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Relationship of Self-Concept, Depression, Academic Estimation,  
and Online Social Networking in Adolescents

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## Abstract

The present study investigated the relationship between academic self-concept, academic outcome confidence, and academic estimation in depressed and non-depressed adolescents, with a focus on gender differences. The study also included exploratory questions on online social networking (OSN) usage. Participants ( $N = 66$ ) were 9<sup>th</sup> and 10<sup>th</sup> grade students from one high school, with 40 females and 26 males. Academic self-confidence and outcome confidence were measured with the Student Self-Concept Scale (SSCS) and depressive symptoms were measured with the Center for Epidemiological Studies' Depression Scale for Children (CES-DC). Standardized test scores and grade point average (GPA) for each student were collected directly from school records. A researcher-created survey contained questions on diagnosis and treatment of depression and OSN usage. Results from regression analyses indicated that there were significant negative relationships between depressive symptoms and academic self-confidence and academic estimation in female students. Academic outcome confidence had no significant relationship with depression. Approximately 30 percent of the sample had scores on the CES-DC above the cutoff for significant depressive symptoms, 35% of females and 23% of males, and in the sample 7.5% of female students and 11.5% of male students reported receiving treatment for depression. Eighty-five percent (85%) of students identified as depressed by the CES-DC were not receiving any treatment. The exploratory data analysis for online social networking found a significant positive relationship between weekly time using OSN and depressive symptoms, irrespective of gender. There was also a significant negative correlation between weekly time using OSN and reading standardized test scores.

*Keywords:* adolescents, academic achievement, academic self-concept, depression, online social networking, Facebook

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Depression is a common psychological disorder in adolescents, with research indicating that up to one out of three girls and one out of five boys will have at least one episode of depression by age 18, and middle to late adolescence is the average age of the first appearance of depressive symptoms (Merrell, 2008). The Substance Abuse and Mental Health Services Administration (SAMHSA, 2012) conducted a large national study in 2010 which provided statistics on prevalence rates of major depression experienced by adolescents in the past year. The data from 68,487 interviews were included in the results, and youths aged 12 to 17 completed questions on depression. SAMHSA found that 8% (1.9 million) of adolescents aged 12 to 17 had experienced a major depressive episode (MDE) in the last year. The prevalence of MDE increased with age, with prevalence ranging from 3.3% among 12 year olds to 10.9% among 16 year olds and 10.3% among 17 year olds. There were 1.3 million adolescents who had a MDE with severe impairment, which was 5.6% of the population aged 12 to 17. This means that 70% of adolescents who had a MDE in the last year had severe impairment.

In terms of gender, depression is a disorder that disproportionately affects girls at a rate twice higher than that of boys (Machoian, 2005; Merrell, 2008; Seeley, Rohde, Lewinsohn, & Clarke, 2002). The incident rate in girls increases around age 13 to 15 and a typical episode of depression can last 7 to 9 months (Huberty, 2009). The SAMHSA (2012) study found that 11.8% of females had a major depressive episode in the last year, compared to 4.4% of boys. Females also had higher rates (8.2%) of severe impairment than males (3.2%). Of the females who had a MDE in the last year, 69% experienced severe impairment.

Depression can affect many domains of an adolescent's life, including social and family relationships, schoolwork, self-worth, and decision making (Merrell, 2008; Seeley et al., 2002). In particular, depression can negatively affect different aspects of cognitive functioning in children and adolescents (Cole, Martin, Powers, & Truglio, 1996; Nolen-Hoeksema, Girgus, & Seligman, 1986), including concentration (Fröjd et al., 2008). Huberty (2009) identified memory, concentration, and attention problems as cognitive manifestations of depression. Fröjd et al. (2008) found that concentration was impaired in a sample of teenage girls with severe depression. Perhaps as a result of a decrease in cognitive functioning, children with depression often struggle in academic areas, and decreased school achievement has been described as a behavioral characteristic of depression (Huberty, 2009; Machoian, 2005). Cole et al. (1996) proposed that depressive symptoms may lead to lower academic achievement scores, although academic issues could be "both the cause and effect of depression" (p 258). Children with depression may be perceived as unmotivated and uninterested in academics, creating negative social feedback which may in turn lower self-worth and mood (Huberty, 2009).

Depression can lead to feelings of hopelessness in children, which may result in negative expectations towards the future (Kazdin, French, Unis, Esveldt-Dawson, & Sheric, 1983). Bandura (1977) defined an *outcome expectancy* as "a person's estimate that a given behavior will lead to certain outcomes" (p. 193) Bandura proposed that if an individual does not believe success is possible, this creates a sense of powerless and futility. Abramson, Seligman, and Teasdale (1978) identified two types of depression which can result if a person believes that outcomes are uncontrollable: universal helplessness and personal helplessness. Both relate to feelings of noncontingency, or feelings of hopelessness that one's actions are futile. Those with feelings of universal helplessness can be described as having low outcome expectations, with the

belief that no behavior or response by anyone will result in the wanted outcome (Abramson et al., 1978; Weisz, Sweeney, Proffitt, & Carr, 1993).

Bandura (1997) distinguished between outcome expectations and self-efficacy, defining the latter as beliefs in one's capabilities to produce desired outcomes. When a person's self-efficacy is low, they lack confidence that their actions will achieve desired results (Weisz et al., 1993). Bandura stated that low self-efficacy can lead to feelings of sadness and depression. In the context of the learned helplessness model of depression, Abramson et al. (1978) identified low self-efficacy as a central component of personal helplessness. Weisz et al. (1993) described *personal helplessness* as "a belief that one is low in competence" (p. 412). In relation to Bandura's concepts, Abramson and colleagues identified *personal helplessness* as "a low efficacy expectation coupled with a high outcome expectation" (p. 54). The researchers proposed that people with low self-efficacy believe that successful outcomes are available to others, but unavailable to themselves because of a perceived inadequacy or incompetence. Those with depression are likely to interpret setbacks and failures as having an internal cause, and this can lead to a reduction in feelings of self-worth, which contribute to depression.

The *contingency-competence-control model* (Weisz, Southam-Gerow, & McCarty, 2001) incorporates both the ideas of outcome expectancy and self-efficacy. *Control* is broadly defined as a self-perceived potential to achieve the desired results. An individual's feelings of control over their life are thought to relate to their contingency and competence beliefs. In the CCC model, contingency is analogous to the idea of outcome expectations and is defined as "the degree to which the outcome depends on the behavior of relevant 'individual'" (p. 98).

*Competence* is similar to the concept of self-efficacy and is defined as a person's beliefs about

their ability to complete a task. The authors proposed that control also includes other factors outside of competence and contingency such as temporary events like receiving a poor grade.

Weisz et al. (1993) conducted a study which examined the relationship between competency and contingency beliefs and depressive symptoms in 116 elementary school children. Competence was measured with the Self-Perception Profile for Children (SPCC), which includes a total self-concept score, as well as Academic, Social, Behavioral, Athletic, and Physical Appearance self-concept scores. The authors reported a significant negative correlation between CDI scores and the Total Competence score ( $r = -.61$ ) and Academic Competence ( $r = -.55$ ). The Perceived Contingency Scale for Children (P-Contingency) was used to measure the perception of contingencies for children, or their beliefs that certain outcomes will result from actions by any child. The P-Contingency includes scores for Total Contingency, as well as Academic, Behavioral, and Social Contingency. The authors found a significant negative correlation between CDI scores, the P-Contingency Total Competence Score ( $r = -.46$ ) and the P-Contingency Academic Competence Score ( $r = -.45$ ). In total, the researchers found that the academic subscales for contingency and competence accounted for 35% of the variance in scores on the CDI.

Muris et al. (2003) conducted a similar study which used the CCC model to examine the relationship between contingency, competence, and depression in 214 adolescents (10 to 14 years) in the Netherlands. The authors used the SPCC and the P-Contingency as measures of competence and contingency, respectively. The Revised Anxiety and Depression Scale (RCADS) was used to measure both depression and anxiety. The researchers found that low contingency and competence scores were associated with higher levels of both anxiety and depression. However, competency scores were identified as the “most consistent predictor of

symptoms” (p. 337). Significant gender differences were noted in the study, with girls having lower levels of competence and contingency but more depressive and anxiety symptoms than boys.

Weisz et al. (2001) conducted a study to test the CCC model in both children and adolescents in relation to depressive symptoms. There were 360 participants ranging from 8 to 17 years old who had been referred to clinical outpatient programs. The authors conducted separate analyses on children (8 to 11 years old) and adolescents (12 to 17 years old.) Competence was measured using the SPCC, while contingency was measured with the P-Contingency. Depression was measured with the CDI and two other self-report measures: the Diagnostic Interview Schedule for Children (DISC) and the anxious and depressed syndrome score from the Youth Self-Report (YSR). The scores from the three measures were used to create a composite depression score. The authors reported that together the SPCC and P-Contingency predicted 36% of the variance in depression. The researchers found that low self-competence was significantly associated with depression across both children and adolescents. However, the authors found a difference in regards to the relationship between contingency and depression. Low contingency was associated with higher depression symptoms in adolescents, but not for children. The researchers theorized this might be because adolescents experience advances in reasoning which allow them to think in generalities about the world and the experiences of others. Weisz et al. concluded that “among adolescents...low levels of both perceived competence and perceived contingency appear to be directly associated with depression” (p. 106). Beliefs in competence had a stronger negative correlation with depressive symptoms than contingency beliefs. The researchers did not include an analysis by gender as

they found no significant interaction. The study did not include any information on the academic scales for either the SPCC or the P-Contingency.

Other studies have found negative correlations between depressive symptoms in children and adolescents and self-efficacy (Kovacs, 1992; McGrath, 2000; Weisz et al., 1993), and academic-self efficacy (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Ehrenberg, Cox, & Koopman, 1991; Muris, 2002; Scott et al., 2008). Bandura et al. (1999) described academic self-efficacy as the “perceived ability to fulfill academic demands” (p. 259). Ehrenberg and Cox (1991) conducted a study which investigated the relationship between academic self-efficacy and depressive symptoms in 8<sup>th</sup> to 12<sup>th</sup> grade students ( $N = 366$ ), with 194 female and 172 male subjects. Participants were administered the BDI and the Measure of Academic Self-Efficacy (MASK), a 21 item scale which Ehrenberg and Cox identified as having high reliability. Depressive symptoms and academic self-efficacy had a negative relationship for the entire sample ( $r = -.60$ ), meaning that as BDI scores increased, academic self-efficacy decreased. The researchers examined the results by dividing the subjects into groups of younger and older female and male adolescents, and the relationship between depression and academic self-efficacy was found to be significant for all groups. However, academic self-efficacy scores were found to be the strongest predictor of depression scores for the younger group of male adolescents.

Muris (2002) conducted a study with 596 adolescents ranging in age from 12 to 19 years, with 318 girls and 278 boys, to examine the relationship between self-efficacy and depressive symptoms. To measure self-efficacy, participants were given the Self-Efficacy Questionnaire for Children (SEQ-C), which provides scores for total self-efficacy, as well as specific scores in academic, social, and emotional self-efficacy. Eight items on the SEQ-C address academic self-efficacy. Participants were also given the CDI to measure depressive symptoms. The researcher

found a significant negative correlation between academic self-efficacy and depressive symptoms ( $r = -.41$ ); however, Muris controlled for gender differences but did not provide separate statistics for females and males. Muris also performed analyses where he controlled for anxiety and neuroticism and reported that academic self-efficacy still had a significant relationship with depressive symptoms ( $r = -.27$ ).

McGrath (2000) proposed that negative self-concept and the resulting “cognitive distortions” can lead to a misperception of academic ability by depressed students. McGrath conducted a longitudinal study with fourth grade students, which included measurements of depression, self-concept, and reading grades give three separate times over a three year period. Depressive symptoms were computed as a composite of children’s self-report, teacher report, and parent report. Self-concept was measured with the SPPC, using both the Total Competence and Academic Competence score. The researcher computed the discrepancy between each student’s SPPC Academic Competence score and reading grades using regression analysis. McGrath labeled this discrepancy as a “cognitive distortion” and found that “children who experienced higher levels of depressive symptoms were more likely to underestimate their abilities” (p. 45). Children with lower levels of depressive symptoms were more likely to overestimate their academic abilities. The author performed correlations between cognitive distortions and depressive symptoms at each of the three assessment times. The correlations between cognitive distortions and depressive symptoms were  $r = -.31$  for Time 1,  $r = -.34$  for Time 2, and  $r = -.24$  for Time 3. The correlations at Time 1 and 2 were significant at  $p < .001$ , while Time 3 was significant at  $p < .01$ . Although these correlations are considered to be low to medium, they are significant because distortions and depressive symptoms not only persisted

over time, but get worse. McGrath found that higher levels of depression led to more severe underestimation over the three year period.

Noble, Heath, and Toste (2011) conducted a study with 71 adolescents examining the relationship between what they termed “positive illusions” of academic achievement (p. 650) and depressive symptoms. Positive illusions were defined as overestimations of ability. To calculate positive illusions, Noble and colleagues asked participants to predict their score on the spelling and math subtests of the Wide Range Achievement Test-3 (WRAT-3) before the test was administered. Discrepancies between the predicted and actual scores were calculated and positive scores represented illusions. The researchers divided the adolescents into low and high achieving groups for each test based on how each student scored relative to the mean, and then compared the estimations of each group. While the authors found no significant relationships for spelling, adolescents who were classified as low-achieving in math were more likely to have overestimated their math ability. Noble et al. correlated the estimation scores with the total scores on the CDI ( $r = -.21$ ). The authors found that overestimation in math was associated with fewer depressive symptoms, thus implying that underestimation in math was associated with more depressive symptoms.

