study*

Cognitive vulnerability, rumination, experiential avoidance, problem-solving abilities, and gender have all been associated with the development and severity of depression. Research on the association of EMS and depression severity is relatively new, with a few studies connecting various schemas and depressive symptoms. Although research has developed in this area, no studies have directly compared the predictive utility of EMS as they compare to cognitive variables empirically demonstrated to account for depression severity. It is conceivable that when an individual possesses an Early Maladaptive Schema, it leads to the development of maladaptive coping strategies (rumination) and inhibits the development of adaptive ways to address depression (such as healthy problem-solving techniques). Insufficient research on this topic warrants further evaluation to better elucidate the importance of schemas in predicting depression severity. Based on research discussed, when controlling for cognitive vulnerability, rumination, experiential avoidance, problem-solving ability, and gender, it was hypothesized that domains I (disconnection and rejection) and II (impaired autonomy and performance) would serve as significant predictors of depression severity and account for unique variance beyond empirically demonstrated (cognitive) risk factors linked with depression severity.

## Method

### *Participants*

Participants included 82 undergraduate students at the University of Tennessee. Students aged 18 or older were eligible to participate, with no additional exclusion criteria. The sample consisted of 29 males (35%) and 53 females (65%). Ethnic distribution consisted of 67 Caucasians (81%), 7 African-Americans (9%), 4 Asian-American/Pacific Islanders (5%), 1 Latino (1%), and 3 who identified as 'Other' (4%). Participant age ranged from 18-27 years old ( $M = 19.1$  years;  $SD = 1.6$ ). All but one participant was unmarried.

### *Assessment Measures*

*The Cognitive Style Questionnaire* (CSQ; Alloy et al., 2000) is a measure of cognitive vulnerability to depression based on the hopelessness theory of depression (Abramson et al., 1989). The CSQ is a modified version of the Attributional Style Questionnaire (ASQ; Peterson et al., 1982) that uses a 7-point Likert scale to assess attributions for 12 positive and 12 negative hypothetical events on dimensions of internality, stability, and globality, as well as probable consequences for each event and implications for the self. A measure of "negative inferential style" is calculated through summing and averaging responses across the 12 negative events in the questionnaire. Negative sample items include rating the reasons/consequences for events like: "you take an exam and receive a low grade on it," and "you go to a party with some friends and throughout the party people don't act interested in you." The CSQ is a reliable measure of cognitive vulnerability with strong construct validity (Haefel et al., 2008). In the current study, internal consistency of the CSQ was strong ( $\alpha = .95$ ).

*The Ruminative Response Scale* (RRS; Nolen-Hoeksema & Morrow, 1991) is a 22-item self-report measure that assesses tendencies to ruminate. Each item is rated on a 4-point scale.

The RRS assesses three types of ruminative responses: focusing on the self, the symptoms, and the possible consequences and causes of moods. Sample items include ‘[How often do you...] Think about how alone you feel?’ and “Think ‘what am I doing to deserve this?’” The instrument has adequate two-year test-retest reliability ( $r = 0.67$ ) and good convergent and predictive validity (Nolen-Hoeksema & Morrow, 1991; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). The internal consistency of the RRS was strong in this study ( $\alpha = .93$ ).

*The Young-Schema Questionnaire-Short Form Revised* (YSQ-S3; Young, 2006) is a 90-item self-report measure that measures early maladaptive schemas. The measure asks participants to rate items in terms of how they feel about their lives on a 6-point Likert scale (“completely untrue” to “describes me perfectly”). Sample items include “I worry that people I feel close to will leave or abandon me,” and “I always feel on the outside of groups.” This questionnaire is an abridged version of the original 205-item measure (Young, 1994). The scale assesses 18 Early Maladaptive Schemas (e.g. “Abandonment/Instability” or “Failure to Achieve”) that are sorted into five different Domains (e.g. Domain I: “Disconnection and Rejection”). Studies assessing both the long and short forms of this questionnaire have shown adequate discriminant and predictive validity (Oei & Baranoff, 2006; Waller, Meyer, & Ohanian, 2001; Wellburn et al., 2002). In the current study, internal consistency of the YSQ-S3 was strong ( $\alpha = .96$ ).

