

Depression, Anxiety, Stress, and Satisfaction with Life: Moderating Role of Interpersonal Needs among University Students

Choe Chai Tan

Sunway College

Kuan Siew Khor

Sunway University

Pei Boon Ooi (✉ peiboono@sunway.edu.my)

Sunway University <https://orcid.org/0000-0002-7259-3381>

Research article

Keywords: Depression, Anxiety, Stress, Interpersonal Needs, Satisfaction with Life, University Students, Perceived Burdensomeness, Thwarted Belongingness

Posted Date: August 17th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-22880/v2>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background Depression, anxiety, and stress are ranked among the top mental health concerns faced by university students. The transition to higher education coincides with a new social environment and adaptation that has potential to increase mental health conditions. However, limited studies in Malaysia have examined the relationship among depression, anxiety, stress, and satisfaction with life with interpersonal needs. Thus, this study was performed to assess the relationship among depression, anxiety, stress, and satisfaction with life, with interpersonal needs (perceived burdensomeness and thwarted belongingness) as moderators. Method A cross-sectional study using convenient sampling method was conducted among 430 students (Mean aged= 20.73 years; SD = 1.26 years) in two private universities in Malaysia. A self-administered questionnaire comprising the Depression, Anxiety and Stress Scale (DASS-21), Satisfaction with Life Scale, and Interpersonal Needs Questionnaire were used. Results Students who experienced depression and anxiety reported higher satisfaction with life under the influence of low perceived burdensomeness. Perceived burdensomeness, when coupled with depression ($\beta = 0.76, p < 0.01$) and anxiety ($\beta = 0.79, p < 0.01$), contributed 15.8% of variance in satisfaction with life. Students who experienced stress reported higher satisfaction with life under the influence of high thwarted belongingness ($\beta = 0.73, p < 0.01$), contributing 17.0% of variance in satisfaction with life. Conclusions For university students who experienced depression and anxiety symptoms, mental health practitioners, researchers, and teaching staff may need to be aware and educate the students on how to reduce and manage their perceptions on perceived burdensomeness. For university students who experienced stress symptoms, the focus shall not be solely on managing perception towards thwarted belongingness as it is not necessarily perceived as a negative 'interpersonal need' in this study. Future studies are required to substantiate this result.

Background

The World Health Organization indicated that mental health conditions among young adults is one of the global areas of concern, with depression being the third leading condition and suicide being the second leading cause of death among individuals aged between 15 and 29 [1]. Depression, anxiety, and stress are the common issues that affect the well-being of students [2], with depression and anxiety being particularly prevalent among college students [3, 4]. In Malaysia, the number of university students with mental health conditions has risen remarkably over the past few years; specifically, the number of people living with depression has doubled and suicidal symptoms among students has tripled over the same period [5].

The onset of most mental health disorders is during young adulthood [6]. Various studies have reported that 40 million of adults in the United States have anxiety disorder, of which 75% of them experienced their first episode by age 22, a typical college age [7], and over half of college students in the country had at least one mental health problem [8]. Similarly, more than 20% of university students in Hong Kong live with either depression, anxiety, or stress [9]. In Malaysia, 29.2% of Malaysian adults have reported some form of mental health conditions compared to 10.7% in 1996, suggesting that prevalence rate has doubled over that period [5]. The Malaysian Mental Healthcare Performance: Technical report 2016 indicated further that younger adults who experienced emotional issues has increased to 29.2% in 2015 with depression (17.7%),

anxiety (39.5%), and stress (10.1%) being the top three mental health conditions reported by 25,507 students nationwide [10, 11]. Furthermore, these students are also at high risk of developing suicidal behaviour [12], and exhibit poor academic performance [4].

As such, with almost 1.3 million Malaysian youths in college or university [13], studies on mental health conditions and the well-being of students are significant and crucial to promote positive mental health among college and university students [14].

Depression, anxiety, stress, and SWL

Students are typically young adults who are susceptible to positive and negative affective conditions that determine their state of happiness or well-being. Their wellness motivated the current study to focus on the effects of negative affective conditions, specifically depression, anxiety, and stress, on satisfaction with life (SWL). To ensure mental health wellness in students, universities typically monitor the students' mental health continually and systematically by conducting surveys from time to time. Universities are able to assess the mental well-being of their students and also use the survey results to assist them in improving the viability of their existing counselling programmes [15].

One past study indicated that severe levels of depression, anxiety, and stress are strongly associated with low life satisfaction among university students [16]. These negative affective conditions—depression, anxiety, and stress—are not healthy emotional symptoms and may affect the subjective well-being of individuals. Well-being comprises affective and cognitive components [17]. This study focused on the latter as young adults who are Generation Z – those aged between 5 to 25 - grow up online and a tech-savvy. They seem well connected virtually, enjoy digital lives and longing for connection, sense of belongingness and interpersonal needs [18].

Most of the research found that university students' satisfaction with life and have negative correlation with depression. Their findings suggest that to improve the satisfaction with life is to focus on the effective intervention and manage depression issue among the university students [19, 20].

In addition, greater anxiety is associated with greater depressive symptoms [21] where individual reported greater self-criticism, hypervigilance of cues of disapproval from people in their surroundings, and feelings of unworthiness of love. Tsitsas, Nanopoulos and Paschali (2019) also indicated that university students score higher in life satisfaction when their anxiety scores are low [22]. Their result suggested a negative association between the life satisfaction and anxiety. On another note, Boyraz et al. [23] found significant association between authenticity, life satisfaction, and decreased distress.

In some research, university students who experience higher depression, anxiety and stress in life have lower level of life satisfaction [16], [24]. These negative association are in line with a systematic literature review that stated quality of life among university students have negative correlation with stress. The factors highlighted were burnout, sleep disturbances and depression escalate the negative association with quality of life [25].

Thus, based on the reviews aforementioned, we hypothesised that:

H₁: Depression is negatively associated with SWL.

H₂: Anxiety is negatively associated with SWL.

H₃: Stress is negatively associated with SWL.

The role of interpersonal needs and SWL.

According to Maslow's hierarchy of needs theory [26], individuals strive to fulfil their basic needs, such as physiological needs and safety needs, before striving to achieve their belongingness needs, esteem needs, and self-actualisation needs. University students fulfil their belongingness needs through their interpersonal relationships. They are in the developmental stages of "identity versus role confusion" and "intimacy versus isolation" as suggested by Erikson [27]. They are developing their self-identity and achieving a feeling of belongingness, which comes from interacting with and being acknowledged by the individuals around them, contribute to this development. Failing to form close social interactions, on the other hand, would instead trigger the feeling of thwarted belongingness. Students need interpersonal attachments with their social circle to create a sense of belonging that contributes to their development.

