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Examining the Predictive Abilities of Mindfulness, Self-Compassion, and Grit

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ABSTRACT

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A growing body of evidence indicates that positive psychology constructs are related to better mental health. In particular, greater mindfulness and self-compassion are associated with better psychological well-being, and some research suggests that grit may be related to less depression. This study explored the extent to which mindfulness, self-compassion, and grit uniquely predicted well-being. Participants were 228 college students (75.9% female, 78.9% White, M_{age} = 19.84 years) who completed a series of questionnaires. Overall, greater self-compassion and greater mindfulness were uniquely associated with better well-being. Furthermore, self-compassion partially mediated the relation between mindfulness and well-being. In general, grit was not significantly related to the well-being outcomes. These findings support the existing literature regarding the benefits of mindfulness and self-compassion and suggest that self-compassion may be a mechanism of action in mindfulness-based interventions.

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Examining the Predictive Abilities of Mindfulness, Self-Compassion, and Grit

Positive psychology is a relatively recent area of empirical study within the field of psychology (Seligman & Csikszentmihalyi, 2014). The primary focus of positive psychology is to determine what makes a person strong, happy, and healthy (i.e., what psychological factors protect a person from psychopathology and improve or maintain well-being). It is important to understand how constructs of positive psychology affect well-being and psychopathology in order to create effective clinical interventions. Three constructs that have received attention recently are mindfulness, self-compassion, and grit. All three have been associated with a number of positive outcomes, such as greater psychological well-being and lower levels of depression (Baer, Lykins, & Peters, 2012; Salles et al., 2017; Van Dam et al., 2010). Despite evidence linking each of these factors with positive psychological outcomes, no studies to date have examined mindfulness, self-compassion, and grit concurrently to my knowledge. Some recent research has indicated that mindfulness and self-compassion may be interrelated (e.g., Hollis-Walker & Colosimo, 2011), and there is theoretical reason to believe that grit is associated with mindfulness and self-compassion. Thus, it is unclear to what extent each construct is uniquely related to psychological well-being. The purpose of this study was to determine the extent to which mindfulness, self-compassion, and grit independently related to well-being and depression.

Mindfulness

Mindfulness is described as being non-judgmentally aware of the present moment (Brown & Ryan, 2003). This involves awareness of present thoughts, feelings, and surroundings, both positive and negative, without passing judgment or fixating on one thing. Some people are more inclined to think in a mindful way, but a state of mindfulness can also be induced through

activities, such as meditation. An inherent tendency to be mindful is known as dispositional mindfulness as it effects how a person reacts and thinks on a day to day basis, instead of in the current moment. A person with high dispositional mindfulness is aware of his or her surroundings and lets thoughts pass by rather than obsess over any one idea or memory. Conversely, a person low in dispositional mindfulness may do things with little awareness because he/she is focused on a particular train of thoughts instead of his/her surroundings.

Dispositional mindfulness is related to many positive outcomes (Brown & Cordon, 2009). Bernstein, Tanay, and Vujanovic (2011) found that mindfulness was related to lower levels of post-traumatic stress disorder (PTSD) symptom severity, psychiatric multi-comorbidity, anxiety, and depressive loss of interest symptoms. Several studies have also shown that dispositional mindfulness is negatively related with depression, anxiety, stress, negative affect, emotional reactivity, and health problems (Bao, Xue, & Kong, 2015; Bränström, Duncan, & Moskowitz, 2011; Brown & Ryan, 2003; Cash & Whittingham, 2010; Keng, Smoski, & Robins, 2011). Conversely, dispositional mindfulness is positively related with positive affect, life satisfaction, self-esteem, positive states of mind, adaptive stress responses, and subjective, emotional, psychological, social, and eudaimonic (vitality, self-actualization) well-being (Bränström, Duncan, & Moskowitz, 2011; Brown & Ryan, 2003; Howell et al., 2008; Keng, Smoski, & Robins, 2011; Weinstein, Brown, & Ryan, 2008). A review of mindfulness research notes that these correlations with dispositional mindfulness are independent of social desirability biases and shared variance with other individual difference variables, such as neuroticism and extroversion (Brown & Cordon, 2009).

Mindfulness-based interventions designed to improve psychological well-being are widely used and empirically supported (Eberth & Sedlmeier, 2012; Hoffman et al., 2012). A

meta-analysis showed that mindfulness-based therapies, such as mindfulness-based cognitive therapy and mindfulness-based stress reduction, are highly effective at decreasing levels of anxiety and depression, with some large effect sizes (Hedge's g = 0.97; Hofmann et al., 2010). Mindfulness-based treatments are also shown to be effective at reducing stress and have positive effects on physical and mental health (Grossman et al., 2004).

Together, the evidence indicates that mindfulness is a powerful skill and intervention tool that promotes several types of well-being. Those with a greater affinity for mindfulness tend to have better psychological well-being, and learning about mindfulness helps to build interventions that spread its benefits to others.

Self-Compassion

Self-compassion is based on the Buddhist idea of compassion being extended to others *as well as* oneself. It involves showing kindness to all aspects of oneself, recognizing that an individual experience is part of the human experience of everyone, and having a non-judgmental awareness of the present moment (Barnard & Curry, 2011). The latter aspect is also known as mindfulness. Although mindfulness is an important aspect of self-compassion, self-compassion has a greater focus on forgiving oneself and recognizing one is not alone in his/her misfortunes. For example, if a self-compassionate person performs poorly on a task, he or she does not harshly judge him/herself as a failure, but instead he/she accepts him/herself and recognizes the poor performance does not make him/her a lesser person. Research on self-compassion suggests that high self-compassion allows for realistic self-evaluations without obsessing over negative aspects or causing distress (Leary et al., 2007).

Research shows that self-compassion is negatively associated with psychopathology. Higher avoidance symptoms in PTSD has been found to be negatively correlated with self-

compassion (Thompson & Waltz, 2008), and self-compassion weakens the association between maladaptive perfectionism and depression (Ferrari et al., 2018). A meta-analysis has shown that the relation between self-compassion and psychopathology has a large effect size (r = -.54; Macbeth & Gumley, 2012). There is also a link between self-compassion and motivation for self-improvement, even in the face of initial failure (Neff, Hsieh, & Dejitterat, 2005). This has been shown academically but could be applied to increase retention in psychological interventions (Breines & Chen, 2012). Self-compassion moderates reactions to negative events, such as failure and embarrassment (Leary et al., 2007), and self-compassion also appears to mediate the negative association between attachment anxiety and subjective well-being (Wei et al., 2011). These findings suggest that self-compassion is a protective factor for negative affect and poor well-being.

