



Psychological Resilience in Higher Education Students: A Systematic Investigation of Predictive Factors

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ABSTRACT Resilience is built upon complex interactions between internal and external factors. Research investigations have highlighted predictive factors of resilience over the years. However, their methodologies, scale measurements, and targeted populations differ from each other, making their conclusions non-comparable. Therefore, the aim of the present study is to systematically investigate both internal and external factors that promote resilience amongst university students. A hundred and twenty eight participants completed the survey which included measurement scales of resilience, personality, satisfaction with life, perceived social support, grit, self-esteem, and potential stress events. The analysis of data indicated that self-esteem, grit, agreeableness, openness to experience, and neuroticism were significant predictors of resilience scores. Additionally, the impact of stress and satisfaction with life on resilience was investigated, indicating no differences between the experimental conditions. The present study highlights the influence of internal factors in the prediction of resilience levels in higher education students.

INTRODUCTION

Psychological resilience has evolved from the concept of invulnerability and invincibility to the refined idea of rapidly recovering from, adjusting in, and thriving through adverse circumstances (Anthony 1974; Rutter 1985; Werner 1995; Luthar et al. 2000; Masten 2001). Originally, the phenomenon had been indirectly examined by identifying correlational factors between expressions of schizophrenic symptomatology, and protective factors, such as social support (Garmezy 1970). Further studies on descendants with parents suffering from schizophrenia revealed that a large number of the sample exhibited flourishing development, while others succumbed to their genetic predispositions (Garmezy 1974; Garmezy and Streitman 1974). Although these studies were not explicitly focused on resilience, they introduced the notion of protective and risk factors that can crucially affect an individual's behavior. Hence, the present study aims to systematically investigate factors that are associated with resilience, focusing on higher education students.

The pioneering work of Werner and Smith (1982) epitomized resilience as a psychological construct. In a longitudinal study, 698 participants from the island of Kauai, Hawaii, were tested from infancy to adulthood (1-32 years of age) on measurements of vulnerability and susceptibility to negative outcomes, whilst exposed to the community's detrimental environment (Werner and Smith 1982). Similarly to the Garmezy (1974) study, many individuals presented positive adaptations and the ability to overcome deleterious situations (Werner and Smith 1982). A systematic effort to discern intrapersonal factors of resilience was attempted by Werner and Smith (1982), which highlighted the association between this strength characteristic with high self-esteem, traits of responsibility, and flexibility. In a surge of research investigations on early developmental resilience, Rutter (1985) and Garmezy (1991), among others, explored predictive factors of resilience in children who have experienced high-risk and harmful conditions. These studies concluded on a number of internal factors predicting resilience such as self-efficacy, self-control, self-esteem, and openness to experience that promote successful adaptation (Cicchetti et al. 1993).

Progressively, research questions shifted towards the influence of interpersonal factors.

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Rutter (1996) emphasized the interconnection of genetic and environmental influences on the development of resilience. Specifically, the family system is recognized as one of the sources of shaping resilience (Rutter 1996). However, it is explained that positive experiences do not automatically entitle high resilience levels, but they rather constitute a mitigating factor that might neutralize negative outcomes (Rutter 1996). In more recent studies among monozygotic twins, results signify behavioral differences (that is, adjustment and emotional stability) amongst variations of perceived experiences of parental warmth within the family system, highlighting the impact of environmental factors (Bowes et al. 2010). Additionally, Bowes et al. (2010) revealed that children between the ages of 10 to 12 who were growing up in a warm and positive family environment displayed remarkably well-adjusted behavior despite having been victims of bullying at school.