Thwarted belongingness is categorised as social or belongingness needs, the third level of the five levels of needs in Maslow's hierarchy [28]. To do well academically, which is related to esteem needs, students need to fulfil their social needs beforehand [29]. The present of such a void induces students to form self-criticism and feelings of unworthiness which contributed to the development of anxiety and depressive symptoms [23]. Øverup (2017) study also presented the importance of interpersonal needs, specifically perceived belongingness and perceived burdensomeness in mediating the relationship between anxiety and depressive symptoms. Thus, this present study posited that students are hindered from achieving a higher level of the self if their belongingness needs are not fulfilled- making the thwarted belongingness a moderator in this study. This further increases their chances of experiencing depression, anxiety, and stress, which have a reverse effect on their academic performance [15].

Perceived belongingness occurs in relationships with others and it is inclusive of perceived burdensomeness and thwarted belongingness. These factors are found to have important associations with suicidal ideation among college students [30]. Stressful life events experienced during young adults could be overwhelming and students who are able to adjust their assumptions about the world and their self-identity face less suicidal risk. Students have decreased suicidal risk is even when they perceive burdensomeness and lack of belongingness. Thus, it is possible to make meaning of stressful life events, eventually free from depression and anxiety. The meaningful transformation would eventually and indirectly increase the students' SWL. Although Van Orden et al. [31] proposed that unmet interpersonal needs contribute to suicidal ideation, our study focuses on SWL instead of suicidal ideation because the sample of university students in this study

exhibit neither high clinical severity nor high suicidal risk. The study posits that satisfaction with perceived belongingness would lead to SWL- making perceived belongingness the moderator.

In the current study, interpersonal needs refer to individuals' desires and comprises perceived burdensomeness and thwarted belongingness. There is scarce research in this area that examines these factors among university students as most studies are on psychiatric patients [32, 33]. According to Van Orden et al. [31], both perceived burdensomeness and thwarted belongingness are pivotal constructs and considered to be the most proximal interpersonal needs that lead to suicidal ideation. Other constructs, such as mental health conditions and stressful life events, are comparatively more distant in the risk chain of suicidal ideation. Perceived burdensomeness and thwarted belongingness, fortunately, are postulated as dynamic and obedient to therapeutic change. In view of that, both constructs are viable moderating variables to explain how the relationship among depression, stress, anxiety, and SWL changes among individuals with low or high interpersonal needs.

Perceived burdensomeness is an individual's mental state that perceives himself or herself as a burden to others. Such a mental state, of perceiving that others would "be better if I were gone", is a result of an unmet social ability. This mental state explained the role of individuals' innate need for connection and relatedness in allowing them to grow and become competent in managing their life [34]. Van Orden et al. [31] pointed out that the perception of being a burden to others can be induced by multiple factors, including functional impairment [35-37], unemployment [38], and family discord [39]. These factors induce perceived burdensomeness, which could lead to lower SWL among young adults who may or may not have experienced symptoms of depression, anxiety, and stress.

Thus, we hypothesised that:

H₄: Perceived burdensomeness moderates the relationship between depression, anxiety, and stress on SWL.

H₅: Thwarted belongingness moderates the relationship between depression, anxiety, and stress on SWL.

Many studies have explored the relationship between various psychological variables, such as depression, stress, anxiety, and SWL [40-45]. However, few studies have examined the role of interpersonal needs such as thwarted belongingness and perceived burdensomeness as the moderating factors in the relationship among depression, stress, anxiety, and SWL of university students. Our study aims to discover whether interpersonal needs will moderate the relationship among depression, anxiety, stress, and SWL of university students in two private universities in Malaysia. Perceived burdensomeness and thwarted belongingness act as the constructs of interpersonal needs.

Our research framework is illustrated in Figure 1.

INSERT FIGURE 1 HERE

Method

Participants

Participants (N = 430) were recruited from private universities using convenient sampling method. Self-administered questionnaires were distributed to participants upon receiving approval from the institutional review board (SUREC 2018/044). Participating students were enrolled in the following programmes: Pre-University (N = 15), Diploma (N = 11), Undergraduate Degree (N = 397), and Postgraduate Degree (N = 7). Of the participants, 73.3% of them were between the ages of 19 and 21). Participants reported gender assigned at birth and female participants accounted for 58.6% of the responses whereas male participants accounted for 40.9%. Most of the participants were local students (90.0%) and some were international students (9.8%). In terms of family structure, participants reported the following: (i) extended family, composed of grandparents, parents, children, or relatives (38.4%), (ii) immediate family, composed of parents and children (53.5%), (iii) single-parent family, composed of father or mother and children (7.6%) and others (0.5%) Table 1 illustrates the demographic background of the participants both in frequency and percentage.

INSERT TABLE 1 HERE

Measures

DASS-21 Questionnaire (DASS). DASS is made up of three subscales, namely depression, anxiety, and stress. Each item in the questionnaire is rated on a four-point Likert scale, ranging from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*) for respondents to select their answers [46]. DASS is widely used and has been validated to assess the severity of depression, anxiety, and stress among different samples [47]. Depression is defined as a state of mind where the individual loses self-esteem and incentives, as if believing that he or she is incapable of achieving life-defining goals [48]. Anxiety is characterised as physiological hyper arousal, where the individual experiences nervousness, fearfulness, and autonomic arousal [48, 49]. Stress is characterised as negative affect or emotional state of mind, where the individual experiences persistent arousal, tension, and tolerates a low threshold for becoming upset and frustrated [48], DASS assesses stress as difficulty in relaxing, nervous arousal, easily upset or agitated, irritable or over-active, and impatient. One past study indicated that severe levels of depression, anxiety, and stress are highly associated with low life satisfaction among university students [16]. We selected DASS- 21 version as it is known to have good internal consistency and stable factor analysis structure to provide a desirable convergence to the study [50-53].

Interpersonal Needs Questionnaire (INQ). INQ is used to measure interpersonal needs in participants: nine items measure thwarted belongingness and six items measure perceived burdensomeness (see Appendix) [31]. Unlike DASS-21, items in INQ are rated on a five-point Likert scale, ranging from 1 (*Not at all true for me*) to 5 (*Very true for me*) [54]. Van Orden et al. [31] suggested that thwarted belongingness and perceived burdensomeness are closely related yet highly distinctive aspects within areas of psychology. They also explained that INQ has been subject to multiple group analyses among younger versus older adults and clinical versus non-clinical samples, and found applicable to diverse populations. Previous studies mentioned that the scores derived from this scale provides good validity and psychometric properties [31]. Hence, INQ is reliable enough to assess thwarted belongingness and perceived burdensomeness.

Satisfaction with Life Scale (SWLS). SWLS was developed by Diener et al. [55] It is a brief five-item instrument designed to measure the concept of life satisfaction, with each item rated on a seven-point Likert scale, ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). According to Kobau et al.[56], SWLS demonstrated acceptable internal consistency reliability (Cronbach's $\alpha = 0.88$).

Data Analysis And Results

Assessment of Measurement Items

Common method bias was examined using the Harman's one-factor test to detect the existence of a general factor that accounts for 50% of variance among the measurement items [57]. Both DASS and INQ did not seem to measure a single dimension. Additionally, DASS, INQ, and SWLS use 4-point, 5-point, and 7-point Likert-type response scales respectively to treat the effects of common method bias.