Increasing self-compassion may help protect at-risk populations from developing psychological disorders. There is some promising work demonstrating that the Mindful Self-Compassion (MSC) program effectively enhanced self-compassion, mindfulness, and well-being while also decreasing levels of depression, anxiety, stress, and emotional avoidance (Neff & Germer, 2013). At both the six-month and one-year follow-ups, the outcomes were maintained, and life satisfaction increased. Most of the participants had a history of meditation and still saw large increases in well-being, suggesting that the MSC program was more effective than meditation practices alone. There have yet to be studies comparing the Mindfulness Based Stress Reduction intervention to MSC.

Self-compassion and mindfulness both positively relate to happiness and are negatively associated with depression and anxiety (Baer, Lykins, & Peters, 2012; Van Dam et al., 2010). However, self-compassion uniquely predicts outcomes of well-being and psychopathology

separate from mindfulness. For example, self-compassion appears to be a stronger predictor of well-being, depression, and anxiety than mindfulness (Van Dam et al., 2010). However, Baer, Lykins, and Peters (2012) suggest that the two constructs are equally, and differently, important.

Furthermore, self-compassion may mediate the relation between mindfulness and psychological well-being (Hollis-Walker & Colosimo, 2011). In the study, each participant completed Ryff's (1989) full scale of Psychological Well-Being (PWB), Baer et al.'s (2006) Five-Factor Mindfulness Questionnaire (FFMQ), and Neff's (2003) Self-Compassion Scale (SCS). The mediation was tested using Baron and Kenny's (1986) approach and the Sobel (1982) test, and their results suggested that self-compassion did in fact mediate the relation between mindfulness and psychological well-being. Since mindfulness is an aspect of self-compassion, it makes sense that increasing mindfulness would help to increase self-compassion. And given self-compassion's focus on self-acceptance and connection, it is logical that it would in turn increase psychological well-being. However, this effect has yet to be replicated.

Grit

Grit is a relatively unexplored concept. Duckworth and colleagues (2007) define grit as "perseverance and passion for long-term goals" (p. 1087). That is, individuals higher in grit have a strong, consistent desire to work towards long-term goals and will consistently put in the work to achieve their goals regardless of setbacks. Much like conscientiousness, this is defined as a personality trait. Some people inherently have more grit than others.

Early research has shown that grit is positively associated with age, GPA, and education level (Duckworth et al., 2007). It has more recently been positively correlated with seeking meaning in life, as well as engagement, while being negatively correlated with pleasure seeking (Von Culin et al., 2014). Longitudinal studies involving medical residents have also shown that

higher levels of grit predicted better psychological well-being and less depression and attrition six months later (Salles, Cohen, & Mueller, 2014) and one year later (Salles et al., 2017).

Grit has also been linked to suicide attempts and suicidal ideation (Anestis & Selby, 2015; Blalock, Young, & Kleiman, 2015; Kleiman et al., 2013). High levels of grit have been shown to buffer the relation between negative life events and suicidal ideation (Blalock, Young, & Kleiman, 2015), as well as nearly negate suicidal ideation when combined with high levels of gratitude (Kleiman et al., 2013). However, another study found that high levels of grit moderated the relation between non-suicidal self-injury (NSSI) and suicidal behavior and predicted more frequent suicide attempts (Anestis & Selby, 2015). Together, the research on grit and its relation to psychological well-being and psychiatric symptoms needs to be expanded. The findings thus far are sparse and contradictory, and more research is needed to fully understand the role of grit.

To date, there have been no studies that have examined whether grit is related to mindfulness or self-compassion. However, there is some reason to believe that associations may exist. For example, mindfulness has been related with greater autonomous motivation, or motivation toward work on something important to an individual and their identity (Deci & Ryan, 2008). Breines and Chen (2012) demonstrated that those in a self-compassion condition had greater motivation to improve themselves and to reconcile moral transgressions compared to those in self-esteem, positive distraction, and no intervention conditions. As an individual with high grit would need to be motivated to work on the smaller goals that lead to the long-term goal, motivation may connect these three constructs. These indirect ties to grit make the relation between grit and self-compassion and mindfulness a point of interest.

The Present Study

The current study aimed to determine the extent to which mindfulness, self-compassion, and grit uniquely predicted well-being and depression. There is extensive literature relating mindfulness to well-being and depression (Bernstein, Tanay, & Vujanovic, 2011; Bränström, Duncan, & Moskowitz, 2011; Brown & Cordon, 2009; Brown & Ryan, 2003; Cash & Whittingham, 2010; Keng, Smoski, & Robins, 2011; Weinstein, Brown, & Ryan, 2008), and a growing literature base showing self-compassion's association with well-being and depression (Baer, Lykins, & Peters, 2012; Ferrari et al., 2018; Hollis-Walker & Colosimo, 2011; Macbeth & Gumley, 2012; Neff & Germer, 2013; Raes, 2010; Van Dam et al., 2010; Wei et al., 2011). Although there is limited research on grit, longitudinal studies of medical residents show a positive association with well-being and negative association with depression (Salles, Cohen, & Mueller, 2014; Salles et al., 2017). Previous research has demonstrated that mindfulness and self-compassion are related (Baer, Lykins, & Peters, 2012; Van Dam et al., 2010), but there is also reason to believe that grit may be related to both mindfulness and self-compassion. Mindfulness is associated with autonomous motivation and self-compassion is associated with self-improvement motivation (Deci & Ryan, 2008; Breines & Chen, 2012). Conceptually, grit is also related to motivation due to its emphasis on consistent work towards a long-term goal. Thus, grit, self-compassion, and mindfulness may be interrelated.

The purpose of the present study was to examine the relations among these three constructs and to determine the extent to which each factor independently predicted well-being and depression. It was expected that mindfulness, self-compassion, and grit would be positively related with one another. Likewise, it was expected that the three constructs would be positively related with well-being and negatively related with depression. Furthermore, the extent to which

self-compassion mediated the relation between mindfulness and well-being was assessed. We expected to replicate the results of Hollis-Walker and Colosimo (2011). It was also hypothesized that self-compassion would mediate the relation between mindfulness and depression.