*Acceptance and Action Questionnaire* (AAQ; Hayes et al., 2006). The AAQ is a 9-item scale assessing EA. Sample items include “Anxiety is bad,” “If I could magically remove all the painful experiences I’ve had in my life, I would do so,” and “I’m not afraid of my feelings.” Responses range from 1 (never true) to 7 (always true). The AAQ has satisfactory psychometric

properties (Hayes et al., 2004), with adequate internal consistency ( $\alpha = .70$ ) and 4-month test-retest reliability demonstrated for the measure ( $r = .64$ ). Internal consistency of the AAQ was adequate in this study ( $\alpha = .74$ ).

*The State Trait Anxiety Inventory* (STAI; Spielberger, 1983) is a widely used measure of state and trait anxiety. The STAI has both State and Trait scales, each consisting of 20 items that are rated on a 4-point Likert scale. Internal reliability, test-retest reliability, and convergent and discriminant validity have been demonstrated for both state and trait anxiety in younger and older adults (Spielberger et al., 1983; Kabacoff, Segal, Hersen, & Van Hasselt, 1997). To maintain consistency with the YSQ-S3 that focuses on pervasive and more enduring behavioral influences, the STAI-T scale was used in the current investigation. Sample items include “I take disappointments so keenly that I can’t put them out of my mind,” and “I worry too much over something that doesn’t matter.” The internal consistency of the STAI-T scale was good in this study ( $\alpha = .85$ ).

*The Beck Depression Inventory-II* (BDI-II; Beck, Steer, & Brown, 1996) consists of 21 items, each of which is rated on a 4-point Likert scale. Sample items include assessment of the frequency and intensity of “sadness,” “guilt,” “pessimism,” etc. The instrument has excellent psychometric properties, and has been demonstrated to have excellent internal reliability and strong convergent validity with other measures of depression with depressed younger and older adults (Beck et al., 1996; Nezu, Ronan, Meadows, & McClure, 2000; Hopko, Lejuez, Armento, & Bare, 2004). In the current study, internal consistency of the BDI-II was strong ( $\alpha = .91$ ).

*The Social Problem-Solving Inventory-Revised* (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 1996) is a 52-item questionnaire designed to assess strengths and weaknesses in social

problem solving skills and attitudes. It assesses five factors: positive problem orientation, negative problem orientation, rational problem solving, impulsivity/carelessness style, and avoidance style and provides an overall SPS score that was used in this study (total social problem solving). Sample items include “I prefer to avoid thinking about the problems in my life instead of trying to solve them,” and “I feel nervous and unsure of myself when I have an important decision to make.” The SPSI-R has good psychometric properties (D’Zurilla et al., 1996; Maydeu-Olivares & D’Zurilla, 1996; D’Zurilla, Nezu, & Maydeu-Olivares, 2002). In the current study, internal consistency of the SPSI-R was good ( $\alpha = .83$ ).

### *Procedure*

Participants were recruited through the University of Tennessee Human Participation in Research (HPR) website, designed as an efficient resource for students to obtain research credits for their respective courses. Participants completed the BDI-II as a screening measure (Beck, Steer, & Brown, 1996) and were presented with the opportunity to be contacted for further participation. Interested students were contacted and scheduled to complete the study in the research lab. Upon arrival to the laboratory, participants met individually with an experimenter, and completed the informed consent form, demographic form, and assessment measures outlined above. Upon experiment completion, participants were debriefed, any questions were answered, and all students were provided with a list of mental health services. The study was approved by the University of Tennessee Institutional Review Board.