Next, exploratory factor analysis was applied to assess the measurement items. The principal component analysis using Varimax rotation method ensured that the items load on corresponding factors. The results of the factor analysis satisfied Kaiser-Meyer-Olkin Measure of Sample Adequacy (KMO-MSA) at a value above 0.5 [58] and Bartlett's Test of Sphericity, which rejected the null hypothesis that the correlation matrix is an identity matrix.

The reliability analyses were used to assess the consistency of items in measuring the concept they set out to measure. Table 2 presents the descriptive and reliability statistics, where Cronbach's alpha coefficient for all the variables were within the range of 0.847 to 0.952, which is well above the value of 0.70 recommended by Nunally [59]. No items were deleted to improve the internal consistency of the variables being studied. Mean score was used for interpretation of score. Although the mean value for anxiety for both genders is similar, male participants appeared to report a slightly higher mean value for depression ($M = 1.94$, $S.D. = 0.69$) and stress ($M = 2.11$, $S.D. = 0.79$). Female participants appeared to score higher for thwarted belongingness ($M = 2.78$, $S.D. = 0.83$). These results are similar to past research which found male students to report more severe depressive symptoms compared to female students. The independent-samples t-tests showed that only SWL appeared to be significantly different statistically across gender, where male participants reported a lower mean score compared to female participants (Table 2).

INSERT TABLE 2 HERE

Hypotheses Testing

Prior to the hierarchical regression analysis, the Pearson's product moment correlation was applied to examine the association between the variables. Table 3 shows that the strength of correlation between the independent variables, namely depression, anxiety, and stress, are strong and statistically significant at $r \geq 0.60$. Moreover, the independent variables appear to have stronger correlations with perceived burdensomeness than thwarted belongingness, and reported weak but statistically significant negative correlations with SWL.

INSERT TABLE 3 HERE

The moderating effects of perceived burdensomeness and thwarted belongingness were tested using a four-step hierarchical regression analysis as recommended by Sharma et al. [60] Step 1 tested the effect of gender as the control variable and it accounted for 2.3% of variance in SWL ($\beta = -0.15, p < 0.01$). Step 2 tested the effects of depression, anxiety, and stress (Hypotheses 1 to 3), where only depression accounted for 9.9% of variance in SWL. Anxiety and stress were not found to be significant predictors and hence, Hypotheses 2 and 3 are not supported.

Step 3 examined the inclusion of moderator variables (perceived burdensomeness and thwarted belongingness) as independent variables—Table 4 presents the regression analyses for perceived burdensomeness (left column) and thwarted belongingness (right column). The F change value was not significant with the inclusion of perceived burdensomeness to the structural path, but F change was significant with the inclusion of thwarted belongingness, which accounted for 4.7% of variance in SWL ($\beta = 0.23, p < 0.01$). Step 4 tested Hypotheses 4 and 5 by including the product of the independent variables and moderator variables. The interaction between depression and perceived burdensomeness ($\beta = 0.76, p < 0.01$), and the interaction between anxiety and perceived burdensomeness ($\beta = 0.79, p < 0.01$) contributed 16.0% of variance in SWL, thus partially supporting Hypothesis 4 (pure moderator). For thwarted belongingness, only stress ($\beta = 0.73, p < 0.01$) appeared to be a significant predictor, contributing 17.0% of variance in SWL, thus partially supporting Hypothesis 5 as quasi moderator.

INSERT TABLE 4 HERE

The post hoc graphs are developed only for interactions that are statistically significant in the fourth step of the hierarchical regression analysis (refer to Table 4). This step helps visualise the relationship between depression, anxiety, and stress with SWL under the moderating influence of perceived burdensomeness and

thwarted belongingness. Figure 2 (i & ii) show that participants who scored lower than the mean average for perceived burdensomeness would experience lower SWL when they experience greater depression or anxiety. On the contrary, the relationship appears positive when perceived burdensomeness was rated higher than average.

INSERT FIGURE 2(i) and 2(ii) HERE

Figure 3 presents the negative linear relationship between stress with satisfaction in life among participants with low or high thwarted belongingness. The solid line represented a group of participants who scored lower than the mean average for thwarted belongingness whereas the dashed line represented the other group of participants who scored higher than the mean average for thwarted belongingness. Higher stress translates to lower satisfaction in life for both groups of participants. The negative relationship appears to be stronger for the group with higher thwarted belongingness.

INSERT FIGURE 3 HERE

Discussion

The results of the stepwise hierarchical regression analyses presented in Table 4 showed that only depression predicted SWL even though all three exogenous variables, namely depression, anxiety, and stress, were negatively correlated with the SWL. The results also suggested interpersonal needs (perceived burdensomeness and thwarted belongingness) to be moderating variables that could potentially reduce or raise SWL among young adults.

With reference to Figure 2, the slopes indicate that individuals who scored low in perceived burdensomeness reported higher SWL compared to those who scored high in perceived burdensomeness. Another observation from the figure is the statistically indifferent low level of SWL across individuals who had been grouped into low and high levels of depression and anxiety. Based on Steps 3 and 4 of Table 4, perceived burdensomeness exhibited the characteristics of a pure moderating effect, thus suggesting its pivotal role in individuals' well-being. Our study is one of the few studies that analysed the explanatory role of interpersonal needs in the cognitive component of SWL. Chu et al. found perceived burdensomeness and thwarted belongingness to explain suicidal ideation, a state of mind that is essentially the opposite of SWL [61]. A takeaway from this is that the negative perception of the self as a burden to others is not beneficial towards maintaining one's well-being and could in fact be harmful. In the United States and in other countries, suicide prevention programmes now focus on the theme "You Matter", which highlights the importance and significance of developing a sense of belongingness [62]. Counsellors in universities or colleges can incorporate similar themes of self-care in their sessions, with the aims of changing any negative perceptions students might have of themselves.

Figure 3 showed the quasi moderating effect of thwarted belongingness on the relationship between stress and SWL. Regardless of the levels of thwarted belongingness, the result showed that higher stress contributes to lower satisfaction with life. Figure 3 also explored the said relationship among individuals who scored low or high in thwarted belongingness. Surprisingly, the results showed that individuals who scored high on thwarted belongingness reported higher SWL, compared to individuals who scored low in thwarted belongingness. This is inconsistent with previous literature and a reason to it may be that, due to their desire for independence, young adults might be more inclined to withdraw and isolate themselves from others, gradually reducing their social circles and limiting their ability to seek social support when needed [63]. In addition, today's generation of young adults are more inclined to interact virtually on online platforms, displacing valuable real-world interaction with family and friends. They experience an increased sense of freedom but over the course of time, their sense of belongingness dissipates and predispose them to feelings of loneliness and possibly the development of an egocentric personality.