Method

Participants

Participants included 228 West Virginia University undergraduate students (M_{age} = 19.84 years, *SD* = 2.75; 75.9% female; 78.9% White; 87.3% Heterosexual). A study advertisement was circulated through psychology courses at West Virginia University (WVU), and participants signed up through the anonymous, online SONA program. SONA provided extra credit to students for participating in research. Participants had to be at least 18 years old to participate.

Measures

Mindful Awareness Attention Scale (MAAS). This 15-item questionnaire is a unidimensional assessment of dispositional mindfulness (Brown & Ryan, 2003). Participants indicate the extent to which items apply to themselves on a scale from 1 (*almost always*) to 6 (*almost never*). Items include "I find myself doing things without paying attention," "I tend to walk quickly to get to where I'm going without paying attention to what I experience along the way," and "I could be experiencing some emotion and not be conscious of it until sometime later." The scale's internal consistency is 0.82. The average score of all the items is calculated to create the composite score with higher scores indicating higher levels of dispositional mindfulness. The MAAS items aim to indirectly measure the "present attention and awareness" definition of mindfulness by asking questions about states of mindlessness, or not acknowledging present perceptions and feelings (Brown & Ryan, 2003, 823). Brown and Ryan (2003) found that the MAAS exhibited convergent, discriminant and content validity.

Cognitive and Affective Mindfulness Scale – Revised (CAMS-R). This unidimensional assessment of dispositional mindfulness includes 12 items (Feldman et al., 2007). Participants are asked to rate the extent to which each item applies to themselves on a scale from 1 (*Rarely/Not at All*) to 4 (*Almost Always*). Example items include "I can accept things I cannot change" and "I try to notice my thoughts without judging them." After reverse coding necessary items, all items are summed to make the composite score, where higher values reflect higher dispositional mindfulness. The internal consistency is 0.77. Evidence shows this scale demonstrates discriminant and convergent validity in university students (Feldman et al., 2007).

Self-Compassion Scale (SCS). The self-compassion scale was developed by Neff (2003) to measure compassion towards oneself. The scale includes 26 items and has 6 subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. There has been some debate as to whether these dimensions should just be split into positive (i.e., self-compassion) and negative (i.e., self-criticism) factors (Lopez et al., 2015). However, the six-factor structure has been replicated across multiple cultures (Neff, 2016) and different populations, including college students, community adults, Buddhist-meditators, and adults with a history of recurrent depression (Neff, Whittaker, & Karl, 2016). Furthermore, Williams et al. (2014) found better support for the six-factor model than a one-factor or higher order model. Despite this debate, most researchers utilize a single composite score of the self-compassion scale. The items are all rated on a 5-point Likert scale from 1 (*almost never)* to 5 (*almost always)*. Some example items are "I'm disapproving and judgmental about my own flaws and inadequacies," "When something upsets me, I try to keep my emotions in balance," and "When times are really difficult, I tend to be tough on myself." The self-judgment, isolation, and over-identification scales are all reverse coded, and the subscale items are averaged. The subscale

means are summed to create a composite SCS score. Higher scores indicate higher levels of self-compassion. The internal consistency is 0.92. The scale has demonstrated strong convergent, discriminant, and distinct groups validity (Neff, 2003; Neff, 2016).

Grit Scale. Developed by Duckworth et al. (2007) to measure the perseverance for long-term goals, the grit scale consists of 12 items and two subscales: consistency of interests and perseverance of effort. Items are rated on a 5-point Likert scale from 1 (*not at all like me*) to 5 (*very much like me*). The first six items are reverse coded, and all items are totaled for the grit score, where higher scores indicate more grit. The scale has an internal consistency value of 0.85. The grit scale's been shown to have predictive validity in that it was associated with less life time career changes and higher academic achievement among people of the same age. However, the validity of the grit scale as a whole is under question as a meta-analysis indicates that the higher order structure of grit is unconfirmed (Credé, Tynan, & Harms, 2017). The same meta-analysis examined the criterion validities of the two subscales and demonstrated that the perseverance subscale had significantly stronger criterion validity than the consistency of interest subscale. It also found that the perseverance of effort subscale was still able to explain variance in academic performance even after controlling for conscientiousness, whereas the results for the consistency of interest were insignificant (Credé, Tynan, & Harms, 2017). Similarly, Bowman et al. (2015) found that perseverance of effort significantly predicted greater academic adjustment, college GPA, college satisfaction, sense of belonging, and intent to persist but saw fewer and weaker relationships with consistency of interest. Thus, analyses were run both for the whole scale and the subscales.

Ryff's Scale of Psychological Well-Being (SPWB). This 18-item questionnaire is a measure of psychological well-being reduced from the original 180 item questionnaire (Ryff &

Keyes, 1995). Participants rate to what degree they agree with each statement from 1 (*strongly disagree*) to 6 (*strongly agree*). Example items include "When I look at the story of my life, I am pleased with how things have turned out" and "I judge myself by what I think is important, not by the values of what others think is important." After reverse coding necessary items, a composite score is made by summing all the items. Higher scores indicate higher psychological well-being. The internal consistency of the scale is 0.81 (Keyes, 2002). The larger form of the scale has demonstrated test-retest reliability and convergent and discriminant validity (Ryff, 1989).

Positive and Negative Affective Schedule (PANAS). This 20-item questionnaire measures positive and negative mood (Watson, Clark, & Tellegen, 1988). The scale includes items such as "interested," "ashamed," and "determined." Participants indicate how much they generally feel each item on an average day on a scale of 1 (*very slightly or not at all*) to 5 (*extremely*). Positive items and negative items are summed, with higher totals indicating higher positive affect and negative affect, respectively. The internal consistencies are 0.88 for positive affect and 0.87 for negative affect, and both have shown convergent and discriminant validity (Watson et al., 1988).

Subjective Happiness Scale (SHS). This 4-item questionnaire measures subjective happiness (Lyubomirsky & Lepper, 1999). Participants rate how happy they consider themselves on a 7-point scale from the negative option to the positive option, with the labels changing based on the question. An example item is "Compared with most of my peers, I consider myself: 1 (*less happy*) to 7 (*more happy*)." One item is reverse coded, and the mean of the item scores is calculated. Higher scores indicate higher subjective happiness. The scales internal consistency

equals 0.86, and it has shown good reliability and convergent and discriminant validity (Lyubomirsky & Lepper, 1999).

