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Predicting Depression Symptoms Among College Students: The Influence of Parenting Style

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PREDICTING DEPRESSIVE SYMPTOMS AMONG COLLEGE STUDENTS: THE INFLUENCE OF PARENTING STYLE

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

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Table of Contents

Page

List of Tables

Page

List of Figures

Page

Abstract

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By Sarah W. Clark, B.A.

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This study examined parenting style variables in predicting college students' depression symptoms. Participants were 989 college students who participated in the first wave of the Spit for Science project (Dick et al., 2011). This study described the prevalence of depression symptoms, including the percentage of the sample endorsing various depression symptoms, and the frequency depression scores were elevated at multiple time points. A hierarchical multiple regression was conducted to examine whether two dimensions of parenting style, Autonomy Granting and Parental Involvement, would interact in predicting depression symptoms in the Junior year. The present study demonstrates that parenting style predicts a small but significant amount of variance in depression symptoms, after controlling for demographic characteristics, and these variables interact in producing their effect. Overall,

findings suggest that depression symptoms are common and parenting style is relevant in understanding such symptoms.

Predicting Depressive Symptoms Among College Students: The Influence of Parenting Style

Mental health among college students has received a great deal of interest recently. The National Comorbidity Survey Replication sample indicates that three quarters of all lifetime cases of diagnosable psychological conditions begin by age 24 (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005). Young adulthood appears to be a vulnerable time for developing psychological problems for both college students and non-college attending individuals (Blanco, Okuda, Wright, Hasin, Grant, Liu, & Olfson, 2008). Psychological conditions among college students has become a national concern, especially as colleges struggle to provide care for students during the often-difficult transition to college. The National Survey of College Counseling Centers (Gallagher, 2013) indicated that 95% of counseling center directors reported an increase over previous years in students with severe psychological problems present on campus, 73% noted an increase in crises requiring immediate response, 41% noted an increase in non-suicidal self-injury, and 34% reported an increase in alcohol abuse.

Reasons for Depression Symptoms among College Students

There are numerous reasons why young adults transitioning to college may report greater psychological issues. Many students experience mental health problems for the first time in college often due, at least in part, to the stress of increased responsibilities, separation from social support systems (including family members), living away from home, financial concerns, and academic responsibilities (Compas, Wagner, Slavin & Vannatta, 1986). College may also expose individuals to stressors increasing the risk of psychological disorders or may exacerbate existing psychological difficulties (Cleary, Walter, & Jackson

2011). College students report that academic demands, pressure to succeed, and post-graduation plans are the most common sources of stress (Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, & Sammut, 2014).

While many young adults report symptoms consistent with psychological disorders (e.g. poor sleep, lack of motivation, moodiness, irritability), it is important to distinguish between normative experiences and psychological disorders among this age group (Cleary et al., 2011). Although college students frequently report various psychological problems, depression in particular has been shown to have deleterious effects among this population. Eisenberg and colleagues (2014) noted in a large online survey of United States college students, 17.3% of respondents positively screened for depression, 6.3% reported suicidal ideation, and 15.3% reported non-suicidal self-injury. Depression symptoms were higher among females and non-white students (Eisenberg, Hunt, & Speer, 2013). Depression is a concern not only because of the increased risk of suicide, but also because of its significant impact on functioning.

Furthermore, early-onset psychological disorders (e.g. mood, anxiety, and substance use disorders) contribute to reduced educational attainment; persons with psychological disorders account for over 14% of high school dropouts and almost 5% of college dropouts (Kessler, Foster, Saunders, & Stang, 1995). Moreover, within depressive disorders, earlier onset of symptoms may suggest a worse prognosis. More specifically, a strong predictor of more repeated courses of depression is an earlier onset of symptoms, in adolescence or young adulthood (Klein, Glenn, Kosty, Seeley, Rohde, & Lewinsohn, 2013). Sub-syndromal depressive symptoms appearing during adolescence may signal an early-onset of major depressive disorder (Klein et al., 2013). Researchers have demonstrated that early-onset often

denotes a more serious disorder and argue, that the earlier the dysthymia onset, the more serious global impairment is likely to be present (Klein, Taylor, Dickstein, & Harding, 1988a; Klein, Taylor, & Dickstein, 1988b ; Uher, 2011). Thus, the problem of depression among college students warrants serious study as early and accurate detection of depression symptoms among these individuals can prevent long-term negative outcomes.

Of importance to this investigation, Matheson, Kelly, Cole, Tannenbaum, Dodd, & Anisman (2005) report that early life experiences and relationships, especially those with primary caregivers (parents), may affect the ability of individuals to cope with life stress, and, in turn, may be associated with depressive symptoms. In line with this view, Lizardi and colleagues (1995) found that a significant predictor of depressive symptoms is early life experiences and the relationships with parents. A positive relationship with primary caregivers is important in for developing healthy behaviors and skills that lead to successful functioning as a college student. Parents do this by teaching their children to behave appropriately, function effectively, as well as by providing emotional support and love as the child develops. Relationships with parents and other attachment figures have long been identified as playing an important role in psychosocial development and functioning, the effects of which persist far into adulthood (Cicchetti & Toth, 1998). Various constructs have been developed to describe the influence and relationship with parents. In this study, we will focus on one specific construct: parenting style.

In summary, this thesis will focus on parenting style as one way to investigate the serious problem of depression among college students. In order to study parenting style as a construct, we must first understand the ways in which parenting style is defined in the literature and in turn, understood as a significant developmental influence that informs

functioning in young adulthood. In this study, we will seek to determine the ways in which the college students' perceptions of parenting styles may predict depressive symptoms within this group.

Models of Parenting Style and Implications for Development of Depressive Symptoms

Diana Baumrind. A great deal of research has demonstrated the important role primary caregivers play in developing an individual's ability to function psychosocially, a role that that has implications throughout the lifespan. Various efforts have been made to describe the means through which parents may fulfill, or fail to fulfill, their socialization role. As noted previously, we focus on parental behavior in terms of parenting style patterns, which have identifiable developmental outcomes. One particular type of parenting, authoritative parenting (Baumrind, 1991), has been consistently shown to be associated with positive outcomes among children and young adults (Darling & Steinberg, 1993). Authoritative parenting denotes that parents are responsive to requests and inquiries from the child and accepting of them, while also demanding the child follow rules in order to fit into both the family and society (Baumrind, 1991). It appears that this balance, that is one of responding to the child's needs while also requiring the child conform to social rules, is a key quality of authoritative parents. Important is the fact that children whose parents fail to do one or both of these tasks tend to have worse academic, psychological, and social outcomes (Darling & Steinberg, 1993). Although this research has predominantly studied children and adolescents, research with college students also suggests that parenting style continues to play a role in young adulthood, even after the child is no longer living with parents (Strage & Brandt, 1999, Fergusson, Woodward, & Horwood, 2000). The following section will discuss the development and refinement of the parenting style construct and its components, so that

we can examine how particular parenting styles may contribute to depressive symptoms among college students.

Early models of parental behaviors, such as though from psychoanalytic or behavioral traditions, tended to focus on a unidirectional mode of influence; that is, they focused on the way parents behaved toward the child. They also implicated either, but not both, emotional or behavioral processes depending on the theoretical orientation (Darling & Steinberg, 1993). It was Baumrind who first described three types of parenting styles: authoritative, authoritarian, and permissive (1971, 1991). According to her, *Authoritarian* parents exert strong control over their children and are strongly demanding and directive. They are obedience-oriented and not likely to respond to children's requests; they may say things like "because I said so" rather than provide explanations (Baumrind, 1991). Secondly, *Authoritative* parents also expect their children to follow rules and guidelines, but they are more democratic and non-coercive in their style (Baumrind, 1991). They encourage children to express their individuality and are willing to provide explanations, in addition to being nurturing and forgiving rather than punishing. (3) Finally, in Baumrind's third style (1991), *Permissive,* parents make few demands on their children, and they may rarely punish or set expectations for child behavior. While they may be more responsive to children and might appear warm and caring, they are generally more lenient and may also be interpersonally disengaged.

Baumrind developed these parenting definitions through identification and description of parenting behaviors that preceded or resulted in specific clusters of child behavior (Baumrind, 1971). She developed this three part framework by observing behaviors that were correlated with specific child outcomes; thus, her model was ecologically rather than theoretically based (Darling & Steinberg, 1993). However, this model is important for

this investigation because it describes the parent-child relationship as bidirectional (children influencing parents and vice versa) and dynamic. The relationship changes as the child matures or the child's responsiveness to parenting changes; or, as the child becomes more or less willing to obey the parent. More importantly, it was assumed that specific types of patterns contributed to certain child outcomes, such as academic performance, child competence, and social functioning; this perspective has implications for the behavior and functioning of college youth. Summarily, this initial conceptualization, positions us to assume that parenting style has developmental outcomes and may inform for psychological functioning, including depressive symptoms among college students.