## Results

### *Descriptive Statistics*

According to independent samples t-tests, no significant gender differences existed as a function of depression severity [BDI-II:  $t(79) = -1.75, p = 0.08$ ; Full Sample  $M = 12.2, SD = 8.7$ ],

cognitive vulnerability to depression [CSQ:  $t(78) = 0.75, p = 0.45$ : Full Sample  $M = 4.4, SD = 0.8$ ], rumination [RRS:  $t(79) = -0.82, p = 0.41$ : Full Sample  $M = 48.8, SD = 8.8$ ], trait anxiety [STAI-T:  $t(80) = 1.93, p = 0.06$ : Full Sample  $M = 46.9, SD = 4.2$ ], social problem-solving ability [SPSI:  $t(74) = 0.66, p = 0.51$ : Full Sample  $M = 100.9, SD = 15.6$ ], experiential avoidance [AAQ:  $t(80) = -0.30, p = 0.76$ : Full Sample  $M = 34.8, SD = 7.0$ ], or early maladaptive schema pathology [YSQ:  $t(77) = -0.19, p = 0.85$ : Full Sample  $M = 231.8, SD = 55.3$ ]. According to the BDI-II, depression scores ranged from 0-47 (no depression to severely depressed), with an average of 12.3 ( $SD = 8.74$ ), which indicates a ‘minimal’ or sub-clinical level of depression. According to sample frequencies, at least 32% of participants reported at least a ‘mild’ level of depression, which warrants attention.

### *Bivariate Correlations*

Pearson product-moment correlation coefficients among all variables are presented in Table 1. As expected, all variables were significantly associated with self-reported depression, with the exceptions of gender ( $p = 0.08$ ) and trait anxiety ( $p = 0.21$ ). The non-significance of these predictors could be due to issues of power in the data set. According to analyses, power was low for the project, at  $=.41$  (Faul, Erdfelder, Buchner, & Lang, 2009), increasing the chance for Type II error. Perhaps a larger sample size would have yielded different results in terms of gender, and possibly trait anxiety. Due to the high correlations observed between depression and YSQ-S3 schema domains, preliminary analyses were conducted to assess the strength of these relationships using Pearson’s Test of Dependent R’s (Bruning & Kintz, 1997). When statistically compared to other YSQ-S3 domains, Domains I (*Disconnection and Rejection*) and II (*Impaired Autonomy and Performance*) were significantly more associated with self-reported depression on the BDI-II. YSQ-S3 Domains I and II did not statistically differ in terms of their relative

relations to depression, gender, cognitive style, rumination, experiential avoidance, social problem-solving ability, and trait anxiety.

#### *Incremental Validity of YSQ-S3 Domains I and II in Predicting Depression Severity*

Given previous research findings, study hypotheses, and the bivariate correlation results showing that YSQ-S3 Domains I and II were more associated with self-reported depression than other domains, a series of hierarchical multiple regression analyses were conducted to determine the predictive value of gender, cognitive vulnerability, rumination, experiential avoidance, social problem-solving ability, trait anxiety, and early maladaptive schemas (Domains I and II) in accounting for self-reported depression severity. Specifically, the incremental significance of early maladaptive schema domains I and II were assessed beyond variance accounted for by gender and cognitive variables associated with depression. With BDI-II depression severity as the criterion variable, the first step of the regression model included gender. In step two, the incremental value of all cognitive variables was assessed (cognitive vulnerability, rumination, experiential avoidance, social problem-solving ability, trait anxiety). In step three, the incremental significance of Domain I (DI: Disconnection and Rejection) in predicting depression severity was assessed. For the regression analysis, collinearity statistics were within the acceptable range [tolerance values = .36 to .89; variable inflation factor (VIF) = 1.1 to 2.8; Hair et al., 1995). Results of the regression analysis are presented in Table 2. For depression severity, gender accounted for 7% of the variance, with being female significantly associated with increased depression [ $F(1, 78) = 5.41, p < .05$ ]. When the cognitive factors were added on the second step, the amount of variance increased to 60% [ $F(6, 73) = 15.96, p < .001$ ] with decreased problem solving ability ( $\beta = -0.30$ ) and increased rumination ( $\beta = 0.30$ ) significantly associated with increased depression severity. When YSQ-S3 Domain I was added on the third