Center for Epidemiological Studies – Depression Scale (CES-D). This questionnaire measures frequency of depressive symptoms and consists of 20 items (Radloff, 1977). It asks participants to rate how often over the past week they have experienced depressive symptoms, rated on a scale of 0 (*Rarely or None of the Time*) to 3 (*Most or All of the Time*). Some items include "I felt that I could not shake off the blues, even with help from my family or friends" and "I felt that everything I did was an effort." Some positive items are included, such as "I enjoyed life" and "I was hopeful about the future." Positive items are reverse scored, and then the items are summed. Higher scores indicate more symptomatology. In nonclinical samples, internal consistency equals 0.85. The CES-D has also shown reliability, and concurrent, discriminant, and content validity (Radloff, 1977). Although this scale was not originally intended for use on a college sample, it has been used in college studies before with high reliability (Carleton et al., 2013; Morgan & Cotten, 2003; Wei, Russell, & Zakalik, 2005).

Demographics. Participants were also be asked to provide demographic information, such as gender, age, ethnicity, etc. at the end of the study. These were used to control for factors like age and education in the analyses.

Procedure

Participants signed up for the study through SONA. When participants arrived at the lab, they were seated at individual workstations and asked to provide informed consent. As part of a larger study, participants wrote a short essay about a "typical" weekend. They then completed a series of questionnaires, which included the measures of interest. The questionnaires were presented in a random order, except for demographic questions, which appeared last (see all

measures in the Appendix). All measures were administered on a computer with MediaLab. The study sessions lasted no more than 30 minutes, and the students received 1 hour of SONA credit for their completion of the study.

Results

Means, standard deviations, and Cronbach's alphas for all major study measures are shown in Table 1. All data were checked for normality, missingness, and outliers. All measures appeared normally distributed. Two participants were excluded from the analyses due to missing data. Outliers were identified as data points which fell more than 1.5 times the interquartile range above the third quartile or below the first quartile. One outlier was found each for NA, SPWB, CES-D, and GS. Analyses were run with and without outliers to decide whether it was necessary to exclude them. As the pattern of results did not change, it was deemed unnecessary to exclude outliers. Thus, analyses are reported with all participants included.

To determine whether any demographic variables should be included as covariates in the primary analyses, each demographic variable was compared to the measures of interest. Age significantly correlated with the CAMS-R ($r = 0.18$, $p = 0.007$), MAAS ($r = 0.16$, $p = 0.016$), and SCS ($r = 0.18$, $p = 0.008$). CES-D scores differed by sexual orientation, where heterosexuals had significantly lower scores than those who were not heterosexual, $t(226) = 2.15$, $p = 0.039$. Finally, there were some significant differences based on religion: Christians had higher SHS ($t(226) = 3.46$, $p = 0.0007$), CAMS-R ($t(226) = 2.52$, $p = 0.01$), and GS ($t(226) = 2.52$, $p = 0.009$) scores and lower CES-D scores ($t(226) = 2.08$, $p = 0.04$) than non-Christians. Gender, college year, and ethnicity were not significantly related to any of the primary variables. Therefore, only age, religion, and sexual orientation were assessed as potential covariates in the primary analyses. However, when the demographic covariates were removed from the analyses,

the pattern of results did not change. As such, the results are reported without the demographic covariates included.

Correlations

To examine the bivariate associations among the primary variables, Pearson correlation analyses were conducted (see Table 2). Psychological well-being, positive affect, and subjective happiness were all positively related with one another and negatively related with negative affect and depression. Negative affect and depression were positively related. Mindfulness, self-compassion, and grit were positively related with one another. As expected, each positive psychology construct was positively related to psychological well-being, positive affect, and subjective happiness, and each positive psychology construct was negatively related to negative affect and depression.

Regression Models

To determine the extent to which self-compassion, the grit subscales, and mindfulness uniquely predicted depression and well-being, multiple linear regression analyses were run with the four positive psychology measures as the predictors and each well-being variable as the outcome. To see if adding each positive psychology variable accounted for significantly more variance in the well-being outcomes, the models were run stepwise. Since there were two measures of mindfulness (MAAS and CAMS-R), a composite variable was created. The MAAS and CAMS-R were strongly correlated ($r = 0.55$, $p < .001$) and the results of the regression analyses did not differ if each individual measure was used. Thus, z-scores for each measure were used to create a mean mindfulness score.

The results for the stepwise regression models with the grit subscale are shown in Table 3. In all models, self-compassion was a significant, positive predictor of psychological well-

being, positive affect, and subjective happiness and negative predictor of negative affect and depression. Similarly, mindfulness was uniquely associated with better well-being, except for positive affect. In general, the grit subscales did not significantly predict the well-being outcomes, but both were significant predictors of psychological well-being. The consistency of interest subscale was also a significant predictor of less negative affect while persistence of effort was a significant predictor of greater positive affect. The stepwise regressions were also run with the grit composite score, but it was only able to predict psychological well-being, consistent with the results of the subscale steps.

Mediation Models

To test for mediation, a bootstrapping technique was utilized through Hayes' PROCESS macro (Hayes, 2012) with 5,000 resamples. Again, the composite score of mindfulness was used. Also, positive well-being (PosWB) and negative well-being (NegWB) composite variables were created to simplify reporting. All of the positive and negative well-being measures were strongly correlated and the mediation results were consistent if the individual outcome variables were used. The PosWB score was calculated as the mean of the z scores for the SPWB, SHS, and PA; the NegWB score was calculated in the same fashion but included the CES-D and NA scores. Mindfulness was set as the predictor, self-compassion as the mediator, and PosWB or NegWB as the outcome variable. In order to compare an alternative model, the z-scores for self-compassion were used.

First, we tested if self-compassion mediated the relation between mindfulness and PosWB (see Figure 1). Greater mindfulness was related to greater self-compassion, $\beta = 0.73$, $SE = 0.06$, $t(226) = 11.10$, $p < 0.001$, and PosWB, $\beta = 0.60$, $SE = 0.05$, $t(226) = 10.98$, $p < 0.001$. When mindfulness and self-compassion were simultaneously predicting positive well-being, both

self-compassion, $\beta = 0.44$, $SE = 0.05$, $t(225) = 8.98$, $p < 0.001$, and mindfulness $\beta = 0.30$, $SE = 0.06$, $t(225) = 5.27$, $p < 0.001$, were significantly related. The mean estimate of the indirect effect was 0.32 ($SE = 0.04$) with a 95% bias-corrected confidence interval (CI) of [0.25, 0.40]. This suggests that self-compassion partially mediated the relation between mindfulness and positive well-being.