Maccoby & Martin. Maccoby and Martin (1983) refined Baumrind's original descriptions of naturally-occurring parenting patterns by adding their theoretical framework to the parenting style domain. Although Baumrind initially supplied the "what" of parenting style, Maccoby and Martin provided a framework for discussing "how" parenting style might contribute to child functioning. They presented a two-dimensional framework describing parenting styles in terms of *demandingness* (high versus low) and *responsiveness* (high versus low). In doing so, they created a four-fold classification of parenting style. See Figure 1 for a representation of this framework. Demandingness refers to the frequency and kind of demands made of children by parents; this includes expectations of and directions for the child's behavior. Responsiveness refers to the contingency of parental reinforcement, and involves parental warmth, acceptance, and willingness to respond to the child's needs and requests. Maccoby and Martin then defined Baumrind's original three styles along these dimensions. Thus, authoritative parents are high in both responsiveness and demandingness whereas authoritarian parents are low in responsiveness and high in demandingness. They

also differentiated between two types of permissive styles based on their theoretical framework. The result was the description of a neglectful style (low in both responsiveness and demandingness) and an indulgent style (high in responsiveness and low in demandingness). This four-fold classification, similar to that balance advocated by Baumrind between parent responsiveness and demandingness toward the child, emphasizes the importance of balancing demands for behavioral compliance or conformity while continuing to provide acceptance and warmth towards the child. This balanced combination appears to facilitate the development of an autonomous sense of self while being able to fit in with others socially.

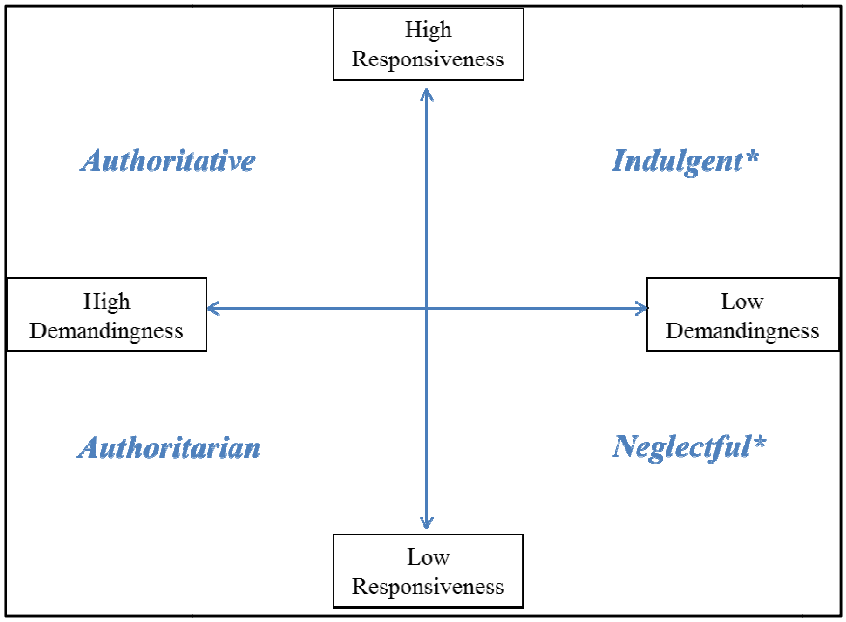

Figure 1. Maccoby & Martin (1983) Model of Parenting Style . Maccoby and Martin organized Baumrind's original three styles along the dimensions of responsiveness and demandingness to create a four-fold typology of parenting style. In doing so, they distinguished between two types of permissive parenting: Indulgent and Neglectful (indicated by an asterisk in the figure).

Steinberg, Lamborn, Mounts, & Dornbusch. Further clarifying the "how" of parenting style, work by Steinberg, Lamborn, Mounts, and Dornbusch (1991) shed light on specific components of authoritativeness, the facilitative parenting style of Baumrind, that

tend to contribute to positive psychological outcomes. Focusing on this one parenting style, these researchers (1991) identified three dimensions of authoritative parenting: (1) parental acceptance and warmth; (2) strictness and behavioral supervision; (3) and psychological autonomy granting. Steinberg et al. continued to use responsiveness and demandingness from Maccoby and Martin's work to define authoritative parenting; however, they added these three components to further describe how authoritative parenting positively influences children outcomes that are important in the current investigation. In Steinberg's view, parental acceptance and warmth is defined thusly: "the extent to which the adolescent perceives his or her parents as loving, responsive, and involved;" behavioral supervision/strictness is defined as "assessing parental monitoring and limit setting;" and psychological autonomy granting refers to the degree to which parents use "noncoercive, democratic discipline and encourage the adolescent to express individuality within the family" (Steinberg, Lamborn, Dornbusch, & Darling, 1992, p. 1270). Again, these specific components of authoritative parenting have been shown to predict emotional well-being (Lamborn, Mounts, Steinberg, & Dornbusch, 1991).

Summarily, based on the work of Baumrind, Maccoby and Martin, and Steinberg et al., parenting styles represent a pattern of behaviors that affect children's ability to function adaptively. One negative yet important outcome for us herein then, pertains to psychological functioning in the form of depressive symptoms in college students.

Parenting Style and Young Adult Functioning

It is also important to understand the means by which parenting style influences child development and ultimately young adult functioning. Darling & Steinberg (1993) define parenting style as "a constellation of attitudes toward the child that are communicated to the

child and that, taken together, create an emotional climate in which the parent's behaviors are expressed" (Darling & Steinberg, 1993, p.488) These behaviors include both non-directive, non-goal-oriented communication and behavior (e.g. changes in body language, tone of voice, expressions of emotion) as well as specific behaviors through which parents fulfill their parental responsibilities and encourage children to develop certain valued qualities (e.g. punishing a child for breaking a rule, listening to a child practice an instrument, showing affection to the child). In their view, parenting style creates a climate, or backdrop within which the child develops. It encompasses the overall attitude and approach to monitoring and rearing children, referring to general patterns of behavior or interacting with the child rather than to specific behaviors. The emotional climate within which the parenting style is actualized is hypothesized to be the critical launching pad from which adaptive as well as maladaptive behavior results in the developing child and, ultimately, in the young adult. Among young adults who develop depressive symptoms in college, we will assume they have reaped some of the negative consequences of parenting styles gone awry.

The influence of parenting style on depression symptoms. We turn now to an examination of parenting style and how it informs depression among college students. This section will summarize the results of literature examining the influence of parenting style on child outcomes and we will infer how these dynamics play out in college student functioning. We know that (1) parenting style continues to affect psychosocial functioning even when children are no longer living with their parents (e.g. Klein et al., 1988b, Lizardi et al., 1995, Cicchetti & Toth, 1998), and (2) that components of parenting contribute to psychological outcomes both generally and specifically in regards to depressive symptoms (Lamborn et al., 1991). In short, how children are raised affects adult functioning.

For example, children reared in authoritative homes have better academic, social, and psychological outcomes than their peers (Lamborn et al., 1991; Steinberg et al., 1992). Research has also shown similar effects for college students as for younger age groups (Fulton & Turner, 2008, Patock-Peckham & Morgan-Lopez, 2008). Furthermore, parenting styles have been shown to be associated with different outcomes in child development. This research has focused on the important role parents play in facilitating academic success and motivation (Steinberg et al., 1992; Fulton & Turner, 2008; Turner, Chandler, & Heffer, 2009). Parenting style has also been identified as a predictor in various other developmental outcomes, such as alcohol use and abuse (Wood, Read, Mitchell, & Brand, 2004; Patock-Peckham & Morgan-Lopez, 2007), cognitive styles (Manfredi, Caselli, Rovetto, Rebecchi, Ruggiero, Sassaroli, & Spada, 2011) and, important to our concerns, adjustment among late adolescents (McKinney, Donnelly, & Renk, 2008). This body of research, taken together, supports our view that parenting style and the emotional milieu it is delivered within significantly affects adult functioning and behavior. Finally, research suggests that parenting may predict psychological and academic outcomes among college students, even when students live separately from their parents (Strage & Brandt, 1999; Fergusson, 2000; Wood et al., 2004; Patock-Peckham & Morgan-Lopez, 2007).

Authoritative parenting revisited. Research shows that authoritative parents, who are both setting boundaries for child behavior but responsive to their needs, produce children that report fewer symptoms of depression during college (Wintre & Yaffe, 2000; Barton & Kirtley, 2012). More specifically, Barton & Kirtley (2012) revealed that maternal parenting style predicted depression symptoms among female college students, a relationship mediated by anxiety and stress. Similarly, Patock-Peckham & Morgan-Lopez (2007) found that

depressive symptoms mediated the relationship between parenting and alcohol abuse, such that poorer parental relationships predicted increased in depressive symptoms leading to problem drinking behaviors. Conversely, these researchers also reported that authoritative parenting had a protective or buffer effect in reducing depressive symptoms.

