Resilience as Mediator between Extraversion, Neuroticism, and Depressive Symptoms in University Students

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Abstract

The prevalence of depression in university students is greater than in the general population. Previous studies have demonstrated that high levels of neuroticism and low levels of extraversion are linked to depression in students, and that resilience buffers against depression, though theorists have debated conceptualizing resilience as a process or a trait. However, past research has not examined the interaction between personality and resilience on depressive symptoms, especially when controlling for stressful life events (SLEs). To investigate this, Irish university students completed online scales measuring resilience as a trait, resilience as a process, extraversion, neuroticism, recent SLEs, and depressive symptoms. Resilience, both when measured as a trait and as a process, acted as a mediator in the relationships between extraversion and depressive symptoms and between neuroticism and depressive symptoms. Participants scoring high in extraversion tended to score higher in resilience, which predicted lower depressive symptoms. Inversely, participants scoring high in neuroticism tended to have lower levels of resilience, which predicted greater depressive symptoms. Although there remained a direct effect of neuroticism on depressive symptoms, there was no longer a direct effect of extraversion on depressive symptoms after accounting for resilience. Stressful life events did not mediate the relationships between personality and depressive symptoms. These results suggest that psychological interventions promoting resilience would be more effective in people with low levels of extraversion than for individuals high in neuroticism.

Keywords: Resilience, depression, extraversion, neuroticism, stressful life events

Introduction

University life invites change and challenges. Some students find the change an opportunity for intellectual, social, and emotional engagement (e.g. Richardson, King, Garrett, & Wrench, 2012). Other students begin to languish or even develop depressive symptoms. The purpose of this study was to explore elements that protect students against developing depression and investigate if those protectors are stronger than the risk factors that the past literature tends to focus on.

Stressful Life Events (SLEs)

Transitioning from secondary school to university marks a significant change in many young adults' lives. Then, students often experience a shift in housing and adjusting to new roommates (Hicks & Heastie, 2008), take on

individualized control over their learning (Perry, Hladkyj, Pekrun, & Pelletier, 2001), and learn how to manage their time (Trueman & Hartley, 1996). Later, experiencing illness, concern for a family member, conflict with roommates, and conflict with faculty are stressors that university students experience regardless of their year of study (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005). These factors are compounded by the higher rates of SLEs that young adults in general report experiencing relatively to other developmental stages (Hatch & Dohrenwend, 2007).

Depression

These stressful life events (SLEs) are considered major risk factors for depression in students (e.g., Alfeld-Liro & Sigelman, 1998). Depression is the most common

mental condition and the leading cause of disability for ages 15-39 (Vos et al., 2012). The American College Health Association correspondingly identified a 4.6% increase in the diagnosis of depression in university students between 1998 and 2008 (Buchanan, 2012). In Ireland, 13.9% of Dublin's medical and business students met the criteria for a depressive episode (Curran, Gawley, Casey, Gill, & Crumlish, 2009), and 21.4% of university students in Belfast have met the threshold for a depressive episode in the past 12 months (McLafferty et al., 2017). A systematic review of depression prevalence in students has estimated it at 31% (Ibrahim et al., 2013), which is close to twice the prevalence in the general population.

While much empirical focus is on the economic effects of depression, the burden of depression often manifests itself in impaired physical health, cognitive function, and social relationships (Lepine & Briley, 2011). Further, wellbeing is impacted as much or more significantly by depression than by other medical conditions (e.g. Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995). These results are similar to the effects of depression on quality of life (e.g. Pyne et al., 1997), which affect all domains of quality of life (Brenes, 2007).

Resilience

Yet despite these SLEs that all students encounter, not all students develop depressive symptoms. Further, some students find these changes empowering (Pittman & Richmond, 2008). The ability to maintain or regain mental health after experiencing stress and adversity is termed resilience (Herrman et al., 2011). To be considered resilient, two elements need to be present: an antecedent of negative or stressful experiences and the lack of a psychopathological outcome (Rutter, 2006). Individuals with good mental health, that is high levels of wellbeing, but who have not experienced adversity, cannot be considered resilient (Masten, 2007).

Though distinct from wellbeing as a construct, resilience and wellbeing are significantly correlated (e.g. Yildirim & Belen, 2019) and conceptually overlap (e.g. Fredrickson, 2001). For example, positive affect is hypothesized as a mechanism of both resilience (Tugade & Fredrickson, 2007; Georgoulas-Sherry & Kelly, 2019) and wellbeing (Fredrickson & Joiner, 2002). Notably, a lack of positive affect is characteristic of depression in a way not seen with other psychopathology (Kansky & Diener, 2017). With foundational overlap, resilience can be considered wellbeing in the wake of adversity (e.g. McCann et al., 2013). In studying resilience, we can examine the best of people at their testing point.

In resilience research, there is a core theoretical divide between defining the concept as a process or as a trait (Herrman et al., 2011). Theorists of process resilience define it as the interplay between protective factors, both internal, such as self-esteem and structured style (e.g. Masten, 2007; Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003) and external, such as family cohesion and social support (e.g. Mitchell & Ronzio, 2011; Rossetti et al., 2017). Conceptualizing resilience as a dynamic process helps explain the situational and lifespan differences in reactions to SLEs (Fletcher & Sarkar, 2013). It also suggests that resilience levels can be increased, even in individuals who have already experienced an episode of depression (Waugh & Koster, 2015).

Contrastingly, resilience defined as a trait or "ego resiliency" (Block & Kremen, 1996) emphasizes inherent differences between individuals regarding the balance between impulse control and flexibility. When either impulse control or flexibility is low, the individual does not have what trait theorists categorize as a resilient personality, marked by high levels of conscientiousness, agreeableness, extraversion, openness, and emotional stability (i.e., low levels of neuroticism) (Alessandri et al., 2014). In a longitudinal study of undergraduate American students, even though SLEs increased between the periods of measurement, the students' trait ego resiliency scores were not altered, indicating the stability of the construct over time (Karairmak & Figley, 2017).