Next, we tested whether self-compassion mediated the relation between mindfulness and NegWB (see Figure 2). Greater mindfulness was related to NegWB, $\beta = -0.61$, $SE = 0.06$, $t(226) = -10.24$, $p < 0.001$. When mindfulness and self-compassion were simultaneously predicting negative well-being, both self-compassion, $\beta = -0.35$, $SE = 0.06$, $t(225) = -5.97$, $p < 0.001$, and mindfulness, $\beta = -0.34$, $SE = 0.07$, $t(225) = -4.99$, $p < 0.001$, were significantly related. The mean estimate of the indirect effect of mindfulness on NegWB was -0.26 ($SE = 0.05$), with a 95% bias-corrected CI of [-0.36, -0.16]. This suggests that self-compassion also partially mediated the relation between mindfulness and negative well-being.

Given that the study was cross-sectional in nature, alternative models were also tested with self-compassion as the predictor and mindfulness as the mediator. Self-compassion was a significant predictor of mindfulness, $\beta = 0.53$, $SE = 0.04$, $t(226) = 11.10$, $p < 0.001$, positive well-being, $\beta = 0.59$, $SE = 0.04$, $t(226) = 14.26$, $p < 0.001$, and negative well-being, $\beta = -0.52$, $SE = 0.05$, $t(226) = -10.61$, $p < 0.001$. The mean estimate of the indirect effect of self-compassion on positive well-being through mindfulness was 0.16 ($SE = 0.03$), with a 95% bias-corrected CI of [0.10, 0.23], and the mean estimate of the indirect effect of self-compassion on negative well-being through mindfulness was -0.18 ($SE = 0.04$), with a 95% bias-corrected CI of [-0.28, -0.11]. These results suggest that mindfulness might instead partially mediate the relation between self-compassion and both positive and negative well-being.

Discussion

The goal of the present study was to examine the extent to which mindfulness, self-compassion, and grit uniquely predicted depression and multiple measures of well-being. Due to the validity debates surrounding grit's subscales, these predictive tests were done using grit's two subscales to explore their importance. It was expected that mindfulness and self-compassion would be strong predictors of multiple well-being outcomes, and it was thought that grit may positively predict well-being as well. The present study also explored a potential mediation pathway wherein self-compassion partially mediates the relation between mindfulness and well-being. Overall, self-compassion was the strongest and most reliable predictor of better well-being outcomes; mindfulness was also a strong predictor of the better well-being outcomes with the exception of positive mood; and grit was only a significant predictor of better psychological well-being and better mood. There was also evidence that self-compassion partially mediated the relation between mindfulness and well-being.

Self-compassion uniquely predicted all well-being outcome variables over and above mindfulness and grit. This is consistent with Van Dam et al.'s (2010) results, which highlights that self-compassion is a unique and possibly stronger predictor of well-being and depression than mindfulness. As Van Dam et al. (2010) posited, it seems that the way a person approaches his/her private thoughts is more important than simply being aware of them in a nonjudgmental fashion. It also makes sense that the way in which a person reconciles his/her failure would be more important than the desire to achieve a long-term goal despite the failure. It is possible that self-compassion is also able to affect more pathways of thought than mindfulness. Mindfulness teaches that one should not necessarily cling to thoughts, but sometimes people need to think things through and examine possible outcomes. Others are the victim of intrusive thoughts in the

case of some psychopathologies. Self-compassion allows room for these thoughts to be explored and acknowledged with kindness, despite how frightening they may be. It also helps individuals to not feel so isolated in their experiences which mindfulness does not address. Considering the reliable predictive ability of self-compassion and the possible reasons for its predictive strength, it should be included as a measure when developing interventions and analyzing their mechanisms of action. Although there is little current research exploring self-compassion in interventions, it has been established as an important predictor when viewing well-being. If changes in cognition that lead to better psychological well-being are related to changes in self-compassion, then it may be that self-compassion is a mechanism of improvement in psychological well-being.

Mindfulness was a significant predictor of all well-being outcomes over and above grit and self-compassion, except when predicting positive affect. While these were the expected results, the fact that mindfulness was no longer a significant predictor of positive affect when self-compassion and persistence of effort were included was contrary to our expectations and previous findings (e.g., Brown & Ryan, 2003). However, other research has shown that the relation between mindfulness and positive affect can be fully mediated by multiple other variables (Weinstein, Brown, & Ryan, 2008). While it is common that those with higher mindfulness have greater positive affect, it should be considered that mindfulness is not necessarily the driving factor of this effect. Just as seen in past research, mindfulness is still an important predictor of well-being when self-compassion is included despite how self-compassion incorporates mindfulness into its measure (Baer, Lykins, & Peters, 2012). The results also imply that mindfulness does not act alone on well-being. Future studies should investigate the possible

effects of mindfulness interventions on other well-being predictive variables or test possible mediators between mindfulness and well-being.

The present study did investigate mediation of the relation between mindfulness and well-being. Reproducing the results from Hollis-Walker and Colosimo (2011), the results suggest self-compassion may partially mediate the relation between mindfulness and positive well-being. In addition, it was shown that self-compassion may partially mediate the relation between mindfulness and negative well-being. Although alternative models were tested and significant, the confidence intervals in the alternative models were much closer to zero, so the data seem to better fit the original models. This finding suggests that mindfulness may improve self-compassion and that the improvements in well-being from mindfulness-based interventions might partially be from increases in self-compassion. Some future research should observe if self-compassion raises after mindfulness-based interventions.

Grit and its subscales were positively related with self-compassion and mindfulness, as expected, but the directionalities of these relations are unclear. Although grit and its subscales were also positively related to all positive well-being outcomes and negatively related to negative affect and depression, neither subscale was a significant predictor of subjective happiness or depression when considered simultaneously with self-compassion and mindfulness. Both subscales were significantly related to psychological well-being, but differently predicted positive and negative affect. There is some similarity seen between Ryff's scale of psychological well-being and the grit scale, such as items on personal growth, achievement, and feeling a sense of purpose; thus it is possible that the positive relation is due to the similarity in the scale items and not a true relation between grit and psychological well-being. However, it could be that with

greater determination for longer goals, the more fulfilled a person feels as they work towards their long-term goals and thus has better psychological well-being.

Persistence of effort significantly predicted positive affect. It could be thought that a person who persists more accomplishes more, and thus feels the reward and has a better mood. It is also important to note that emotions associated with persistence and the success from persistence appear in the positive affect scale such as "proud" and "determined." On the other hand, consistency of interest significantly predicts lower negative affect. This is perhaps because when one feels engaged in what they are working on or doing for their leisure, they are less likely to feel annoyed.