In a comparable fashion, twins from low socio-economic status were tested on their resilience levels, and it was concluded that parental warmth and social temperament were prophylactic factors to emotional and behavioral maladjustment (Kim-Cohen et al. 2004). Interestingly, it has been indicated that competence, resilience, and well-being in early childhood is determined by environmental factors that regulate the expression of genetic predispositions (Lemery-Chalfant et al. 2013). For instance, research focused on the oxytocin receptor gene, which regulates stress and facilitates affiliation, showed that the gene directly interacts with the child's family environment. This is associated with resilience and psychological affect (Bradley et al. 2013). Therefore, it can be assumed that resilience is built upon complex interactions between protective and risk factors on an internal and external level.

These interactions are attempted to be explained by various theoretical models. The compensatory model asserts that an individual's characteristics and stressors have a cumulative effect in the prediction of an outcome (Werner 2000). In this model, the two factors are independent of each other with distinct qualities (Schoon 2006). The challenge model of resilience asserts that optimal exposure to low risk and stress could enhance competence upon its successful resolution (Luthar and Zigler 1991). This assumption is based on the development of sche-

mas that can be utilized in the future (Schoon 2006). Finally, the protective model suggests an interaction between an individual's idiosyncrasies and stressors. These mediate risk factors and predict levels of adjustment in different circumstances (Schoon 2006). However, this model mandates the presence of stressors in order to account for true resilience measurements (Werner 2000). Taking all the models into consideration, it can be assumed that resilience is a construct that should be measured alongside adverse events (Gonçalves et al. 2017). Therefore, the present study will incorporate measurements of experienced adversity.

Although there is an abundance of research investigating resilience in children, little is known about other populations. A neoteric research initiative to expand the literature on academic population has been attempted. Emerging adulthood has been characterized as a period when individuals experience high psychological distress due to challenging demands and continuous transitions (Peer et al. 2015). Specifically, individuals who enter higher education undergo numerous environmental reconstructions in their social support systems, whilst encountering academic and personal pressures (Peer et al. 2015). Thus, university students are battling with an increased number of risk factors that can lead to the manifestation of mental health problems (Stallman 2010; Rubin et al. 2016; Bruffaerts et al. 2017). As a result, the study of psychological resilience in this population is imperative.

Considering that mental health imbalances are adverse experiences, individuals with high resilience could possibly suppress their emergence. According to Min et al. (2013) patients suffering from depressive and/or anxiety disorders scored low on the Connor-Davidson resilience scale and purpose in life test (Baek et al. 2010). In order to examine the clinical significance of resilience measurements in academia, Sart et al. (2016) tested 384 undergraduates on occurrences of depressive symptomatology, family environment, and perceived resilience. The analysis marked resilience as a mediator between family environment and depression scores (Sart et al. 2016). Analogously, Hartley (2012) revealed a negative correlation between psychological distress and social support with resilience scores. In parallel, close support systems (that is, family, friends), feelings of belongingness within the university life, and psycho-

logical distress can account for more than a third of the variance between high and low resilience levels in higher education students (Pidgeon et al. 2014).

The influence of social support and sense of belongingness in the development of resilience has been suggested by numerous studies (Wilks 2008; Dawson and Pooley 2013; Caruana 2014; Rahat and Ilhan 2016; Skilbred et al. 2016). However, their research method approaches, and scale measurements differ from each other, making their conclusions non-comparable. Other factors that have been associated with resilience are positive affect, psychological adjustment, and coping strategies. Dawson and Pooley (2013) presented positive affect as a significant predictor of resilience in first-year university students. Similarly, Rahat and Ilhan (2016) revealed a positive correlation between optimism and resilience, which sequentially mediated successful adjustment to university life. Furthermore, previous research suggests a moderate correlation between resilience and coping mechanisms in university students (Stanley and Bhuvaneshwari 2015). Coping scales measure individuals' tendency to either adapt successfully by accepting the circumstances, planning, and seeking emotional support, or manifest maladaptive characteristics such as denial, self-blame, and self-distraction (Carver 1997). Gloria and Steinhardt (2016) attempted to study the relationship between positive emotions, employed coping strategies, and resilience in 200 postdoctoral fellows. Regression analysis of the data showed a direct link between positive emotions and resilience, which is also partially mediated by the coping mechanisms (Gloria and Steinhardt 2016).