Much research using Steinberg's dimensions of authoritative parenting has been done with adolescents. Although not directly related to the research question at hand, this research suggests that different components of authoritative parenting defined by Steinberg predict specific types of outcomes that are related to our study (Grolnick & Ryan, 1989, Ginsburg & Bronstein, 1993). For instance, Gray and Steinberg (1999) demonstrated that autonomy granting and parental warmth were important predictors of academic competence among 14-18 year olds; whereas supervision was more important in reducing behavioral problems. Furthermore, autonomy granting and involvement were stronger predictors of psychosocial development and internal distress than was behavioral control (supervision; Gray and Steinberg, 1999). In fact, in this study, adolescents whose parents use moderate levels of supervision with higher levels of involvement and autonomy granting had better psychosocial adjustment, suggesting that these variables may be more important for emotional health. It seems likely that these patterns will also hold among college students.

Similarly, researchers have found that dimensions of parenting work together to produce outcomes among adolescents. Lamborn and colleagues (1991) demonstrated that adolescents who characterize their parents as neglectful (low demandingness, low responsiveness) tend to report the highest levels of psychological dysfunction, which may include depressive symptoms, when compared to their peers. On the other hand, adolescents characterizing their parents as authoritative reported the lowest levels overall of

psychological dysfunction as well as less behavior dysfunction and increased psychosocial competence. This work also highlights the importance of combinations of parenting dimensions: Children who rate their parents high on one dimension of parenting style but low on the other (indulgent: high responsiveness, low demandingness, authoritarian: low responsiveness, high demandingness) have more mixed outcomes, apparently related to the qualities present in each style (Lamborn et al., 1991). Again, although this research does not specifically address depressive symptoms among college students, it has important implications for this research question.

Critical to our present investigation is the finding that children who describe their parents as authoritative report the best overall psychological functioning; therefore, we expect that college students who describe their parents as high on authoritative dimensions (autonomy granting, involvement) will report fewer symptoms of depression (our measure of psychological dysfunction). More specifically, some components of authoritative parenting have, in fact, been shown to be associated with positive outcomes for college students. Those that have used these dimensions have demonstrated that these dimensions influence various outcomes among college students (e.g. Strage & Brandt, 1999, Wood et al., 2004, Fulton & Turner, 2008). For example and consistent with studies of adolescent literature, Fulton and Turner (2008) found that students' perceptions of parenting practices predicted academic outcomes in the form of college grade point average. Supporting this, in a predominantly female sample, parental autonomy granting, as defined by Steinberg et al., was related to grade point average (Strage & Brandt, 1999). Woods and colleagues (2004) demonstrated that parental supervision and involvement were both related to drinking behaviors among high school students transitioning to college (Wood et al., 2004). Interestingly, parental

characteristics significantly moderated the influence of peers, such that higher levels of parental involvement contributed to a weaker relationship between peer influences and alcohol problems (Wood et al., 2004). Again, these studies clearly demonstrate that parenting style contributes to the psychological well-being and functioning among this population. Needed at this point is work that investigates the parenting style characteristics that may relate to depressive symptoms

Among college students, many studies have instead used the construct of *parental bonding* to predict mental health outcomes. This construct is similar to parenting style as it comprises care and overprotection within the relationships with parents; however, parenting style describes how parents choose to relate to and raise their children whereas parental bonding refers more to the quality of the bond (Parker, Tupling, & Brown, 1979). Even so, research regarding parental bond underscores the importance of the parental relationship for preventing depression among young adults. It follows that poor parental bonding is reported to be associated with suicidal and depressive symptoms in adolescents and young adults (Duggan, Sham, Minne, Lee, & Murray, 1998). Although these researchers do not specifically measure Steinberg's constructs of involvement and autonomy granting when speaking of parental bonding, the constructs associated with positive parental bonding (i.e. parental warmth, nurturance, and allowance of child independence) are clearly similar and predict improved psychological outcomes. It follows then that children who describe their parents as high in autonomy granting and involvement should also report fewer depressive symptoms. Another line of research reports a similar conclusion. Poorer parental attachment is associated with higher levels of suicidal behavior among college students (Fergusson et al., 2000). Again, this strongly suggests young adults whose parents demonstrate caring and

foster independence, a behavioral style consistent Baumrind's description of authoritative parents, will be less likely to experience depression during college.

One caveat about authoritative parenting. Returning to the concept of parenting style, it should be noted that some research has shown some inconsistency across demographic characteristics in the relationship between parenting style and child and young adult outcomes. For instance, although authoritative parenting generally appears to predict more positive outcomes, the strength of this relationship appears to vary by ethnicity; the effects appear to be strongest for European-Americans, with weaker effects for members of other ethnic groups (Turner, Chandler, & Heffer, 2009). Alternatively, sociological research has indicated that class or socioeconomic status (SES), rather than race or ethnicity, account for the differences in parents' involvement in children's schooling and day-to-day lives (Lareau, 2002). Middle-class and higher SES families tend to engage in strategies to "cultivate" desired qualities in their children, including developing talents and assertiveness, by devoting time, resources, and attention to their children (Lareau, 2002). On the other hand, lower SES and poor families tend to have fewer resources overall and allow their children to grow naturally with less direction and intervention (Lareau, 2002).

Gender, both that of the parent and that of the child or young adult, also appears to affect the relationship between dimensions of parenting styles and child and young adult outcomes (Fulton & Turner, 2008; Barton & Kirtley, 2012). Some research has also revealed that authoritarian parenting style increased depressive symptoms that contribute to problematic drinking among female college students; however, males did not show this pattern (Patock-Peckham, 2007). Thus, although general patterns of outcomes will be focused upon in this investigation, it is also necessary to keep in mind that cultural and

gender differences may affect the relationship between parenting style and depressive symptoms among college students.

Purpose of This Study

The proposed study will use data from the Virginia Commonwealth University (VCU) Spit for Science project to examine predictors of depression symptoms in the third year of college. Specific aims of this study are as follows: 1) to examine the prevalence of reported depression symptoms among college students generally and to compare the prevalence among different genders and ethnicities; (2) to examine the relationship between parenting style variables and intensity of depressive symptoms among college students when controlling for established covariates, and 3) to test the interaction effect between parenting style variables in predicting intensity of depression symptoms.

The first aim of the study is to examine the prevalence of reported depression symptoms among college students generally, to compare the prevalence among different genders and ethnicities, and to examine the frequency of persistent depression symptoms

- Hypothesis 1: It is hypothesized that female students will report greater intensity of depressive symptoms when compared to male students.
- Hypothesis 2: It is anticipated that non-White students (e.g. African-American/Black, Asian, American Indian/Native Alaskan, Multiracial) will report greater intensity of depressive symptoms when compared to White students.
- Hypothesis 3: It is hypothesized that non-White and female students will be more likely have elevated depression symptoms at multiple time points.

The second aim of the study is to examine the relationship between parenting style variables and intensity of depressive symptoms among college students, when controlling for established covariates.

- Hypothesis 4: It is hypothesized that higher levels of parental *autonomy granting* will be associated with less intense depression symptoms.
- Hypothesis 5: It is anticipated that participants who rate their higher parents in terms of *parental involvement* will report less intense depression symptoms.

Finally, the third aim of this study is to test the interaction effect between parenting style variables in predicting intensity of depression symptoms.

- Hypothesis 6: It is hypothesized that *autonomy granting* and *involvement* will interact to predict depression symptom intensity, such that increasing autonomy granting will weaken the relationship between parental involvement and depression symptoms.

Method

Data Set

The data set used in this thesis was collected as part of the Spit for Science project. This project was funded by the National Institute on Alcohol Abuse and Alcoholism (NIAA; Dick & Kendler, NIH R37 AA011408). Spit for Science is a longitudinal study of undergraduate students attending Virginia Commonwealth University, a public university on an urban campus in Richmond, Virginia. The overall purpose of Spit for Science is to examine factors related to alcohol use and abuse, use of other substances, and emotional health. It included environmental, developmental, and genetic influences. Although the primary aims were to examine alcohol and substance use, this study also included measures about mental health, personality, previous life experiences, and other behaviors. This study is

also notable in that (saliva) DNA samples were collected in order to examine genetic influences on the etiology of alcohol and other psychological disorders. Dick and colleagues (2014) provides a full description of the project and procedures.

Study Procedures

The study was reviewed and approved by the university Institutional Review Board. Initial recruitment began two weeks prior to freshman arrival to campus in Fall 2011. Information about the study was mailed to all incoming freshman and (separately) their parents two weeks before freshmen were scheduled to arrive on campus. Then, all eligible freshmen (first time freshmen aged 18 years and older) were sent an email invitation to participate in the Internet survey the week before freshman "Welcome Week." Reminders were sent by emails to students who did not respond to the initial invitation (i.e. either agreeing or declining to participate in the study). In addition, flyers were placed around campus with details about participating. All students who initiated the study survey were first led through an online consent process including an explanation of the study and their participation. Freshman students who did not participate in the Fall 2011 Freshman survey (including students who transferred to VCU in the Spring), were invited to complete an abbreviated version of the Fall 2011 Freshman survey.