Additional studies have provided support for a relationship between depression and underestimation of academic ability (Bandura et al., 1999; Cole, 1990; Cole & Martin, 1999). Cole and Martin (1999) conducted a longitudinal study with 807 third and sixth graders who completed questions every six months over a three year time period on their academic self-concept, depressive symptoms, and anxiety. Academic underestimation was estimated by comparing academic self-concept scores with a more objective measure of academic competence, which was teacher-reported. They found that boys tended to overestimate their

academic competence, while girls tended to underestimate theirs. Furthermore, Cole and Martin found a strong relationship between underestimation and CDI scores, with an increase in depressive symptoms worsening the degree of underestimation.

Cole (1990) conducted a study with 750 fourth grade students to evaluate the relationship between depression and social and academic competence. Competence was measured by self-report, peer nomination, and teacher rating. Cole reported that fourth grade girls had the tendency to underestimate their academic competence when compared to teacher evaluations, while boys were more likely to overestimate theirs. It was also found that an increase in depressive symptoms was related to a more severe underestimation of academic competence. Bandura et al. (1999) had similar findings in a study with 282 participants, who had mean age of 11.5 years. Assessment were given at two points in time, one year apart, and overall self-efficacy as well as academic self-efficacy was associated with increased levels of depression. Girls experienced more depression than boys because of self-perceived academic inefficacy, even though the girls had higher grades than boys. Bandura et al. found that overall “children were depressed over beliefs in their academic inefficacy rather than over their actual academic performances” (p. 265). This appears to support the idea of cognitive distortions and academic underestimation being associated with depression, particularly in girls.

Humensky et al. (2010) conducted a study which found no correlation between depressive symptoms and objective measures of academic performance such as English and math grades in adolescents ( $N = 83$ ). However, the researchers found a relationship between depression and the participants’ subjective self-assessments of their ability to complete academic schoolwork, or feelings of academic self-efficacy. Depressive symptoms were measured with the CES-D and subjective perceptions of academics were measured with researcher-created

survey questions rated on a 4-point scale. The researchers found significant positive correlations with depressive symptoms and students reporting that “feeling down or sad affected their ability to do well in school, concentrate or complete homework, to concentrate in class, attend class, and deal with other students” (p. 388). Participants were also asked to provide thoughts on how depression and school performance were related, and adolescents reported that depression lead to school underperformance, which resulted in more depressive symptoms and negative thinking. Humensky et al. found that adolescents felt more depression over their feelings of not being academic competent rather than their actual grades. These results are similar to those of Bandura et al. (1999).

Callicoatte (2009) conducted a study on the relationship between grade point average (GPA) and depressive symptoms in adolescents. The author used data from the National Longitudinal Study of Adolescent Health. This was a large scale study done at three different points in time with the same subjects. The first wave was done in the 1994 to 1995 school year with 7<sup>th</sup> to 12<sup>th</sup> grade girls. The second wave was done in 1996. The third wave was completed in 2001 to 2002, with the girls at age 18 to 26. A total of 4,882 girls were included in waves I, II, and III. Depression was measured using the Center for Epidemiological Studies’ Depression Scale (CES-D). GPA was self-reported. Based on these scores, the researcher categorized students into high or low GPA and high or low depression groups. High was defined as at least one standard deviation above the mean while low was defined as at least one standard deviation below the mean. Interestingly, the author found that GPA and depressive symptoms actually had a positive relationship in females, while this same relationship was negative for boys. In wave II, when most of the girls were in high school, the girls in the high GPA group had an average depression score of 9.47, while boys in the high GPA group had an average depression score of

7.53. Callicoatte concluded that “boys received a benefit in terms of their well-being from GPA that girls did not and again this was most pronounced at the high school level” (p. 69).

### **Online Social Networking (OSN)**

The present study also included exploratory questions about online social networking (OSN) usage in teens. Given the popularity of OSN among teens, exploratory questions were included in the study (See Appendix A) to explore the connection between OSN, academics, and depressive symptoms in teens. The relevant literature is outlined below.

Online social networks usually require members to join and create a profile, which typically contains various information about the user (Pempek, Yermolayeva, & Calvert, 2009). OSNs allow members to create a list of other members with whom they share a connection (Amichai-Hamburger & Vinitzky, 2010). These other members may be called “friends” or “followers” depending on the site. Members can also communicate with each other through several formats, including messages similar to email, instant messaging, blog posts, status updates, and sharing of photographs and videos (Correa, Hinsley, & de Zúñiga, 2010). Status updates are typically a brief description of a user’s activities or emotional state, and they may include photographs and video. According to the Pew Internet and American Life Project (2011), approximately 80% of adolescents who use the Internet use OSN sites. The most popular site is Facebook; 93% of adolescents who report using OSN have a Facebook account (Pew Internet and American Life Project, 2011).

As part of a large study by the Kaiser Family Foundation, Rideout, Foehr, and Roberts (2010) surveyed 8 to 19 year olds ( $N = 2,002$ ) on their media usage, including OSN. Participants completed a survey which asked about media usage in the previous day, with all days of the weekly evenly represented among participants. Media usage included the following categories:

TV content, music/audio, computer, video games, print, and movies. Rideout et al. defined categories based on hours of usage: heavy users, who used more than 16 hours per day of media (21% of entire sample); moderate users, who used from 3 to 16 hours per day (63%); and light users, who used less than three hours per day (17%). The study measured grades and level of contentment among the different groups. About half of the heavy users reported getting mostly grades of “C” or lower, while this figure was 23% for light users. Grades were self-reported. Of heavy media users, 32% reported they were often sad or unhappy, while this figure was 22% for light media users.

Rideout and colleagues (2010) provided statistics for computer usage, which were broken down by age: adolescents age 11 to 14 used the computer on average for 1 hour and 46 minutes per day, while 15 to 18 year olds used the computer for 1 hour and 29 minutes per day. Usage was further broken down into time spent using OSN, which included Facebook as well as MySpace and other sites. The age group of 11 to 14 year olds used OSN an average of 29 minutes a day, while 15 to 18 year olds used OSN for 26 minutes a day. However, these figures include students who do not use social networking at all. Of 11 to 14 year olds, an average of 42% used a social networking site in one day, while the figure was 53% for 15 to 18 year olds. On average, users of social networks spent about an hour online per day (1 hour and 7 minutes for 11 to 14 year olds; 48 minutes for 15 to 18 year olds.) In both age groups, 40% of the sample used OSN in any given day, and there was no significant difference between girls and boys. However, girls on average spent more time using OSN daily than boys (1 hour and 1 minute for girls; 47 minutes for boys).

Researchers have studied the relationship between OSN and mental health outcomes such as depressive symptoms and psychosocial adjustment in both high school and college students

(Frank, Santurri, & Knight, 2010; Holleran, 2010; Spraggins, 2009; Windham, 2008.) A recent government-agency sponsored study was conducted with 4,257 teens at 20 schools in Ohio through Case Western Reserve University (Frank et al., 2010). Students provided estimates of their daily time using OSN, by selecting from the following answers: no time on social networking; less than an hour per day; 1 hour per day; 2 hours per day; 3 hours per day; 4 hours per day; and 5 or more hours per day. There was 22.2% of the sample who used no social networking, 35.5% used less than 1 hour per day, and 11.5% used 2 hours per day. The researchers described those who used social networking 3 or more hours a day as hyper-networkers, and 11.5% of the sample met this criteria. The researchers found a significant difference in hyper-networking between female and male students (13.5% of females vs. 9.3% of males.)

Hyper-networkers were significantly more likely to experience depressive sadness, high stress, engage in self-harm, attempt suicide, purge as part of an eating disorder, be a victim of violence, and receive poor grades (Jacin, 2011; Frank et al., 2010). Frank et al. (2010) provided odds ratios for mental health risks, with hyper-networkers 2.5 times more likely to attempt suicide or engage in self-harm, 95% more likely to experience depressive sadness, and 2.2 times more likely to experience high stress. Frank et al. found that social networking was not associated with any protective factors, only with higher risk rates in several areas. As of this writing, the research remains unpublished in a peer-reviewed journal but was shared at the annual meeting of the American Public Health Association in November 2010 and reported in *Child Psychiatry News* (Jacin, 2011). The primary author, Scott Frank, was emailed a request for more statistical information from the study but no reply was received.

For his dissertation, Windham (2008) conducted a study of Internet usage among 9<sup>th</sup> and 10<sup>th</sup> grade students ( $N = 614$ ). Participants were given a written questionnaire created by the researcher which included 15 items which assessed “students’ thoughts, attitudes, and experiences about the time they spend online and its impact on their life, including self-image, relationships, sleep and academic work” (p. 65). Windham called the items the *Online Attitudes & Behavior scale*, and he developed it through a process of observing teen Internet usage and discussion sessions with 36 adolescents. Students were asked: “On a TYPICAL DAY that you go to social networking websites such as MySpace or Facebook, how much time do you spend on such sites?” (p. 140). Participants had five choices on the survey: none, less than 30 minutes; 30 minutes to an hour; 1 to 2 hours; or more than 2 hours. Windham computed the mean using a five point scale from 0 to 4 for the above choices ( $M = 1.7$ ,  $SD = 2.15$ ), which means that the average student used OSN somewhere between less than 30 minutes a day to one hour a day. There were 92 students who also volunteered to keep a log of their Internet usage for three consecutive days using an online survey. The log provided students with the same choices above, and a mean of 45.6 minutes of OSN usage per day was reported for the 76 students who completed the log for least two of the three days.

Windham (2008) provided correlations between daily time using OSN, the *Online Attitudes & Behavior scale*, GPA, and psychosocial adjustment. There was a significant relationship between the time spent using OSN and GPA from the last year ( $r = -.11$ ,  $p < .01$ ), with GPA being self-reported on the written questionnaire. Windham also reported a significant positive correlation between time spent using OSN and the *Online Attitudes & Behavior scale* ( $r = -.42$ ,  $p < .01$ ). Higher scores on *Online Attitudes & Behavior scale* may indicate problematic attitudes and behaviors online, meaning that more time using OSN may indicate negative

experiences with the Internet. In addition, Windham measured psychosocial adjustment with the Personal Adjustment composite score of the Behavioral Assessment System for Children, 2nd Edition (BASC-2), which includes estimates of self-esteem and personal relationships. There was a significant negative correlation between usage of OSN and psychosocial adjustment ( $r = -.07, p < .01$ ), and the relationship was not significantly different for females and males.

Windham also found negative correlations between the *Online Attitudes & Behavior scale* and psychosocial adjustment (for the entire sample:  $r = -.15, p < .01$ ), as well as GPA but this relationship was only significant for 9th grade students ( $r = -.12, p < .01$ ).

Spraggins (2009) conducted a dissertation study that examined the relationship between the usage of OSN and measures of depression and self-esteem in undergraduate students ( $N = 367$ ). The author measured “problematic social networking site use” (p. 38) through a self-report questionnaire which had 29 items. The questions were adapted from the Generalized Problematic Internet Use Scale (Caplan, 2007) in order to assess how dependent students felt on OSN. From the data, Spraggins estimated that 5 to 10% of the sample engaged in problematic usage of OSN. The researcher also measured depressive symptoms using the CES-D and self-esteem using the Rosenberg Self-Esteem Scale. Spraggins reported a significant positive correlation between problematic usage of OSN and depressive symptoms ( $r = .28, p < .001$ ). Spraggins also reported a negative relationship between problematic usage of OSN and self-esteem ( $r = -.30, p < .001$ ).

As part of her dissertation, Holleran (2010) conducted three studies with college students which investigated if early depression could be detected from MySpace blogs and Facebook profiles and status updates. Students were administered the BDI, and a cutoff was established to determine if students met criteria for having subclinical depressive symptoms. Observers who

did not know the participants then viewed their MySpace profile, Facebook profile, or Facebook status updates. Observers then completed one question: “I see the target as someone who is depressed” (p. 22). There was a 7-point scale ranging from strongly disagree to strongly agree. These observations were then correlated with the BDI scores. Holleran concluded that depression can be assessed with a “moderate level of accuracy” by observers (p. 25), with accuracy correlations ranging from .12 to .30. Interestingly, for Facebook, observers were more accurate when they rated the subject based on only on their status updates rather than their entire profile. In addition, for one of the Facebook studies, subjects completed the BDI again three months after the initial study. Observers had been asked three months earlier: “How depressed do you believe the target will be 3 months from now?” with the same 7-point scale as described above. Observers made predictions which were significantly accurate both when they examined the entire profile and status updates, with both having accuracy correlations of .26.

Holleran (2010) also used a text analysis computer program to analyze the use of language categories on MySpace blogs and Facebook status updates. The program counted words in categories like negative emotions (i.e. sad or worthless), and the results were then correlated with the BDI scores. Using fewer positive emotion words (such as happy) was significantly associated with higher levels of depression, and using more words related to death, profanity, negative emotions, and religion was associated with higher depressive symptoms.