step, the amount of variance increased to 67% [overall regression model:  $F(7, 72) = 17.67, p < .001$ ] with increased disconnection and rejection (Domain I:  $\beta = 0.40$ ), increased rumination ( $\beta = 0.21$ ) and gender ( $\beta = 0.16$ ) significantly associated with increased depression severity. Change statistics indicated that the addition of the YSQ-S3 Domain I to the prediction of depression severity was statistically significant [ $F$  change (1, 72) = 11.66,  $p = .01$ ].

A second hierarchical regression analysis was conducted, with Domain II (DII: Impaired Autonomy and Performance) replacing Domain I in the third block of the model. Collinearity statistics were again within the acceptable range [tolerance values = .37 to .89; variable inflation factor (VIF) = 1.1 to 2.7; Hair et al., 1995). Results of the regression analysis are presented in Table 3. For depression severity, gender accounted for 7% of the variance, with being female significantly associated with increased depression [ $F(1, 78) = 5.41, p < .05$ ]. When the cognitive factors were added on the second step, the amount of variance increased to 60% [ $F(6, 73) = 15.96, p < .001$ ] with decreased problem solving ability ( $\beta = -0.30$ ) and increased rumination ( $\beta = 0.30$ ) significantly associated with increased depression severity. When YSQ-S3 Domain II was added on the third step, the amount of variance increased to 68% [overall regression model:  $F(7, 72) = 19.12, p < .001$ ] with more Impaired Autonomy and Performance (Domain II:  $\beta = 0.40$ ) and increased rumination ( $\beta = 0.30$ ) significantly associated with increased depression severity. Change statistics indicated that the addition of the YSQ-S3 Domain II to the prediction of depression severity was statistically significant [ $F$  change (1, 72) = 17.03,  $p < .001$ ].

In the final hierarchical regression analysis, both Domains I and II were included in the third block of the model. Collinearity statistics were again within the acceptable range [tolerance values = .31 to .89; variable inflation factor (VIF) = 1.1 to 2.8; Hair et al., 1995). Results of the regression analysis are presented in Table 4. For depression severity, gender accounted for 7% of

the variance, with being female significantly associated with increased depression [ $F(1, 78) = 5.41, p < .05$ ]. When the cognitive factors were added on the second step, the amount of variance increased to 60% [ $F(6, 73) = 15.96, p < .001$ ] with decreased problem solving ability ( $\beta = -0.30$ ) and increased rumination ( $\beta = 0.30$ ) significantly associated with increased depression severity. When YSQ-S3 Domains I and II were added on the third step, the amount of variance increased to 70% [overall regression model:  $F(8, 71) = 18.09, p < .001$ ] with more Impaired Autonomy and Performance (Domain II:  $\beta = 0.30$ ) and increased rumination ( $\beta = 0.23$ ) significantly associated with depression severity. Change statistics indicated that the addition of the YSQ-S3 Domain II to the prediction of depression severity was statistically significant [ $F$  change (2, 73) = 10.30,  $p < .001$ ].