These two resilience conceptualizations have led to equivalent outcomes, that is buffering effects against depression. Resilience measured as a process has shown to serve a protective role against depression in adolescents (e.g. Anyan & Hjemdal, 2016; Hjemdal, Vogel, Solem, Hagen, & Stiles, 2011) and adults maltreated as children (Arslan, 2016). Similarly, resilience measured as a trait was found to buffer against depression in cancer patients (Sharpley, Bitsika, Wootten, & Christie, 2014), adult victims of childhood abuse (Philippe, Laventure, Beaulieu-Pelletier, Lecours, & Lekes, 2011), and university students from around the world (Ahmed & Julius, 2015; Brailovskaia et al., 2018). Neither conceptualization is fully explanatory of the phenomenon and both should be considered alongside (Davydov, Stewart, Ritchie, & Chaudieu, 2010). In either school of thought, however, the focus on resilience in depression research demonstrates a scholarly interest in looking beyond risk factors and focusing on how strengths can be utilized in stressful periods (Panter-Brick & Leckman, 2013).

Personality

Beyond the trait/process debate, associations between resilience and personality are naturally hypothesized. Indeed, trait theorists view resilience as the amalgamation of certain personality characteristics (e.g. Alessandri et al., 2014), while certain personality traits in university students are more likely to influence their levels of interpersonal resources (e.g. Asendorpf & Wilpers, 1998), which are part of the process resilience conceptualization. Neuroticism and extraversion are two of the Big Five personality traits that have been specifically linked to resilience (Lu, Wang, Liu, & Zhang, 2014). Increased levels of neuroticism are associated with greater anxiety and sadness and lower levels of resilience (e.g. Campbell-Sills, Cohan, & Stein, 2006; Zeb, Naqvi, & Zonash, 2013). Neuroticism's characteristic poor response to stress (Klein, Kotov, & Bufferd, 2011) leads this single personality trait to account for as much as 35% of the variance in resilience scores (Nakaya, Oshio, & Kaneko, 2006). Inverse results have been found in the relationship between resilience and extraversion, a trait defined by gregariousness, assertiveness, activity, excitement-seeking, positive emotions, and warmth (John & Srivastava, 1999). Individuals with high levels of extraversion also tend to score high in resilience (Campbell-Sills et al., 2006; Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005). This may be due to extraversion, in contrast to neuroticism, leading to more positive affect in response to stress (Schneider, Rench, Lyons, & Riffle, 2012), or through the social supports crucial to resilience (e.g. Erdem, 2017), which tend to be stronger in extroverted students (Asendorpf & Wilpers, 1998).

Individuals with high levels of extraversion and low levels of neuroticism tend to experience more of the protective effects of resilience. The inverse personality profile appears to put students at greater risk for depressive symptoms. Individuals high in neuroticism have consistently demonstrated greater risk for depression (e.g. Grav, Stordal, Romild, & Hellzen, 2012), including in university students (e.g. Saklofske, Kelly, & Janzen, 1995). Individuals reporting low levels of extraversion have also been shown to be at higher risk for depression (e.g., Grav et al., 2012), including in samples of students (e.g. Cheng & Furnham, 2003). Janowsky (2001) even theorizes that introversion plays a causal role in the development of depression.

However, when considering the links between resilience, extraversion, neuroticism, and depression, one needs to account for SLEs. Specifically, research suggests that individuals with certain personality traits are more likely to experience different levels of positive or negative stressors. For example, individuals at higher levels of neuroticism tend to experience higher levels of negative life events (e.g. Magnus, Diener, Fujita, & Pavot, 1993; Saudino, Pedersen, Lichtenstein, McClearn, & Plomin, 1997). This pattern is likely not only an artifact of reporting bias as, in a survey of twins, both the self-report and the twin-report of the individual's neuroticism predicted negative life events experienced in the past month (Kendler, Gardner, & Prescott, 2003). However, some studies found that high levels of neuroticism were correlated with higher levels of both positive and negative severe SLEs (Farmer et al., 2002). Yet, these positive results have not been consistently replicated. For example, Pos et al. (2016) did not find significant associations between neuroticism and either positive or negative SLEs.

Higher levels of extraversion have been predictive of experiencing more positive life events (e.g., Saudino et al., 1997), including for university students (Magnus et al., 1993). However, people with high levels of extraversion have also reported higher levels of negative SLEs (e.g. Pos et al., 2016; Saudino et al., 1997). Further, Farmer et al. (2002) found that high levels of extraversion were associated with mild SLEs, but this relationship was no longer significant when accounting for age, gender, and depression. Though numerous studies show evidence of such trends, currently, there is no consensus regarding the relationships between extraversion and exposure to SLEs.

Relationships between Risk and Protective Factors

Given the relationships illustrated above, are students with the high-risk personality profile doomed to suffer with depression when they encounter stressful life events? The dynamics between these factors and the strength of resilience remain underexplored. While previous research has clearly demonstrated independent associations between resilience, depression, SLEs, and personality, the interactions between these different relationships have been overlooked.

Only two studies evaluated mediation models to explore such interactions. In a South Korean sample of almost 4,000 healthy adults, low levels of extraversion predicted depression and this relationship was partially mediated by stress (Kim et al., 2016). Extraversion predicted lower levels of negative life event stress, which predicted lower levels of depression (Kim et al., 2016). Similarly, while high levels of neuroticism predicted depressive symptoms, this relationship was also mediated by the perceived stress of recent negative

SLEs; neuroticism predicted higher levels of stress, and in turn, stress predicted higher levels of depression (Kim et al., 2016). However, this research focused only on negative SLEs and the perceived stress they cause, which is heavily influenced by a respondent's reaction style (Gunthert, Cohen, & Armeli, 1999). Additionally, there was no assessment of recent positive SLEs that can also cause stress (e.g. Scully, Tosi, & Banning, 2000). Finally, the contribution of resilience was not evaluated in the research.