Several studies have analyzed the relationship between GPA and Facebook usage in college students, with mixed findings (Junco, 2012; Kirschner and Karpinski , 2010; Kolek and Saunders, 2008; Pasek, More, and Haritta, 2009.) Kirschner and Karpinski (2010) compared the GPA of college students who used Facebook students with the GPA of college students who did not use Facebook, with a total of 219 graduate and undergraduate students included in the

sample. GPA was self-reported with students being able to select from five ranges. The authors performed ANOVAs to analyze differences in GPA between Facebook users and non-users. The differences were significant, with students who used Facebook reporting a lower GPA ( $M = 3.1$ ,  $SE = .08$ ) than those who did not use Facebook ( $M = 3.8$ ,  $SE = .05$ ). There were 26 students (11.9% of the total sample) who reported in their answers to qualitative questions that Facebook had a negative impact on academics. In contrast, while it was not their main research question, Kolek and Saunders (2008) reported no significant differences between the mean GPA of Facebook users and non-users, with a total sample of 464 undergraduate students.

Pasek et al. (2009) used three data sets to examine the relationship between Facebook usage and GPA. Data for the first study came from first year college students ( $N = 1,060$ ). The second data set was a cross-sectional sample of adolescents and young adults aged 14 to 22 years ( $N = 700$ ). The third data set was a longitudinal study examining changes in grades over a year for adolescents and young adults aged 14 to 23 ( $N = 320$ ). In their analysis, Pasek and colleagues did not find any strong evidence of a negative relationship with Facebook usage and grades after they controlled for demographic variables.

In the largest and most recent study, Junco (2012) found that time on Facebook had a significant negative relationship with GPA in a large sample of college students ( $N = 1,839$ ). Students reported spending an average of 106 minutes daily using Facebook ( $SD = 93$ ). Participants could provide an exact amount of time rather than having to pick from a categorical scale (i.e. 1 to 2 hours). Junco collected GPA directly from the registrar's office rather than relying on self-report. Based on Junco's statistical model, a college student who uses Facebook 279 more minutes than average would have a GPA which is 0.37 points below the mean. Junco theorized that time spent using OSN could negatively affect academics by detracting from study

time, but students “would have to spend an enormous amount of time on Facebook for that use to have a substantial real-world impact on overall GPA” (p. 194).

### **Rationale of Study**

Given the high prevalence rates of depression among adolescents and the importance of academic achievement for future life success, the current study is focused on important areas which could benefit from additional research. The present study proposes to extend the literature by examining rates of depressive symptoms and treatment of depression in a sample of adolescents. The current study also explores the relationship between academic self-efficacy, academic outcome confidence, and academic estimation with depression, with a focus on examining gender differences. Finally, the present study provides exploratory data on online social networking in adolescents, an area in which there are currently few published studies.

### **Research Questions and Hypotheses**

Research Question 1: How is academic self-concept in adolescents related to level of depression?

Hypothesis 1: Academic self-concept will decrease as the level of depression increases. This relationship will be more significant for girls.

Research Question 2: How is academic outcome confidence related to level of depression?

Hypothesis 2: Academic outcome confidence will decrease as level of depression increases. No significant gender differences are expected.

Research Question 3: How is the accuracy of academic estimation related to level of depression?

Hypothesis 3: Academic underestimation will become more severe as level of depression increases. This relationship will be more significant for girls.

## Methods

### Participants

Participants were students attending a high school in the Northwest. The Dean of Students of the high school and school psychologist granted permission for researchers to recruit students to be in the study and collect data on the school campus.

Participants ( $N = 66$ ) were 9<sup>th</sup> and 10<sup>th</sup> grade students. The study excluded 11<sup>th</sup> or 12<sup>th</sup> grade students because one of the dependent variables of the study is not collected by the school for those grades. (Measure of Academic Progress; MAP). Students were recruited from science classes in which the teacher agreed to participate. Nine classes with 186 possible participants were recruited to be in the study. Recruitment took place during a regular class period. The study was described using a recruitment script, and the researcher responded to all student questions. Forms for parental consent were distributed to all 186 students which were returned by 66 students, a 35% participation rate. Additionally, student assent forms for all participants were completed. As an incentive to participate, students who returned their parental consent forms were entered into a random drawing for \$10 iTunes gift cards. Three cards per class were awarded.

Of the 66 students who completed the study, 60% were female ( $n = 40$ ) and 40% were male ( $n = 26$ ). The participants ranged in age from 14 to 16 ( $M = 15.2$ ,  $SD = 0.58$ ). One student did not provide a birthdate so data for age was only available for 65 students. All participants provided their grade level: 60% were in 9<sup>th</sup> grade ( $n = 40$ ) and 40% were in 10<sup>th</sup> grade ( $n = 26$ ). Students were given a list of ethnicities in a researcher-created survey (See Appendix A) and asked to check all that apply. All students ( $N = 66$ ) identified themselves as being White. In addition, 9% of students ( $n = 6$ ) identified themselves as having more than one ethnicity, or bi-

racial. Two students identified as American Indian or Alaska Native, one student identified as Hispanic or Latino, one student identified as Asian or Pacific Islander, one identified as Black or African-American, and one student checked “Other” and wrote in “Middle-Eastern.”

### **Procedures**

The study took place in the science classrooms during regular class time. Students who participated in the study completed the assessments in a part of the classroom separate from students who were not participating in the study. Group sizes for participants in each classroom ranged from three to 13 students. Participants were given instructions as a group and were allowed to ask questions on an individual basis as they completed the study. Students were reminded their participation was voluntary and they could end their participation at any time. Participants were administered the Student Self-Concept Scale (SSCS) and Center for Epidemiological Studies Depression Scale for Children (CES-DC) first, and then completed a researcher-created survey at the end of the session. The survey was given last in order to assess how upset the participants felt as a result of participating in the study, which assessed by the last question of the survey, item 11. (See Appendix A). Data was collected on two days in late spring before the end of the semester so that participant answers were temporally related to student outcomes data (standardized test scores and GPAs).

The project received approval through the Institutional Review Board (IRB) at the University of Montana on April 11, 2011 with the condition that a safety monitoring measure, item 11 from the researcher-created survey (See Appendix A), assessed how upset students felt as a result of completing the questionnaires. The item is presented below:

11. On a scale of 0 to 10, how upset are you right now as a result of completing these questionnaires?

(not at all) 0 1 2 3 4 5 6 7 8 9 10 (extremely)

The criterion for concern was decided beforehand as ratings of 7 to 10 on the scale. If this occurred, the students were to be referred to the school psychologist to follow up according to school protocol. A total of 60 students selected 0, three students selected 1, and three students selected 2. Therefore according to pre-established protocol, no students were referred to the school psychologist.

The research design is correlational, meaning all students completed the same measures and were not assigned to control and experimental groups.

### **Measures**

**Center for Epidemiological Studies Depression Scale for Children.** The Center for Epidemiological Studies Depression Scale for Children (CES-DC; Weissman, Orvaschel, & Padian, 1980) is a self-report depression screener designed for children and adolescents. It is a modification of the original Center for Epidemiological Studies Depression Scale (CES-D Scale, (Radloff, 1977), which is an assessment designed to evaluate the current levels of depressive symptoms of adults in the community. The CES-D has been validated among adults and found to have high levels of internal consistency, substantial concurrent validity with other measures of depression, and adequate test-retest reliability (Blatt, Hart, Quinlan, & Leadbeater, 1993; Radloff, 1977). The original CES-D is a 20 item scale in which test-takers rate themselves on depressive symptoms using a likert-scale which ranges from 0 to 3. Weissman et al. (1980) created the CES-DC by adapting some questions from the adult CES-D to make it more

appropriate and understandable for children. The CES-DC also contains 20 questions with similar content to the CES-D and the same Likert-scale system. The CES-DC contains items measuring six different scales of symptoms, described in Fendrich, Weissman, and Warner (1990) as, “depressed mood, feelings of guilt/worthlessness, a sense of helplessness /hopelessness, psychometric retardation, loss of appetite, and sleep disturbance” (p. 539). Total raw scores for the CES-DC can range from 0 to 60, with higher scores indicating more depressive symptoms in the child or adolescent. The directions for the CES-DC are: “Below is a list of the ways you might have felt or acted. Please check how much you have felt this way during the *past week*.”

Two major studies have been done to evaluate the use of the CES-DC in children, adolescents, and young adults ranging in age from 6 to 23 (Faulstich, 1986; Fendrich et al., 1990). Faulstich (1996) evaluated the psychometric properties of the scale with children and adolescents ( $N = 148$ ) who were hospitalized in psychiatric hospitals. Participants ranged in age from 8 to 17. The sample was divided into a child group, age 12 and under ( $n = 41$ ), and an adolescent group, age 13 and above ( $n = 107$ ). The CES-DC was evaluated for test-retest reliability, with the test being given again two weeks after the original administration. The test-retest reliability was considered very poor for the child group ( $r = .12$ , n.s.). However, it was considered adequate for adolescents ( $r = .61$ ,  $p < .0005$ ). Internal consistency was measured by Cronbach’s alpha and was described as good for both children ( $\alpha = .77$ ) and adolescents ( $\alpha = .86$ ). Concurrent validity was measured by comparing scores on the CES-DC with scores from CDI. The correlations were considered poor for the child group ( $r = .03$ , n.s.), but adequate for the adolescent group ( $r = .61$ ,  $p < .0005$ ). Faulstich (1996) determined from factor analysis that the total scores from the CES-DC did not adequately discriminate between diagnostic categories

of the *DSM-III* as well as depressed and non-depressed participants. Faulstich concluded that overall the CES-DC showed “good psychometric properties for adolescents” (p. 1024).

Fendrich et al. (1990) studied the utilization of the CES-DC as a screener in children, adolescents, and young adults, ages 6 to 23 years ( $N = 220$ ). The sample was described by age, with 16% at age 6 to 11, 45% at age 12 to 18, and 40% at age 19 to 23. In terms of internal reliability, Fendrich et al. reported a Chronbach’s alpha coefficient of .89. The authors examined the sample by *DSM-III* diagnoses, and found that those participants diagnosed with major depressive disorder or dysthymia had mean scores significantly above those than children with another diagnosis (21.2 vs. 13.9) and those children with no current diagnosis (21.2 vs. 12.8). Fendrich et al. provided effect sizes by age group which represented how well the CES-DC can discriminate between those with and without a diagnosis of major depression or dysthymia. The age group from 12 to 18 years had the only significant effect size ( $d = 1.37$ ). Fendrich et al. concluded that “the CES-DC appears to be most valid a as a measure of depression for girls and for children aged 12 to 18 years” (p. 548). The researchers also used factor analysis to evaluate the scale for its screening performance and suggested a raw score of 15 or above may be an appropriate cutoff point when the criterion was major depressive disorder or dysthymia. When the criterion is major depressive disorder only, a cutoff of 16 or above may be preferred (Fendrich et al., 1990).

**Grade point average.** Parental consent and child assent forms granted permission for researchers to access each child’s academic record. Each student’s GPA from the spring 2011 semester was recorded. The high school does not weight any grades so all GPAs are unweighted and do not take into account Advanced Placement and Honors courses.

**Student Self-Concept Scale.** The Student Self-Concept Scale (SSCS; Gresham, Elliott, & Evans-Fernandez, 1993) is a self-concept scale for grades 3 to 12 which can be administered in a group or individual setting. The self-report survey is written at a third grade reading level and contains 72 items. The SSCS has specific questions which cover three dimensions of self-concept: Self-Confidence, Importance, and Outcome Confidence. The dimensions are thought to be conceptually distinct from each other (Gresham, 1995). The SSCS assesses Self-Confidence, Importance, and Outcome Confidence in the Self-Image, Academic, and Social domains. There are also composite scores for Self-Confidence and Outcome Confidence. Self-confidence is similar to self-efficacy, and is described as “the level of confidence a person may have in his or her ability to perform certain behaviors or to have certain culturally valued personal attributes” (Gresham, 1995, p. 22). Importance is defined as “a person’s perceptions about the importance of performing certain behaviors or having certain culturally valued personal attributes (Gresham, 1995, p. 22). The same 50 questions assess a student’s self-confidence and importance for various tasks or personal traits. Two example items are: “I can finish my classwork on time” and “I can make friends easily.” There is a three point scale for how confident the student is that they can do what the item says, ranging from Not at All, Not Sure, or Confident. There is also a three point scale for the student to rank how important the item is, ranging from Not Important, Important, or Critical. The directions also specifically ask the student to pick answers based on both what is important to them and what would make a difference in how they feel about themselves.

There are 15 items specifically for Outcome Confidence, which is defined as the “degree of confidence that a person has that positive outcomes will result from performing certain behaviors or having certain culturally valued personal attributes” (Gresham, 1995, p. 22). The

items are presented as “If, Then” statements. Two examples are: “If I do my homework on time, my parents will be proud of me” and “If I’m as strong as other kids, I will be asked to help with big tasks.” There are descriptive behavior levels given for the subscales of Self-Image, Academic, and Social Outcome Confidence, including low, average, and high. There is also a standard score given for the Outcome Confidence Composite. There are also seven items testing unrealistic situations using a “Lie Scale” placed through the test.