Figure 3 also indicated that individuals facing higher stress reported lower SWL regardless of whether they reported low or high levels of thwarted belongingness. Participants with high levels of thwarted belongingness reported higher SWL compared to those with low levels of thwarted belongingness. This seems to suggest that sense of belongingness does not necessarily contribute to SWL. Higher levels of thwarted belongingness indicate lower sense of belongingness, as one has failed to form close social interactions. Surprisingly, regardless of stress level, individuals who scored high in thwarted belongingness were satisfied with their lives. In addition, these individuals have poorer ability to cope with stress compared to those who scored low in thwarted belongingness. This result is unique in that there are some individuals who could not cope well with stress and reported high levels of thwarted belongingness could be in denial, believing themselves to be satisfied with life. Thus, university or college counsellors should be aware of this denial attitude in young adults, which could be part of the young adults' defence mechanism.

However, our finding is in contrast with some previous research. Civitci [64] found that undergraduate students who participate more in extracurricular activities have higher college belongingness and higher life satisfaction. Similarly, a study by Mellor et al. supported the "belongingness hypothesis", suggesting that individuals seek to form long-term, meaningful, and positive relationships and that failure to achieve this contributes to social isolation, loneliness, and suicidal thoughts [65]. As our findings are inconsistent with that of past studies, it is essential to be cautious in drawing conclusions about the relationship between the need for belongingness and SWL.

The study was among the first study which adapted the IPQ and tested in the context of young adults in Malaysia. The findings are imperative as it helps the Malaysian mental health professions to understand that students who are satisfied with life might also experience depression and anxiety too. In addition, university students who experienced stress symptoms were not due to poor 'interpersonal need' or lack of sense of belongingness. Other aspects of issues that lead to stress symptoms needs to explore further. With more information about depression, anxiety and stress, appropriate awareness, detection and prevention programs can be implemented to reduce the depression risk and increase the mental health literacy of university students.

Suggestions for future study and limitations

Our findings highlight the necessity of preventing negative mental conditions and promoting positive mental health in young adults. Prevention activities such as school bullying, students' educational accomplishment, employment planning activities, and educational transformation were the outcomes of the science of prevention [66]. Universities and colleges can offer more activities, as part of the science of prevention, that focus on students' mental health. Higher education institutions should actively encourage this agenda of mental health [67] and execute activities that focus on advocating the importance of mental well-being among students.[66]

One method that has been found to benefit mental well-being is the art of mindfulness. Mindful individuals are better able to overcome negative affective outcomes despite experiencing high levels of perceived burdensomeness and thwarted belongingness. A study has suggested mindfulness training to be included as part of clinical intervention [68]. In academia, mindfulness techniques embedded in class activities, such as movement-based courses (e.g., Taiji quan, Pilates, and GYROKINESIS®) which include a 15-week class syllabus, showed an increase in mindfulness scores among college students [69]. In addition, mindfulness-based interventions could lessen critical self-evaluation, which may improve self-acceptance and mental well-being [70]. Thus, future studies could investigate the effectiveness of mindfulness training incorporating experimental versus control groups.

It has been found that undergraduates would most likely seek help or emotional support from their friends (79.4%), and least likely from counsellors (7.2%). Only a small proportion of depressed students turn to counselling services and this issue needs to be investigated [71]. Social stigma could be a reason why students avoid seeking professional help. A systematic review done by Clement et al. [72] showed that mental health stigma has a small- to moderate-sized negative effect on individuals seeking help. Many researchers have indicated that students are unwilling to seek help from campus counselling support services because they are concerned about being stigmatised [5, 6]. Other findings have also shown that most young adults would seek help from friends instead of professionals. Friendships are of the utmost importance to young adults and hence, developing a peer support group in school counselling programmes could be an effective way to reduce suicide rates among the youths [73].

Early identification of college students with mental health conditions and comprehensive assessments are critical to provide immediate and adequate services to avoid undesirable outcomes or tragedies [6]. Continued rigorous research on the causes of depression and prevention programmes should be carried out to reduce the incidence rates of undesirable mental health conditions [74].

Finally, this study is not without its limitations. The DASS instrument is not equivalent to clinical diagnosis although DASS has been used and validated in various settings. Although our study reported the positive association between satisfaction in life and thwarted belongingness We recommend our findings to be interpreted with caution. This study was conducted be, this finding shall be interpreted with caution and limit the generalisability of the results. Replications of this study in various setting maybe necessary. In addition,

self-administered questionnaire was used and may pose risk of social desirability bias. Thus, future studies shall be expanded to broader sampling and include evidences obtained from students' personal records and data (e.g., Facebook and Instagram posts which may project their state of well-being).

Conclusion

Our study aimed to examine the relationship among depression, anxiety, stress, and SWL among university students in Malaysia. Furthermore, we wanted to determine the moderating effect of interpersonal needs, specifically perceived burdensomeness and thwarted belongingness, on this relationship. Perceived burdensomeness is indeed a significant moderator on the relationship between (i) depression, (ii) anxiety and SWL. On the other hand, thwarted belongingness exerts significant moderating effect on the relationship between stress and SWL.

Interestingly, we found a positive relationship between thwarted belongingness and SWL, which is in contrast to findings from past research. We attribute this unique finding to the fact that our participants are from "Generation Z", whose lives have been greatly influenced by new technologies. The ways in which they communicate (i.e., through online social media) and how they garner a sense of belongingness are very different from their older counterparts. At the point of writing, generational variance has not been given enough attention in clinical and teaching settings. We believe the concept of generational differences should be examined further in research and that mental health practitioners as well as teaching staff should be more aware of its effects. This research lend supports to Ventriglio & Bhugra (2015), who claimed that every, generation has its own way or method of learning and keeping information, and how the young adults of today live and interact among themselves are changing as well [75]. Their idea of life satisfaction or their perspective on life might be different from college students of earlier generations. Our research sets the stage for future researchers to investigate mental health conditions further, particularly among Generation Z college and university students. Han et al. [76] and Kovess-Masfety et al. [77] also recommended that future studies on mental health conditions to include non-college attending young adults. In addition, future studies could consider other control variables that may act as predictors to life satisfaction (e.g., quality of intimate relationships, attachment style, academic performance).

Abbreviations

DASS: Depression, Anxiety, and Stress Scale; KMO-MSA: Kaiser-Meyer-Olkin Measure of Sample Adequacy; INQ: *Interpersonal Needs Questionnaire*; M: Mean; S.D.: Standard deviation; SWL: Satisfaction with Life Scale

Declarations

Acknowledgement:

We thank Ms. Neeta S. Singh and Ms Sarah Loh Wai Yin for their professional proof reading and editing services; Ms. Neerushah Subarimaniam for providing constructive feedback, Ms Tan Wei Tong and Ms

Chloe Kwok Wei Yan for their contribution during data collection period.