Another model, tested in Chinese university students (Lu et al., 2014), did account for resilience, which partially mediated the relationship between extraversion and both happiness and positive affect. Also, the relationship between neuroticism and both happiness and negative affect was partially mediated by resilience (Lu et al, 2014). However, the model did not acknowledge the importance of SLEs in understanding resilience. Noteworthy, results obtained in Korean (Kim et al., 2016) and Chinese (Lu et al., 2014) samples are not necessarily generalizable to other cultures, as levels of extraversion and neuroticism are different in East Asia relative to Western Europe and North America (Schmitt, Allik, McCrae, & Benet-Martinez, 2007).

Aim and Hypotheses

The present study aimed to understand how the relationship between personality and depression is affected by resilience and SLEs, and if the focus on risk factors has underestimated the strength of resilience. Previous research has focused on the associations between resilience and depression or between personality and depression, but the literature lacks evidence regarding how personality and resilience interact to predict depression, particularly when accounting for recent SLEs. Pairs of variables do not operate in isolation; thus, to generate meaningful recommendations for students as they encounter stressors, we need to understand how this network of relationships functions. Two hypothetical models were tested. Model 1 proposed that the relationship between extraversion and depressive symptoms would be mediated by both SLEs and resilience, such that as levels of extraversion increase, resilience scores increase, and depressive symptoms decrease. Directionality in the relationship between extraversion and SLEs was not hypothesized, as corresponding results have been mixed in the literature. Model 2 proposed that the relationship between neuroticism and depressive symptoms would

also be mediated by both SLEs and resilience. As neuroticism levels increase, resilience would decrease as SLEs increase, which in turn increase depressive symptoms. Figures 1 and 2 represent the hypothesized conceptual models.

Method

Participants

Data were collected during the spring semester of the academic year 2018. A power analysis with 18 predictor variables and a medium effect size of 0.15 indicated that a sample of 147 participants would be required to achieve statistical power of .80. Initially, 343 students accessed the study's link, 235 of these gave consent and 158 (67% of consented participants) completed all measures required for the models' testing. All analyses were limited to the complete 158 sets to avoid issues of missing data and imputation (Graham, 2009). The majority of participants were female (n=122; 77%) and undergraduates (n=107; 68%). First-year was the most representative year of University study (n=68; 43%), and participants were 25.06 years old on average (*SD* = 8.44). Most of the participants reported feeling depressed before (n=68; 74%), with 36% (n=57) volunteering they have sought professional help for depression in the past; and 10% (n=16) receiving professional help for it at the time of completing study.

Procedure

The local university ethics committee approved the present study. Participants were recruited via the Internet and completed the questionnaires online. Invitations to participate, which included a link to the questionnaire, were sent to official departmental emails of four Irish universities with requests to circulate these to their students. The emails included a link to Questback, an online program commonly used for questionnaires' administration. Participation was entirely anonymous. After providing informed consent, students were asked to indicate their gender, age, level and year of study, and if they were currently experiencing depression or had done so in the past. Questionnaires measuring the variable components of the evaluated models were then administered. The instructions included the phrase "Answer according to how you feel or behave when you are your normal self" to contract possible effects of depressive symptoms on the responses to resilience and personality items, as recommended by Kendell and DiScipio (1968).
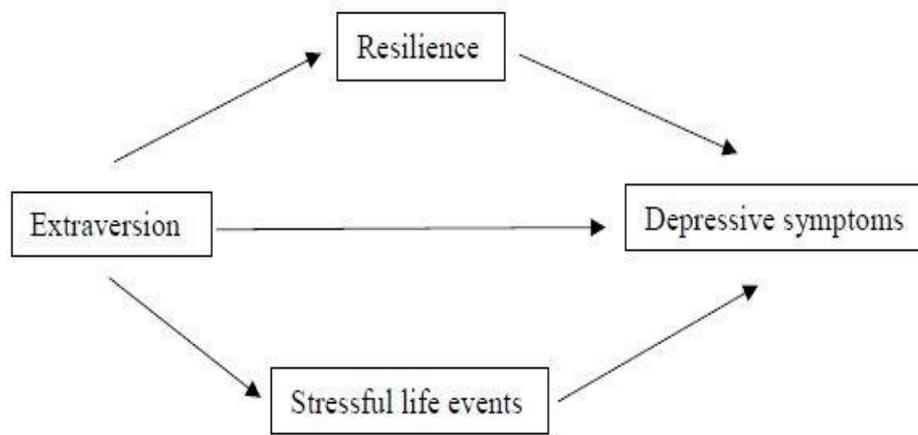
Figure 1. Conceptual Model 1, in which the relationship between extraversion and depressive symptoms is mediated by resilience and SLEs.
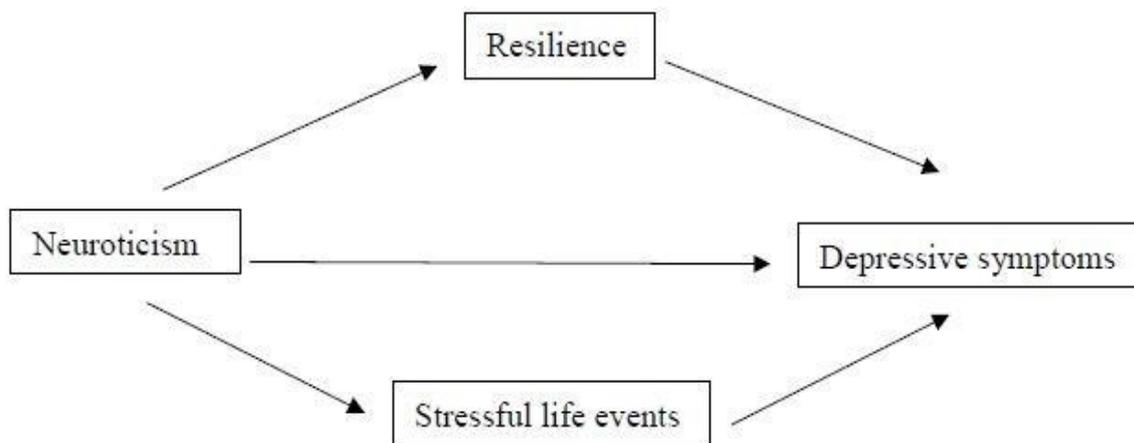

Figure 2. Conceptual model of Hypothesis 2, in which the relationship between neuroticism and depressive symptoms is mediated by resilience and by stressful life events.