Internal consistency coefficients for the SSCS Self-Composite at the elementary and secondary school levels ranged from .89 to .92, with the median at .90 (Gresham, 1995). The composite scores in Self-Confidence in the domains of Self-Image, Academic, and Social were .79 to .82, with the median at .81. Test-retest reliabilities were based on a sample of secondary students ( $N = 305$ ) tested 4 weeks apart. The mean stability coefficient for the Self-Confidence Composite score was .84. For the Self-Confidence subscales in the Self-Image, Academic, and Social areas, the median stability coefficient was .77. In the Importance subscales of the SSCS, the median stability coefficient was .72. The Outcome Confidence Composite had a stability coefficient of .72, while the subscales had a median stability coefficient of .56. The SSCS was tested for correlation with the Piers-Harris Self-Concept Scale, a widely self-concept used measure. The validity coefficient for the tests in a sample of 44 secondary students was .64. Overall, the SSCS has good reliability and correlation with another widely used scale self-concept scale (Gresham, 1995).

**Measure of Academic Progress.** The Measure of Academic Progress (MAP; Northwest Education Association, 2005), is a computerized adaptive test which helps teachers, parents, and administrators improve learning for all students and make informed decisions to promote a child's academic growth. The test can be used with grades 2 to 10 in the following subject areas:

Reading, Language, Mathematics, General Science, and Science Concepts. MAP tests given in Montana align to the state education standards. Students are generally tested twice a year in local high school districts.

The MAP test is administered on a computer and the questions are individually adapted based on the performance of each student (Northwest Education Association, 2012). Subject tests contain approximately 40 to 50 items (Cizek, 2010). All questions are multiple choice, with reading items having four possible answers, and math items having five possible answers (Cizek, 2010). There is no time limit on the computer for the test.

The MAP was standardized from a sample that included more than two million students from 5,616 schools in 794 school districts in 32 states, with the test data coming from 2003 and 2004 (Gierl and Alves, 2010). In their review of the test, Gierl and Alves (2010) described the geographical range of samples as diverse and the ethnic sample as comparable to the national one for most ethnic groups. Test-retest reliability was ranged from .77 to .94 across subject tests and grade levels (Gierl and Alves, 2010).

The MAP Technical Manual contains measures of concurrent validity using other achievement measurements such as the Stanford Achievement Test, Colorado State Assessment Program, Iowa Tests of Basic Skills, Indiana Statewide Testing for Educational Progress-Plus, Washington Assessment of Student Learning, and Wyoming Comprehensive Assessment System (Gierl and Alves, 2010). Gierl and Alves (2010) calculated the average correlation for both Math and Reading at .85 across all tests.

MAP assessment results provide RIT scores and percentiles (Northwest Evaluation Association, 2012). RIT scores are based on the Rasch Unit, which is a scale of equal interval, and they are designed to show absolute growth over time (Northwest Evaluation Association,

2012). The sample in the current study included students both in 9<sup>th</sup> and 10<sup>th</sup> grade students. Students in higher grades typically have higher RIT scores, so these may not have provided a fair comparison across grade levels. Percentile scores were used for the current study because of their ease of interpretation. For example, if a 9<sup>th</sup> grade student scored in the 50<sup>th</sup> percentile on the MAP reading test, it would mean that the student scored higher than 50% of all 9<sup>th</sup> grade students who had taken the MAP reading tests (Cizek, 2010; Northwest Evaluation Association, 2005). Reading and Math percentile scores are used in the analyses for the current study. The scores were the most recent ones available and are from April 2011.

**Survey.** A researcher-created survey (See Appendix A) contained questions on student demographics, including age and ethnicity, current treatment for depression, and social networking usage.

### **Data Analyses**

All hypotheses were tested with regression equations, with separate tests conducted for females and males. Regressions for females and males were examined separately, thus providing values for  $\beta$  and  $R$ -squared for each gender rather than indicating if gender was a significant predictor overall.

Hypothesis 1 was tested with the total raw score from the CES-DC as the independent variable and the Academic Self-Confidence standard score as the dependent variable. The standardized residuals of the regressions were tested for normality using the Kolmogorov-Smirnov test. If the test has a significance level larger than .05, then the scores are considered normally distributed (Pallant, 2010). The residuals were normally distributed for both females and males.

Hypothesis 2 was tested with the total raw score from the CES-DC as the independent variable and the raw score from the SSCS Academic Outcome Confidence as the dependent variable. When the standardized residuals of the regressions for this variable were tested for normality using the Kolmogorov-Smirnov test, the residuals for females were not normally distributed ( $p = .01$ ). The original variable had a negatively skewed distribution for the entire sample. A transformation of the data was performed based on the guidelines in Pallant (2010). The raw scores were transformed into a new variable using the square root of ( $K - \text{old variable}$ ), with  $K$  being the largest possible value of the variable plus one ( $K = 9$ ). However, the original variable had a negative correlation with the CES-DC, while the transformed variable had a positive correlation with the CES-DC. Therefore, it was decided that the transformation made interpretation of the new variable difficult so the original variable was used to test Hypothesis 2. It should be noted that according to Field (2009), a violation of the assumption of normality of standardized residuals in regression can limit the generalizability of results.

Hypothesis 3 was tested with three sets of regression equations with the CES-DC serving as the independent variable for each test. The dependent variables were measures of academic estimation, which were calculated using a design adapted from studies by McGrath (2000) and Cole and Martin (1999). The analysis for Hypothesis 3 was conducted in two steps. In Step 1, three regressions were conducted in which each student's Academic Self-Confidence was regressed onto three achievement measures in separate regression equations. The three achievement measures were the MAP Math percentile score, the MAP Reading percentile score, and GPA. Then, the standardized residuals for each regression were saved as new variables. Statistically, the residuals are the portion of Academic Self-Confidence not explained by the student's MAP scores and GPA. The residuals theoretically represent each student's estimation

of their academic abilities. They serve an estimate of the discrepancy between the student's Academic Self-Confidence and actual academic performance. Positive residuals represent overestimation of academic abilities while negative residuals represent underestimation.

In the Step 2 for the analysis for Hypothesis 3, three sets of regressions for female and male students were conducted. The independent variable for each equation was the total raw score from the CES-DC and the dependent variables were the standardized residuals from the regressions from Step 1. The standardized residuals were tested separately for normality using the Kolmogorov-Smirnov test. The MAP math percentile for males were not normally distributed ( $p = .04$ ). However, since the  $p$ -value was not extreme and the residuals were normally distributed for girls, the original variable was not transformed. As Field (2009) noted, the results of the regression may not be generalizable to the population because of the lack of normality of the residuals. Cook's distance was calculated for each score to test for outliers. No standardized residuals had a value of more than 1 so no scores were excluded from the three regressions.

Adjusted  $R^2$  values are reported because of the small sample sizes for each regression.

### **Sample Size**

Based on the research by Weisz et al. (1993), McGrath (2000), and Noble et al. (2001), who provided values for the Pearson correlation coefficient values for variables similar to those used in the current study, the mean expected correlation is .35. Cohen (1992) describes a small effect size as  $r = .10$ , a medium effect size as  $r = .30$ , and a large effect size as  $r = .50$ . Based on this criteria, medium to large effect sizes are expected for the correlation coefficients for the variables of interest. According to tables provided by Cohen (1992), with a power level of .80 and a  $p$ -value of .05, a sample size of 87 would be needed for an expected medium effect size

and a sample size of 26 would be needed for a large effect size. The current study included a sample of 66 students. Regression analyses were computed separately for female ( $n = 40$ ) and male ( $n = 26$ ) students, so the power level seems adequate for female students but may be considered low for male students.

## **Results**

### **Summary of Missing Data**

One student did not list their birthdate, which means there was one value missing for age. Two students were missing the most current semester GPA. This data appeared to be missing at random and school officials were unable to explain why the information was unavailable at the time of data collection. One student was missing percentile scores for both the MAP Reading and Math tests, presumably because she was absent for the testing. One student had two missing scores for individual items on the SSCS. Based on information in the manual (Gresham, 1995), standard scores and descriptive levels were not calculated due to excessive missing data. In total, there were 15 missing data points from the 19 variables used in the analyses. There were possible 1,254 data points in the analyses, meaning the missing data rate was 1.2%. All missing data was excluded pairwise in the SPSS analyses, which means participants were only excluded from the analyses in which they had missing data.

### **Outliers**

In order to test for outliers, Cook's distance was calculated for each score. Field (2009) stated that scores which are considered outliers do not need to be removed if their Cook's distance is less than one, as this indicates the outlier did not have a significant effect on the regression analysis. No standardized residuals had a value of more than 1, and therefore no scores were removed from the regression analyses that were used to test the hypotheses.

### **Descriptive Statistics from Continuous Variables**

Descriptive scores for all students on the major scales of the SSCS, the total raw score from the CES-DC, the MAP Math and Reading percentile scores, and GPA are listed in Appendix B, Table 1. In order to analyze gender differences on measures, descriptive statistics were calculated separately for female and male students. Independent samples *t*-tests were performed to test for differences between the scores of female and male students. No significant differences were found.

### **Statistics from Categorical Variables**

The SSCS provides descriptive levels for Outcome Confidence in the Self-Image, Academic, and Social domains based on raw scores. The descriptive levels are Low, Average, and High. Levels were available for 65 students. Results for all students, female students, and male students are presented in Table 2.

A chi-square test for independence of the two samples was not performed because preliminary analyses showed that two cells would have an expected frequency count of less than 5, which violates an assumption of the test.

### **Depressive Symptoms**

Analyses were run to determine what percentage of sample would fall above the cutoff of a raw score on the CES-DC of 15 or above as suggested by Fendrich et al. (1990) as a screening for major depressive disorder or dysthymia. For the entire sample, 69.7% ( $n = 46$ ) had a raw score of 14 or below on the CES-DC, while 30.3% ( $n = 20$ ) had a raw score of 15 or above. The sample was further divided by gender. For female participants, 65% ( $n = 26$ ) had a raw score of 14 or below, while 35% ( $n = 14$ ) had a raw score of 15 or above. For male participants, 76.9% ( $n = 20$ ) had a raw score of 14 or below, while 23.1% ( $n = 6$ ) had a raw score of 15 or

above. A Chi-square test for independence suggested that there was no significant association between gender and depression,  $\chi^2(1, n = 66) = .57, p = .45, \phi = -.127.$

The researcher-created survey contained two questions on the treatment of depression. The first question was, "Are you currently receiving treatment for depression?" Students had the option of checking Yes or No. There was 9.1% ( $n = 6$ ) of the total sample which responded "Yes" while 90.9% ( $n = 60$ ) responded "No." The second question was, "If yes, do you feel the treatment you are receiving is helping you?" Students had the option of checking Yes or No. There was 6.1% ( $n = 4$ ) of the sample which answered "Yes." That means of the six students who indicated they were receiving treatment for depression, 67% indicated it was helping them. The questions were examined in terms of gender, with three female students reporting receiving treatment for depression, with two (67%) answering that the treatment was helping them. Three male students (67%) also reported receiving treatment for depression, with two answering that the treatment helped them.

The six students who reported receiving treatment for depression had CES-DC scores of 4, 9, 19, 16, 21, and 32 ( $M = 15.5, SD = 10.45$ ). Three of six students receiving treatment for depression had CES-DC scores of 15 or above, the suggested cut-off point for a screening for dysthymia or major depression (Fendrich et al., 1990). Those students who reported not receiving current treatment for depression ( $n = 60$ ) had a mean CES-DC score of 11.9 and a standard deviation of 8.61, and 71.7% ( $n = 43$ ) had CES-DC totals of 14 or below, while 28.3% ( $n = 17$ ) had totals of 15 or above. Of the 20 students who had scores of 15 or above on the CES-DC, three indicated they were receiving treatment for depression (15%), which means 85% of students who scored above the cutoff were not receiving treatment for depression.

### **Correlations**

A series of Pearson Product-Movement Correlations were performed in order to analyze the relationship between selected variables. Table 3 shows the correlations between the major scales of the SSCS and the CES-DC total raw score, MAP Math and Reading percentile scores, and GPA for all students. In summary, there were significant negative relationships found between the CES-DC and the Academic Self-Confidence, Social Self-Confidence, and the Self-Confidence Composite scales of the SSCS. This means that as depressive symptoms on the CES-DC went up, the SSCS scores decreased. There was also a significant negative correlation between the Academic Importance scale of the SSCS and the MAP reading percentile, meaning that as Academic Importance scores went up, percentiles on the MAP reading decreased.

In order to examine gender differences, correlations were also performed separately for each gender, with Table 4 showing the results for female participants and Table 5 showing the results for male participants. Female participants had a significant negative relationship between the CES-DC and the Academic Self-Confidence, Social Self-Confidence, and Self-Confidence Composite scales of the SSCS, meaning that as depressive symptoms increased, the SSCS self-confidence scores in these areas decreased. There was also a significant positive relationship between the SSCS Academic Self-Confidence and the MAP Reading Percentile, meaning that as Academic Self-Confidence scores went up, percentiles on the MAP Reading increased. There was only one significant correlation for male students. The Academic Importance scale of the SSCS and the MAP Reading Percentile were negatively correlated, meaning that as Academic Importance scores increased, reading scores decreased.

Table 6 presents correlations for all students between the academic scales of the SSCS (Self-Confidence, Importance, and Outcome Confidence.) All of the scales have significant

positive correlations. Correlations were performed by gender, with the results for females presented in Table 7 and the correlations for males presented in Table 8. For female students, only Academic Self-Confidence and Academic Outcome Confidence were significantly positively correlated. Academic Importance did not have any significant correlations with the other variables. Male students had significant positive correlations among all three variables, thus males who saw academics as important were more likely to have higher confidence in their ability to achieve academically, as well as beliefs that anyone could succeed academically with effort. This difference may be explained by the fact that for females, higher rates of depression were associated with lower academic self-confidence. If female students feel academics are important, they may not have corresponding high beliefs in their ability to achieve academically, perhaps due to increased depressive symptoms or lower self-concept as compared to males.