Further variables that have been appraised to be predictors of resilience are attachment style, self-efficacy, and spirituality. Considering the significant impact of the family system to the development of resilience, attachment style is, by extension, associated with the emergence of resilience (Wei et al. 2011). Shibue and Kasai (2014) explored this connection, and they found a positive correlation with secure attachment and a negative correlation with insecure and ambivalent attachment with resilience scores in university students. Interestingly, individuals categorized in both the ambivalent attachment and high resilience group scored higher on earned security attachment, which refers to the transformation of individuals' insecure to secure at-

tachment during adulthood (Shibue and Kasai 2014). This suggested evidence reinforces the debate on the models of resilience (that is, is adversity necessary for the development of resilience?) and highlights the innate complexity of the construct (interaction of protective versus risk factors in an internal and external level). Additionally, self-efficacy - the perceived capability of attainment, is indicated as a significant predictor of resilience in higher education students (Cassidy 2015; Çelikkaleli and Kaya 2016). Finally, spirituality is recognized to be another decisive psychological factor that is positively correlated with resilience, and it is contemplated as a significant factor of well-being (Min et al. 2013; Womble et al. 2013).

Although the aforementioned studies utilized disparate resilient scales, the Connor-Davidson resilience scale (Connor and Davidson 2003) is a product of factor analysis and as such it consists of five factors; personal competence, tolerance to negative effects and strengthening effects of stress, adjustability and formation of secure relationships, self-control, and spirituality (Connor and Davidson 2003). Other resilience scales generally reflect these factors on their scales (Wagnild and Young 1993). Therefore, within this scale, all of the preceding constructs (positive affect, psychological adjustment, coping strategies, self-efficacy, attachment styles, and spirituality) are either directly or partially measured. Hence, these variables are already accounted for in the construct validity of the resilience scales. Consequently, the correlations can be characterized as illusionary, thus redundant of further investigation. As a result, a distinct motivation to conduct this research is the exclusion of multicollinear factors that literature considers as predictors of resilience.

Antithetically to the factors mentioned above, personality, perseverance, and satisfaction with life are considered to be associated with, and not measured through, resilience scales (Werner and Smith 1982; Cicchetti et al. 1993). Campbell-Sills et al. (2006) argued on the interrelationship between resilience and personality by indicating a negative correlation with neuroticism, and a positive association with extraversion and conscientiousness. Analogously, data retrieved from medical students suggest that resilience entails personality characteristics such as conscientiousness, openness to experience, and persistence, which is emblematic of

strong coping capacity (Eley et al. 2016; Eley et al. 2017). In particular, perseverance has been characterized as a long-term motivation that is essential for success (Duckworth et al. 2007). Reraki et al. (2015) found a strong correlation between grit and academic achievement in undergraduate university students. Comparably, qualitative semi-structured interviews signified the importance of motivation and effort on academic achievement in individuals who have previously experienced adverse circumstances in early adulthood (Skilbred et al. 2016). Ultimately, it is plausible that satisfaction with life scores are interpreted as current measurements of adversity levels (Cohn et al. 2009). Multiple studies have found a strong correlation between resilience and stress with life satisfaction scores (Abolghasemi and Varaniyab 2010; Shi et al. 2015).

The identification of predictive variables of psychological resilience is very important due to its prophylactic factors against adversity. Sheerin et al. (2018) examined the protective effects of resilience in a longitudinal study. The analysis of the data indicated that participants' resilience levels were disproportionate to their depression and anxiety scores (Sheerin et al. 2018). This negative correlation shows not only the mitigating role of resilience in the manifestation of psychopathology, but also highlights the detrimental effects of its absence. These effects can be seen in university students through the studies of Houston et al. (2017) and Galante et al. (2018). Both papers randomly assigned a group of undergraduate students to a resilience-promoting psychoeducational intervention or the control group (Houston et al. 2017; Galante et al. 2018). Results signified positive effects of the interventions. Individuals reported higher resilience scores, higher academic achievements, and lower distress score compared to the control group, which exhibited clinically high distress levels (Houston et al. 2017; Galante et al. 2018). Based on the aforementioned studies, it has become increasingly evident that the cultivation of resilience is crucial. However, psychological resilience is a construct that interacts with various factors. Hence, the study of its predictive factors is of vital importance in producing a more comprehensive definition of psychological resilience.