Measures

Resilience Scale for Adults (RSA). As current evidence supports the conceptualization of resilience both as a process and as a trait, a measure of each construct was used. The RSA has been validated as a measure of *process* resilience (Friborg et al., 2005), conceptualized as an interaction of diverse protective factors. Its 33 items assess four internal (perception of self, perception of the future, structured style, social competence), and two external (family cohesion, social resources) protective factors. Each item is rated on a 5-point semantic differential scale with a positive and a negative attribute continuum. For example: "My abilities: I strongly believe in ■ ■ ■ ■ ■ I am uncertain about" (perception of self) or "I get support from: Friends/family members ■ ■ ■ ■ ■ No one" (social resources). About half of the items are reverse-scored. Higher scores indicate more resources that enhance

resilience. Reliability statistics were previously shown above 0.70 for all six subscales (Windle, Bennett, & Noyes, 2011). In the present sample, observed Cronbach α=0.90. The RSA has demonstrated concurrent validity (Jowkar, Friborg, Hjemdal, 2010) and is predictive of psychopathology beyond other known predictive factors, such as age, gender, education, and life stress (Morote, Hjemdal, Uribe, & Corveleyn, 2017), indicating its ability to capture the protective role of resilience.

Ego Resiliency Scale (ERS). The ERS (Block et al., 1996) was designed to measure resilience conceptualized as an individual trait. It evaluates the level of agreement with 14 statements on a 4-point scale from "Does not apply at all" to "Applies very strongly" (e.g., "I enjoy dealing with new and unusual situations"; "I get over my anger at someone reasonably quickly"). Higher scores indicate a stronger ego resiliency. The measure has very good test-retest reliability: $r=0.78$ (Waugh, Fredrickson,

& Taylor, 2008), and observed Cronbach α=0.83 in the current sample. ERS has shown excellent external validity as individuals scoring high also tend to be described as cheerful, assertive, and socially skilled by their peers (Letzring, Block, & Funder, 2005) and return quicker to a physiological baseline after experiencing stressors (Tugade & Fredrickson, 2004).

Beck Depression Inventory – II (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a self-report measure of current intensity of 21 depressive symptoms (e.g., low mood, fatigue, sleep changes) on a 4-point scale, with higher scores indicating higher severity of depressive symptoms. For students, BDI-II's test-retest reliability has been shown at 0.88 after two weeks, and 0.75 after five weeks (Huprich & Roberts, 2012). Observed Cronbach in the current sample was α=0.95. The BDI-II strong convergent validity is well established (e.g. Hicks & McCord, 2012; Segal, Coolidge, Cahill, & O' Riley, 2008).

Big Five Inventory (BFI) – extraversion (E) and neuroticism (N) subscales. The BFI (John et al., 1999) measures personality traits of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Use of BFI is recommended for personality assessment for its brevity without loss of conceptual coverage (John et al., 1999). Each subscale has 8 items, with 3 items in each reverse coded. The root of the scale begins: "I see myself as someone who…" with example items such as "is talkative" (measuring extraversion) and "gets nervous easily" (measuring neuroticism). The respondent marks on a 5 point-scale from "Disagree strongly" to "Agree strongly". The test-retest reliability over three years is shown at 0.79 for the extraversion (BFI-E) subscale and 0.71 for the neuroticism (BFI-N) subscale (Hampson & Goldberg, 2006) with Cronbach α for the current sample of 0.88 and 0.86 respectively. The BFI demonstrates good convergent validity with other personality measures, along with strong correlations between peer and self-report (John, Naumann, & Soto, 2008).

Social Readjustment Rating Scale (SRRS). The SRRS (Holmes & Rahe, 1967) is a checklist of stressful life events that respondents have experienced in the past 12 months. Rather than just recording events, the SRRS assesses the degree of change in one's life, as even desirable events increase risk of stress-related illness (Scully et al., 2000). The 43 events are weighted based on their severity to an aggregated total score representing risk of developing illness. The rank order of weights is consistent for both clinical and general populations (Gerst, Grant, Yager, & Sweetwood, 1978). The SRRS is also highly correlated ($r = 0.97$) with other recent stressful life event checklists (Lei & Skinner, 1980), but explains more variance in symptomology than measures of lifetime stressful events (Scully et al., 2000).

Statistical Analyses

SPSS version 25 was used to calculate descriptive statistics, independent t-tests and Pearson correlations. These analyses were utilized to determine if different demographic groups demonstrated significantly different scores on the outcome variables and could act as potential confounds. Next, parallel mediation analyses were conducted with model 4 of the Hayes (2013) Process macro. Any of the demographic variables that had demonstrated significant differences on outcome variables were added as covariates to the models to account for potential spurious relationships (Hayes, 2012). The two resilience measures were assessed separately due to their shared variance that could lead to suppression effects if entered in the same mediation model. Model 1 was tested using a parallel mediation investigating the relationship between extraversion and depression scores, as mediated by SLEs and resilience as process scores. This procedure was then repeated using SLE scores and resilience as trait scores as mediators. Model 2 was tested using a similar parallel mediation examining the relationship between neuroticism and depression scores, as mediated by SLE and resilience as process scores. This relationship was then tested with SLE scores and resilience as trait scores as mediators.

Table 1. Means, standard deviations and distribution scores on variables included in the assessed models.

	M	*SD*	Min	Max
Neuroticism (BFI)	25.66	7.35	8	39
Extraversion (BFI)	25.20	7.70	8	40
Resilience as process (RSA)	113.94	19.68	48	150
Resilience as trait(ERS)	41.39	6.77	14	53
Stressful life events (SRRS)	183.18	108.58	0	445
Depressive symptoms (BDI-II)	14.27	12.98	0	60

All Process analyses are based on 5,000 bootstrapping samples. In all cases, $p < .05$ was considered a statistically significant result, and when p-values are not provided, as with testing indirect effects, a confidence interval that does not pass through zero was considered significant.