Participants were then invited to complete annual follow-up surveys during subsequent Spring semesters. They were notified by mail of the continuing data collection. E-mail invitations were then sent with links to the online survey. Again, students were led through a consent process when they initiated the online survey. The Sophomore follow-up survey was administered in Spring 2013. The Junior follow-up survey was administered in Spring 2014. All online surveys (initial and follow-up) were designed to take approximately

15-30 minutes to complete. Participants were compensated $10 for their participation in each part of the study. Participants were also asked for a saliva DNA sample for analyses related to other study aims.

Participants

The sample includes participants who completed the first wave of Spit for Science data collection. That is, they were recruited as Freshmen in 2011 and were invited for follow up surveys each year since. Of the 2,954 students who completed the Fall 2011 Freshman survey (full or abbreviated version), 989 students also completed the Junior follow-up survey. Data included in this thesis were collected only from these 989 participants. See Table 3 for descriptive participant information.

Although all participants were invited to participate in each follow-up survey, only 595 participants participated in the initial survey and three follow-up surveys. Data on depressive symptoms were collected at four time points (Fall 2011 Freshman survey, Spring 2012 Freshman survey, Spring 2013 Sophomore survey, and Spring 2014 Junior survey) for 595 participants; this subset was used to examine persistence of depression across multiple time points.

Measures

Demographics. As part of the 2011 freshman survey, participants provided information about demographic characteristics including age, gender, and race/ethnicity. Race/ethnicity was recoded as White (*N*=466) or non-White (*N*=503) for regression analyses. Students provided information about their place of residence (e.g. on-campus residence halls or dormitories, off-campus with friends or family members) and gender in both the 2011 Freshman survey and the 2014 Junior follow-up survey.

Depression symptoms. Depressive symptoms were assessed with from the depression subscale of the Symptom Checklist-90 (SCL-90-R; Derogatis & Cleary, 1977). The SCL-90 is a self-report measure of psychological symptoms. Each item inquires about a specific symptom of depression (e.g. worthlessness, anhedonia). Responses are given on a 5-point Likert scale, which ranges from 1 (*not at all*) to 5 (*extremely)*. Although there is some dispute in the literature about the overall factor structure of the SCL-90 (e.g. Cyr, McKenna-Foley, & Peacock, 1985), the depression scale has been shown to have good convergent and divergent validity (Koeter, 1992; Morgan, Wiederman, & Magnus, 1998).

In the Freshman (Fall) 2011 initial survey, Freshman (Spring) 2012 follow-up survey, Sophomore (Spring) 2013 follow-up survey, four items comprising the SCL-90 Depression subscale were administered at each time point (Fall 2011 Freshman survey, Spring 2012 Freshman follow-up survey, Spring 2013 Sophomore follow-up survey, and the 2014 Junior follow-up survey). An additional five items were administered in the Junior 2014 (Spring) Follow-up survey, creating an Expanded Depression scale for this time point. Internal consistency of this subscale in the present study was estimated at α=0.92 using Cronbach's alpha. The sum score on the 9-item Expanded depression scale (2014 follow up survey) was used in this study as a continuous outcome variable in the regression analysis related to parenting style. The sum score of the 4-item Depression scale in the other time points was used to determine whether clinically significant depression symptoms were present at other time points and to determine course of depression symptoms. Internal consistencies for these 4-item subscales were estimated using Cronbach's alpha at α=0.92 for the Fall 2011 Freshman survey, α=0.81 for the Spring 2012 Freshman follow-up survey, α=0.80 for the Spring 2013 Sophomore follow-up survey, and α=0.84 for the Spring 2014Junior follow-up

survey. Finally, symptom frequency counts and percentages were examined in the present study.

Parenting style. Parenting style was assessed with items based from two of the three Steinberg Parenting scales that measure dimensions of authoritative parenting (Steinberg et al., 1992). This measure has been used frequently in studies regarding the influence of parenting style on child and young adult outcomes, most often in the context of academic motivation (Gray & Steinberg, 1999; Fulton & Turner, 2008). Items based on two scales were administered in this study: Parental Involvement and Autonomy Granting. The Parental Involvement scale (9 items) assessed the respondent's perceptions of his or her parents as loving, responsive, and involved. The Autonomy Granting scale (9 items) measures perceptions of parents as encouraging individuality and employing non-coercive forms of discipline. The Supervision scale was not included in the sample; however, this dimension may be less relevant to a college population due to the reduced need of parental supervision for young adults at college. Moreover, previous studies have suggested that while supervision is an important predictor of problem behavior, it may be less relevant for psychological outcomes (Gray & Steinberg, 1999). Factor structure of the Steinberg parenting scales have been shown to be consistent across ethnic, social class, and family structure groups (Steinberg et al., 1991). For each item, participants rated how much they agreed with statements on a 4-point Likert-style scale (from *Strongly agree* to *Strongly disagree*) about the parent or guardian with whom they grew up. Sum scores for each scale were computed for each participant. Higher scores on each scale indicate the respondent rated their parents as less involved or less granting of autonomy. Low scores indicate higher levels of involvement or autonomy granting. Internal consistency of the Parental Involvement Autonomy Granting

Scale in the present study was estimated using Cronbach's alpha at α=0.82 and α=0.76, respectively. This information was collected during the 2011 Freshman survey. See Table 1 for the full measure.

Table 1.

Steinberg Parenting Scale Items

Steinberg Parenting Scales	
Autonomy Granting	**Involvement**
My parents said I should give in on arguments rather than making people angry.*	My parents helped me with schoolwork if there was something I didn't understand.
My parents told me that their ideas were correct and I should not question them.*	My parents knew who my friends were.
My parents acted cold and unfriendly if I did something they didn't like.*	My parents spent time just talking with me.
My parents said that I shouldn't argue with adults.*	I could count on my parents to help out if I had some kind of problem.
When I received a poor grade in school, my parents would make my life miserable.*	My parents kept pushing me to think independently.
When I argued with my parents, they said "you'll know better when you grow up. *	My parents kept pushing me to do best in whatever I did.
My parents let me make my own plans for things I wanted to do.	When my parents wanted me to do something, they explained why.
When I received a poor grade in school, my parents made me feel guilty.*	When I received a poor grade in school, my parents encouraged me to try harder.
My parents wouldn't let me do things with them when I did what they didn't like.*	My family did fun things together.
For each item, respondents could select *Strongly agree*, *Agree somewhat*, *Disagree somewhat*, *Strongly disagree*, or "I choose not to answer"	
Items reversed coded.	

Family history. Participants were asked whether they believed various first-degree relatives had ever experienced problems with depression or anxiety in separate questions for biological mother and biological father (i.e. "Do you think your biological mother has ever had problems with depression or anxiety?" Yes or No).

Socioeconomic status. Participants indicated the highest level of education completed by their mother figure and father figure in the 2011 Freshman survey. Responses were coded categorically as *Less Than High School*, *High School Graduate or Equivalent*,

Some College, *College Graduate*, and *Education Beyond College*. A variable reflecting the highest level of known parental education (either mother or father) was created and used in the regression models.

In addition, respondents were asked during the Fall 2011 Freshman Survey which of the following best described their or their family's financial situation: *More money than you need*, *Just enough for your needs*, or *Not enough to meet your needs*.

Data Analysis

Statistical analyses were performed using SPSS v.22.0 (SPSS, Chicago, IL).

Data Preparation

Prior to analysis, descriptive statistics were calculated for all study variables: proportions, frequencies, and confidence intervals were calculated for categorical variables and means, standard deviations, and 95% confidence intervals (or medians and inter-quartile ranges if the data is non-normal) were estimated for continuous variables. Data were checked for univariate and multivariate outliers. Outliers were then examined for data entry errors but otherwise retained in the analyses. Multicollinearity was examined using the variance inflation factor (values > 4 are typically considered problematic). No evidence of multicollinearity was found in either regression analysis; there were no correlations between predictors greater than 0.80. The linear relationship between the independent and dependent variables were checked by examining the scatter plots between each independent variable and the dependent variable. Violations of assumptions were evaluated to guide modification of analyses (e.g., using transformations of variables). Homogeneity of variance and normality of the residuals were evaluated by examining scatterplots of the residual versus predicted values and Q-Q plots. Examination of scatterplots and Q-Q plots of the residuals indicated

some violation of homogeneity of variance in the linear regression; however, it was within acceptable levels. Linearity of the logit for the logistic regression was verified by checking that the interaction between each continuous predictor and its log transformation of itself was non-significant. Assumptions for all regression analyses were met.