*Post-Hoc Simultaneous Regression Analyses of Early Maladaptive Schemas*

Given the strong relations between YSQ-S3 Domains I and II with depression severity, two simultaneous regression analyses were conducted to more micro-analytically investigate the specific schemas within Domains I and II that were most predictive of depression severity. Bivariate correlations indicated that all schemas were significantly correlated with depression severity ( $p < .001$ ) within both Domain I ( $r = .37$  to  $.67$ ) and Domain II ( $r = .26$  to  $.66$ ). As presented in Table 5, within Domain I (Disconnection and Rejection), 55.3% of the variance in depression severity was accounted for by its schemas [ $F(5, 73) = 18.05, p < .001$ ]. Of the associated schemas, Abandonment/Instability ( $\beta = 0.45$ ), Social Isolation/Alienation ( $\beta = 0.44$ ), and Defectiveness/Shame ( $\beta = 0.38$ ) were significantly associated with depression severity. As presented in Table 6, within Domain II (Impaired Autonomy and Performance), associated schemas accounted for 54.8% of the variance in depression severity [ $F(5, 73) = 23.32, p <$

.001]. Failure ( $\beta = 0.28$ ), Dependence/Incompetence ( $\beta = 0.29$ ), and Vulnerability to Harm ( $\beta = 0.34$ ) were all significantly associated with depression severity.

### Discussion

This study provided support for the incremental validity of pervasive early maladaptive schemas in predicting depression severity beyond variance accounted for by cognitive factors known to be associated with depression. This finding is an important empirical and theoretical advancement in that it not only strengthens confidence in cognitive theory postulating that early maladaptive schemas are a major vulnerability toward increased depression severity, but also that maladaptive schemas are as important as rumination, problem solving deficits, and other cognitive processes in conceptualizing depression severity. Furthermore, when taking EMS into account, many of the known predictors of depression are no longer significant (e.g. gender, cognitive vulnerability, anxiety, experiential avoidance, etc.). The primary finding that EMS Domains I and II were most predictive of depression severity when controlling for cognitive correlates of depression is novel and thought provoking. In particular, analyzing the relation of depression severity with schema domain categories allowed for exploration of complex cognitive processes underlying depression that may be unrecognized when focusing on surface-level symptom presentations or DSM-IV-TR (APA, 2000) nomenclature. The significance of EMS Domains (I and II) in predicting depression severity highlights the importance of pervasive information processing patterns toward understanding vulnerability to and maintenance of depressive experiences. In other words, there are depressive “themes” that may be common among individuals and serve as a predisposing cognitive vulnerability to depression (Scher, Segal, & Ingram, 2004). Specifically, cognitive themes of disconnection and rejection (Domain I) and impaired autonomy and performance (Domain II) are particularly relevant insofar as the

etiology and severity of depression symptoms is concerned. The significance of Domain II is particularly pertinent as it applies to higher education students, who tend to view academic competence as one important source of self-worth (Crocker, Luhtanen, Cooper, & Bouvrette, 2003). Therefore, in an academic environment, schemas exemplifying impaired performance could result in feelings of worthlessness, lower self-esteem, poor motivation, etc. if activated. Identification of these (Domain-based) schema patterns is consistent with the ideas that schemas in the self-system are highly inter-related (Segal, 1988) and that maladaptive schemas are often connected and tend to trigger one another. Beck (1967) originally discussed this phenomenon, and referred to it as a process called 'secondary activation', in which primary schemas concerning loss/worthlessness/failure/inadequacy activated secondary and lesser schemas involving themes related to an individual's unique circumstances and upbringing.

While these themes are important on a more global level, a more micro-analytic perspective suggests that Abandonment/Instability, Social Isolation/Alienation, Defectiveness/Shame (Domain I) and Failure, Dependence/Incompetence, and Vulnerability to Harm schemas (Domain II) may be most operative in the secondary activation process. Of course the relative significance of these specific EMS (Young et al., 2003) in accounting for depression severity will be dependent on an individual's life experiences and social development. So theoretically, although there is variability in terms of self-concepts and self-representations, among individuals with increased depression severity, there appear to be certain schematic vulnerabilities and information processing patterns that render individuals more vulnerable to depression when negative life events trigger these schema-driven vulnerabilities and negatively biased perceptions of the self, world (other), and future. The finding that EMS Domains I and II and corresponding schemas were associated with depression severity generally is consistent with