Inconsistent with the results from the meta-analysis by Credé, Tynan, and Harms (2017), the results showed consistency of interest significantly predicted psychological well-being and negative mood. This implies that consistency of interest may be important in studies of psychological well-being, even though it shows little predictive ability in academic settings. More research should be done to investigate the predictive values of the grit subscales.

While it appears that grit is largely unrelated to well-being, it could be that the scale does not accurately measure grit. This has been a debate in the research of grit in academic settings, and the results of this study only support this notion (Crede, Tynan, & Harms, 2017). Theoretically, it makes sense that having a passion for long term goals would help define an individual's purpose and lead to better well-being. Perhaps with a better measure of grit, the results would show a unique predictive ability of grit. It is also possible that the predictive ability of grit is mostly present in select populations who have long term goals and are undergoing extreme circumstances, such as in the studies by Salles, Cohen, and Mueller (2014) and Salles et al. (2016).

Limitations

The present study is cross-sectional in nature which makes it not entirely appropriate for mediation testing. Future investigations of the mediation models should be experimental or longitudinal in order to demonstrate the causal and temporal relation between mindfulness, self-compassion, and well-being. The study is also weakened by a poorly generalizable sample, which is heavily dominated by college-aged, single, white women with no known psychopathology. It is also important to note that while the well-being and mindfulness composites had high reliability, they no longer have the validity research to support their use. Future studies should also aim to take more diverse samples and perhaps more specifically clinical and community samples. An experimental approach to the relations of these constructs would also better show directionality. Self-compassion and mindfulness could be manipulated, and both could be measured before and after manipulation or days of intervention. Experiments like this could help better mindfulness-based interventions, reveal mechanisms of action, and possibly lead to the creation of new and better interventions.

Conclusion

Overall, it is clear that mindfulness and self-compassion are both important factors for better well-being. It is also probable that self-compassion partially mediates the relation between mindfulness and well-being, implying that part of the improvement seen from mindfulness-based interventions is due to improvements in self-compassion. Its broader focus than mindfulness allows more possibilities for better mental health by also promoting patience towards oneself and diminishing feelings of isolation. Given these outcomes and theoretical implications, self-compassion should be a greater focus of future intervention research and development. On the

other hand, it seems grit is not related to well-being, and its weaker associations do not merit future study.

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Table 1

Means Standard Deviations, and Cronbach's Alpha values of All Variables

Variable	Mean/%	SD	α
Positive Well-Being	0	0.85	0.91
Positive Affect (1 to 5)	3.29	0.74	0.87
Ryff's Scale of Psychological Well-Being (1 to 6)	4.50	0.67	0.84
Subjective Happiness Scale (1 to 7)	4.75	1.38	0.89
Negative Well-Being	0	0.9	0.92
Negative Affect (1 to 5)	2.11	0.77	0.87
Center for Epidemiological Studies – Depression Scale (0 to 60)	18.54	10.62	0.90
Self-Compassion Scale (26 to 130)	75.14	19.11	0.94
Mindfulness	0	0.85	0.89
Cognitive and Affective Mindfulness Scale – Revised (1 to 4)	2.56	0.52	0.83
Mindful Awareness Attention Scale (1 to 6)	3.54	0.83	0.87
Grit Scale (1 to 5)	3.26	0.61	0.79
Persistence of Effort (1 to 5)	3.66	0.70	0.75
Consistency of Interest (1 to 5)	2.87	0.75	0.71
Demographics			
Age (18 to 55)	19.84	2.75	
Sexual Orientation (Heterosexual)	87.3%		
Religion (Christian)	56.3%		
College Year (Freshman)	38.2%		
Marital Status (Single)	98.7%		
Ethnicity (White)	78.9%		
Gender (Female)	75.9%		

Table 2

Correlations Among All Applicable Study Variables

	SPWB	SHS	PA	NA	CAMS-R	MAAS	CES-D	SCS	GS	GS – Pers
SPWB	--									
SHS	0.66*	--								
PA	0.51*	0.58*	--							
NA	-0.54*	-0.47*	-0.23*	--						
CAMS-R	0.64*	0.60*	0.53*	-0.52*	--					
MAAS	0.50*	0.40*	0.21*	-0.42*	0.55*	--				
CES-D	-0.68*	-0.65*	-0.42*	0.63*	-0.64*	-0.45*	--			
SCS	0.63*	0.67*	0.50*	-0.46*	0.67*	0.50*	-0.61*	--		
GS	0.61*	0.43*	0.40*	-0.36*	0.54*	0.37*	-0.42*	0.51*	--	
GS – Pers	0.56*	0.42*	0.46*	-0.26*	0.52*	0.29*	-0.35*	0.45*	0.82*	--
GS – Cons	0.47*	0.31*	0.22*	-0.34*	0.39*	0.33*	-0.36*	0.41*	0.85*	0.41*

Note. SPWB = Ryff's Scale of Psychological Well-Being, SHS = Subjective Happiness Scale, PA = Positive Affect, NA = Negative Affect, CAMS-R = Cognitive and Affective Mindfulness Scale – Revised, MAAS = Mindful Awareness Attention Scale, CES-D = Center for Epidemiological Studies – Depression Scale, SCS = Self-Compassion Scale, GS = Grit Scale, GS – Pers = Grit Scale – Persistence of Effort Subscale, GS – Cons = Grit Scale – Consistency of Interest Subscale, * $p < 0.01$

Table 3

Regression Models Predicting Well-Being Measures

	Outcome Variable									
	SPWB		SHS		PA		CES-D		NA	
Predictor	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Mindfulness	0.39^{***}	0.26^{***}	0.29^{***}	0.17^{*}	0.18^{***}	0.10	0.30^{***}	-0.26^{***}	0.23^{***}	-0.29^{***}
Self-Compassion	0.09^{***}	0.30^{***}	0.18^{***}	0.52^{***}	0.09^{***}	0.34^{***}	0.12^{***}	-0.41^{***}	0.04^{***}	-0.24^{**}
Grit – Persistence of Effort	0.05^{***}	0.23^{***}	0.01	0.10	0.06^{***}	0.29^{***}	0.00	0.01	0.00	0.05
Grit – Consistency of Interest	0.02^{**}	0.15^{*}	0.00	-0.01	0.00	-0.07	0.01	-0.09	$0.02^{\dagger}$	$-0.15^{\dagger}$