In summary, a myriad of variables have been examined as predictors of psychological resil-

ience. However, the disparate measurement tools and studied populations are hard to be compared. Therefore, the aim of the present study is to systematically investigate both internal and external factors that promote resilience amongst university students. According to the literature, personality, self-esteem, grit, social support, stress, satisfaction with life, academic success, and socio-economic status are indicative factors that predict resilience (Werner and Smith 1982; Kim-Cohen et al. 2004; Campbell-Sills et al. 2006; Wilks 2008; Reraki et al. 2015; Gonçalves et al. 2017). Consequently, it was hypothesized that the interplay of extraversion, conscientiousness, neuroticism, openness to experience, high self-esteem, high sense of social support, and high grit would be a significant predictor of resilience scores. Additionally, a significant difference in resilience scores is anticipated between participants with low-stress levels and high satisfaction of life scores versus those with high-stress levels and low satisfaction of life.

METHODOLOGY

Participants

Originally, 128 students in higher education completed the online survey. However, 19 participants were excluded from the data set because they did not meet the inclusion criteria. From the remaining 109 participants, 93 were biologically identified as females ($M_{age} = 21.86$, $SD=2.483$) and 16 as males ($M_{age} = 23.31$, $SD=3.005$). Stratified sampling was utilized to acquire the data. The inclusion criteria required participants to be enrolled in a higher education program and be between the ages of 18 to 29. From the 19 excluded participants, 17 were older than 29 years old, and 2 were younger than 18 years of age. A priori sample size for multiple regression with eight predictors was calculated signifying a minimum of 108 participants ($f^2 = .15$, $\beta = .80$, $p < .05$).

Design

A within-subject design was applied in order to test the first hypothesis. The predictors were personality, self-esteem, grit, social support, stress, satisfaction with life, academic success, and socio-economic status. The outcome was resilience scores. Regarding the second

hypothesis, a 2 (high vs. low satisfaction with life scores) x 2 (high vs. low stress scores) between-subjects factorial design was employed with resilience scores as the dependent variable.

Materials

The survey was created on Google forms and included the standardized questionnaires below:

Biographical Information

Participants were asked to declare their age, biological sex, the current level of education, year and mode of study. In addition, they were asked to disclose their academic achievement (that is, percentage score, classification, or grade point average) and perceived socio-economic status.

Connor–Davidson Resilience Scale

The Connor–Davidson Resilience Scale (CD-RISC) comprises of 25 items, each rated on a Likert type 5-point scale (1=not true at all; 5=true nearly all the time), with higher scores reflecting greater resilience (Connor and Davidson 2003). It measures the notion of personal competence, tolerance of negative affect, positive acceptance of change and secure relationships, control and spiritual influences (Connor and Davidson 2003). The scale reports high internal consistency ($\alpha = 0.89$) (Connor and Davidson 2003).

Mini-International Personality Item Pool

The Mini-International Personality Item Pool (MINI-IPIP) is a measurement of the Five Factor Model (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) and it consists of 20 items (Donnellan et al. 2006). Each item is rated on a Likert type 5-point scale (1=very accurate; 5= very inaccurate), with each personality trait represented by four items (Donnellan et al. 2006). The scale was tested across five studies signifying an acceptable internal consistency ($\alpha \geq 0.89$) (Donnellan et al. 2006).