The study compared participants across a variety of pre-existing characteristics including gender, ethnicity, parental education, financial status, and family history of anxiety and depression problems (among biological mother and/or father). These variables were used in subsequent analyses as covariates as they have previously been shown to predict depressive symptoms (Eisenberg, Hunt, & Speer, 2013; Kessler, Zhao, Blazer, & Swartz, 1995). In addition, parental education and participant financial status was used as proxies for socioeconomic status and included as covariates. The sample was described in terms of overall level of depressive symptoms endorsed. Further, percentages were used to describe the how much specific symptoms cause discomfort among respondents and the number of respondents reporting multiple depressive symptoms; however, these were not used in regression analyses.

Missing Data

All study variables including demographic, initial and follow-up data were examined to determine the amount of missing data. Multiple imputation, using the SPSS Multiple Imputation package, was used to account for the missing values for each participant. Multiple imputation was used as an estimation method to account for missing values because it allows for participants with partial missing data to be retained in the analysis and contribute to model estimation based on their response to other items within the survey (Schafer, 1999). Predictive Mean Matching was used. This method substitutes missing values from an

observation whose regression-predicted value is most similar to the regression-predicted value from a regression model. This method only allows plausible values to be imputed for missing values and for the distribution of the observed values to be accurately represented. Depression items on the SCL-90 (included those completed at previous time points), Autonomy Granting Scale, Parental Involvement scale, and demographic characteristics were used as predictors for the multiple imputation model. See Table 2 for a full list of variables used to impute the missing data. This imputed data set was used in conducting the regression analyses described below. All descriptive characteristics reflect the unimputed data unless noted.

Table 2.

Variables Used In The Multiple Imputation Model

Variables used in the multiple imputation
Demographic characteristics
Gender
Ethnicity
Highest Parental Education
Financial status (Freshman Fall Survey)
Parenting Style Autonomy Granting Items (9)
Parenting Style Involvement Items (9)
Family History Variables
Biological mother problem with depression/anxiety
Biological father problem with depression/anxiety
SCL-90 Depression Items for Freshman Fall/Spring Surveys, Sophomore Survey (4 items/year)
SCL-90 Expanded Depression Items Junior Survey (9 Items)

Note. These variables were used in the multiple imputation. Predictive mean matching was used to estimate missing values within the data.

Statistical Analyses

The present study examined depressive symptoms among college students in relation to perceived parenting style. Specifically, this study described the prevalence of depressive symptoms among college students and then used parenting style as a predictor of these

symptoms. The present study examined (1) the prevalence of depressive symptoms among college students, (2) the prevalence of persistent depressive symptoms and predictors of persistent depression (3) the relation between parenting style and depressive symptoms, and (3) the interaction between two facets of parenting style in predicting depressive symptoms.

Prevalence of depressive symptoms. The sample is described in terms of average total score on the SCL-90 Expanded Depression Scale collected at the 2014 Junior follow-up survey in order to demonstrate the average level of discomfort caused by various depressive symptoms. Further, frequency counts were used to (1) describe the percentage of respondents endorsing various levels of discomfort due to each symptom (for example, the percentage reporting that feeling blue has caused discomfort "a little bit" over the past 30 days), and (2) the percentage of respondents reporting more than one depressive symptom that cause discomfort at least moderately, broken out by number of depressive symptoms (i.e. 0, 1-3, 4-6, 7-9 symptoms). This was done in order to demonstrate the frequency of participants experiencing multiple problematic symptoms.

Finally, participant sum scores on the 4-item SCL-90 Depression scale were examined at each time point to determine if they were above 12. These four items reflect four depression symptoms that are consistent with *DSM-5* (APA, 2013). Twelve was selected as a cutoff score because it indicates their average level of distress across four depression items rated moderate or greater, which is a potential indicator of clinical depression. Participants who were found to have elevated depression scores (i.e. >12) at multiple time points, with at least one year in between and no intervening time points without elevations, were classified as having "persistent depression symptoms." Participants were classified as having "non-persistent depression symptom" depressed if they reported depression scores above 12 at

least one time point, but did not persist to subsequent follow-ups, even if it returned later. Participants were classified as non-depressed if they reported no elevations above 12 at any time point. Only participants who completed all four time points were included in this analysis (N=595). A logistic regression was conducted to predict whether participants had persistent depression symptoms or non-persistent depression symptoms. Predictors included demographic and parenting variables.

Relation of parenting style variables and participant characteristics to depressive symptoms. In order to examine if parenting style variables (autonomy granting or parental involvement) significantly predicted depressive symptoms above and beyond covariate demographic and genetic variables, a hierarchical regression analysis was conducted. Covariate participant characteristics (ethnicity, gender, maternal history of depression or anxiety, paternal history of depression or anxiety, parental education, and financial status) were entered in a single block on Step 1, followed by both parenting style variables in Step 2.

The third research goal of this study was to evaluate the interaction between autonomy granting and involvement in predicting depressive symptoms. Thus, a term representing the interaction between both parenting style variables will be included in the hierarchical regression in Step 3. While it was hypothesized that both would significantly predict depressive symptoms, it was hypothesized that the interaction of these variables would also be significant.

Results

Descriptive Analyses

Descriptive characteristics of sample participants are displayed in Table 3. Participants ranged in age from 18 to 31 years of age (M=18.42. SD=0.79). The sample, consisting of individuals who completed both Freshman and Junior surveys, is predominantly female (N=495, 66.5%). Nearly half the sample self-identified as Caucasian (47.1 %). For parental history of depression or anxiety, 34.7% of respondents said they believed their mother had problems with depression or anxiety and 20.6% said they believed their father had such problems. Most participants reported that the highest level of education completed between their two parents was a college degree or higher; however, 12.1% said their parents had completed some college courses but not graduated, 13.7% had obtained a high school diploma or equivalent, and 2.4% had not completed high school. More than one in ten participants described themselves and their family has having not enough money to meet their needs during freshman year. During freshman and junior year, most participants did not live with family (4.8% Freshman year, 8.8% Junior year). Instead, most participants lived on or off campus with friends or roommates. More than one in five participants had ever used University Counseling Services by their Junior year.

Table 3.

Participant Descriptive Characteristics, N=*989*

Variable	Frequency (Percent)	*Mean ± SD*
Age	--	18.42 ± 0.79
Sex		
Female	N=644 (65.1%)	--
Race/Ethnicity		
American Indian/Alaska Native	N=4 (0.4%)	--
Asian	N=184 (18.6%)	--
Black/African American	N=217 (21.9%)	--
Hispanic/Latino	N=41 (4.1%)	--
More than one race	N=52 (5.3%)	--
Native Hawaiian/Other Pacific Islander	N=5 (0.6%)	--
White	N=466 (47.1%)	--
Family history of depression/anxiety		
Mother, Yes	N=343 (34.7%)	--
Mother, No	N=502 (50.8%)	--
Mother, Unknown or chose not to answer	N=143 (14.5%)	--
Father, Yes	N=204 (20.6%)	--
Father, No	N=573 (57.9%)	--
Father, Unknown or chose not to answer	N=211 (21.3%)	--
Highest Parental Education		
Less than high school	N=24 (2.4%)	--
High school	N=135 (13.7%)	--
Some college	N=120 (12.1%)	--
College graduate	N=359 (36.3%)	--
More than college	N=317 (32.1%)	--
Financial Status		
More than enough	N=130 (13.1%)	--
Just enough	N=446 (45.1%)	--
Not enough	N=116 (11.7%)	--
Freshman residence (2011)		
Residence Hall	N=715 (72.3%)	--
With family	N=47 (4.8%)	--
Off-campus	N=26 (2.6%)	--
Chose not to answer	N=9 (0.9%)	--
Junior residence (2014)		
Residence Hall	N=261 (26.4%)	--
Off-campus with family	N=87 (8.8%)	--
Off-campus with friends	N=533 (53.9%)	--
Off-campus, alone	N=43 (4.3%)	--
Off-campus, other	N=57 (5.7%)	--
Chose not to answer	N=8 (0.8%)	--
Ever Used University Counseling Services		
Yes	N=257 (26.0%)	--

Note. N = 989. Age is calculated in years for Freshman year. For Freshman residence, information was missing for 188 participants. Ever Used of University Counseling Services was collected Junior year.

Table 4.

Descriptive Statistics for Continuous Variables Used in Regression Analyses

Variable	*Mean ± SD*
Parenting Style Variables	
Autonomy Granting	15.34 ± 4.73
Parental Involvement	21.75 ± 5.04
Dependent Variable	
SCL-90 Expanded Depression	19.14 ± 7.87

Note. *N*=989

Prevalence of Depressive Symptoms

Average total depression symptoms. The average scores on the SCL-90 Expanded Depression subscale collected in Spring 2014 Junior follow-up survey are displayed in Table 4. As can be seen in Figure 1, depression symptoms were common among the sample. Seven of nine symptoms were endorsed as causing some discomfort more often than not for most participants. The most commonly endorsed symptoms (causing problems at least a little bit) were (1) "worrying too much," (2) "blaming yourself for things," and (3) "feeling blue." Most commonly endorsed as causing problems "extremely" were (1) excessive worry, (2) self-blame, and (3) low energy. Least endorsed were (1) "loss of sexual interest," (2) "feelings of worthlessness," and (3) "feeling hopeless about the future." Full information about the frequency of each response for each depression symptom is presented in Table 5.