Note. SPWB = Ryff's Scale of Psychological Well-Being, SHS = Subjective Happiness Scale, PA = Positive Affect, CES-D = Center for Epidemiological Studies – Depression Scale, NA = Negative Affect, $^{\dagger}p < 0.05$, $^{*}p < 0.01$, $^{**}p < 0.005$, $^{***}p < 0.001$

Figure 1. The partial mediation of self-compassion on the mindfulness and positive well-being relation. *The standardized betas for the direct effects are displayed for all variables with standard errors displayed in parentheses, and the indirect effect of mindfulness is shown beneath its direct effect with bias-corrected confidence interval. PosWB is a composite variable averaging the z-scores of Ryff's Scale of Psychological Well-Being, Subjective Happiness Scale, and Positive Affect.*

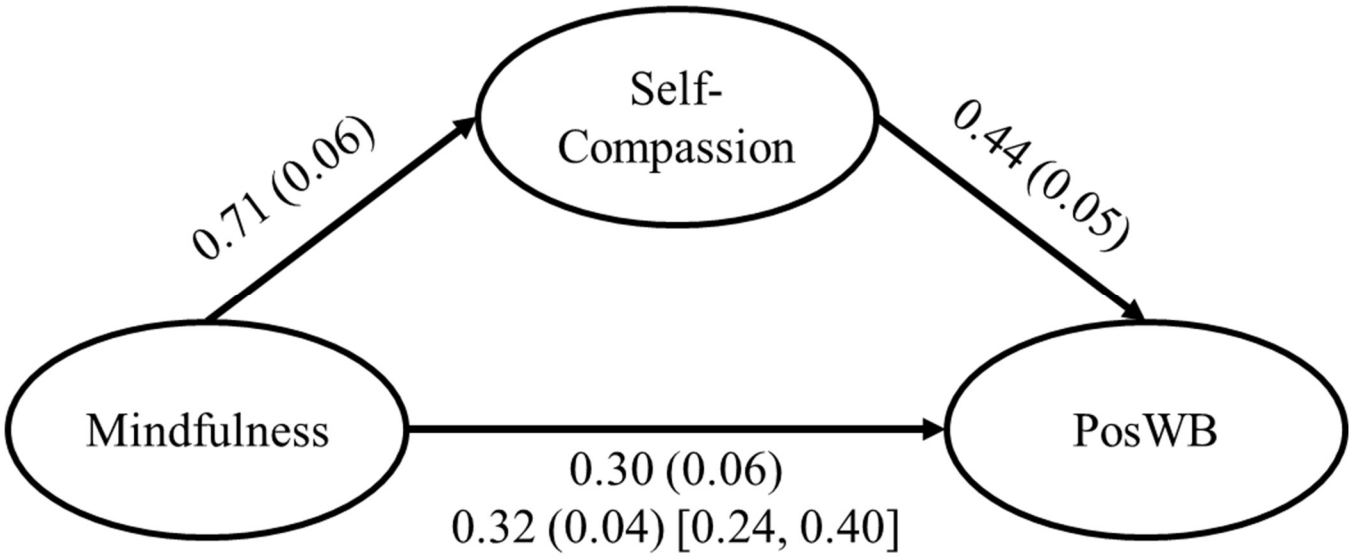
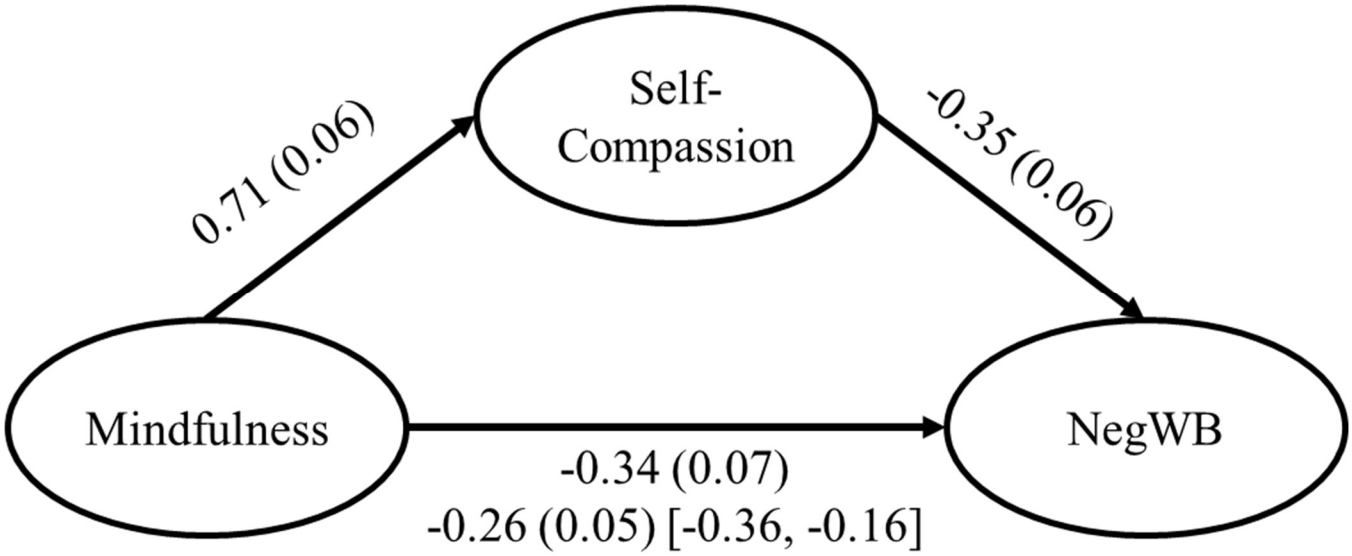


Figure 2. The partial mediation of self-compassion on the mindfulness and negative well-being relation. *The standardized betas for the direct effects are displayed for all variables with standard errors displayed in parentheses, and the indirect effect of mindfulness is shown beneath its direct effect with bias-corrected confidence interval. NegWB is a composite variable, averaging the z-scores of depression and negative affect.*



Appendix

MAAS

Mindful Attention Awareness Scale

Measure:

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

1. I could be experiencing some emotion and not be conscious of it until sometime later
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention
6. I forget a person's name almost as soon as I've been told it for the first time
7. It seems I am "running on automatic," without much awareness of what I'm doing
8. I rush through activities without being really attentive to them
9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there
10. I do jobs or tasks automatically, without being aware of what I'm doing
11. I find myself listening to someone with one ear, doing something else at the same time
12. I drive places on "automatic pilot" and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
14. I find myself doing things without paying attention.
15. I snack without being aware that I'm eating.