Correlations were performed to examine the relationship between the total raw score of the CES-DC and the three measures of academics: the MAP Math percentile score, the MAP Reading percentile score, and GPA. For all students (Table 9), there was a significant negative correlation between the CES-DC and GPA, meaning that as depressive symptoms increased, GPA decreased. To examine gender differences, correlations were performed for female and male students (see Table 9). There was a significant negative correlation between the CES-DC and the MAP Reading Percentile for females, meaning that as depressive symptoms increased, reading scores decreased. However, the correlations between the CES-DC and math scores and GPA were not significant. These differences may be explained by the negative correlation between Academic Self-Confidence and Map Reading scores. Academic self-confidence and depressive scores also had a significant negative relationship in females. Thus, depressive symptoms, academic self-confidence, and reading test scores appear to have significant

relationships with each other in females. There were no significant correlations for males between the CES-DC and academic measures.

### **Research Question/Hypothesis 1**

Research Question 1: How is academic self-concept in adolescents related to level of depression?

Hypothesis 1: Academic self-concept will decrease as the level of depression increases. This relationship will be more significant for girls.

Results of the regression equation of academic self-confidence on depressive symptoms for females are presented in Table 10 and the results for males are presented in Table 11. The regression equation was significant for females but not males, meaning that for females, as depressive symptoms increased, academic self-confidence decreased ( $R = -.56$ ). For females, depressive symptoms predicted 29.4% of the variance in Academic Self-Confidence (adjusted  $R^2 = .29$ ,  $\beta = -.56$ ).

### **Research Question/Hypothesis 2**

Research Question 2: How is academic outcome confidence related to level of depression?

Hypothesis 2: Academic outcome confidence will decrease as level of depression increases. No significant gender differences are expected.

The regression of academic outcome confidence on depressive symptoms was not significant for either females or males, but approached significance for males. For females, depressive symptoms predicted none of the variance in academic outcome confidence (adjusted  $R^2 = .00$ ,  $\beta = -.16$ ). For males, depressive symptoms predicted 6.9% of the variance in academic outcome confidence (adjusted  $R^2 = .07$ ,  $\beta = -.33$ ).

### **Research Question/Hypothesis 3**

Research Question 3: How is the accuracy of academic estimation related to level of depression?

Hypothesis 3: Academic underestimation will become more severe as level of depression increases. This relationship will be more significant for girls.

In order to analyze gender differences for academic estimation, descriptive statistics were calculated separately for female and male students for the standardized residuals used to test each regression equation (see Table 12). Independent samples t-tests were performed to test for differences in academic estimation between females and males. No significant differences were found.

The results for the regressions for the MAP Math standardized regression residuals on the depressive symptoms are presented in Table 13 (females) and Table 14 (males). The regression equation was significant for females but not for males, meaning that for females, as depressive symptoms increased, the underestimation of math abilities became more severe ( $R = -.56$ ). For females, depressive symptoms predicted 29.5% of the variance in math academic estimation (adjusted  $R^2 = .30$ ,  $\beta = -.56$ ). For males, depressive symptoms predicted less than 1% of the variance in math academic estimation (adjusted  $R^2 = .01$ ,  $\beta = -.18$ ).

The results for the regressions for the MAP Reading standardized regression residuals on depressive symptoms are presented in Table 15 (females) and Table 16 (males). The regression equation was significant for females but not for males, meaning that for females, as depressive symptoms increased, the underestimation of reading abilities became more severe ( $R = -.55$ ). For females, depressive symptoms predicted 28.8% of the variance in reading academic estimation (adjusted  $R^2 = .29$ ,  $\beta = -.55$ ). For males, depressive symptoms predicted 1.1% of the variance in reading academic estimation (adjusted  $R^2 = -.01$ ,  $\beta = -.17$ ).

The results of the regressions for GPA standardized regression residuals on depressive symptoms are presented in Table 17 (females) and Table 18 (males). The regression equation

was significant for females but not for males, meaning that for females, as depressive symptoms increased, the underestimation of GPA became more severe ( $R = -.48$ ). For females, depressive symptoms predicted 20.7% of the variance in GPA estimation (adjusted  $R^2 = .21$ ,  $\beta = -.48$ ). For males, depressive symptoms predicted none of the variance in GPA estimation (adjusted  $R^2 = -.02$ ,  $\beta = -.14$ ).

### **Exploratory Data Analysis for Online Social Networking (OSN)**

The researcher-created survey (see Appendix A) included several questions assessing participants' usage of online social networking (OSN) to examine the relationship of OSN to depression. These questions are considered exploratory because of the lack of peer-reviewed research on social networking usage in adolescents. In addition, the usage questions were open-ended, which may make drawing conclusions from quantitative analyses difficult.

**Descriptive statistics of OSN usage.** Questions 4 to 9 of the survey are focused on online social networking usage. Question 4 was: "Do you participate in any online social networking sites (such as Facebook, MySpace, Twitter, Tumblr)?" Students could respond yes or no, with 90.9% ( $n = 60$ ) responding yes, and 9.1% ( $n = 6$ ) responding no. Thirty-nine ( $n=39$ ) females (97.5%) and 21 males (80.8%) responded yes to use of OSN. All 60 students who responded yes to Question 4 answered Questions 5 and 6. Question 5 was: "If yes, which ones? They can be in addition to the ones listed above." There was no limit to how many networks students could list. Percentages given are out of 60. There was 75% ( $n = 45$ ) who reported using one social network, 16.7% ( $n = 10$ ) reported using two social networks, 6.7% ( $n = 4$ ) using three social networks, and 1.67% reported ( $n = 1$ ) using four social networks. Students reported using a total of nine social networks, which are listed in Table 21. Question 6 is, "Which network do

you use the most?” One student reported using two networks and the other 59 reported using one network. Table 19 summarizes the data from Questions 4, 5, and 6.

Question 7 was: “Estimate how many friends or followers you have on the network you use the most.” All 60 participants who used OSN answered the question. There were seven social networks which were used as primary networks by students (See Table 19) so the responses to Question 7 represented the number of friends or followers on seven different networks. For six of the seven networks, all except Facebook, only one student used it as their primary network. Here is a list of the six networks followed by the amount of friends/followers given by the one student who used it as their primary network: MySpace (100), Windows Live Messenger (9), Skype (60), Google (36), MSN Messenger (1), and Tumblr (135). The student who listed Tumblr as their primary network for Question 6 also listed Facebook.

Of the 60 students who used online social networks, 58 (96.7%) reported using Facebook. Of these, 55 students identified Facebook as their primary network. Descriptive statistics for friends on Facebook were calculated separately from other networks. Making comparisons of the number of friends or followers across networks may not be valid as the networks are qualitatively unique and may be used for different purposes. Because Question 7 was open-ended, participants could write whatever they wanted, and the precision of the estimate of the number of friends varied. Of the 55 participants who primarily used Facebook, there were 39 students (70.9%) who provided a number alone without any words or symbols. Two students provided a range of friends (3.6%), and 14 (25.4%) students indicated their response was an estimate by using the symbols “~” or “+” or “?”, or the words “about,” “around,” or “over.”

In order to analyze the data, certain rules were followed when entering the number of Facebook friends into SPSS. If a student wrote only a number, that was entered. If the student

provided a range, the mean was entered. Estimates were entered as the number given by students without any adjustment. Two students provided estimates which were “~500+” and “over 300” and these were entered respectively as 500 and 300 with no adjustments. One student reported that they had 5,692 friends and another student reported that they had 7,720 friends. These students were excluded from all analyses, as Facebook only allows users to have 5,000 friends (Ball, 2010) and the accuracy of these data points is in question. The student who reported having 7,720 friends on Facebook was the one who also listed Tumblr as a primary network. No other data points were identified as outliers for Facebook friends.

Table 20 provides descriptive statistics for the number of Facebook friends, both for the total sample and divided by gender. On average, male students had 38 more friends than female students. Table 21 provides means and standard deviations for two groups of students, those who indicated they were receiving treatment for depression in Survey Question 1, and those who were not receiving treatment. On average, participants receiving treatment for depression had 58 more friends than those not receiving treatment. Table 21 provides means and standard deviations for two groups of students, those who had total raw scores on the CES-DC of 15 (depressed) and above, and those who had raw scores of 14 and below (not depressed), using the recommended cutoffs for the CES-DC (Fendrich et al., 1990) On average, participants with CES-DC scores of 15 or above had 69 more friends than those with scores of 14 or below,

Question 9 of the survey was: “Estimate how many hours a week you spend on ALL social networking sites.” Therefore, students who used networks other than Facebook were included in analyses, with 60 students total answering Question 9. The question was open-ended so the precision of responses varied. There were 33 students out of 60 (55.5%) who provided a number only, with 16 students (26.7%) providing a range of time. There were 11 students

(18.3%) who indicated their responses were estimates by using a question mark, or the words “about,” “probably,” “roughly,” or “less than.” Data was entered using the same rules as for Facebook friends: numbers alone were entered as written, means of ranges were entered, and estimates were entered without adjustment. There were six students who used the words “less than” in their answer and their estimates were entered without adjustment. Two answers were eliminated from analyses because they were identified as extreme outliers by SPSS, meaning they were more than 3 box lengths away from the box in a box plot. The outliers were 40 hours (female respondent) and 80 hours (male respondent). Tables 20, 21, and 22 provide descriptive statistics for weekly time using OSN. In summary, on average, female students reported spending 2.05 more hours per week using OSN than male students. On average, participants receiving treatment for depression reported spending 3.52 more hours per week using OSN than those not receiving treatment. On average, participants with CES-DC scores of 15 or above reported spending 3.8 hours more per week using OSN than those with scores of 14 or below.

**Correlations.** Correlation analyses were performed to examine the relationship between OSN usage and other measures used in the study. The number of Facebook friends and OSN time per week were used as variables in the correlations. The same data entry rules were applied that were discussed in the descriptive statistics section. The same outliers were deleted for the analyses.

Table 23 presents the correlations between Facebook friends and weekly time using OSN with measures from the SSCS. There were significant positive correlations between the Importance scores in the Self-Image, Academic, and Social areas and the number of Facebook friends, meaning that as the number of friends increased, so did the SSCS scores. There was a

significant negative correlation between OSN time and Social Outcome Confidence, meaning that as students spent more time per week using OSN, Social Outcome Confidence decreased.

Correlations were conducted separately for female students (Table 24) and male students (Table 25) to examine any gender differences. For female students, there were significant positive correlations between the number of Facebook friends and Importance scores in the Self-Image, Self-Confidence, and Self-Image areas, meaning that these SSCS scores increased as the number of friends increased. There was a significant negative correlation between OSN time and Academic Self-Confidence and Social Outcome Confidence, meaning that more time using OSN was associated with lower, less confident, SSCS scores. For males, there was a significant positive correlation between Academic Importance and the number of Facebook friends, meaning that as Academic Importance increased as the number of Facebook friends did. Like with females, there was also a significant negative correlation between Social Outcome Confidence and OSN time. In summary, the significant correlations between the number of Facebook friends and SSCS scores for Importance were positive, and the significant correlations between OSN time and SSCS scores for Confidence and Outcomes were negative.

Table 26 presents the correlations between the number of Facebook friends and weekly time using OSN and the total raw score from CES-DC as well as academic measures and academic estimation. There were no significant correlations between the number of Facebook friends and the other variables. There was a significant positive correlation between the CES-DC and OSN time, meaning that as depressive symptoms increased, students spent more time using OSN. There was also a significant negative correlation between the MAP Reading percentile score and OSN time, meaning that as students spent more time using OSN, reading scores decreased. Correlations for females are presented in Table 27 and results for males are

presented in Table 28. There were no significant correlations for either group for this set of variables.

While several correlations were not significant based on the p-value of .05, they approached significance. All of these correlations would be considered small to medium based on Cohen's (1992) criteria. These are reported as they may suggest directions for future research. For all students, the relationship between OSN time and GPA approached significance ( $r = -.22$ ,  $p = .099$ ). For female students, the correlation between the number of Facebook friends and the CES-DC total approached significance ( $r = .27$ ,  $p = .108$ ). For male students, the relationship between OSN time and MAP reading scores approached significance ( $r = -.36$ ,  $p = .122$ ).

## Discussion

### Hypothesis 1

There was partial support for Hypothesis 1. It was predicted that academic self-concept would decrease in the entire sample as depressive symptoms increased. However, this relationship was only significant for females and not for males. As predicted, the correlation was stronger for females than for males.

Previous research has found significant correlations between lower academic self-concept and higher depressive symptoms in both female and male children and adolescents (Ehrenberg et al., 1991; Muris, 2002; Weisz et al., 1993; Weisz et al., 2001). Muris, Schouten, Meesters, and Gijbbers (2003) found that adolescent girls had lower levels of competence but more depressive symptoms. In the current study, females had a significant correlation ( $r = -.56$ ) between the CES-DC and the SSCS Academic Self-Confidence scale. According to guidelines provided by Cohen (1982), this would be considered a large correlation. In comparison, Weisz et al (1993)

found correlations of  $-.55$  between depressive symptoms and academic competence, while Ehrneberg and Cox (1991) found a correlation of  $-.60$ , although both of these correlations were for the entire sample. Muris (2002) found a correlation of  $-.41$  between academic self-efficacy and depressive symptoms. The correlations between depression and academic self-efficacy found in the present study are similar to previous research, although other studies have generally found significant associations for both females and males.