Results

Descriptive Statistics
Tables 2, 3, and 4 present descriptive statistics of the core outcome variables as a function of, respectively, gender, level of study, and year of study.

Gender, Resilience, Stressful Life Events (SLEs), and Depression
Independent t-tests were conducted to determine if there were significant differences between men and women on the core variables, but none were significant: resilience as process, $t(156) = 1.38$, $p = .17$; resilience as trait, $t(156) = .60$, $p = .55$ SLEs, $t(156) = .73$, $p = .047$, or depression, $t(156) = 1.93$, $p = .056$.

Level of Study, Resilience, Stressful Life Events (SLEs), and Depression
Independent t-tests tested for significant differences between undergraduates or postgraduates on the core variables. Level of study had no significant effect on resilience as trait, $t(156) = 1.40$, $p = .16$, or SLEs, $t(156) = .12$, $p = .90$. However, postgraduates scored significantly higher than undergraduates on resilience as process, $t(121.41) = 2.95$, $p = .004$. Moreover, undergraduates scored significantly higher than postgraduates in depression, $t(156) = 1.97$, $p = .050$.

Year of Study, Resilience, Stressful Life Events (SLEs), and Depression
A final series of independent t-tests were conducted to determine if first years scored systematically different than older years on the resilience measures, SLEs, or depression. None were significant: resilience as process, $t(156) = 0.45$, $p = .65$, resilience as trait, $t(156) = 0.32$, $p = .75$, SLEs $t(156) = 1.22$, $p = .23$, or depression, $t(156) = 0.77$, $p = .45$.

Age, Resilience, Stressful Life Events (SLEs), and Depression
Pearson correlations examined relationships between age and key models' variables. These were significant for resilience as process, $r = .27$, $p = .001$, resilience as trait, $r = .27$, $p = .001$, and depression (negative correlation), $r = -0.23$, $p = .004$. They were not significant for SLEs, $r = -.13$, $p = .094$.

Parallel Mediation by Resilience and SLEs
Mediation of extraversion and depression by process resilience and SLEs. A parallel mediation analysis revealed an indirect effect of extraversion on depressive symptoms through resilience as process scores, even when controlling for stressful life events, age, and level of study $b = -.66$, BCa 95% CI [-0.89, -0.45]. However, there was no indirect effect of extraversion on depression scores through stressful life events, $b = .02$, BCa 95% CI [-0.02, 0.06]. When accounting for SLEs and resilience as process scores, there was no longer a significant direct effect of extraversion on depressive symptoms, $b = .06$, $p = .631$, BCa 95% CI [-0.19, 0.31]. Together, extraversion, SLEs, resilience as process scores, age and level of study explained 47.78% of the variance in depression scores.

Mediation of neuroticism and depression by resilience as process and SLEs. The parallel mediation analysis demonstrated a significant indirect effect of neuroticism on depressive symptoms through resilience as process scores when controlling for SLEs, age, and level of study $b = .43$, BCa 95% CI [0.26, 0.62]. However, when controlling for resilience as process and the covariates, SLEs did not act as a significant mediator of the relationship between neuroticism and depression scores, $b = .00$, BCa 95% CI [-0.04, 0.05]. When controlling for resilience as process and SLEs, there was still a significant direct effect of neuroticism on depressive symptoms, $b = .65$, $p < .001$, BCa 95% CI [0.43, 0.87]. Together, neuroticism, SLEs and resilience as process, age, and level of study explained approximately 56.95% of the variance in depressive symptoms.

Table 2. Means and standard deviations of key outcome variables as a function of gender

	Male		Female	
	M	*SD*	*M*	*SD*
Resilience as process (RSA)	117.84	17.84	112.75	20.13
Resilience as trait (ERS)	41.97	8.06	41.21	6.35
Stressful life events (SRRS)	194.54	106.94	179.70	109.28
Depressive symptoms (BDI-II)	10.70	8.26	15.35	13.96

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Means and standard deviations of key outcome variables as a function of level of study

	Undergraduate		Postgraduate	
	M	*SD*	*M*	*SD*
Resilience as process (RSA)**	111.14	20.67	120.00	15.92
Resilience as trait (ERS)	40.88	6.47	42.50	7.32
Stressful life events (SRRS)	183.90	112.75	181.62	100.06
Depressive symptoms (BDI-II)*	15.64	13.85	11.30	10.37

*$p < .05$. **$p < .01$. ***$p < .001$.

Mediation of neuroticism and depression by resilience as trait and SLEs. When controlling for SLEs, age, and level of study, there was a significant indirect effect of neuroticism on depression scores through resilience as trait, $b = .26$, BCa 95% CI [0.03, 0.50]. There was not, however, a significant indirect effect of neuroticism on depressive symptoms through SLE scores when controlling for resilience as trait scores, age, and level of study, $b = .01$, BCa 95% CI [-0.05, 0.07]. When accounting for SLEs and resilience as trait, there was still a significant direct effect of neuroticism on depressive symptoms, $b = .81$, $p < .001$, BCa 95% CI [.56, 1.08]. Approximately 46.19% of the variance in depression scores was explained by age, level of study, neuroticism, resilience as trait, and SLE scores.

Discussion

Previous research has studied the pathways between resilience and depression and between personality and depression. However, examining the interactions between these pairs of variables is lacking in the literature, particularly when accounting for the contribution of stressful life events (SLEs). To investigate this dynamic, we evaluated two general hypothetical models; within each, resilience was considered in turn as a trait and as a process. We found that resilience acted as a mediator in the relationships between extraversion and depressive symptoms and between neuroticism and depressive symptoms. Participants scoring high in extraversion tended to score higher in resilience, which predicted lower depressive symptoms. Inversely, participants scoring high in neuroticism tended to have lower levels of resilience, which predicted greater depressive symptoms. While a direct effect of neuroticism on depressive symptoms remained when accounting for resilience, SLEs, age, and level of study, there was no longer a significant direct effect of extraversion on depressive symptoms when accounting for these variables. SLEs were not a significant mediator. These patterns remained stable independently of resilience being conceptualized as a trait or as a process.