The Cognitive and Affective Mindfulness Scale – Revised (CAMS-R)

The CAMS-R is a 12-item measure designed to capture a broad conceptualization of mindfulness with language that is not specific to any particular type of meditation training.

Feldman, G., Hayes, A., Kumar, S. et al. J Psychopathol Behav Assess (2007) 29: 177.
doi:10.1007/s10862-006-9035-8

Instructions: People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways applies to you.

Measure:

1	2	3	4
Rarely/Not At All	Sometimes	Often	Almost Always

1. It is easy for me to concentrate on what I am doing.
2. I am preoccupied by the future.
3. I can tolerate emotional pain.
4. I can accept things I cannot change.
5. I can usually describe how I feel at the moment in considerable detail.
6. I am easily distracted.
7. I am preoccupied by the past.
8. It's easy for me to keep track of my thoughts and feelings.
9. I try to notice my thoughts without judging them.
10. I am able to accept the thoughts and feelings I have.
11. I am able to focus on the present moment.
12. I am able to pay close attention to one thing for a long period of time.

Scoring: Items 2, 6, and 7 are reverse-scored. After appropriate reversals, sum values for items 1 - 12. Higher values reflect greater mindful qualities.

Self-Compassion

Participants were instructed to indicate how often they acted in the manner stated in each of the items on a scale of 1 (almost never) to 5 (almost always).

Self-Kindness Subscale

- I try to be understanding and patient towards those aspects of my personality I don't like.
- I'm kind to myself when I'm experiencing suffering.
- When I'm going through a very hard time, I give myself the caring and tenderness I need.
- I'm tolerant of my own flaws and inadequacies.
- I try to be loving towards myself when I'm feeling emotional pain.

Self-Judgment Subscale (reverse code)

- When I see aspects of myself that I don't like, I get down on myself.
- When times are really difficult, I tend to be tough on myself.
- I can be a bit cold-hearted towards myself when I'm experiencing suffering.
- I'm disapproving and judgmental about my own flaws and inadequacies.
- I'm intolerant and impatient towards those aspects of my personality I don't like.

Common Humanity Subscale

- When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
- I try to see my failings as part of the human condition
- When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
- When things are going badly for me, I see the difficulties as part of life that everyone goes through.

Isolation Subscale (reverse code)

- When I fail at something that's important to me I tend to feel alone in my failure.
- When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.
- When I'm feeling down I tend to feel like most other people are probably happier than I am.
- When I'm really struggling I tend to feel like other people must be having an easier time of it.

Mindfulness Subscale

- When something upsets me I try to keep my emotions in balance.
- When I'm feeling down I try to approach my feelings with curiosity and openness.
- When something painful happens I try to take a balanced view of the situation.
- When I fail at something important to me I try to keep things in perspective.

Over-Identification Subscale (reverse code)

- When something upsets me I get carried away with my feelings.
- When I'm feeling down I tend to obsess and fixate on everything that's wrong.

- When something painful happens I tend to blow the incident out of proportion.
- When I fail at something important to me I become consumed by feelings of inadequacy.

Grit Scale

Consistency of Interests
I often set a goal but later choose to pursue a different one.
New ideas and new projects sometimes distract me from previous ones.
I become interested in new pursuits every few months.
My interests change from year to year.
I have been obsessed with a certain idea or project for a short time but later lost interest.
I have difficulty maintaining my focus on projects that take more than a few months to complete.

Perseverance of Effort
I have achieved a goal that took years of work.
I have overcome setbacks to conquer an important challenge.
I finish whatever I begin.
Setbacks don't discourage me.
I am a hard worker.
I am diligent

Measure:
1 = not at all like me to 5 = very much like me

Ryff Scale of Psychological Well-being

Measure:

The following set of statements deals with how you might feel about yourself and your life. Indicate the degree to which you agree with each statement. Please remember that there are neither right nor wrong answers.

1	2	3	4	5	6
Strongly Disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1.* I tend to be influenced by people with strong opinions.
2. In general, I feel I am in charge of the situation in which I live.
3. I think it is important to have new experiences that challenge how you think about yourself and the world.
4.* Maintaining close relationships has been difficult and frustrating for me.
5.* I live life one day at a time and don't really think about the future.
6. When I look at the story of my life, I am pleased with how things have turned out.
7. I have confidence in my opinions, even if they are contrary to the general consensus.
8.* The demands of everyday life often get me down.
9. For me, life has been a continuous process of learning, changing and growth.
10. People would describe me as a giving person, willing to share my time with others.
11. Some people wander aimlessly through life, but I am not one of them.
12. I like most aspects of my personality.
13. I judge myself by what I think is important, not by the values of what others think is important.
14. I am quite good at managing the many responsibilities of my daily life.
15.* I gave up trying to make a big improvements or changes in my life a long time ago.
16.*I have not experienced many warm and trusting relationships with others.
17.* I sometimes feel as if I've done all there is to do in life.
18.* In many ways, I feel disappointed about my achievements in life.

Reverse Coding:

1, 4, 5, 8, 15, 16, 17, 18

The Positive Affect Negative Affect Schedule

Instructions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you GENERALLY feel this way, that is, how you feel on the average day:

Measure:

very slightly or not at all	a little	moderately	quite a bit	extremely
1	2	3	4	5

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery
19. Active
20. Afraid

Subscale	Positive Affect	Negative Affect
Items	Interested Excited Strong Enthusiastic Proud Alert Inspired Determined Attentive Active	Distressed Upset Guilty Scared Hostile Irritable Ashamed Nervous Jittery Afraid

Subjective Happiness Scale

Measure:

1. In general, I consider myself:

1	2	3	4	5	6	7
not a very happy person						a very happy person

2. Compared with most of my peers, I consider myself:

1	2	3	4	5	6	7
less happy						more happy

3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?

1	2	3	4	5	6	7
not at all						a great deal

4. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

1	2	3	4	5	6	7
not all						at a great deal

Reverse Coding:
4

Center for Epidemiological Studies – Depression Scale

Center for Epidemiologic Studies Depression Scale (CES-D), NIMH

Below is a list of the ways you might have felt or behaved. Mark how often you have felt this way during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues, even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people disliked me.	☐	☐	☐	☐
20. I could not get "going".	☐	☐	☐	☐

SCORING: zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items (4, 8, 12, and 16) is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.