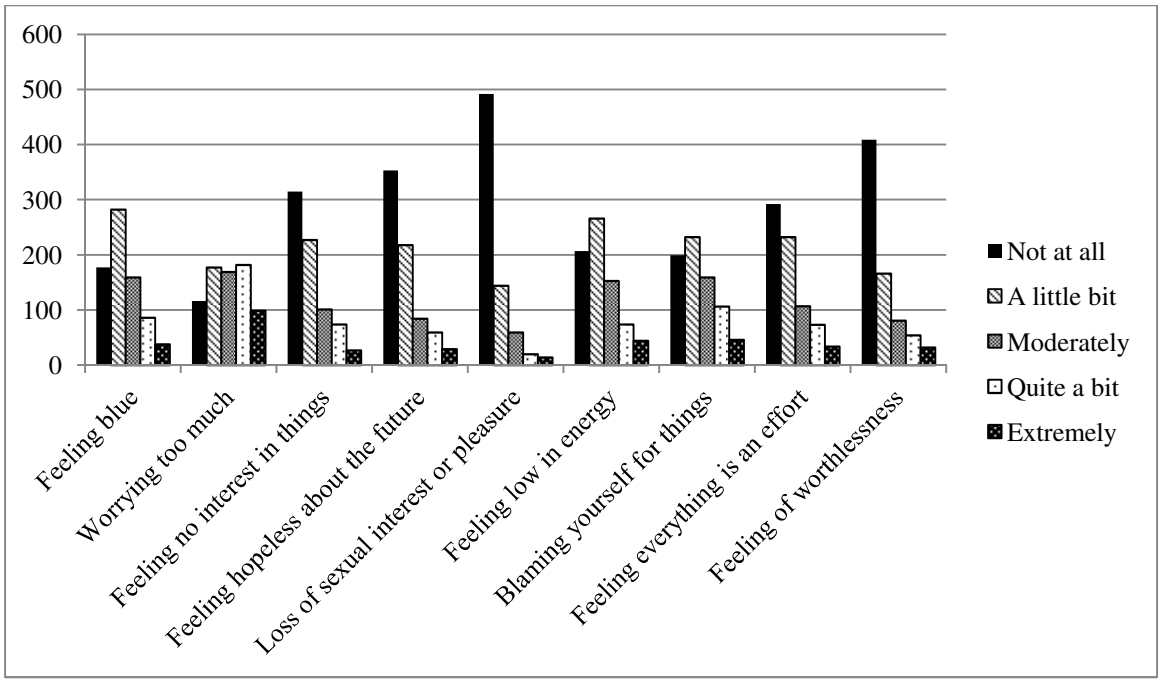

Figure 2. Frequency of endorsement of SCL-90 Expanded Depression Items

Table 5.

Frequencies and Percentages Each Symptom from The SCL-90 Expanded Depression Scale Was Endorsed by Participants

	Frequency (Percent)				
Item	*Not at all*	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
Feeling blue	*n*=177 (23.8%)	*n* =282 (37.9%)	*n* =159 (21.4%)	*n* =86 (11.6%)	*n* =38 (5.1%)
Worrying too much about things	*n* =116 (15.6%)	*n* =177 (23.8%)	*n* =169 (22.7%)	*n* =182 (24.5%)	*n* =99 (13.3%)
Feeling no interest in things	*n* =315 (42.3%)	*n* =227 (30.5%)	*n* =101 (13.6%)	*n* =74 (9.9%)	*n* =27 (3.6%)
Feeling hopeless about the future	*n* =353 (47.4%)	*n* =218 (29.3%)	*n* =84 (11.3%)	*n* =59 (7.9%)	*n* =29 (3.9%)
Loss of sexual interest or pleasure	*n* =492 (66.1%)	*n* =144 (19.4%)	*n* =59 (7.9%)	*n* =20 (2.7%)	*n* =14 (1.9%)
Feeling low in energy or slowed down	*n* =207 (27.9%)	*n* =266 (35.8%)	*n* =153 (20.6%)	*n* =74 (9.9%)	*n* =44 (5.9%)
Blaming yourself for things	*n* = 199 (26.7%)	*n* =232 (31.2%)	*n* =159 (21.4%)	*n* =106 (14.2%)	*n* =46 (6.2%)
Feeling everything is an effort	*n* =292 (39.2%)	*n* =232 (31.2%)	*n* =107 (14.4%)	*n* =73 (9.8%)	*n* =34 (4.69%)
Feeling of worthlessness	*n* =409 (55.0%)	*n* =166 (22.3%)	*n* =81 (10.9%)	*n* =54 (7.3%)	*n* =32 (4.3%)

Note. These values represent the unimputed data of the total sample.

Frequency counts and percentages were used to describe how many college students experienced multiple problematic symptoms of depression. Problematic symptoms of depression were defined as those rated as causing discomfort at least moderately over the past 30 days. More than a quarter of the sample reported no such problems (*n*=210, 27.1%). Of those reporting any problematic symptoms, 36.5% reported 1-3 problematic symptoms (*n*=265), 20.1% of the sample reported 4-6 problematic symptoms (*n*=149), and 15.4% of the sample reported 7-9 problematic symptoms (*n*=152).

Predicting Persistent and Non-persistent Depression Symptom Elevations

Logistic regression was used to examine whether demographic and parenting style variables could be used to predict whether participants were had persistent or non-persistent

depression elevations. For this analysis, only participants who completed all four Spit for Science surveys were included (*N*=595). For each time point, participants completed the four depression items comprising the SCL-90 Depression scale. Total sum scores above 12 on the Depression scale suggest a positive screen for elevated depression symptoms. Participants who screened positively at least two consecutive time points that were at least a year apart (i.e. two consecutive positive screens for only Fall 2011 Freshman and Spring 2012 Freshman surveys did not qualify as approximately 6 months passed between administration of these two surveys), were coded as having "persistent depression symptoms" (*n* = 124). Reflecting the DSM-5 criteria, individuals under 21 only need be depressed for one year to meet criteria for Persistent Depressive Disorder (APA, 2014). Participants who had at least one positive screen for elevated depression symptoms but did not meet the criteria for persistent depression were coded as having "non-persistent depression symptoms" (*n* =154). Participants who did not screen positively for elevated depression symptoms at any time point were coded as "never depressed" (*n* = 317); however, only individuals with "persistent depression symptoms" and "non-persistent depression symptoms" were included in the logistic regression.

Descriptive statistics for each of the two groups is presented in Table 6. Aside from having a higher percentage of females in the persistent depression symptoms group, the groups appeared to be similar in terms of demographic characteristics. Further, the group with persistent depression symptoms had consistently higher average scores on the SCL-90 depression subscale, as is to be expected. Remove extra page that follows.

Table 6.

Comparison of Descriptive Statistics Between Individuals with Non-persistent and Persistent Depression Symptoms

	Non-persistent Depression Symptoms *N*=154 (25.9%)		Persistent Depression Symptoms *N*=123 (20.7%)	
Variable	Frequency (Percent)	*Mean ± SD*	Frequency (Percent)	*Mean ± SD*
SCL-90 Depression score				
Fall 2011 Fresh, Survey	--	9.79 ± 3.56	--	11.13 ± 3.77
Spring 2012 Fresh. Survey	--	10.79 ± 3.01	--	13.76 ± 3.35
Spring 2013 Soph. Survey	--	9.20 ± 3.18	--	15.06 ± 2.56
Spring 2014 Junior Survey	--	10.39 ± 3.41	--	13.17 ± 3.25
Sex				
Male	*N*=50 (32.5%)	--	*N*=21 (16.9%)	--
Female	*N*=103 (66.0%)	--	*N*=102 (82.3%)	--
Race				
White	*N*=73 (47.4%)	--	*N*=61 (49.2%)	--
Non-white	*N*=79 (48.0%)	--	*N*=61 (49.2%)	--
Family history				
Maternal hx	*N*=65 (42.2%)	--	*N*=59 (47.6%)	--
No maternal hx	*N*=70 (45.5%)	--	*N*=45 (36.3%)	--
Paternal hx	*N*=82 (53.2%)	--	*N*=38 (30.6%)	--
No paternal hx	*N*=44 (28.6%)	--	*N*= 55 (44.4%)	--
Parenting Variables				
Parental Involvement	--	9.31 ± 2.27	--	9.05 ± 2.31
Autonomy Granting	--	7.78 ± 2.31	--	7.86 ± 2.42

Note. N=595 completed all 4 time points, Never Depressed, *N*= 317 (53.3%). Maternal hx = Maternal history of depression and/or anxiety, Paternal hx = No paternal history of depression and/or anxiety.