Our first model was partially supported. Resilience acting as a significant mediator in the relationship between extraversion and depressive symptoms supports and extends the conclusions of Lu et al. (2014). Indeed, our results indicate that resilience not only enhances the positive mood of individuals low in extraversion, but also buffers against a potential mood disorder. Further, this pattern remained stable for both resilience measured as a trait or as a process, and while accounting for SLEs, age, and level of study, providing evidence of the robust nature of this relationship. Contrary to their hypothesized contribution, SLEs did not act as significant mediator in the relationship between extraversion and depressive symptoms. Specifically, though SLEs predicted depressive symptoms when controlling for resilience as a trait, participants' levels of extraversion did not predict their reported levels of stressors. Previous mixed research suggests that highly extroverted individuals tend to experience more positive life events (e.g. Saudino et al., 1997), an increase risk of negative life events (e.g., Pos et al., 2016; Saudino et al., 1997) or a decrease risk of negative life stressors (e.g., Kim et al., 2016). Our findings did not align with any of these results. However, they are consistent with the observed significant association between extraversion and mild SLEs becoming non significant when accounting for gender, age, and depression in Farmer et al.'s study (2002).

A possible explanation of this discrepancy lies with the subjectivity of many of the measures of SLEs used in previous studies. The above-described studies asked respondents not only about the occurrence of the events, but also about the level of importance or desirability of the event. Notably, individuals high in extraversion also tend to be more emotionally expressive (e.g. Wu, Lu, Chen, & Xiang, 2018), which often results in extreme responses on survey items (Harzing, 2006). With an objective measure of SLEs, such as the SRRS used in this study, there is less opportunity for the over-emotionality of extraversion to influence the ratings of stress from life events. These between-studies discrepancies highlight the need for clarification of the dynamics between extraversion and SLEs.

Table 4. Means and standard deviations of key outcome variables as a function of year of study

	First years		Older years	
	M	*SD*	*M*	*SD*
Resilience as process (RSA)	113.13	20.96	114.56	18.75
Resilience as trait (ERS)	41.59	7.12	41.24	6.53
Stressful life events (SRRS)	195.26	114.05	174.04	103.96
Depressive symptoms (BDI-II)	15.18	13.63	13.58	12.49

*$p < .05$. **$p < .01$. ***$p < .001$

Noteworthy, within Model 1, the relationship between extraversion and depressive symptoms was fully mediated. Indeed, consistent with previous studies (e.g. Grav et al., 2012), the total effect model indicated that higher levels of extraversion predicted lower levels of depressive symptoms. However, when accounting for the mediation by resilience, there was no longer a direct effect of extraversion on depressive symptoms. Thus, Janowsky's (2001) claim that low levels of extraversion serve a causal role in depression disregards the effect of resilience. Though persons low in extraversion may still be considered at higher risk for depression (as extraversion significantly predicted resilience), more introverted individuals are not necessarily destined to suffer from depression. Even when encountering stressful life events, it appears as though these at-risk individuals still have the capacity for a positive outcome. This finding serves as a reminder that groups may be at risk, but because of intersections with protective characteristics, the risk of an individual is always unknown (Pan & Chan, 2007). More introverted students may be at greater risk of depression – but that is not to say that an introverted student cannot flourish in the face of stressors.

The second model was also partially supported with resilience acting as a significant mediator. Higher levels of neuroticism in participants predicted lower levels of resilience, which then predicted greater depressive symptoms. Again, this finding supports and extends the work of Lu et al. (2014). Resilience demonstrated buffering effects for high-neuroticism students not only against negative affect but also against severity of depressive symptoms. This is a key extension, as the consequences of a poor mood are generally transient, while the consequences of even mild depressive symptoms are functional impairment (e.g. Jaffe, Froom, & Galambos, 1994) and, in severe cases, can lead to suicide (e.g. Garlow et al., 2008). Contrary to their hypothesized contribution, SLEs did not significantly mediate the relationship between neuroticism and depressive symptoms. While higher rates of SLEs did predict depressive symptoms, neuroticism did not predict

SLEs. This finding is at odds with some previous studies (e.g. Kendler et al., 2003; Kim et al., 2016). However, it is consistent with Pos et al.'s (2016) observation that neuroticism was not predictive of either positive or negative SLEs, and with Farmer et al.'s (2002) results of neuroticism no longer predicting SLEs when accounting for age, gender, and depression. A possible explanation for these discrepancies is the time period covered by the SLEs measures. Specifically, both Kim et al. (2016) and Kendler et al., (2003), who found that higher levels of neuroticism predicted negative life events, only measured SLEs that had occurred in the past month. However, Pos et al. (2016), Farmer et al. (2002), and the present study considered SLEs that occurred in the 12 months prior to reporting. This timeframe difference is important because of the interaction between past SLEs and neuroticism levels. Specifically, positive SLEs, including transitioning to university life, are associated with a later decrease in neuroticism scores (Jeronimus, Ormel, Aleman, Penninx, & Riese, 2013; Lüdtke, Roberts, Trautwein, & Nagy, 2011). We measured SLEs over the past year along with currently reported personality traits, while studies with dissimilar findings (Kendler et al., 2003; Kim et al., 2016), by assessing life events of the past four weeks, measured current SLEs. If neuroticism does expose individuals to negative SLEs, the relationship would be more evident at overlapping times of measurement than after neuroticism scores have the opportunity to change from the initial SLEs exposure.

Unlike in the extraversion models, the relationship between neuroticism and depressive symptoms was only partially mediated by resilience. Even when accounting for resilience, SLEs, age, and level of study, there was a direct effect of neuroticism on depressive symptoms, supporting the validity of our models, which replicate this well-established link in both clinical, and student populations (see meta-analyses of, respectively, Kotov, Gamez, Schmidt, & Watson, 2010; and Liu et al., 2019).