### **Hypothesis 2**

Results of the current study did not indicate a significant relationship between depressive symptoms and academic outcome confidence for either male or female students, thus providing no support for this hypothesis. This means that neither females' or males' estimates of a person's ability to have positive academic outcomes is attenuated by depressive symptoms. This finding is in contrast to other studies (Muris et al., 2003; Weisz et al., 1993; Weisz et al., 2001) which found significant relationships between lower contingency beliefs and depressive symptoms. Contingency beliefs are conceptually similar to outcome confidence. However, the measures used in those studies all provided standard scores for contingency beliefs, while the SSCS only provided raw scores for academic outcome confidence. In addition, the raw scores for outcome confidence were not normally distributed for either gender, which could have skewed the results.

### **Hypothesis 3**

There was partial support for Hypothesis 3. It was predicted that academic underestimation would become more severe in the entire sample as depressive symptoms increased. However, this relationship was only significant for females and not for males. As predicted, the correlation was stronger for females than for males. Other researchers have found

correlations between academic underestimation and increased depressive symptoms in elementary school students (Bandura et al., 1999; Cole, 1990; Cole & Martin, 1999). The study by McGrath (2000) had a similar design to the present study, in which the researcher used regressions to create a variable representing academic estimation based on reading grades in elementary school students. McGrath measured the correlations between estimation and depression at three points in time and found significant negative correlations which averaged  $-.30$  for all participants, which would be considered a moderate effect size according to Cohen (1992). The more recent study by Noble et al. (2011) reported a correlation of  $-.21$  between positive illusions, a measure of academic estimation, and depression for the entire sample. For female students, this study found correlations of  $-.56$ ,  $-.55$ , and  $-.48$  respectively between depressive symptoms and estimation of math, reading, and GPA, which would be considered large correlations according to Cohen (1992). The correlations in this study between academic estimation and depression were larger than those found in other studies. In addition, this appears to be the first study which used estimations of academic ability for GPA and standardizes reading test scores in adolescents. Noble et al. also used a measurement of math estimation in their study, although their variable was calculated in a different way.

### **Rates of Depression**

This study found that 30.3% of the sample fell above the screening cutoff for dysthymia and depression on the CES-DC, a finding that is similar to previous research in which authors included adolescents with both clinical and subclinical depressive symptoms. Hankin (2006) reported prevalence rates of approximately 20 to 50% of subclinical depressive symptoms in adolescents, based on several cross-sectional studies that measured self-reported symptoms. Ehrenberg and Cox (1991) identified levels of depression in their sample ( $N = 366$ ) using the

BDI. Using cutoff scores based on research, the authors found that 68.6% of the total sample were considered nondepressed, 20.5% were mildly depressed, and 10.9% met the criteria for clinical depression. Ehrenberg and Cox summarized that approximately 30% of their sample was experiencing mild to clinical depressive symptoms, which similar to the results of this study. In addition, Fergusson et al. (2005) found that 18.4% of a sample of 18 year olds met the criteria for major depression disorder, while 7.3% met the criteria for subclinical but significant depressive symptoms, meaning 25.7% of their sample was experiencing depressive symptoms.

Examining the current study by gender, prevalence rates for depressed females (35%) were greater than for males (23.1%). Similar gender differences in sample prevalence rates are also reported in other studies. Fergusson et al. (2005) reported in their study that 25.3% of females experienced mild depressive symptoms, and 14.4% had clinical depressive symptoms, or a total of 39.7% of females experienced depressive symptoms. For males, 15.1% had mild depressive symptoms, and 7% had clinical symptoms, for a total of 22.1% of males who experienced mild or clinical depressive symptoms. Rates of depression in adolescents found in previous studies appear to be similar to the figures found in the current study.

### **Implications of the Study**

**Depression screening in schools.** The high rates of depressive symptoms found in both this study and other research indicates a high need for screening and treatment in adolescents. particularly since major depression is associated with lower cognitive, social, relationship, and academic functioning. Furthermore, adolescents who experience clinical depression have a 7% chance of completing suicide by the time they reach adulthood (Phillips, Corcoran, & Grossman, 2003). Research has indicated that adolescents who experienced depressive symptoms without meeting the criteria for a diagnosis may have lower functioning and are at risk

for the development of more severe symptoms. Hammen and Rudolph (2003) summarized that “elevated self-report scores indicate impaired functioning, and may portend the later development of diagnosable disorders” (p. 242). Humensky et al. (2010) found that subclinical symptoms of depression in adolescents were associated with reductions in school performance and more negative subjective thoughts about school. Fergusson, Horwood, Ridder, and Beautrais (2005) found that in a sample of 18 year olds, those with subclinical depression were at risk for developing later major depressive disorder and increased suicidal behaviors. Hankin (2006) found that mild symptoms of depression represent an increased risk for later depressive disorder and reduced life functioning. Rudolph and Lambert (2010) stated that even mildly elevated levels of depression are “ ” (p. 216). Both subclinical and clinical levels of depression in adolescents as indicated on self-reports are associated with negative outcomes, both in present and long-term functioning, thus making screening and intervention important for adolescents.

Screening and assessment is the first stage in the intervention process (Lewinsohn, Rohde, & Seely, 1998). Rudolph and Lambert (2010) identify self-reports for internalizing disorders as valuable tools, particularly for adolescents, who usually possess the intellectual capabilities to reflect on their feelings and thoughts, which may be difficult for others to observe. In addition, Lewinsohn et al. (1998) noted that adolescents may be more willing to admit severe depressive or suicidal symptoms on a self-report than in response to direct questions.

The CES-DC appears to have valid psychometric properties in adolescents and is available for free, thus making it a potentially valuable and cost-effective screening tool for depression, particularly in a school environment where screening may be limited due to monetary concerns. Other assessments may also be useful screening tools. Lewinsohn et al. (1998) identified the BDI and CES-D as the most widely used self-report screening instruments

for depression.. The CES-D is also available for free, although the researchers identified the BDI as having better screening properties. However, the authors stated that both measures provide a “fast, economical, and valid way” of screening and asserted that “we have been unable to improve the strong screening properties of either of these measures” (p. 782) and recommended either one as a first step in screening in settings such as schools. The researchers stated that the next step in identifying possible cases of depression should be interviews with the adolescents who score above the cutoff. Large screenings with self-report measures can be an efficient way to identify adolescents who may be having a major depressive episode. In addition, screenings may identify those students who are experiencing subclinical levels of depression. Identification of subclinical depressive symptoms in adolescents could lead to early intervention, which could prevent the negative outcomes which research has found to be associated with subclinical levels of depression.

**School-based treatment for depression.** The SAMHSA study (2012) reported that 37.7% of 1.9 million adolescents who had a major depressive episode in the last year received treatment, meaning that 62.2% did not receive treatment. In addition, SAMHSA reported that 41.2% of the 1.3 million adolescents had a severe episode MDE in the last year received treatment, meaning that 58.8% did not receive treatment. Based on these figures, there were more than one million adolescents who experienced an episode of major depressive episode and did not receive any form of treatment. The current study found that 85% of the sample who were above the cutoff on the CES-DC reported not receiving treatment for depression. However, the cutoff used in this study was for both dysthymia and depression, while the SAMHSA statistics only included those adolescents who had experienced a major depressive episode. The inclusion

of adolescents with lower depressive symptoms in this study could explain the discrepancy in treatment rates.

The high rates of depressive symptoms found in this study and other studies suggested a strong need for evidence-based treatments for both female and male adolescents for depression. There are several evidence based-treatments for depression in adolescents that have been used effectively in schools. Two treatments are reviewed below.

***Cognitive Behavioral Therapy (CBT).*** Reynolds and Coats (1986) found that CBT was an effective treatment for adolescents experiencing moderate depression. The treatment was given in a group format in a high school with ten 50-minute sessions conducted over 5 weeks. Depressive symptoms were assessed five weeks after treatment, and all of the participants who received treatment no longer self-reported clinically significant depressive symptoms.

In a more recent study, Shirk, Kaplinski, and Gudmundsen (2009) implemented CBT in a school setting for 12 sessions with adolescents who met criteria for either dysthymia or major depressive disorder. The authors reported a treatment response rate of 64%, and after treatment, the majority of adolescents fell within the average range on the BDI. Shirk et al. concluded that, “school-based CBT is a relatively robust treatment for adolescent depression across gender, age, and ethnic groups, as well as for adolescents with varied patterns of comorbidity” (p. 106).

***Relaxation training.*** Relaxation training can be a component of CBT, but Reynolds and Coats (1986) found that relaxation training on its own was as effective as CBT in significantly reducing depressive symptoms in adolescents. The relaxation training was given in a group format and like the CBT treatment, consisted of ten 50 minute sessions given over 5 weeks.

**Targeted interventions for females.** There appears to be a general need for depression screening and treatment in adolescents, but the findings from this study also suggest a possible

need for targeted interventions for females. Academic self-efficacy and depressive symptoms appear to have a significant negative association in females, although the relationship is correlational, meaning we cannot draw causal conclusions from the results of this study. However, Marsh and Martin (2011) examined possible causal relationships between academic self-concept and academic achievement and concluded that although the two are mutually reinforcing, research indicates that increases in academic self-concept lead to increases in achievement and long-term positive educational outcomes. The researchers highlighted the importance of interventions which build academic self-concept as they may also result in academic improvements.

Muris (2002) suggested that a low sense of efficacy may be a precursor to psychological disorders such as anxiety and depression, while high self-efficacy may serve as protective factor against such disorders. Based on the results of their study, Ehrenberg and Cox (1991) proposed that academic-self-efficacy is of significant importance to adolescents because they face increased pressure to perform academically and select a future career, and lower levels of academic self-efficacy may be associated with lowered career aspirations. Humensky et al. (2010) suggested that negative subjective perceptions of academic abilities in adolescents may affect high school grades and even limit future career opportunities. In addition, Wouters et al. (2011) found that positive academic self-concept in high school was associated with higher coping skills and success in the first year of college, although the researchers controlled for gender in their analyses. The research implies that academic self-concept in adolescents has an association with later academic and career success, thus highlighting the importance of using evidence-based interventions with high school students, particularly girls, who have a low academic self-concept. Possible evidence-based treatments include:

***Cognitive Behavioral Therapy.*** Reynolds and Coats (1986) found that CBT was effective in reducing depressive symptoms in adolescents, but subjects in their study experienced significant gains in academic self-concept as well. The authors suggested that CBT was especially suited for a school setting because of its emphasis on skill-building, which may in turn lead to more positive attitudes toward school and increased academic self-efficacy.

***Rational Emotive Behavior Therapy (REBT).*** Gonzalez et al. (2004) conducted a meta-analysis on 19 studies in which researchers implemented REBT with children and adolescents in a school setting. The researchers evaluated the effects of REBT on several outcome domains, including self-concept and GPA. Gonzalez et al. reported a significant weighted mean effect size across the studies of 0.38 for self-concept and 0.49 for GPA, respectively. Those effect sizes included both children and adolescents. The authors found that REBT appeared to be effective both as an intervention for children with identified psychological disorders and as prevention for children without identified problems who were experiencing some difficulties in mental health or academics.

As part of his dissertation, D'Elia (1998) developed a specific type of REBT and evaluated its impact on the academic self-concept of high school students. The intervention was implemented by a school psychologist in a high school, with one 42 minute session per day for five days. The group who received the REBT therapy had significant gains in their academic self-concept scores, but no gender differences were reported.

**Role of school psychologists in treatment.** According to the SAMHSA (2012) study, youth aged 12 to 17 are most likely to receive mental health care in an educational setting, and 2.9 million children received treatment in schools in 2010. Of those, 34.9% received treatment for depression, which is approximately one million children. Thus, screening and treatment for

depression among adolescents is a wide-scale issue; one million adolescents are already receiving treatment, but the SAMHSA study indicated that approximately one million more adolescents are experiencing depressive symptoms and may benefit from treatment.

To address this issue, school psychologists can encourage, organize, and implement school-wide screenings for depression (Charvat, 2012; Weist et al., 2007). In order to increase support among administrators, teachers, and school staff for screenings, they could conduct trainings which provide information on the high rates of depressive symptoms in adolescents and the signs of depression. School psychologists could also provide information on the possible manifestations of low academic self-concept and its connection to depression, especially in females. School personnel could be encouraged to make referrals to school mental health professionals as needed.

If females are presenting with depressive symptoms or a low academic self-concept, school psychologists may want to consider administering assessments in both areas to create targeted interventions. School psychologists can also organize and implement treatment groups to improve academic self-concept, or provide CBT interventions to students with depression. In addition, school psychology as a field emphasizes prevention, and the research indicates that adolescents with subclinical levels of depression can experience academic and life impairment and are at risk for developing major depressive disorder. This group could benefit from early intervention programs, and school psychologists are in a prime position to advocate for these services (Charvat, 2012; Weist et al., 2007).

Humensky et al. (2010) suggested that teachers could be especially helpful in identifying adolescents who may benefit from interventions focused on academic-self-concept, as they work directly with students on a daily basis. Marsh and Martin (2010) also suggested that teachers

could focus on fostering academic self-concept of students while also increasing actual achievement so students can maintain any gains in self-concept. Humensky et al. also suggested school specific interventions which could teach study skills and increase completion of assignments. In addition, other school staff members could become involved in identifying students in need of mental health care. Humensky et al. also discussed how their findings could be applied to school settings, with an emphasis on how school nurses could help identify students who are experiencing physical symptoms, which can be associated with anxiety and depression, and then they can make appropriate referrals to mental health professional within the schools.