the results of the few available studies cited in the introduction. Interestingly, findings also are consistent with pioneering work that highlighted cognitive themes such as inadequacy, failure, loss, and worthlessness that were proposed to most strongly associate with depression (Beck, 1967). For example, these themes are very clearly represented in the six EMS most significantly related to depression severity in the current study: EMS Defectiveness/Shame (DI: reflects worthlessness, inadequacy, failure), Failure to Achieve (DII: inadequacy, worthlessness, failure), Abandonment/Instability (DI: loss, worthlessness, inadequacy), Social Isolation/Alienation (DI: inadequacy, worthlessness), Dependence/Incompetence (DII: inadequacy), Vulnerability (DII: inadequacy), Enmeshment (DII: inadequacy), and Emotional Deprivation (DI: loss). Making this connection could also explain why previous researchers also found Domain IV EMS of self-sacrifice (e.g., Calvete et al., 2005) to be correlated with depression. This schema involves the suppression and silencing of one's own needs at the expense of another's, which also reflects feelings of inadequacy, and could be more significant to females, who value their relationships as key to self-worth (Nolen-Hoeksema, 1991). So in this study and others preceding, a common finding has emerged whereby EMS Domains I and II are markedly related to depression severity with much less support for Domains III, IV and V. Accordingly, future research and development of treatment interventions may be advised to focus on these two schema domains as they seem most relevant to depression.

The finding of rumination as accounting for significant variance in predicting depression severity also is noteworthy. In particular, as presented in the introduction, rumination has a ripple effect in that this cognitive process tends to weaken other coping mechanisms that normally help to attenuate depression symptoms, such as decreasing problem-solving skills and engendering experiential avoidance instead of approach-oriented behaviors. Therefore, in addition to schema-

based therapy that focuses on domains I and II (Young et al., 2003), interventions that also target rumination (Addis & Martell, 2004; Papageorgiou & Wells, 2003) will likely enhance problem-solving skills as well as decrease experiential avoidance and negative affect.

There are a few methodological limitations to this study that should be addressed. First, the sample in this study was a non-clinical and predominantly young undergraduate Caucasian cohort. Although this was our target population due to the increasing prevalence and impact of depression among college students, this study should be replicated in clinical and older adult samples to assess generalizability of findings. Second, although a number of cognitive variables known to be associated with depression were controlled for in the current investigation, as highlighted earlier, there are a number of clinical and demographic risk factors associated with depression that were not concurrently examined. Future studies should therefore continue to evaluate the incremental validity of EMS in predicting depression severity while taking these variables into account. In spite of these limitations, the study has clear theoretical implications in terms of understanding the etiology and maintenance of depression. Additionally, findings emphasize the importance of assessing early maladaptive schemas and their relative impact toward case conceptualization. Results also provide some support for the notion that general schema domains and associated EMS may need to be a significant focus in the treatment of depression, and if unaddressed, these pervasive schemas and information processing liabilities may render individuals less likely to experience treatment gains and more vulnerable to relapse.

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## Appendix A: Tables

Table 1

*Bivariate Correlations of Predictor Variables and Schema Domains*

	BDI-II	Gender	CSQ	STAI(T)	RRS	AAQ	SPSI	DI	DII	DIII	DIV	DV
BDI-II	--	.19	.46**	.14	.60**	.59**	-.63**	.70**	.70**	.42**	.50**	.42**
Gender		--	-.09	-.21	.09	.03	-.08	-.01	.12	-.17	.00	.00
CSQ			--	.36**	.43**	.42**	-.55**	.57**	.49**	.26*	.41**	.29**
STAI-T				--	.16	.20	-.23*	.18	.22*	.09	.15	.27*
RRS					--	.60**	-.38**	.56**	.41**	.31**	.32**	.28*
AAQ						--	-.69**	.66**	.57**	.53**	.28**	.42**
SPSI							--	-.62**	-.61**	-.43**	-.45**	-.30**
DI								--	.68**	.60**	.60**	.65**
DII									--	.41**	.64**	.52**
DIII										--	.45**	.49**
DIV											--	.52**
DV												--

Note: BDI-II = Beck Depression Inventory-II, Gender (1-male, 2-female), CSQ = Cognitive Style Questionnaire, RRS = Ruminative Response Scale, STAI-T = State-Trait Anxiety Inventory (Trait Scale), AAQ = Acceptance and Action Questionnaire; SPSI = Social-Problem Solving Inventory, Long Form-Revised; DI, DII, DIII, DIV, DV = Young Schema Questionnaire Domains I-V.