Authors' contributions:

KSK originated the design of the study, collected data, performed statistical analysis. KSK, Tan CC and OPB interpreted and drafted the manuscript. KSK, TCC and OPB critically revised the draft manuscript. All authors have read and approved the final manuscript

Funding:

The author(s) received no financial support for research, authorship, and/or publication of this article.

Availability of data and materials

The generated dataset is available upon request to the corresponding author at the contact address in this article.

Ethics Approval and Consent to Participate:

Written informed consent was obtained from participants who took part in the study and Sunway University Research Ethics Approval was obtained (SUREC 2018/044). This article does not contain any studies with animals.

Consent for publication:

Not applicable.

Competing interests:

All authors declare no conflict of interest.

References

1. (WHO), W.H.O. *World Mental Health Day 2018: Young people and mental health in a changing world.* 2018 10 October 13 Sept 2019]; Available from: https://www.who.int/mental_health/world-mental-

[health-day/2018/en/](#).

2. Bhujade, V.M., *Depression, anxiety and academic stress among college students: A brief review*. Indian Journal of Health & Wellbeing, 2017. **8**(7).
3. Shamsuddin, K., et al., *Correlates of depression, anxiety and stress among Malaysian university students*. Asian journal of psychiatry, 2013. **6**(4): p. 318-323.
4. Storrie, K., K. Ahern, and A. Tuckett, *A systematic review: Students with mental health problems—a growing problem*. Int J Nurs Pract, 2010. **16**(1): p. 1-6.
5. (IPH), I.f.P.H., *National Health and Morbidity Survey 2015*, in *NHMS Report. 2015*. 2015, Ministry of Health Malaysia.
6. Pedrelli, P., et al., *College Students: Mental Health Problems and Treatment Considerations*. Acad Psychiatry, 2015. **39**(5): p. 503-11.
7. Ran, M.S., et al., *Predictors of mental health among college students in Guam: implications for counseling*. Journal of Counseling & Development, 2016. **94**(3): p. 344-355.
8. Zivin, K., et al., *Persistence of mental health problems and needs in a college student population*. J Affect Disord, 2009. **117**(3): p. 180-5.
9. Leung, C.H., *University support, adjustment, and mental health in tertiary education students in Hong Kong*. Asia Pacific Education Review, 2017. **18**(1): p. 115-122.
10. Unit, M.H.P., *Malaysian Mental Healthcare Performance: Technical report 2016 (MOH/S/CRC/55.18(TR)-e)*. 2017, Ministry of Health Malaysia: Putrajaya.
11. Keyes, C.L., et al., *The relationship of level of positive mental health with current mental disorders in predicting suicidal behavior and academic impairment in college students*. J Am Coll Health, 2012. **60**(2): p. 126-33.
12. Ahmad, N., et al., *Suicidal ideation among Malaysian adolescents*. Asia Pacific Journal of Public Health, 2014. **26**(5_suppl): p. 63S-69S.
13. Tapsir, D.P.D.S.H. *Harmonising public and private higher education*. 2019; Available from: <https://www.nst.com.my/opinion/columnists/2019/05/488452/harmonising-public-and-private-higher-education>.
14. Hunt, J. and D. Eisenberg, *Mental health problems and help-seeking behavior among college students*. Journal of adolescent health, 2010. **46**(1): p. 3-10.
15. Beiter, R., et al., *The prevalence and correlates of depression, anxiety, and stress in a sample of college students*. J Affect Disord, 2015. **173**: p. 90-6.
16. Bukhari, S.R. and F. Saba, *Depression, anxiety and stress as negative predictors of life satisfaction in university students*. Rawal Medical Journal, 2017. **42**(2): p. 255-257.
17. Pavot, W. and E. Diener, *Review of the satisfaction with life scale*, in *Assessing well-being*. 2009, Springer. p. 101-117.
18. Davis, K., *Young people's digital lives: The impact of interpersonal relationships and digital media use on adolescents' sense of identity*. Computers in Human Behavior, 2013. **29**(6): p. 2281-2293.

19. Kumar, H., A. Shaheen, and I. Rasool, *shafi M (2016) Psychological Distress and Life Satisfaction among University Students*. J Psychol Clin Psychiatry, 2016. **5**(3): p. 00283.
20. Seo, E.H., et al., *Life satisfaction and happiness associated with depressive symptoms among university students: a cross-sectional study in Korea*. Annals of General Psychiatry, 2018. **17**(1): p. 52.
21. Boyraz, G., J.B. Waits, and V.A. Felix, *Authenticity, life satisfaction, and distress: a longitudinal analysis*. J Couns Psychol, 2014. **61**(3): p. 498-505.
22. Tsitsas, G., P. Nanopoulos, and A. Paschali, *Life Satisfaction, and anxiety levels among university students*. Creative Education, 2019. **10**(05): p. 947.
23. Øverup, C.S., et al., *Belonging, burdensomeness, and self-compassion as mediators of the association between attachment and depression*. Journal of Social and Clinical Psychology, 2017. **36**(8): p. 675-703.
24. Denovan, A. and A. Macaskill, *Stress and subjective well-being among first year UK undergraduate students*. Journal of Happiness Studies, 2017. **18**(2): p. 505-525.
25. Neto, M.L.R., et al., *When basic supplies are missing, what to do? Specific demands of the local street population in times of coronavirus - a concern of social psychiatry*. Psychiatry Res, 2020. **288**: p. 112939.
26. Maslow, A., *Motivation and personality*. New York: Harpers. 1954, Inc.
27. Cherry, K. *Erik Erikson's Stages of Psychosocial Development*. 2019 5 Sept 2019]; Available from: <https://www.verywellmind.com/erik-eriksons-stages-of-psychosocial-development-2795740>.
28. Lavigne, G.L., R.J. Vallerand, and L. Crevier-Braud, *The fundamental need to belong: On the distinction between growth and deficit-reduction orientations*. Personality and social psychology bulletin, 2011. **37**(9): p. 1185-1201.
29. Kaur, A., *Maslow's need hierarchy theory: Applications and criticisms*. Global Journal of Management and Business Studies, 2013. **3**(10): p. 1061-1064.
30. Lockman, J.D. and H.L. Servaty-Seib, *College student suicidal ideation: Perceived burdensomeness, thwarted belongingness, and meaning made of stress*. Death studies, 2016. **40**(3): p. 154-164.
31. Van Orden, K.A., et al., *Thwarted belongingness and perceived burdensomeness: construct validity and psychometric properties of the Interpersonal Needs Questionnaire*. Psychol Assess, 2012. **24**(1): p. 197-215.
32. Roush, J.F., et al., *Thwarted interpersonal needs mediate the relation between facets of mindfulness and suicide ideation among psychiatric inpatients*. Psychiatry research, 2018. **265**: p. 167-173.
33. Taylor, N.J., et al., *Thwarted interpersonal needs and suicide ideation: Comparing psychiatric inpatients with bipolar and non-bipolar mood disorders*. Psychiatry Res, 2016. **246**: p. 161-165.
34. Ryan, R.M. and E.L. Deci, *The darker and brighter sides of human existence: Basic psychological needs as a unifying concept*. Psychological inquiry, 2000. **11**(4): p. 319-338.
35. Conwell, Y., et al., *Health status and suicide in the second half of life*. Int J Geriatr Psychiatry, 2010. **25**(4): p. 371-9.