Taken together, these results add evidence to an idea core to positive psychology – that people are stronger than psychological research has historically appreciated (Sheldon & King, 2001). By focusing on how and when
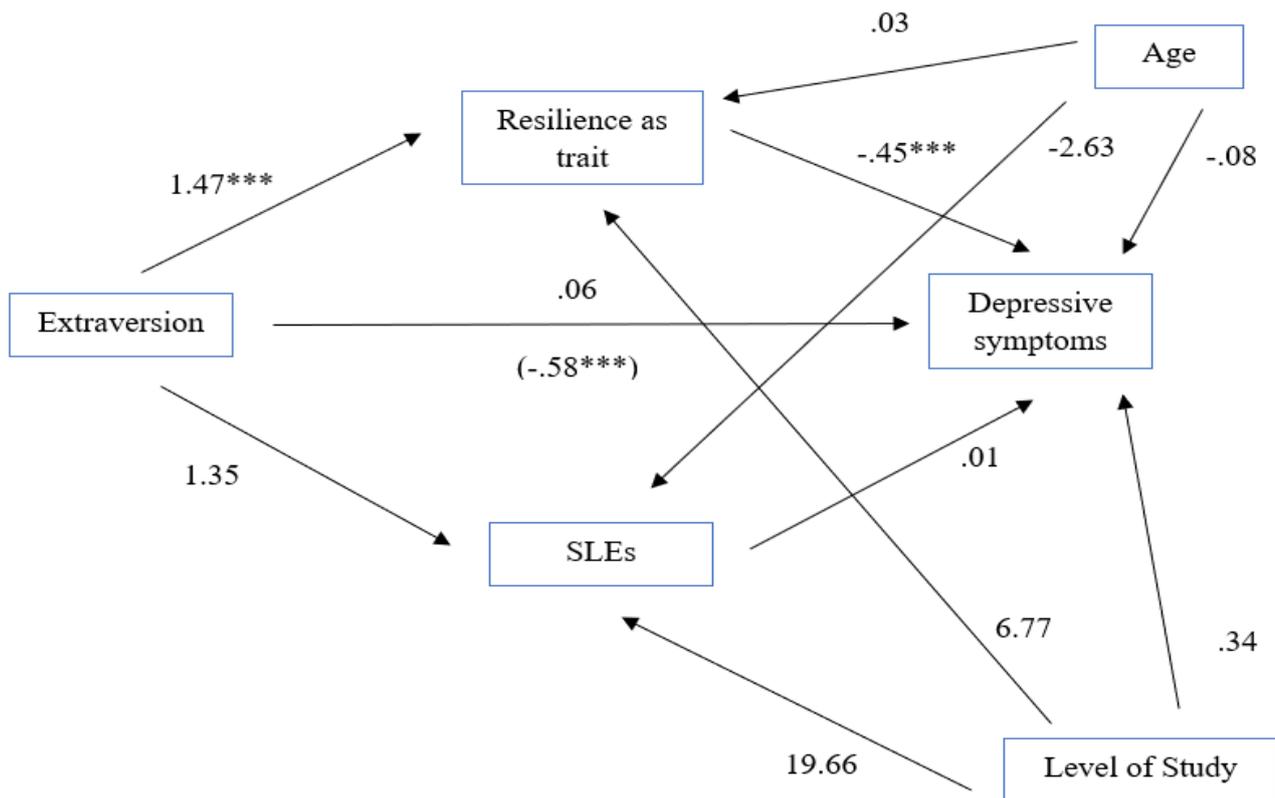
Figure 3. Parallel mediation of the relationship between extraversion and depressive symptoms by resilience as process and stressful life events, when controlling for age and level of study

things go right – as in this study when we look at how and when students are free from psychological distress – we can better understand the conditions under which wellness is achieved (Gable & Haidt, 2005). In this case, we learn that there are "at risk" individuals who are not all as fragile as previous literature suggested.

The main limitation of this study resides in its cross-sectional design where it remains unclear whether reports on the personality and resilience measures were impacted by current depressive episode. Indeed, research has shown consistently that, after remission from a depressive episode, neuroticism scores tend to decrease, and extraversion scores tend to increase (Kendell et al., 1968; Karsten et al., 2012). Thus, current depressive symptoms might have impacted the observed personality scores. Another limitation consists in the restriction of our models to be predicting depressive symptoms. While this provides direct evidence toward the role of resilience in the lack of a negative outcome, we must extrapolate these findings in predicting a positive outcome. Finally, as measures of resilience as a trait and as a process were not directly compared, our study also does not support preferentially either resilience conceptualization. However, the parallel assessment of these two conceptualizations along with their equivalent mediation

patterns provide a more generalizable evidence of resilience acting as a mediator between personality and depressive symptoms.

Implications for Counseling Psychologists, Clinical Psychologists and University Coordinators