### **Limitations and Future Directions**

The external validity of the current study is limited because of the demographic restrictions of the study, as data was only gathered from one high school in the Northwest. In addition, there was limited ethnic diversity in the sample, with every participant identifying themselves as being Caucasian or white. In addition, a larger sample would increase the power and generalizability of the results.

This study did not control for anxiety when conducting analysis, and Muris (2001) suggested that self-efficacy is primarily a manifestation of anxiety which is highly comorbid with depression. Future studies exploring the relationship between depression and academic self-efficacy may explore this connection more, as targeted treatments for anxiety could improve academic self-efficacy and/or depression. Hankin (2006) noted that depression is often preceded by anxiety symptoms, so early treatment of anxiety may stave off the development of later depression in adolescents.

The assessment instruments used in this study could perhaps had better psychometric properties. The CES-D has been found have generally good psychometric properties, but more

studies are needed to validate its use as a screening instrument in adolescents. Roberts, Lewinsohn, and Seeley (1991) and Lewinsohn et al. (1999) suggested that the BDI and CES-D are the best screening tools for depression in adolescents so future research may benefit from using those instruments. In addition, the raw scores from the Outcome Confidence scale of the SSCS were used to test Hypothesis 2 because standard scores are not available for that scale. The scores were not normally distributed in either males or females, which may have distorted the results and also limited the generalizability of the study. Future studies could use an assessment like the Self-Perception Profile for Children (SPCC), which provides standard scores and measures Academic Contingency beliefs, which are similar conceptually to Academic Outcome Confidence.

### **Discussion - Online Social Networking (OSN)**

**Usage statistics.** The current study included questions on the percentage of students who used OSN, the percentage of students who used Facebook, and how much time students spend per week using OSN per week. The results from the survey indicated that 90.9% of the sample used OSN and 87.9% had a Facebook account. In comparison, the Pew Internet and American Life Project (2011) found that approximately 80% of students who used the Internet used OSN, and 93% of those students had a Facebook account. In terms of usage statistics, this study reported a mean of 5.78 hours a week for total OSN usage, which is approximately 50 minutes a day. In comparison, Windham (2008) reported that students on average used OSN between 30 minutes and one hour a day, while Rideout et al. (2010) reported that adolescents ages 11 to 18 used OSN for approximately an hour a day. The OSN usage statistics from this study appear to be similar to those from other studies with adolescents.

**Measurement issues.** Each study reviewed previously used a different method for estimating time using OSN, which may raise some measurement concerns. The current study asked about time spent on all social networks, while other studies included only time spent using Facebook. Since Facebook is the most widely used OSN among teens, usage questions perhaps should be limited to its usage. In addition, this study asked students to provide the time spent per week using OSN while other studies have asked students about daily usage. In this study, students may have under or overestimated their usage, as it may have been easier for them estimate time per day rather than per week. Windham (2008) provided an online log for a subset of students to record their time using OSN, and this approach should be considered for future studies, as collecting multiple data points may increase accuracy. In addition, having the log online may result in students paying more attention to their Internet habits.

Some studies have measured OSN usage by having participants select from several answers which are ranges of time (Frank, et al., 2010; Pew Internet and American Life Project, 2011; Windham, 2008). Junco (2012) allowed college students to provide continuous estimates of their Facebook usage time and he proposed that this may have caused students to reflect more on their usage. Use of ranges (i.e. one to two hours) may also reflect biases of the researchers (Junco, 2012). However, allowing students to generate their own responses can make data entry and analysis more imprecise. In this study, many students included ranges or estimates and this might have made the data less accurate.

GPA is another measurement concern; researchers in present study checked the school records instead of relying on self-report or having students select a range. Junco (2012) also collected the GPA of participants directly from the university, while Windham (2008) and Frank et al. (2010) asked for categorical estimates from the students. Collecting academic data directly

from the school can eliminate the error from estimating grades, and thus could be preferred in future studies.

**Depressive symptoms.** This study found a significant positive relationship between depressive symptoms and time spent using OSN. Likewise, in studies with high school students, Rideout et al. (2010) reported that heavy users of media, including OSN, were more likely to unhappy, and Frank et al. (2010) found that hyper-networkers who used OSN three hours a day or more were more likely to experience depressive sadness. The connection between higher OSN use and depression found by this study is similar to results from other studies. More research is needed in this area. In particular, studies which use scores from self-report depression inventories may provide more precise results than categorical survey questions.

**Grade point average (GPA).** The negative correlation found in the current study between daily time on OSN and GPA is similar to the results found by Windham (2008). While the correlation only approached significance in this study, the  $r$  value was  $-.22$ , which can be categorized a small effect size, according to Cohen (1988). Windham also found a significant negative correlation, although the value for  $r$  was smaller ( $-.11$ ) than the one reported in this study. In addition, Frank et al. (2010) found that more time on Facebook was associated with poorer grades in high school students. Pasek et al. (2010) analyzed two studies where the sample included both adolescents and young adults which found no significant relationship with GPA and Facebook usage. However, the results were not reported by age, making it difficult to parse out the results for high school students. Overall, there appears to be some support for the connection between more time spent using OSN and poorer grades in high school students, although there are few studies on this subject.

In this study, more time using OSN was also associated with lower reading standardized test scores ( $r = -.26$ ), which is considered a medium effect size based on the estimates provided by Cohen (1988). As of this writing, no peer-reviewed studies were found which explored this relationship in high school students.

**Implications of OSN data.** More time using OSN may be connected to negative outcomes such as depressive symptoms and lower grades. However, how do we separate normal usage from excessive usage? Frank et al. (2010) defined hyper-networking as three or more hours a day using OSN while Rideout et al. (2010) defined heavy media usage as 16 hours or more day of using any type of media, including a computer and OSN. Frank et al. suggested that parents and other adults who work with teens, including teachers and primary care physicians, be aware of the possible health risks associated with excessive OSN usage. The researchers recommended that parents establish rules and carefully monitor the OSN usage while keeping in mind a range of time which is considered average.

While monitoring the time spent on OSN may help adults gauge if teens are engaging in excessive networking, it may be difficult to discern actual usage time, particularly if a teen has a computer in their bedroom or uses OSN on a mobile phone. Studies have suggested that problematic OSN usage can be identified in other ways. Windham (2008) and Spraggins (2009) both designed assessments which measured attitudes, thoughts, and behaviors concerning the Internet and OSN. Both researchers found that more problematic usage is correlated with negative outcomes like depressive symptoms, lower psychosocial adjustment, and poor grades. In her survey, Spraggins included questions which addressed specifically dependency on OSN, such as “I have gotten in trouble with my employer or school because of being online on a social networking site” and “I lose track of time when I am using a social networking site.”

These behaviors or attitudes could possibly be observed by parents, teachers, or counselors, who could then inquire about a student's OSN usage. Spraggins suggested that school counselors, school psychologists, and clinical psychologists need to thoroughly acquaint themselves with Facebook and the possible symptoms of Internet and/or OSN dependency and the detrimental effects it could have on a student's academic performance, social functioning, and mental health.

Based on her studies, Holleran (2010) made the conclusion that the content of OSN profiles could help in the identification of depression. Blogs on MySpace and status updates on Facebook provide a medium for users to relay their current emotions and cognitions to network friends, and users may express things they may not feel comfortable saying outside of the Internet (Holleran, 2010). Students, parents, and teachers could be educated on the symptoms of depression and be aware of these as they read blogs and status updates. This is particularly important for adolescents, given the high rate of depression among this population, particularly females.

Holleran (2010) also suggested that companies such as Facebook could use text analysis programs to look for language cues that a user is depressed. The researcher identified such a system as a possibly cost-effective screening tool for depression. Given that both teen and adult users have made suicide announcements on Facebook (Rudder et al., 2011), references to death could be particularly important for companies to monitor. However, such an automated warning system may create concerns, including if users have to provide consent to be screened or the privacy of collected data. Holleran concludes that the best approach in detecting depression is to use both human observers and automated systems. Family members and friends could be encouraged to inquire if they develop concerns about a loved one. Rudder et al. (2011) noted that a suicide note on an OSN could potentially lead to immediate crisis intervention by other

users, even a casual acquaintance, thus making OSN a potentially life-saving tool for suicide intervention. Facebook has a system where users can report suicidal content on profiles (Hoffman, 2012). Facebook employees then verify the concerns and send links to lifeline services to both the distressed user and the user who reported the content if warranted. Facebook also sends links to an online counseling service to the potentially suicidal user.

### **Conclusion**

The current study adds to the relatively small literature base on depressive symptoms and academic self-concept, academic estimation, and social networking, in adolescents. Those who are experiencing depressive symptoms or low academic self-concept are at risk for current impaired functioning, future development of psychological disorders, and reduced academic and career achievements. More studies, particularly those with larger sample sizes, are needed to explore the connections between these variables, particularly as they relate to gender.

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## Appendix A

## Researcher-Created Survey

**Survey of Adolescents About Depression and Social Networking***Confidentiality*

The results of this survey will be kept private unless we need to tell school staff because you are upset.

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Birthdate: \_\_\_\_\_

Grade: \_\_\_\_\_

Ethnicity:

(Please check all that apply)

White

American Indian or Alaska Native

Hispanic or Latino

Asian or Pacific Islander

Black or African-American

Other: Please describe: \_\_\_\_\_

1. Are you currently receiving treatment for depression?

\_\_\_Yes \_\_\_No

2. If yes, do you feel the treatment you are receiving is helping you?

\_\_\_Yes \_\_\_No

3. Answer the following by circling the number that best rates how you feel.

1= not at all true    2= somewhat true    3=pretty much true    4= very true

- |    |  |   |   |   |   |
|----|--|---|---|---|---|
| a. | My work in school is the best I can do.                          | 1 | 2 | 3 | 4 |
| b. | I put a lot of effort and try my hardest to do well in school.   | 1 | 2 | 3 | 4 |
| c. | My teachers think I am a good student                            | 1 | 2 | 3 | 4 |
| d. | I think I am a poor student.                                     | 1 | 2 | 3 | 4 |
| e. | I secretly think I am good at academics, but I pretend I am not. | 1 | 2 | 3 | 4 |

4. Do you participate in any online social networking sites (such as Facebook, Myspace, Twitter, Tumblr)?

Yes     No

5. If yes, which ones? They can be in addition to the ones listed above.

---

6. Which network do you use the most?

---

7. Estimate how many friends or followers you have on the network you use the most.

---

8. When was the last time you checked how many friends or followers you had on this network?

---

9. Estimate how many hours a week you spend on ALL social networking sites.

---

10. Answer the following by circling the number that best rates how you feel.

1= not at all true    2= somewhat true    3=pretty much true    4= very true

- |    |  |   |   |   |   |
|----|--|---|---|---|---|
| a. | Online social networking makes me feel connected to others.    | 1 | 2 | 3 | 4 |
| b. | Online social networking makes me feel better about myself.    | 1 | 2 | 3 | 4 |
| c. | Online social networking gives me a chance to say what I want. | 1 | 2 | 3 | 4 |
| d. | Online social networking is a waste of time.                   | 1 | 2 | 3 | 4 |

11. On a scale of 0 to 10, how upset are you right now as a result of completing these questionnaires?

(not at all) 0 1 2 3 4 5 6 7 8 9 10 (extremely)

## Appendix B

## Tables

Table 1  
*Summary of Descriptive Statistics for SSCS, CES-DC, and Academic Measures*

Measure	Total		Female		Male	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-Confidence Self-Image	98.2	15.16	96.3	15.40	101.0	14.64
Self-Confidence Academic	103.8	13.73	103.2	12.19	104.8	15.98
Self-Confidence Social	101.9	15.76	102.0	16.81	101.7	14.34
Self-Confidence Composite	101.5	14.70	100.5	14.46	103.0	15.22
Importance Self-Image	99.2	15.90	97.0	16.14	102.6	15.22
Importance Academic	109.3	19.64	110.3	12.97	107.9	26.98
Importance Social	106.7	16.75	105.2	14.63	108.9	19.62
Outcome Confidence Self-Image <sup>a</sup>	5.8	2.39	5.4	2.47	6.5	2.14
Outcome Confidence Academic <sup>a</sup>	6.9	1.34	7.0	1.45	6.9	1.19
Outcome Confidence Social <sup>a</sup>	9.2	2.33	9.4	2.23	9.0	2.51
Outcome Confidence Composite <sup>a</sup>	100.0	13.31	99.5	13.36	100.8	13.46
CES-DC <sup>a</sup>	12.2	8.76	12.9	8.62	11.1	9.04
Math <sup>b</sup>	74.6	21.89	75.1	19.67	73.8	25.24
Reading <sup>b</sup>	73.0	24.74	76.6	20.57	67.2	29.52
GPA <sup>c</sup>	3.3	0.70	3.4	.70	3.2	.70

*Note.* Values for *N* range from 64 to 66 for all students and *n* = 38 to 40 for female students due to occasional missing data. *n* = 26 for male students. All scores are standard scores unless noted.

<sup>a</sup>Raw scores. No standard scores are available for these measures.

<sup>b</sup>Percentile scores from the MAP test.

<sup>c</sup>GPA from the most current semester at the time of the study.