Satisfaction with Life Scale

The Satisfaction with Life Scale (SWL) is a 5-item measurement of perceived life satisfac-

tion (Diener et al. 1985). Every item is rated on a 7-point Likert type scale (1 = strongly disagree; 7 = strongly agree), with high scores indicating high satisfaction with life. The scale was tested across six studies signifying a high internal consistency ($\alpha \geq 0.79$) (Pavot and Diener 1993).

Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support (PSS) is a 12-item scale which is a metric of perceived social support from family, friends, and significant others (Zimet et al. 1988). Every item is answered on a 7-point Likert type scale (1 = very strongly disagree; 7 = very strongly agree), with high scores suggesting high social support. The scale is considered to have a very high internal consistency ($\alpha = 0.93$) (Canty-Mitchell and Zimet 2000).

Short Grit Scale

The Short Grit Scale is an 8-item scale which measures individuals' capacity for perseverance in long-term goals (Duckworth and Quinn 2009). Each item is rated on a Likert type 5-point scale (1=not like me at all; 5= very much like me), with the total higher scores to demonstrate greater perseverance (Duckworth and Quinn 2009). The scale also reports high internal consistency ($\alpha \geq 0.73$) (Duckworth and Quinn 2009).

Rosenberg Self-esteem Scale

The Rosenberg Self-esteem Scale measures individuals' self-concept, and it consists of a 10-item scale, each rated on a Likert type 4-point scale (1=strongly disagree; 4= strongly agree), with higher scores signifying greater self-esteem (Rosenberg 1965). Rosenberg (1965) presented high internal consistency ($\alpha = 0.77$).

Social Readjustment Rating Scale

The Social Readjustment Rating Scale adapted on college students is a binary (yes/no) scale of 32 potential stress events (PSE) that are most commonly experienced throughout the university, with high scores revealing greater experienced stress (Holmes and Rahe 1967).

Procedure

The survey link was shared to all students of Richmond, the American International University in London via email, and it was also posted on social media (that is, Facebook pages) of various higher education institutes. The survey started with a consent form explaining the nature of the study and highlighting the participants' rights. Additionally, email contact information was provided before participants signed electronically by checking the appropriate box. Thereafter, the biographical information was asked, followed by the CD-RISC, MINI-IPIP, SWLS, MSPSS, Short Grit Scale, Rosenberg Self-esteem Scale, and PSE questionnaires. Ultimately, a debriefing form was presented explaining the research investigation and its possible implications. As a motivational strategy, participants had the opportunity to receive their MINI-IPIP personality scores by inserting their email address. After the emails were sent, the addresses were permanently deleted by the data set to ensure participants' anonymity.

RESULTS

Normality Testing

The outcome variable's normality was evaluated through the Kolmogorov-Smirnov test suggesting that the resilience scores do not differ from normality ($p = .062$). In addition, there was no multicollinearity between the predictor variables, which can be seen in the correlations

table. Ultimately, the Standardized Residual ($-2.133 \leq ei \leq 2.422$) and Cook's distance ($.001 \leq Di \leq .078$) signified a linear relationship between the variables and the sample size. Regarding the second hypothesis, the evaluation of normality was tested through the Kolmogorov-Smirnov indicating in all conditions that the data does not differ from normality ($p > .05$) and the assumption of homogeneity of variance was not violated ($p = .220$).

Inferential and Descriptive Statistics

A multiple linear regression was calculated to test if the socio-economic status, academic achievement, personality traits, satisfaction with life, perceived social support, grit, self-esteem, and potential stress events significantly predicted participants' scores of resilience. The results of the regression, as depicted in Table 1, indicated all the predictors explained 65.1 percent of the variance ($R^2 = .651$, $F_{(12, 96)} = 14.919$, $p < .001$). It was found that three out of five personality traits - agreeableness, neuroticism, and openness to experience - significantly predicted resilience scores ($\beta = .150$, $p < .05$; $\beta = -.212$, $p < .005$; $\beta = .152$, $p < .05$ respectively). Regarding the rest of predictors, only self-esteem and grit were indicated as significant predictors of resilience scores ($\beta = .380$, $p < .001$ and $\beta = .220$, $p < .05$ respectively). Additionally, all of the variables' mean scores and their standard deviations are presented in Table 2. The academic achievement and potential stress event variables have been transformed into nominal-type variables to facilitate the analysis.