Table 2

*Depression Severity as a Function of Gender, Cognitive Variables, and Domain I*

Independent Variable	Standardized Coefficient ( $\beta$ )	SE	Partial r	t	p
Step 1					
Gender	.27	2.17	.27	2.33	<.05
$R^2 = .07$					
Step 2					
Gender	.14	1.57	.21	1.66	=.10
Cognitive Vulnerability	.18	1.22	.21	1.74	=.09
Trait Anxiety	-.04	.18	-.05	-.40	=.69
Experiential Avoidance	.15	.16	.15	1.19	=.24
Rumination	.30	.07	.33	2.78	<.01
Social Problem-Solving	-.30	.07	-.30	-2.47	<.05
$R^2 = .60$					
$\Delta R^2 = .53$					
Step 3					
Gender	.16	1.45	.26	2.08	<.05
Cognitive Vulnerability	.08	1.18	.09	.74	=.47
Trait Anxiety	-.01	.16	-.01	-.09	=.93
Experiential Avoidance	.05	.15	.05	.37	=.71
Rumination	.21	.07	.25	2.04	<.05
Social Problem-Solving	-.21	.07	-.22	-1.79	=.08
Domain I (EMS)	.40	.05	.40	3.42	<.01
$R^2 = .67$					
$\Delta R^2 = .07$					

Note: Cognitive Vulnerability = CSQ; Trait Anxiety = STAI; Experiential Avoidance = AAQ; Rumination = RRS; Social Problem-Solving = SPSI:R-L ; Domain I = YSQ-S3 Domain I.

Table 3

*Depression Severity as a Function of Gender, Cognitive Variables, and Domain II*

Independent Variable	Standardized Coefficient ( $\beta$ )	SE	Partial r	t	p
Step 1					
Gender	.27	2.17	.27	2.33	<.05
$R^2 = .07$					
Step 2					
Gender	.14	1.57	.21	1.66	=.10
Cognitive Vulnerability	.18	1.22	.21	1.74	=.09
Trait Anxiety	-.04	.18	-.05	-.40	=.69
Experiential Avoidance	.15	.16	.15	1.19	=.24
Rumination	.30	.07	.33	2.78	<.01
Social Problem-Solving	-.30	.07	-.30	-2.47	<.05
Solving					
$R^2 = .60$					
$\Delta R^2 = .53$					
Step 3					
Gender	.06	1.41	.10	.80	=.43
Cognitive Vulnerability	.10	1.12	.13	1.07	=.29
Trait Anxiety	-.06	.16	-.10	-.79	=.44
Experimental Avoidance	.02	.15	.02	.18	=.86
Rumination	.30	.06	.36	3.13	<.01
Social-Problem Solving	-.21	.06	-.23	-1.85	=.07
Domain II (EMS)	.40	.06	.46	4.12	<.001
$R^2 = .68$					
$\Delta R^2 = .08$					

Note: Cognitive Vulnerability = CSQ; Trait Anxiety = STAI; Experiential Avoidance = AAQ; Rumination = RRS; Social Problem-Solving = SPSI:R-L; Domains II = YSQ-S3 Domain II.