Table 2

*Summary of Descriptive Levels of SSCS Outcome Confidence Scales for All Students, Female Students, and Male Students*

Measure	Low		Average		High	
	<i>n</i>	%*	<i>n</i>	%	<i>n</i>	%
<u>All Students</u>						
Self-Image Outcome Confidence	16	24.2%	44	66.7%	5	7.6%
Academic Outcome Confidence	2	3.0%	37	56.1%	26	39.4%
Social Outcome Confidence	7	10.6%	47	71.2%	11	16.7%
<u>Female Students</u>						
Self-Image Outcome Confidence	12	30%	23	57.5%	4	10%
Academic Outcome Confidence	1	2.5%	21	52.5%	17	42.5%
Social Outcome Confidence	5	12.5%	28	70%	6	15%
<u>Male Students</u>						
Self-Image Outcome Confidence	4	15.4%	21	80.8%	1	3.8%
Academic Outcome Confidence	1	3.8%	16	61.5%	9	34.6%
Social Outcome Confidence	2	7.7%	19	73.1%	5	19.2%

\*Percentages may not add up to 100% due to rounding.

Table 3

*Pearson Product-Movement Correlations Between SSCS, CES-DC, and Academic Measures for All Participants*

	CES-DC	Math	Reading	GPA
Self-Confidence Self-Image	-.10	-.06	-0.18	.04
Self-Confidence Academic	-.37**	.10	0.07	.20
Self-Confidence Social	-.28*	-.11	0.02	.04
Self-Confidence Composite	-.29*	-.03	-0.04	.11
Importance Self-Image	.02	-.14	-0.13	.00
Importance Academic	-.05	-.12	-.028*	.00
Importance Social	-.07	-.14	-0.12	.00
Outcome Confidence Self-Image	.02	-.11	-0.19	.02
Outcome Confidence Academic	-.21	-.15	-0.06	-.10
Outcome Confidence Social	-.20	-.12	-0.06	.00
Outcome Confidence Composite	-.13	-.15	-0.12	.00

*Note:* Values for *N* range from 63 to 66.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 4

*Pearson Product-Movement Correlations Between SSCS, CES-DC, and Academic Measures for Females*

	CES-DC	Math	Reading	GPA
Self-Confidence Self-Image	-.10	.04	-.17	.02
Self-Confidence Academic	-.56**	.32	.40*	.19
Self-Confidence Social	-.37*	-.06	.09	.07
Self-Confidence Composite	-.41**	.10	.10	.10
Importance Self-Image	.20	-.21	-.15	-.11
Importance Academic	.04	-.09	-.05	.05
Importance Social	.03	-.16	.01	.04
Outcome Confidence Self-Image	.00	-.03	-.19	.05
Outcome Confidence Academic	-.16	-.07	.11	-.22
Outcome Confidence Social	-.25	-.16	-.07	-.07
Outcome Confidence Composite	-.13	-.08	-.04	-.05

*Note:* Values for  $n$  range from 37 to 40.

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

Table 5

*Pearson Product-Movement Correlations Between SSCS, CES-DC, and Academic Measures for Males*

	CES-DC	Math	Reading	GPA
Self-Confidence Self-Image	-.07	-.17	-.14	.12
Self-Confidence Academic	-.17	-.08	-.17	.22
Self-Confidence Social	-.13	-.19	-.07	.01
Self-Confidence Composite	-.12	-.17	-.16	.13
Importance Self-Image	-.23	-.06	-.06	.21
Importance Academic	-.13	-.14	-.44*	-.06
Importance Social	-.16	-.11	-.20	-.04
Outcome Confidence Self-Image	.14	-.20	-.11	.04
Outcome Confidence Academic	-.33	-.27	-.31	.13
Outcome Confidence Social	-.16	-.09	-.10	.06
Outcome Confidence Composite	-.12	-.22	-.19	.09

*Note:*  $n = 26$  for all correlations.

\*.Correlation is significant at the 0.05 level (2-tailed).

Table 6

*Pearson Product-Movement Correlations Between SSCS Academic Scores for All Participants*

	Self- Confidence Academic	Importance Academic	Outcome Confidence Academic
Self-Confidence Academic	-	.41**	.43**
Importance Academic		-	.44**
Outcome Confidence Academic			-

*Note:* Values for  $N$  range from 63 to 66.

\*\*Correlation is significant at the 0.01 level (2-tailed).

Table 7

*Pearson Product-Movement Correlations Between SSCS Academic Scores for Females*

	Self- Confidence Academic	Importance Academic	Outcome Confidence Academic
Self-Confidence Academic	-	.12	.38*
Importance Academic		-	.28
Outcome Confidence Academic			-

*Note:* Values for  $n$  range from 39 to 40.

\* Correlation is significant at the 0.05 level (2-tailed).

Table 8

*Pearson Product-Movement Correlations Between SSCS Academic Scores for Males*

	Self- Confidence Academic	Importance Academic	Outcome Confidence Academic
Self-Confidence Academic	-	.62**	.55**
Importance Academic		-	.69**
Outcome Confidence Academic			-

*Note:*  $n = 26$  for all correlations.

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 9

*Pearson Product-Movement Correlations Between CES-DC and Academic Measures*

	Math	Reading	GPA
<u>All Students</u>			
CES-DC	-.02	-.08	-.25*
<u>Female Students</u>			
CES-DC	-.17	-.34*	-.31
<u>Male Participants</u>			
CES-DC	.15	.13	-.19

Note: Values for *N* for all students range from 64 to 65.

Values for *n* range from 38 to 39 for female students. *n* = 26 for male students for all correlations.

\*Correlation is significant at the 0.05 level (2-tailed).

Table 10

*Regression Table, Academic Self-Confidence on Depressive Symptoms for Females*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	1765.77	1	1765.77	16.85	.00
Residual	3876.59	37	104.77		
Total	5642.36	38			

Table 11

*Regression Table, Academic Self-Confidence on Depressive Symptoms for Males*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	174.28	1	174.28	.67	.42
Residual	6206.33	24	258.60		
Total	6380.62	25			

Table 12

*Summary of Descriptive Statistics of Academic Estimation by Gender*

Measure	Female		Male	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Residuals Math	0.01	0.80	0.07	1.17
Residuals Reading	0.00	0.80	0.08	1.17
Residuals GPA	0.02	0.82	0.09	1.15

*Note.* Values for *n* range from 37 to 38 for female students. *n* = 26 for male students.

Table 13

*Regression Table, Math Academic Estimation Standardized Residuals on Depressive Symptoms for Females*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	7.45	1	7.45	16.50	.00
Residual	16.26	36	0.45		
Total	23.71	37			

Table 14

*Regression Table, Math Academic Estimation Standardized Residuals on Depressive Symptoms for Males*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	1.09	1	1.09	0.78	.39
Residual	33.41	24	1.39		
Total	34.50	25			

Table 15

*Regression Table, Reading Academic Estimation Standardized Residuals on Depressive Symptoms for Females*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	7.31	1	7.31	15.97	.00
Residual	16.48	36	0.46		
Total	23.79	37			

Table 16

*Regression Table, Reading Academic Estimation Standardized Residuals on Depressive Symptoms for Males*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	1.01	1	1.01	0.73	.40
Residual	33.36	24	1.39		
Total	34.38	25			

Table 17

*Regression Table, GPA Academic Estimation Standardized Residuals on Depressive Symptoms for Females*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	5.58	1	5.58	10.39	.00
Residual	18.80	35	0.54		
Total	24.38	36			

Table 18

*Regression Table, GPA Academic Estimation Standardized Residuals on Depressive Symptoms for Males*

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	0.61	1	0.61	0.45	.51
Residual	32.51	24	1.35		
Total	33.12	25			

Table 19  
*Summary of Social Networking Usage by Network*

Online Social Network	Participants Who Used Network <sup>a</sup>	Percentage of Total Sample Who Used Network	Participants Who Used as Primary Network <sup>b</sup>	Percentage of Total Sample Who Used As Primary
Facebook	58	87.9%	55	83.3%
MySpace	10	15.2%	1	1.5%
Twitter	2	3%	0	0%
YouTube	3	4.5%	0	0%
Windows Live Messenger	1	1.5%	1	1.5%
Skype	2	3%	1	1.5%
Google	1	1.5%	1	1.5%
MSN Messenger	1	1.5%	1	1.5%
Tumblr <sup>b</sup>	1	1.5%	1	1.5%

<sup>a</sup> Number of participants who reported using the network in Survey Question 5.

<sup>b</sup> Number of students who reported using the social network the most in Question 6. One participant listed two primary networks, Facebook and Tumblr. Both are included as primary networks in the above chart.

Table 20  
*Summary of Facebook Friends and Weekly Time on Online Social Networking for All Students, Female, and Male Students*

Measure	Total			Female			Male		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Facebook friends	53	325.7	219.68	36	313.4	205.11	17	351.5	252.54
Weekly Time Using OSN	58	5.8	7.32	38	6.5	6.98	20	4.4	7.94

Table 21  
*Summary of Facebook Friends and Weekly Time on Online Social Networking for Students By Current Treatment of Depression*

Measure	Depression treatment <sup>a</sup>			No Depression treatment <sup>b</sup>		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Facebook friends	5	378.0	240.56	48	320.2	219.43
Weekly Time using OSN	5	9.0	7.55	53	5.5	7.30

<sup>a</sup> Answered yes to Survey Question 1, “Are you currently receiving treatment for depression?”

<sup>b</sup> Answered no to Survey Question 1.

Table 22

*Summary of Facebook Friends and Weekly Time on Online Social Networking for Students By CES-DC Cut-Off Score for Depressive Symptoms*

Measure	CES-DC of 14 or below			CES-DC of 15 or above		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Facebook friends	35	302.2	194.99	18	371.2	261.25
Weekly Time Using OSN	39	4.5	4.58	19	8.3	10.74

Table 23

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and SSCS for All Participants*

SSCS Measure	Facebook Friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
Self-Confidence Self-Image	.18	-.04
Self-Confidence Academic	-.09	-.23
Self-Confidence Social	.00	-.20
Self-Confidence Composite	.04	-.18
Importance Self-Image	.44**	-.03
Importance Academic	.30*	.09
Importance Social	.28*	-.07
Outcome Confidence Self-Image	.27	.04
Outcome Confidence Academic	-.09	-.04
Outcome Confidence Social	-.02	-.46**
Outcome Confidence Composite	.06	-.23

<sup>a</sup> Values for *n* range from 52 to 53.

<sup>b</sup> Values for *n* range from 57 to 58.

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 24

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and SSCS for Females*

SSCS Measure	Facebook Friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
Self-Confidence Self-Image	.34*	.02
Self-Confidence Academic	-.25	-.48**
Self-Confidence Social	-.03	-.29
Self-Confidence Composite	.05	-.30
Importance Self-Image	.55**	.16
Importance Academic	.23	-.03
Importance Social	.08	-.05
Outcome Confidence Self-Image	.35*	.08
Outcome Confidence Academic	-.24	-.03
Outcome Confidence Social	-.26	-.47**
Outcome Confidence Composite	-.10	-.21

<sup>a</sup> Values for *n* range from 35 to 36.

<sup>b</sup> Values for *n* range from 37 to 38.

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 25

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and SSCS for Males*

SSCS Measure	Facebook friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
Self-Confidence Self-Image	-.07	-.11
Self-Confidence Academic	.10	.05
Self-Confidence Social	.04	-.11
Self-Confidence Composite	.03	-.01
Importance Self-Image	.27	-.26
Importance Academic	.39	.24
Importance Social	.49*	-.07
Outcome Confidence Self-Image	.10	.05
Outcome Confidence Academic	.25	-.11
Outcome Confidence Social	.40	-.51*
Outcome Confidence Composite	.31	-.28

<sup>a</sup>  $n = 17$  for all correlations

<sup>b</sup>  $n = 20$  for all correlations

\* Correlation is significant at the 0.05 level (2-tailed).

Table 26

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and CES-DC and Academic Measures for All Participants*

Measure	Facebook friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
CES-DC	.12	.28*
Math	.05	-.15
Reading	-.14	-.26*
GPA	-.14	-.22
Residuals Math	-.03	-.07
Residuals Reading	-.02	-.07
Residuals GPA	-.02	-.05

<sup>a</sup> Values for  $n$  range from 50 to 53.

<sup>b</sup> Values for  $n$  range from 56 to 58.

\* Correlation is significant at the 0.05 level (2-tailed).

Table 27

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and CES-DC and Academic Measures for Females*

Measure	Facebook friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
CES-DC	.27	.26
Math	.15	-.17
Reading	-.19	-.18
GPA	-.29	-.24
Residuals Math	-.16	-.26
Residuals Reading	-.13	-.26
Residuals GPA	-.13	-.25

<sup>a</sup> Values for  $n$  range from 33 to 36.

<sup>b</sup> Values for  $n$  range from 36 to 38.

Table 28

*Pearson Product-Movement Correlations Between Facebook Friends, Online Social Networking (OSN) Time and CES-DC and Academic Measures for Males*

Measure	Facebook friends <sup>a</sup>	Weekly Time Using OSN <sup>b</sup>
CES-DC	-.11	.28
Math	-.08	-.14
Reading	-.07	-.36
GPA	.08	-.24
Residuals Math	.11	.07
Residuals Reading	.11	.08
Residuals GPA	.09	.10

<sup>a</sup>  $n = 17$  for all correlations

<sup>b</sup>  $n = 20$  for all correlations