Table 1: Correlations between predictor variables and resilience

	<i>Res</i>	<i>SES</i>	<i>AA</i>	<i>Ex</i>	<i>Ag</i>	<i>Con</i>	<i>Neur</i>	<i>Open</i>	<i>SWL</i>	<i>PSS</i>	<i>Grit</i>	<i>SE</i>	<i>PSE</i>
Res	-												
SES	0.225	-											
AA	-0.168	-0.165	-										
Ex	0.335	0.183	-0.014	-									
Ag	0.226	0.061	-0.108	0.104	-								
Con	0.334	0.007	-0.174	0.023	0.041	-							
Neur	-0.407	-.193	0.24	-0.216	0.061	-0.056	-						
Open	0.201	0.023	-0.140	0.118	0.308	0.141	0.270	-					
SWL	0.468	0.288	-0.358	0.238	-0.016	0.177	-0.300	0.017	-				
PSS	0.314	0.107	-0.157	0.147	0.255	0.256	-0.023	0.160	0.344	-			
Grit	0.586	0.010	-0.297	0.207	0.175	0.469	-0.177	0.140	0.410	0.354	-		
SE	0.675	0.305	-0.108	0.396	-0.025	0.170	-0.422	0.015	0.484	0.205	0.488	-	
PSE	0.040	-0.066	0.160	-0.002	0.013	-0.027	0.075	0.007	-0.158	-0.080	-0.110	0.027	-

Res=Resilience, SES=Socio-economic Status, AA=Academic Achievement, Ex=Extraversion, Ag=Agreeableness, Con=Conscientiousness, Neur=Neuroticism, Open=Openness to experience, SWL= Satisfaction with Life, PSS=Perceived Social Support, SE=Self-esteem, PSE=Potential Stress Events

Table 2: Mean scores and standard deviation of resilience and the predictor variables

<i>Variable</i>	<i>M</i>	<i>SD</i>
Resilience	65.96	12.509
Socio-economic status	3.21	0.708
Academic achievement	1.74	0.792
Extraversion	11.93	3.482
Agreeableness	16.63	3.310
Conscientiousness	13.80	3.274
Neuroticism	12.83	3.188
Openness to experience	15.40	3.334
Satisfaction with Life	22.20	5.699
Perceived Social Support	5.48	1.105
Grit	3.30	0.624
Self-esteem	18.18	5.354
Potential stress events	2.58	0.657

In order to test the second hypothesis, a two-way independent measures ANOVA was conducted with a 2x2 between-subjects factorial design with ‘Satisfaction with life - SWL’ and ‘Potential Stress Events - PSE’ as independent variables, and the difference in resilience scores in the experimental conditions as the dependent variable. There was no main effect of either ‘SWL’ ($F_{2,103} = .701, p = .498, \eta^2 p = .013$) or ‘PSE’ ($F_{1,103} = 2.222, p = .139, \eta^2 p = .021$). There was no interaction between SWL x PSE ($F_{2,103} = 1.793, p = .172, \eta^2 p = .034$). Ultimately, the basic descriptive information is listed in Table 3. Although there seems to be a difference in resilience scores between the LowSWL - HighPSE versus HighSWL - LowPSE conditions, the analysis of variances showed no main effect within or between the two variables.