Table 4

*Depression Severity as a Function of Gender, Cognitive Variables, and Domains I and II*

Independent Variable	Standardized Coefficient ( $\beta$ )	SE	Partial r	t	p
Step 1					
Gender	.27	2.17	.27	2.33	<.05
$R^2 = .07$					
Step 2					
Gender	.14	1.57	.21	1.66	=.10
Cognitive Vulnerability	.18	1.22	.21	1.74	=.09
Trait Anxiety	-.04	.18	-.05	-.40	=.69
Experiential Avoidance	.15	.16	.15	1.19	=.24
Rumination	.30	.07	.33	2.78	<.01
Social Problem-Solving	-.30	.07	-.30	-2.47	<.05
$R^2 = .60$					
$\Delta R^2 = .53$					
Step 3					
Gender	.12	1.41	.19	1.51	=.14
Cognitive Vulnerability	.06	1.13	.08	.65	=.52
Trait Anxiety	-.04	.16	-.07	-.51	=.61
Experiential Avoidance	.01	.15	.01	.08	=.93
Rumination	.23	.07	.29	2.37	<.05
Social Problem-Solving	-.17	.06	-.19	-1.47	=.15
Domain I (EMS)	.24	.05	.24	1.90	=.06
Domain II (EMS)	.30	.07	.34	2.77	<.01
$R^2 = .70$					
$\Delta R^2 = .10$					

Note: Cognitive Vulnerability = CSQ; Trait Anxiety = STAI; Experiential Avoidance = AAQ; Rumination = RRS; Social Problem-Solving = SPSI:R-L ; Domains I/II = YSQ-S3 Domain I, Domain II.

Table 5

*Depression Severity as a Function of Domain I (Disconnection and Rejection) Schemas*

Independent Variable	Standardized Coefficient ( $\beta$ )	SE	Partial r	t	p
Emotional Deprivation	-.02	.19	-.02	-.17	=.87
Abandonment/Instability	.45	.18	.37	3.40	<.001
Mistrust/Abuse	.04	.16	.04	.35	= .73
Social	.44	.19	.37	3.39	<.001
Isolation/Alienation					
Defectiveness/Shame	-.07	.27	-.05	-.44	= .66
$R^2 = .55$					

Note: Disconnection and Rejection (Domain I): The expectation that one's needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect will not be met in a predictable manner.

Table 6

*Depression Severity as a Function of Domain II (Impaired Autonomy and Performance) Schemas*

Independent Variable	Standardized Coefficient ( $\beta$ )	SE	Partial r	t	p
Failure to Achieve	.28	.18	.27	2.48	<.05
Dependence/Incompetence	.29	.26	.25	2.29	<.05
Vulnerability to Harm/Illness	.33	.19	.38	3.58	<.001
Enmeshment/Undeveloped Self	-.07	.19	-.09	-.81	= .42
$R^2 = .55$					

Note: Impaired Autonomy and Performance (Domain II): Expectations about oneself and the environment that interfere with one's perceived ability to separate, survive, function independently, or perform successfully.

### Vita

Lindsey Kate Colman was born in Basingstoke, England, to the parents of Janet Wallace and Stuart Colman. She is the middle of three children, between Nick and Rosemary Colman, and has three step-siblings: Megan, Andrew, and Marion Wallace. She attended Dunnannie and Dunhurst schools in Petersfield, Hampshire, England, and then immigrated with her family to Nashville, TN at the age of 11. Lindsey stayed in Franklin and graduated from Centennial High School in 2003. Attending the University of Tennessee on full scholarship, Lindsey became interested in Psychology in her Sophomore year of college. She began to work as a Program Counselor at a treatment center, immediately felt a connection with the work, and decided to pursue graduate school and a career in Clinical Psychology. Highly motivated, Lindsey graduated from the University of Tennessee in three years and was accepted directly into the doctoral program in Clinical Psychology at the University of Tennessee. Lindsey graduated with a Master of Arts degree in Psychology in May of 2010. She is continuing to pursue her doctorate at the University of Tennessee, and plans to graduate with a Doctor of Philosophy in May of 2012.