36. Conwell, Y., et al., *Completed suicide among older patients in primary care practices: a controlled study*. Journal of the American Geriatrics Society, 2000. **48**(1): p. 23-29.
37. Duberstein, P.R., et al., *Suicide at 50 years of age and older: perceived physical illness, family discord and financial strain; Life events and suicide at age 50 and older; PR Duberstein and others*. Psychological medicine, 2004. **34**(1): p. 137.
38. Brown, G.K., et al., *Risk factors for suicide in psychiatric outpatients: a 20-year prospective study*. J Consult Clin Psychol, 2000. **68**(3): p. 371-7.
39. Duberstein, P.R., et al., *Poor social integration and suicide: fact or artifact? A case-control study*. Psychol Med, 2004. **34**(7): p. 1331-7.
40. Bayram, N. and N. Bilgel, *The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students*. Social psychiatry and psychiatric epidemiology, 2008. **43**(8): p. 667-672.
41. Cömert, I.T., Z.A. Özyeşil, and S. Burcu Özgülük, *Satisfaction with life, meaning in life, sad childhood experiences, and psychological symptoms among Turkish students*. Psychological Reports, 2016. **118**(1): p. 236-250.
42. Ghazwin, M.Y., et al., *The association between life satisfaction and the extent of depression, anxiety and stress among Iranian nurses: a multicenter survey*. Iranian journal of psychiatry, 2016. **11**(2): p. 120.
43. Iqbal, S., S. Gupta, and E. Venkatarao, *Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates*. The Indian journal of medical research, 2015. **141**(3): p. 354.
44. Naseem, S. and S. Munaf, *Suicidal Ideation, Depression, Anxiety, Stress, And Life Satisfaction Of Medical, Engineering, And Social Sciences Students*. J Ayub Med Coll Abbottabad, 2017. **29**(3): p. 422-427.
45. Smith, M.M., et al., *Does perfectionism predict depression, anxiety, stress, and life satisfaction after controlling for neuroticism?* Journal of Individual Differences, 2017.
46. Andreou, E., et al., *Perceived Stress Scale: reliability and validity study in Greece*. Int J Environ Res Public Health, 2011. **8**(8): p. 3287-98.
47. Musa, R., et al., *Concurrent validity of the depression and anxiety components in the Bahasa Malaysia version of the Depression Anxiety and Stress scales (DASS)*. Malay, 2011. **230**: p. 93.5.
48. Lovibond, P.F. and S.H. Lovibond, *The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories*. Behav Res Ther, 1995. **33**(3): p. 335-43.
49. Brown, T.A., et al., *Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples*. Behav Res Ther, 1997. **35**(1): p. 79-89.
50. Beaufort, I.N., et al., *The depression, anxiety and stress scale (DASS-21) as a screener for depression in substance use disorder inpatients: a pilot study*. European addiction research, 2017. **23**(5): p. 260-268.

51. Silva, H.A.d., et al., *Short version of the Depression Anxiety Stress Scale-21: is it valid for Brazilian adolescents?* Einstein (São Paulo), 2016. **14**(4): p. 486-493.
52. Szabo, M., *The short version of the Depression Anxiety Stress Scales (DASS-21): factor structure in a young adolescent sample.* J Adolesc, 2010. **33**(1): p. 1-8.
53. Tran, T.D., T. Tran, and J. Fisher, *Validation of the depression anxiety stress scales (DASS) 21 as a screening instrument for depression and anxiety in a rural community-based cohort of northern Vietnamese women.* BMC psychiatry, 2013. **13**(1): p. 24.
54. Parkhurst, K.A., Y. Conwell, and K.A. Van Orden, *The interpersonal needs questionnaire with a shortened response scale for oral administration with older adults.* Aging Ment Health, 2016. **20**(3): p. 277-83.
55. Diener, E., et al., *The Satisfaction With Life Scale.* J Pers Assess, 1985. **49**(1): p. 71-5.
56. Kobau, R., et al., *Well-being assessment: An evaluation of well-being scales for public health and population estimates of well-being among US adults.* Applied Psychology: Health and Well-Being, 2010. **2**(3): p. 272-297.
57. Podsakoff, P.M., et al., *Common method biases in behavioral research: a critical review of the literature and recommended remedies.* J Appl Psychol, 2003. **88**(5): p. 879-903.
58. Kaiser, H.F., *A second generation little jiffy.* Psychometrika, 1970. **35**(4): p. 401-415.
59. Nunally, J.C. and I.H. Bernstein, *Psychometric theory.* 1978, New York: McGraw-Hill.
60. Sharma, S., R.M. Durand, and O. Gur-Arie, *Identification and analysis of moderator variables.* Journal of marketing research, 1981. **18**(3): p. 291-300.
61. Chu, C., et al., *Role of thwarted belongingness and perceived burdensomeness in the relationship between violent daydreaming and suicidal ideation in two adult samples.* Journal of aggression, conflict and peace research, 2018.
62. Flett, G., A. Khan, and C. Su, *Mattering and psychological well-being in college and university students: Review and recommendations for campus-based initiatives.* International Journal of Mental Health and Addiction, 2019. **17**(3): p. 667-680.
63. Venta, A., Y. Shmueli-Goetz, and C. Sharp, *Assessing attachment in adolescence: a psychometric study of the child attachment interview.* Psychol Assess, 2014. **26**(1): p. 238-55.
64. Çivitci, A., *Perceived stress and life satisfaction in college students: Belonging and extracurricular participation as moderators.* Procedia-Social and Behavioral Sciences, 2015. **205**: p. 271-281.
65. Mellor, D., et al., *Need for belonging, relationship satisfaction, loneliness, and life satisfaction.* Personality and individual differences, 2008. **45**(3): p. 213-218.
66. Yıldız, M., *Serial Multiple Mediation of General Belongingness and Life Satisfaction in the Relationship Between Attachment and Loneliness in Adolescents.* Educational Sciences: Theory & Practice, 2016. **16**: p. 553-578.
67. Eisenberg, D., E. Golberstein, and J.B. Hunt, *Mental health and academic success in college.* The BE Journal of Economic Analysis & Policy, 2009. **9**(1).
68. Collins, K.R.L., et al., *Mindfulness and zest for life buffer the negative effects of experimentally-induced perceived burdensomeness and thwarted belongingness: Implications for theories of suicide.* J Abnorm