Table 3: Mean scores and standard deviations of resilience in all experimental condition

<i>Conditions</i>	<i>Mean Res</i>	<i>SD</i>
LowSWL - HighPSE	70.15	12.889
HighSWL - LowPSE	66.30	13.496
LowSWL - LowPSE	65.40	8.746
HighSWL - HighPSE	64.00	11.554

DISCUSSION

The present study sought to firstly investigate the predictive factors of resilience in higher education students and secondly examine the impact of stress and satisfaction with life on resilience scores. It was hypothesized that the interplay of extraversion, conscientiousness, neu-

roticism, openness to experience, high self-esteem, high sense of social support, and high grit would be a significant predictor of resilience scores. The regression analysis signified partial support of the hypothesis. Regarding the personality traits, openness to experience and agreeableness positively predict resilience, while neuroticism is a negative predictor of resilience scores. In addition, high self-esteem and high grit were indicated as the most significant predictors of resilience scores. Thus, the predicted variables of extraversion and perceived social support did not significantly predict resilience scores as it was theorized. The generated model is presented on Figure 1, with all predictive variables explaining the 65.1% of the variance in the dependent variable.

Furthermore, the second hypothesis anticipated a significant difference in resilience scores between participants with low-stress levels and high satisfaction of life scores versus those with high-stress levels and low satisfaction of life. The analysis of variance tested all the experimental conditions and indicated non-significant differences in resilience scores between the groups. Therefore, stress and satisfaction with life did not have the impact it was assumed it would have, resulting in the failure of rejecting the null hypothesis.

Both of these hypotheses were based on a systematic literature review that included different populations (that is, age groups, clinical sample). Consequently, many of the predictor variables did not demonstrate any significant contributions of resilience scores. A macro perspective of the variables could result in their categorization into internal and external factors that influence resilience. Personality, self-esteem, and grit are constructs attached to the Self. Perceived social support, satisfaction with life, and potential stress events are related to environmental factors. Many of the studies have suggested the interaction and the impact of these two categories on psychological resilience (Cicchetti et al. 1993; Gonçalves et al. 2017). However, the present study highlighted a significant difference in the influence on resilience between internal and external factors. The most significant predictors found in higher education students were self-esteem, grit, and agreeableness, openness to experience, and neuroticism from personality traits.

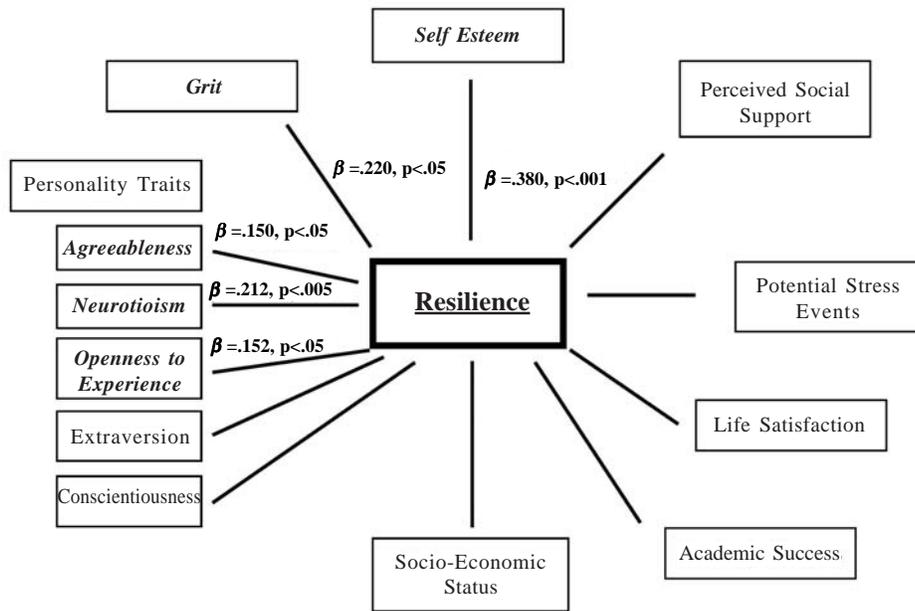


Fig. 1. Model of Resilience: Results of regression indicated all the predictors explained the 65.1% of the variance
 Source: Authors