As can be seen in Table 7, a logistic regression predicting persistent or non-persistent depression symptoms was conducted with predictors gender, race, maternal history of depression or anxiety, paternal history of depression or anxiety, autonomy granting, parental involvement, and the interaction between autonomy granting and parental involvement. A test of the full model R^2 was significant, $\chi^2(8)=9.65$, p = .03, Nagelkerke $R^{2=}.15$, indicating that these predictors distinguished between those who do not have persistent depression

symptoms and those who do not. Gender (β = -1.17, p = .002), Autonomy Granting (β = -1.17, p = .02), and the interaction between Autonomy Granting and Parental Involvement (β = -.24, p = .02) were statistically significant in contributing to the prediction of whether a participant had persistent depression symptoms or non-persistent depression symptoms. Females were more likely to have persistent depression symptoms, as were people with lower scores on the Autonomy Granting scale.

Table 7.

Logistic Regression Results

DV: Persistent Depression Symptoms Depressed or Non-persistent Depression Symptoms	R^2=.04, .11 (Cox & Snell), .15 (Nagelkerke). Model $\chi^2(8)$=9.65, p = .03. *p < .05			
			95% CI for Odds Ratio	
	B(SE)	*Odds Ratio*	*Lower*	*Upper*
Gender	-1.17**(0.38)	3.23	1.54	6.826
Race	.295(.33)	.74	.39	1.42
Maternal hx	.01(.34)	.99	.51	1.9
Paternal hx	.20(.34)	.82	.43	1.6
Autonomy Granting	-.24*(.10)	.79	.65	.97
Parental Involvement	-.27(.15)	.76	.57	1.03
AGxPI	0.02*(.01)	1.02	1.00	1.03

Note. For gender, -1=female, 1=male. For race, -1=Non-White, 1=White. Maternal hx=Maternal history of depression or anxiety and -1=no, 1=yes, Paternal hx=Paternal history of depression or anxiety, and -1=no, 1=yes. AGxPI=the interaction between Autonomy Granting and Parental Involvement. R^2=.04, .11 (Cox & Snell), .15 (Nagelkerke). Model $\chi^2(8)$=9.65, p = .29. *p < .05. **p < .01. ***p < .001.

Relationship Between Parenting Style Variables and Depression Symptoms

A hierarchical regression analysis was conducted to examine whether autonomy granting and involvement interacted to predict depression symptoms above and beyond demographic variables (i.e. gender and ethnicity, parental education, and financial status) and parental history of depression and/or anxiety.

As shown in Table 8, when gender, race, financial status variables, parental education variables, maternal and paternal history of depression were entered in Step 1, 9% of the variance in depression symptoms was predicted (p<.001). When autonomy granting and parental involvement variables were entered on Step 2, these predictors explained an incremental 3% of the variance in depression symptoms, ΔF (2, 976) = 16.26, p < .001, above and beyond the variance accounted for demographic and other covariates. When a term representing the interaction between autonomy granting and parental involvement was entered on Step 3, an additional 1% of variance in depression symptoms was explained, ΔF (2, 976) = 14.10, p = .003.

The interaction term itself showed a significant effect (β = .11, t(975) = 2.73, p = .01). The effect size for the interaction term was small in strength according to the criteria outlined by Cohen (f^2=.01, Cohen, 1977). A plot of this interaction (see Figure 3) demonstrated the relationship between Parental Involvement and depression symptoms was dependent on the level of Autonomy Granting. It should be noted that higher scores on each of these parenting scales indicate the respondent rated the parent as having *less* of that characteristic. As autonomy granting increases, the effect of parental involvement becomes smaller. When Autonomy Granting scores were high (+1SD), Parental Involvement scores were positively associated with depression symptoms, predicting higher levels of depression symptoms. Thus, this shows that for students who describe their parents as less granting of autonomy, those who *also* rated their parents as being highly involved reported higher levels of depression. Students who describe their parents as less granting of autonomy but less involved reported comparatively lower levels of depression symptoms. Alternatively, when Autonomy Granting scores were low (-1SD), there was a negative association between

Parental Involvement scores and depression symptoms, although this effect was much smaller as indicated by the almost flat slope. When parents were more granting of autonomy, students reported fewer depressive symptoms as perceived parental involvement decreased.

In addition and consistent with hypotheses 5 and 6, there was a significant positive main effect for both parenting style variables. Autonomy Granting scores were positively associated with depressive symptoms ($\beta = .11$, $t(975) = 3.09$, $p = .002$), as were Parental Involvement scores ($\beta = .10$, $t(975) = 2.87$, $p = .004$). Thus, lower levels of both autonomy granting and parental involvement increase depressive symptoms; however, given the significant interaction effect, it is important to remember that these effects are each dependent on the effect of the other.

Gender, maternal history of depression or anxiety, and paternal history of depression or anxiety were also significant predictors of depression symptoms in the final model. Consistent with Hypothesis 1, females reported significantly higher levels of depression when compared to males ($\beta = -.12$, $t(975) = -3.82$, $p < .001$). There were no significant differences between White and non-White students ($\beta = .07$, $t(975) = -1.94$, $p = .054$), contrary to Hypothesis 2. Having a biological mother or father with depression or anxiety each significantly predicted higher levels of depression, $\beta = .15$, $t(975) = 4.18$, $p < .001$ and ($\beta = .10$, $t(975) = 2.32$, $p = .03$, respectively.

Table 8.

Hierarchical Regression Model Examining the Relations Among Parenting Style Variables and Depression Symptoms

DV: SC-L90 Depression Total	Step 1 Model Summary: $F(10,978) = 9.66$, $R^2 = 0.09$***				Step 2 Model Summary: $F(12,976) = 11.01$, $R^2 = 0.12$*** $\Delta F(2,976) = 16.26$, $\Delta R^2 = 0.03$***				Step 3 Model Summary: $F(13,975) = 11.38$, $R^2 = 0.13$*** $\Delta F(1,975) = 14.10$, $\Delta R^2 = 0.01$**			
	B	*SE*	*B*	*t*	*B*	*SE*	*β*	*t*	*B*	*SE*	*β*	*t*
Gender	-0.84	0.26	-.10	-3.24**	-1.08	0.26	-0.13	-4.12***	-1.03	0.27	-.12	-3.82***
Race	0.34	0.26	.04	1.29	0.59	0.27	0.07	2.18*	0.53	0.27	.07	1.94
Parental Edu.												
High School	0.96	0.88	.09	1.10	-0.62	0.53	-.06	-1.17	1.01	0.85	.09	1.18
Some college	1.08	0.88	.09	1.22	-0.40	0.45	-.05	-0.88	1.18	0.86	.10	1.38
College	1.14	0.85	.14	1.35	0.99	0.87	.09	1.15	1.20	0.82	.15	1.47
More than college	1.39	0.84	.17	1.66	1.25	0.87	.11	1.45	1.46	0.81	.17	1.80
Finances												
More than enough	-0.90	0.52	-.09	-1.73	-0.62	0.53	-.06	-1.17	-0.57	0.52	-.06	-1.08
Just enough	-0.56	0.44	-.07	-1.27	-0.40	0.45	-.05	-0.88	-0.37	0.44	-.04	-0.83
Mother	1.49	0.29	.19	5.05***	1.19	0.29	.15	4.12	1.20	0.29	.15	4.18***
Father	0.86	0.37	.10	2.29*	0.84	0.36	.10	2.33	0.85	0.36	.10	2.32*
AG	--	--	--	--	0.21	0.06	.13	3.82***	0.16	0.06	.10	2.87**
PI	--	--	--	--	0.16	0.06	0.10	2.87**	0.17	0.06	.11	3.09**
AG X PI	--	--	--	--	--	--	--	--	0.04	0.01	.11	2.73*

Note. For gender, 1= male, -1 = female. For race, 1= White, -1 = Non-White. Mother= Biological mother history of depression or anxiety, -1 = No, 1 = Yes, Father = Biological father history of depression or anxiety, -1 = No, 1 AG = Autonomy Granting, PI = Parental Involvement. AGxPI= Interaction between Autonomy Granting and Parental Involvement. These values represent imputed data. *$p < .05$. **$p < .01$. ***$p < .001$.