The observed inter-relationships between extraversion, neuroticism, resilience, and depressive symptoms have important implications for clinical and counseling psychologists advising university students, especially students struggling with adversity and associated depressive symptoms. These results also have relevance for university administrators, especially those involved in campus wellness, who are in a position to apply such findings before students experience the need to seek counseling services. The mediation of resilience in all models remained significant when accounting for recent SLEs, indicating the robust nature of the effect. Of importance for counseling psychologists is the finding that extraversion no longer has a direct effect on depressive symptoms when accounting for resilience. While neuroticism has been the personality trait most strongly associated with depression (Kotov et al., 2010), it may be more productive to focus resources on promoting resilience in students with low levels of
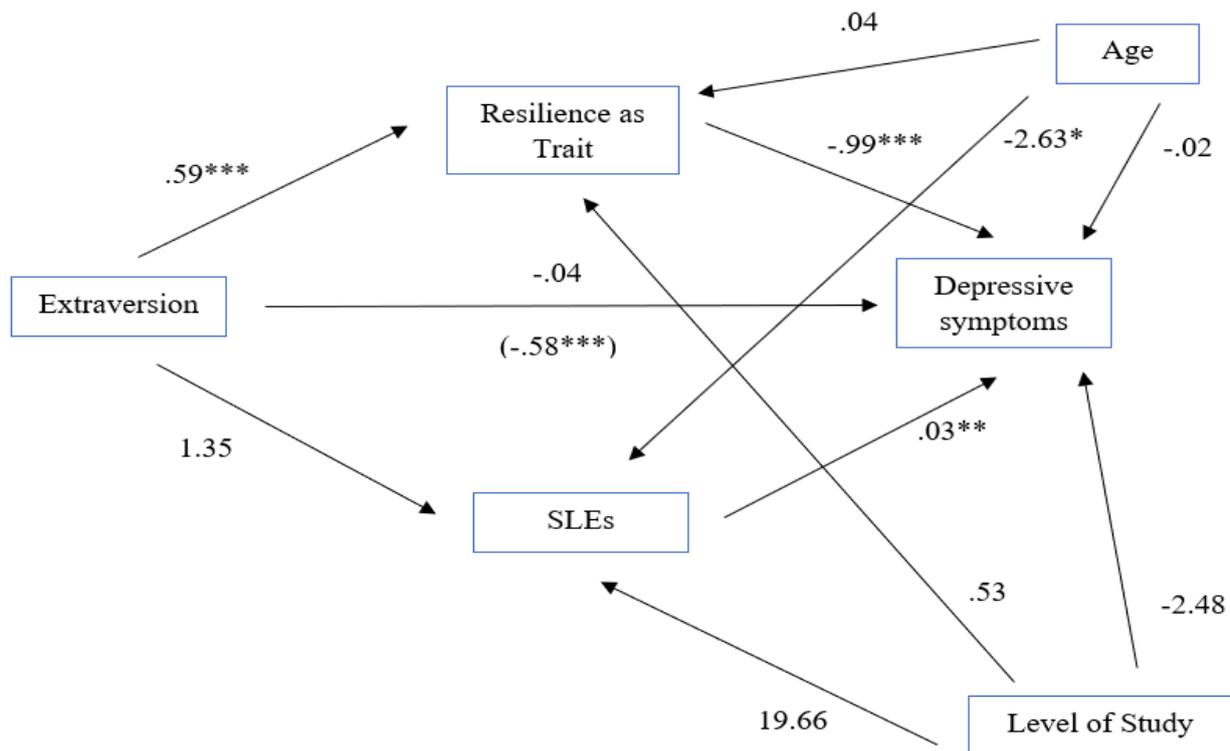
Figure 4. Parallel mediation of the relationship between extraversion and depressive symptoms by resilience as a trait and stressful life events, when controlling for age and level of study

extraversion than in students with high levels of neuroticism. Further, this complete mediation calls into question the assumptions of previous research (e.g., Janowsky, 2001) that low levels of extraversion are a primary source of depression risk. Our results indicate that with sufficient levels of resilience, introverted students will be at no greater risk of depression than their extraverted peers. Therefore, it is also worthwhile for universities to incorporate resilience promotion programs targeting introverted individuals.

For example, principles from Acceptance and Commitment Therapy (ACT) can be applied to work with students to either alleviate (Levin, Haeger, Pierce, & Twohig, 2017) or prevent depressive symptoms (Levin, Pistorello, Seeley, & Hayes, 2014). ACT resides simultaneously in positive and abnormal fields of positive psychology study (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012), because it is centered around the idea that the degree of psychological flexibility can allow for one to either flourish or develop psychopathology (Tanhan, 2019). As Tanhan (2019) reviews, ACT interventions provide allowances for pain, and focus on a life directed by the individual's values. While psychological flexibility (or lack thereof) has been more associated with neuroticism than extraversion (Latzman & Masuda, 2013), it extends to applications of

introverted students. For example, the mindfulness that ACT stresses (e.g. Tanhan, 2019) has demonstrated associations with extraversion (van den Hurk et al., 2011). While mindfulness and acceptance practices are not the only elements of the psychological flexibility model, mindfulness facilitates the second piece of the model – committed actions focused on one's values (Fletcher & Hayes, 2005). Mindfulness-based interventions have proven beneficial for both nonclinical (e.g. Canby, Cameron, Calhoun, & Buchanan, 2015) and depressed (e.g. McIndoo, File, Preddy, Clark, & Hopko, 2016) groups of university students. Ideally, such curriculums would be implemented both individually in counseling sessions and across campus (Byrd & McKinney, 2012), and could still target students with lower levels of extroversion. Such interventions would be a productive use of campus resources, as they could benefit students with or without psychopathology. However, that is not to say that universities should be thoughtless in their application of these interventions; Tanhan (2019) emphasizes the importance of putting the therapeutic principles' in an individual context. While he shines the light of functional contextualism of ACT with Muslim individuals, this is equally important in the context of students in Ireland. Further study is warranted to provide direct evidence of such interventions efficacy

in improving the psychological flexibility of introverted Irish students and increasing their resilience and wellness.

Interventions with ACT principles, focusing on internal processes in context, are likely to be more productive than focusing on students' interpersonal relationships, based on the equivalent results from using a process resilience measure and a trait resilience measure. While a natural assumption may be that high levels of extraversion would elevate the social resources element of resilience, trait resilience also fully mediated the relationship between extraversion and depressive symptoms. Therefore, any resilience training for introverted students should not only focus on increased reaching out for external resources, but also developing individual characteristics. For example, elevated access to social resources could be paired with development of positive self-appraisals – a significant predictor of young adult's resilience to depression (Carbonell et al., 2002). Further, our results suggest that any such resilience programs should not be limited to undergraduates. When controlling for the other variables, level of study largely did not influence resilience scores, depressive symptoms, or SLEs. Clearly, adjustments made during the undergraduate introduction to university life do not stop the occurrence of depressive symptoms. Therefore, resilience training, whether through counseling sessions or campus programs, would likely be beneficial at any level of study.

It has been well established that certain personality traits lead a higher likelihood of depression (e.g. Liu et al., 2019; Kotov et al., 2010). However, particularly for students with low levels of extraversion, when these associations fail to account for resilience, they underestimate the strength of these students in the face of university life stress.

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