- Psychol, 2016. **125**(5): p. 704-714.
69. Caldwell, K., et al., *Developing mindfulness in college students through movement-based courses: effects on self-regulatory self-efficacy, mood, stress, and sleep quality*. Journal of American College Health, 2010. **58**(5): p. 433-442.
70. Allan, B.A., E.M. Bott, and H. Suh, *Connecting mindfulness and meaning in life: Exploring the role of authenticity*. Mindfulness, 2015. **6**(5): p. 996-1003.
71. Furr, S.R., et al., *Suicide and depression among college students: A decade later*. Professional Psychology: Research and Practice, 2001. **32**(1): p. 97.
72. Clement, S., et al., *What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies*. Psychological medicine, 2015. **45**(1): p. 11-27.
73. Kok, J.K. and L.Y. Goh, *Anomic or egoistic suicide: Suicide factors among Malaysian youths*. International Journal of Social Science and Humanity, 2012. **2**(1): p. 47.
74. Stice, E., et al., *A meta-analytic review of depression prevention programs for children and adolescents: factors that predict magnitude of intervention effects*. Journal of consulting and clinical psychology, 2009. **77**(3): p. 486.
75. Ventriglio, A. and D. Bhugra, *Age of entitlement and the young: Implications for social psychiatry*. 2016, SAGE Publications Sage UK: London, England.
76. Han, B., et al., *Prevalence and Mental Health Treatment of Suicidal Ideation and Behavior Among College Students Aged 18-25 Years and Their Non-College-Attending Peers in the United States*. J Clin Psychiatry, 2016. **77**(6): p. 815-24.
77. Kovess-Masfety, V., et al., *Mental health of college students and their non-college-attending peers: results from a large French cross-sectional survey*. BMC Psychol, 2016. **4**(1): p. 20.

Tables

Table 1. Demographic characteristics of participants

Demographic Variables	Frequency	%
Age		
16 to 18 years	18	4.2
19 to 21 years	315	73.3
22 to 24 years	93	21.6
More than 25 years	4	0.9
Gender		
Male	176	40.9
Female	252	58.6
Missing data	2	0.5
Nationality		
Local student	387	90.0
Foreign student	42	9.8
Missing data	1	0.2
Type of Family Structure		
Blended family- includes grandparents, parents, children and relatives	165	38.4
Nucleus family- includes parents and children	230	53.5
Single parent family- includes either father or mother and sibling(s)	33	7.6
Others	2	0.5

Table 2. Descriptive and reliability statistics of participants

Score	Range	Mean (SD)		Cronbach's Alpha
		Male	Female	
Depression	0-3	1.94 (0.69)	1.85 (0.62)	0.890
Anxiety	0-3	1.82 (0.72)	1.82 (0.65)	0.895
Stress	0-3	2.11 (0.79)	2.03 (0.74)	0.924
Perceived burdensomeness	1-5	1.81 (0.97)	1.68 (0.92)	0.952
Thwarted belongingness	1-5	2.78 (0.83)	2.92 (0.77)	0.847
Satisfaction with life*	1-7	3.78 (1.50)	4.25 (1.41)	0.938

Note: * Significant difference between male and female participants.

Table 3. Correlation between variables

Variables	ALL					
	(1)	(2)	(3)	(4)	(5)	(6)
(1) Depression	1					
(2) Anxiety	0.63**	1				
(3) Stress	0.63**	0.67**	1			
(4) Perceived burdensomeness	0.62**	0.57**	0.54**	1		
(5) Thwarted belongingness	0.15**	0.23**	0.24**	0.17**	1	
(6) Satisfaction with life	-0.28**	-0.15*	-0.15**	-0.23**	0.19**	1

Significant levels: ** $p < 0.01$, * $p < 0.05$,

Table 4. Hierarchical regression analysis: The moderating effect of perceived burdensomeness and thwarted belongingness

Perception	Outcome				Perception	Outcome			
	Satisfaction with life					Satisfaction with life			
	Step 1	Step 2	Step 3	Step 4		Step 1	Step 2	Step 3	Step 4
<u>Control</u>					<u>Control</u>				
<u>Variable</u>					<u>Variable</u>				
Gender	-0.15**	-0.13**	-0.13**	-0.12**	Gender	-0.15**	-0.13**	-0.11*	-0.12**
<u>Independent</u>					<u>Independent</u>				
<u>Variable</u>					<u>Variable</u>				
Depression		-0.32**	-0.28**	-0.57**	Depression		-0.32**	-0.31**	-0.55*
Anxiety		0.02	0.04	-0.31*	Anxiety		0.02	-0.01	0.12
Stress		0.05	0.07	0.28*	Stress		0.05	0.01	-0.54*
Perceived			-0.10	-0.86**	Thwarted			0.23**	-0.20
burdensomeness					belongingness				
<u>Interaction</u>					<u>Interaction</u>				
<u>Term</u>					<u>Term</u>				
Depression*Perceived				0.76**	Depression*Thwarted				0.34
burdensomeness					belongingness				
Anxiety*Perceived				0.79**	Anxiety*Thwarted				-0.19
burdensomeness					belongingness				
Stress*Perceived				-0.43	Stress*Thwarted				0.73*
burdensomeness					belongingness				
R ²	0.02	0.10	0.10	0.16	R ²	0.02	0.10	0.15	0.17
F Change	10.01**	11.82**	2.47	8.88**	F Change	10.01**	11.82**	23.21**	4.65**
F	10.01**	11.56**	9.77**	9.78**	F	10.01**	11.56**	14.38**	10.96**
Durbin-Watson			1.92		Durbin-Watson		1.90		