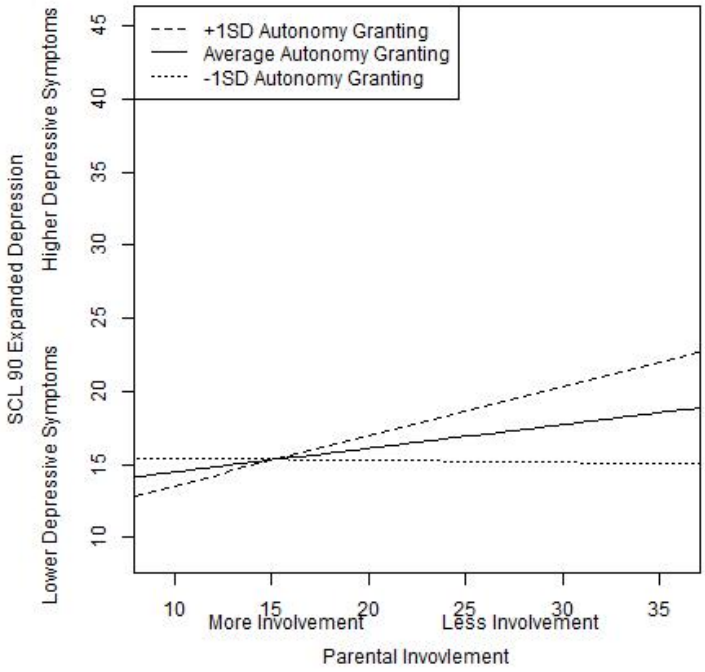

Figure 3. Graph of the interaction between autonomy granting and parental involvement in predicting depression symptoms. Parental Involvement and Autonomy Granting scales are scored such that higher scores indicate the parent is rated as having *less* of that quality. As such +1SD Autonomy Granting represents the lowest levels of autonomy granting, and -1SD represents the highest. Higher scores on the SCL-90 indicate more severe depression symptoms.

Discussion

This thesis examined the prevalence of depression symptoms and the relation between parenting style variables and depression symptoms in a large, diverse sample of students at a public university on an urban campus. Notably, this study found that depression symptoms are common among college students and that parenting style is associated with depression symptoms among this population.

The first aim of this study was to examine the prevalence of depression symptoms in this sample. Consistent with previous research (e.g. Blanco et al., 2008; Eisenberg et al., 2013), depression symptoms were commonly endorsed by college students in this sample. Over half the sample reported at least one symptom causing discomfort at least moderately in

the previous 30 days. For seven of nine items on the SCL-90 Expanded Depression subscale, participants were more likely to endorse the symptom as causing at least some discomfort than they were to say it caused discomfort "not at all." Although one fourth of the sample endorsed no depressive symptoms, most reported multiple. Seven or more problematic symptoms of depression were reported by 15.4% of the overall sample. Additionally, almost a quarter of the students who participated at all four time points reported depressive symptoms that persisted across multiple time points and lasting at least one year.

These overall high levels of depression symptoms among this sample highlight the psychological needs of this population, even continuing into later years on campus. Notably, this study showed high rates of depression symptoms through the third year on campus and represented students who were presumably functioning well enough to stay enrolled in school and participate in the study. This may underscore the vulnerability of this population to depressive symptoms given the multiple sources of stress due to college highlighted in other studies (Cleary et al., 2011, Beiter et al., 2014). Directors of college counseling centers have reported increased demand for psychological services (Gallagher, 2013). Within this sample, 26.0% of the sample reported using University Counseling Services by the third year of college.

A logistic regression examined whether predictors could distinguish between participants who were had persistent depression symptoms and those that had non-persistent symptoms; however, although the model was significant, it was poor in its ability to correctly identify individuals who had elevated depression symptoms at multiple time points. This may be due to the similarity between the two groups and the lack of other relevant predictors that might distinguish better between these groups. Even so, female gender, Autonomy Granting,

and the interaction between Autonomy Granting and Parental Involvement increased the probability of having persistent depression symptoms.

Various demographic characteristics were associated with increased depression symptoms. Consistent with hypothesis 1, gender significantly predicted overall depression symptoms, with females reporting higher levels of depression. Similarly, and partially consistent with hypothesis 3, female gender significantly added to the prediction of whether a participant had persistent depression symptoms or non-persistent depression symptoms. Contrary to hypothesis 2, there was no significant difference for race. This may be due to combining several different minority groups into a non-White group; these different minority groups may have very little in common with each other. There may be different effects for different minority groups. Further, this study took place at a diversely populated campus; thus, factors that influence depression symptoms among minority individuals may be less present or relevant in this setting.

Parenting Style and Depression Symptoms

The second and third aims of this study were to examine how two dimensions of parenting style predict depression among college students. It was found that parenting style significantly predicts depression symptoms in the third year of college; however, this effect was small given the small amount of variance accounted for by the model. The constructs of Autonomy Granting and Parental Involvement are distinct, and tap different aspects of parenting behaviors. Autonomy granting refers to respondent perceptions that parents are non-coercive and democratic whereas Parental Involvement reflects perceptions that parents are loving and responsive. As expected in Hypotheses 5 and 6 main effects were present,

such that students who described their parents as involved and more granting of autonomy reported fewer depression symptoms.

Despite being statistically significant, only a small amount of the variance in depression symptoms was accounted for by parenting variables and the overall model. Even so, this finding is notable, however, as most students in this sample live separately from their parents during the Junior year as that this effect was present even after controlling for relevant demographic characteristics. Further, this study extended the use of the Steinberg Parenting style measures into an older college student sample and examined the influence of these scales in predicting psychological functioning. These scales had previously been used predominantly in predicting academic motivation among children (e.g. Lamborn et al., 1991).

It is likely that situational stressors or other factors would be more relevant variables in understanding current level of depression symptoms. Parenting, however, may influence college students' abilities to cope with present-day stressors, making college students more or less vulnerable to the negative effects of stress; previous work has shown that parents are important in developing coping ability in their children (Matheson et al., 2005).

Consistent with hypothesis 6, parenting dimensions did interact in predicting depression symptoms by influencing each other such that the relationship of parental involvement in predicting depression symptoms depended on the level of autonomy granting. When parents are more autonomy granting, the effect of parental involvement becomes weaker in predicting depression symptoms. In accordance with Steinberg's description of parenting style as a "constellation" of parenting practices and qualities, the interplay between these two dimensions appear to produce the effect.

Consistent with these results, previous research has suggested that the best developmental outcomes occur when parents are both warm and involved in their children's lives (reflected in the construct of Parental Involvement) but also employ non-coercive forms of discipline and foster children's individuality (Autonomy Granting, Lamborn et al., 1991). Poorer outcomes occur when parents are low on either or both dimensions (Lamborn et al., 1991). This has been shown both with younger children (Lamborn et al., 1991) as well as college students (Strage & Brandt, 1999; Fulton & Turner, 2008). As suggested by Diana Baumrind, parents must balance accommodating the individuality of the child while also making demands for behaviors compliance. Failures to do so may contribute to poorer outcomes, including increased psychological distress in the form of depressive symptoms as found in this study.

Strengths and Limitations

Several strengths of this study should be noted, and must include the longitudinal data collection as well as a large and diverse sample. In addition, symptoms of depression were examined in the third year, presumably at which points students have adjusted to the demands of college. Even so, several limitations exist in this thesis. Only a small amount of variance in depression was explained by the predictors in the full model. Accounting for relevant present-day stressors might contribute to a better understanding of the factors that influence depression symptoms in this population. Although the aims of this study were to examine how parenting style influences depression symptoms among college students, other factors that might be important in predicting college student depression (e.g. stress, other kinds of relationships) were not included in the model. Secondly, there was not information available about participants who chose to participate at early time points but not later ones.

More than half the students that participated in the initial survey did not complete the Junior follow-up survey 2.5 years later. Information is not available about why participants did not complete follow up surveys. Finally, all of the students in this sample came from a single public university. As such, it cannot be assumed that these results will generalize to all college students attending other institutions until these findings are replicated in future study.

This study might have been improved by using different measures. Despite assessing several symptoms of depression, the SCL-90 is not a diagnostic instrument and does not provide guidelines for interpreting scores. Other measures of depression that allow for diagnosis of clinical depression would help to identify the prevalence of significant depression symptoms among this population and distinguish clinical and normative symptom endorsement. In addition, the Steinberg Parenting Scales were designed for studies related to academic motivation in younger populations**.** Other measures of relevant parenting variables, such as parental bond (Parker et al., 1983) or attachment to caregivers might be helpful in understanding the multiple ways in which parents contribute to their children's development. Further, it would also be helpful to distinguish between mother and father's parenting style as previous research has suggested different effects based on the gender of parent and/or child (e.g. Barton & Kirtley, 2012; Patock-Peckham & Morgan-Lopez, 2007).

Future Directions

This study contributes to the literature by underscoring the continued influence of parents in the psychological well-being of college students. This study also may be used to inform future research, including attempts to replicate these findings in other settings or to address the limitations of this study. In addition, future research should examine mediational pathways, such as coping style, through which parenting style contributes to depression

symptoms. It also might be helpful to examine the relationship between parenting style and depression in a clinical sample as college students are a relatively high functioning population given that students must meet academic demands in order to maintain enrollment. Similarly, using measures that more adequately capture diagnostic status would help to distinguish between problematic and normative levels of depression symptoms.

Conclusion

Findings from this study suggest that depression symptoms are common among college students, even through to the third year of college. Parenting style continues to influence depression symptoms among young adults, and dimensions of this construct appear to interact in producing effects. Even so, this effect was small, which indicates that there may be more to be explained if we are to understand more about depression among college students. It may be important to assess other factors, particularly environmental stressors, contributing to depression symptoms and etiology in this population.

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List of References

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