Antithetically, satisfaction with life and potential stress events were not signified either as predictors of resilience nor had a main effect within and between their spectrum scale (that is, high versus low) on participants’ scores of resilience. Ultimately, the perceived social support variable was not a significant predictor although it was emphasized as such in the literature (Bowes et al. 2010). Interestingly, one of the personality traits that did not significantly predict resilience scores was extraversion, which is positively correlated with perceived social support (Swickert et al. 2002). Therefore, it can be seen that psychological resilience in university students was sourced from intrinsic factors. A possible explanation could be the heavy environmental influence in one’s development during the periods of childhood and adolescence, and the strong manifestation of genetic inheritance from emerging adulthood onwards, as it is noted in the construct of intelligence quotient (McGue et al. 1993; Davis-Kean 2005). This theory could propel further research, which is described below in the recommendations section.

Psychological resilience is an important area of study because it is essential for mediating mental health imbalances and promoting positive psychological adjustment (Sheerin et al. 2018). In the higher education context, resilience equips students with coping mechanisms against high levels of distress, which facilitates academic success (Houston et al. 2017; Galante et al. 2018). However, resilience is a construct that interacts with various factors. Infurna and Luthar (2018) emphasize resilience’s multidimensional nature and denote the importance of understanding its emergence in various samples and segments of the population. In this paper, the identification of predictive factors in university students could help in producing a more comprehensive definition of psychological resilience. This knowledge could enable the implementation of interventions by strategically improving all these factors that associate with high resilience scores.

Taking the results above into consideration, it can be suggested that resilience is a tool that can be developed through educational interven-

tions. Parsons et al. (2016) argue that the development of resilience lies in the flexibility of the affective-cognitive systems, which promotes the idea that resilience can be cultivated. Similarly, Moore et al. (2018) identified a positive prediction of brain volume in the prefrontal cortical regions with resilience. These regions are susceptible to brain plasticity, resulting in the regulation of resilience (Moore et al. 2018). This follows the assumptions of Cognitive Behavioral Therapy regarding the independence of external factors in individuals' cognition and behavior, making the development of psychological resilience possible (Beck 1970). Additionally, Galante et al. (2018) have shown that resilience is a process rather than a trait. Consequently, this research can have critical implications for the prevention and treatment of certain psychological disorders, by developing educational interventions and therapeutic techniques in an attempt to enhance psychological resilience.

CONCLUSION

In conclusion, the present study aimed to systematically investigate predictive factors of resilience in university students. Results indicated that high self-esteem, high grit, agreeableness, openness to experience, and neuroticism were significant predictors of resilience scores. Additionally, the impact of stress and satisfaction with life on resilience was investigated, indicating no differences between the experimental conditions. A macro perspective of the results highlighted a significant difference in the influence of resilience between internal and external factors. This signifies that psychological resilience is influenced more by the construct of the Self (personality, self-esteem, grit) than external factors (social support, stress, life satisfaction, socio-economic status) in higher education students.

RECOMMENDATIONS

Future research could focus on a cross-sectional study to test the influence of external versus internal factors in various age groups. A holistic approach which includes genetic testing, personal attributes, and environmental factors, as well as situational cognitive mapping could highlight differences between age groups.

Consequently, stratified approaches to the development of resilience could be developed. Future research is necessary to support these findings and further explore the predictive factors of resilience in every stage of development.

LIMITATIONS

This research investigation, however, succumbed to limitations. In this study, there was a significant gender inequality amongst the participants. Although the resilience scale suggested no gender differences, there seems to be ambiguity in the literature (see Karairmak 2010; Allan et al. 2013). Additionally, the transition in factorial design from within-subjects to between-subjects led to the distribution of participants in four different groups. Therefore, the results could be considered equivocal. However, the strength of the present research lies in the systematic investigation of resilience's predictive factors by excluding variables that were measured through the Connor-Davidson scale.

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