Significant levels: ** $p < 0.01$, * $p < 0.05$

Figures

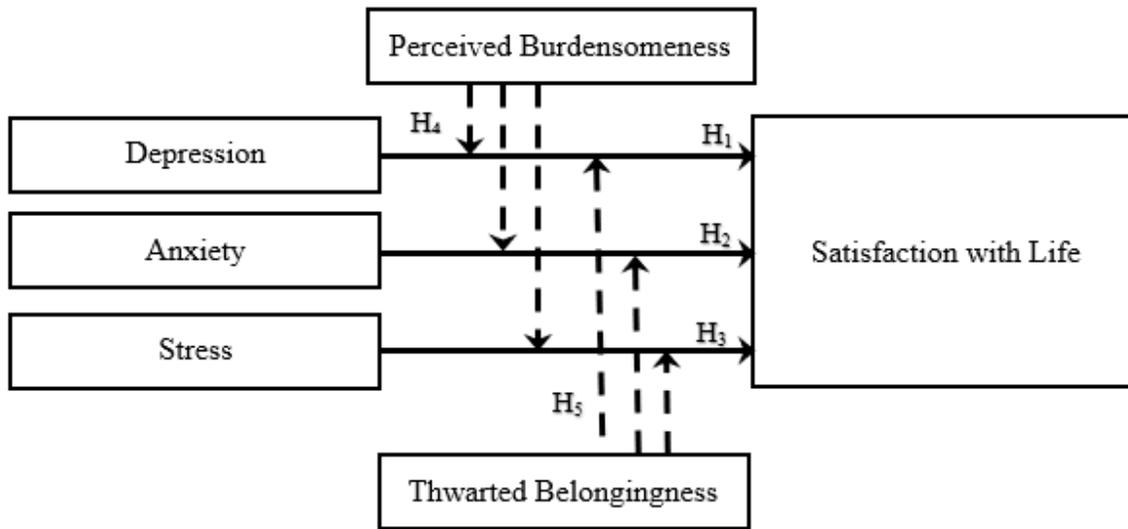


Figure 1

Research Framework

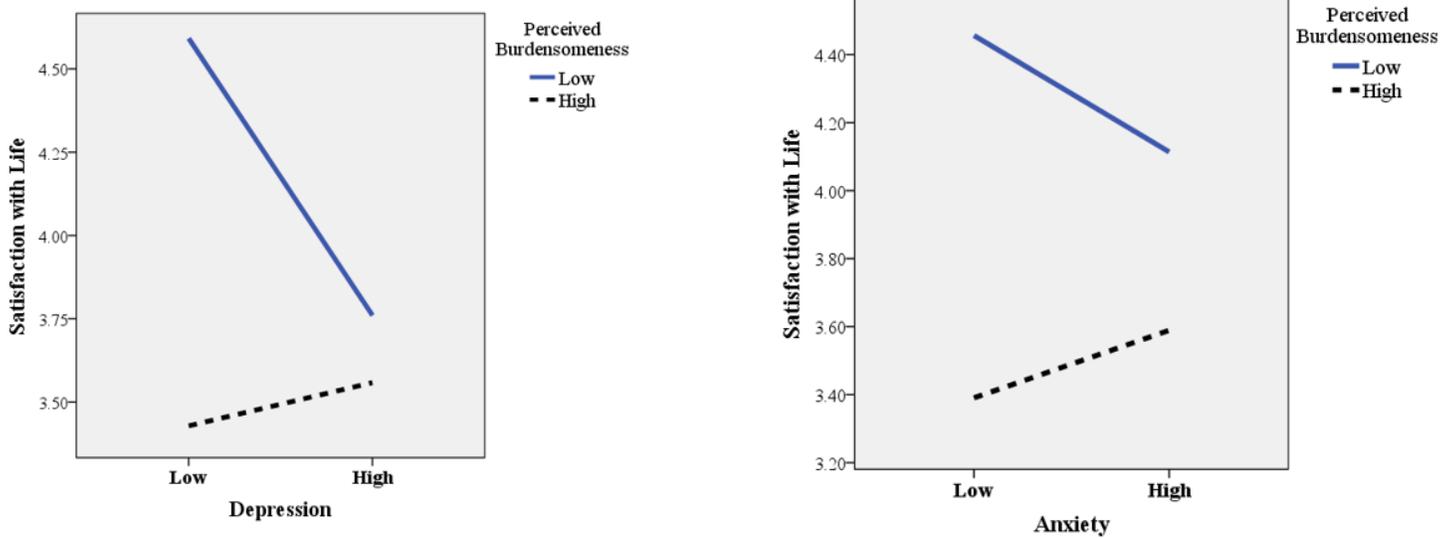


Figure 2

(i). Plot of Significant Interactions: The Moderating Effect of Perceived Burdensomeness on the Relationship between Depression and Satisfaction with Life (ii). Plot of Significant Interactions: The Moderating Effect of Perceived Burdensomeness on the Relationship between Anxiety and Satisfaction with Life

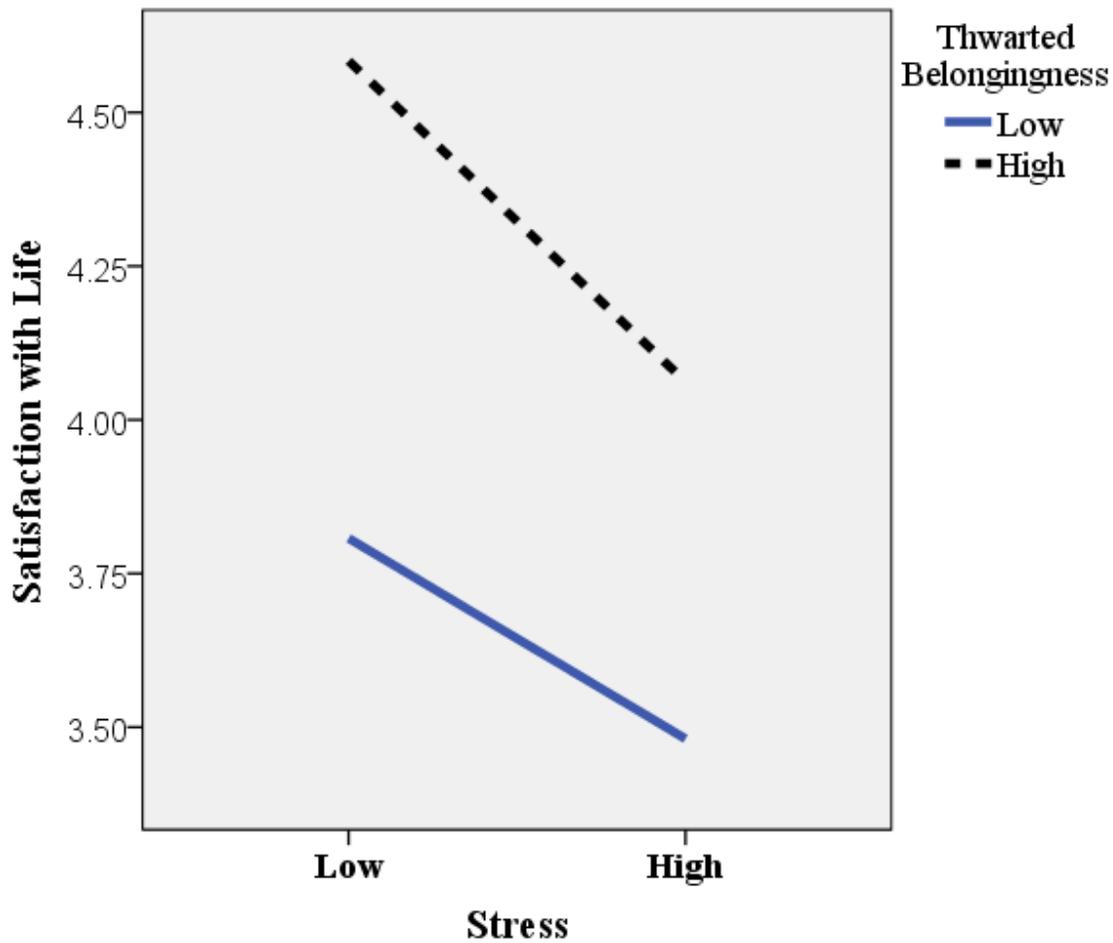


Figure 3

Plot of Significant Interactions: The Moderating Effect of Perceived Burdensomeness on the Relationship between Stress and Satisfaction with Life

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Appendix.docx](#)