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The role of psychological distress as a potential route through which procrastination may confer risk for reduced life satisfaction

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Abstract
Procrastination, mental health problems and decreased life satisfaction among university students constitutes an issue over which there is growing public concern. Yet, there is little research explaining the mechanisms through which academic procrastination may lead to less life satisfaction. The present study aimed to explore the link between procrastination and psychopathology among 2 samples (sample 1, $N = 681$ and sample 2, $N = 183$) of Greek University students. We also further tested the assumption that psychological distress would mediate the relationship between procrastination and life satisfaction. Data were analyzed using correlational analyses and structural equation modeling. In the first Study, procrastination was related to psychopathology. In the second study, results revealed that students who had the tendency to procrastinate in general, or their academic obligations, in particular, reported less psychological well-being, more anxiety, more psychological distress, less emotional ties, less general positive affect, more loss of behavioral and emotional control, more depressive symptoms and less life satisfaction. More importantly, the model exhibited a good fit to the data, while the bootstrapped standardized indirect effect of procrastination on life satisfaction was statistically significant supporting the hypothesis that Psychological distress partially mediated the relationship between procrastination and life satisfaction. In conclusion, difficulty to meet deadlines within a specific time-frame is related to worse mental health and decreased overall life satisfaction Academic procrastination, general procrastination, psychopathology, mental health, life satisfaction.

Keywords Academic procrastination · General procrastination · Psychopathology · Mental health · Life satisfaction

Introduction

Mental health among university students represents an important and growing public health concern. In an American study, it was estimated that the prevalence of any depressive or anxiety disorder was 15.6% for undergraduates and 13.0% for graduate students. Suicidal ideation in the past 4 weeks was reported by 2% of students. Students reporting financial struggles were at higher risk for mental health problems (Eisenberg et al. 2007). In a British study, it was found that financial and other difficulties increased anxiety and depression and affected academic performance (Andrews and Wilding 2004). Greek university students, in particular, were found to be 1.5 to 2% times more likely to develop a psychological disorder compared to the general population according to a large epidemiological study (Efthimiou et al. 2007; Navrides et al. 1990).

Procrastination appears as the tendency, the state or behavioral trait that "describes a situation in which the lack of motivation and mood are prevalent in the completion of a task" (Shah 2000). Previous studies reported that 80–90% of college students engage in procrastination (O'Brien 2002), with some estimates as high as 95% asserts to engage in academic procrastination (Steel 2007). From the aforementioned facts, it is understood that procrastination constitutes a serious problem for the students' population with educational implications worldwide. Therefore, it is important to minimize its consequences through clinical and educational interventions in order to offer a boost into students' mental health and well-being.

Academic Procrastination, Emotional Distress and Mental Health

As a point of fact, procrastination is extremely common amongst the students, nowadays (Harriott and Ferrari 1996).

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This results from the fact that university students are engaged in several academic activities such as studying courses, writing tasks, and preparing themselves for term exams (Şirin 2011). Due to the fact that procrastination has a significant effect on a persons' thoughts, feelings, behavior and physical health (Burka and Yuen 1983), many researchers have found a negative correlation between students' mental health and procrastination (Steel 2007; Sirois 2007; Sirois 2015; Ferrari et al. 1999). Procrastinators tend to experience more often negative emotions such as shame and guilt about oneself and depression, while they are more prone to advocate negative health behaviors. For example, they tend to delay seeking care for health problems (Steel 2007; Sirois et al. 2003; Sirois 2007). Furthermore, students who presented high levels of procrastination appeared to experience feelings of exhaustion, guilt, anxiety, high levels of sensitivity and mild depressive symptoms due to the pressure to keep up with the deadlines regarding the submissions of the tasks (Blanchard and Gottry 2004; Schraw et al. 2007; Stainton et al. 2000; Steel 2007). Students who score high on procrastination also exhibit poorer academic performance. Test anxiety is one of the factors that have a negative impact on students' performance and mental health, respectively (Alpert and Haber 1960; Depreeuw 1984): In fact, test anxiety correlates with high levels of general anxiety, depression, worry, and a significant loss of self-esteem. According to research, test anxiety is divided into two categories: the "active" anxiety that includes high study effort and better test results and the "passive" test anxiety that includes high procrastination and poor study performance (Depreeuw 1992). Lay et al. (1989) found that anxiety is increasing amongst university students who postpone the study of their courses as the exam period approaches. Solomon and Rothblum (1984), also, refer to a positive correlation between procrastination and anxiety. Furthermore, Curtis (1989) has connected anxiety with a series of behaviors whilst Baumeister and Scher (1988) have linked anxiety with procrastination, which often includes the choice of the short-term against the long-term benefits. McCown and Johnson (1991) indicated that to the extent that the anxiety has a deterrent effect, people who have the tendency to procrastinate will postpone the initial task, and will consequently concentrate on other less stressful activities. Van Eerde (2000), in her meta-analysis, has also found a medium relationship amongst procrastination, anxiety, and depression, confirming the research of Bernstein (1998) who found that procrastination is correlated with depression and mood. According to this point of view, many researchers claim that procrastination seems to function as a temporal relief from anxiety as well as a cause of temporal amelioration of mood (König and Kleninmann 2004; Sigall et al. 2000; Pychyl et al. 2000; Ferrari 1992). Therefore, procrastination constitutes a strategy to regulate negative emotions, thereby making the individual feel better, at least temporarily (Baumeister et al. 1994). Despite the fact that procrastination can positively affect the mood in the short term, it correlates with lower levels of mental health in the long term (Tice and Baumeister 1997; Tice et al. 2001). Besides, procrastination is also associated with a lack of engagement in planned or future-oriented behaviors.

Procrastination, Emotional Distress and Life Satisfaction

Another factor affecting students' academic performance is life satisfaction which has previously been correlated with procrastination (Salmela-Aro and Tynkkynen 2010; Argiropoulou et al. 2014). Life satisfaction includes emotional and cognitive evaluation of a person's life (Diener et al. 2003; Capan 2010). Durden (1997) found that there is an important negative correlation between procrastination and life satisfaction. Students that scored highly in procrastination were less satisfied with their life. Caldwell and Mowrer (1998) resulted in the same conclusion that procrastination correlates with life satisfaction through anxiety. Specifically, procrastinators demonstrated higher levels of anxiety which is possible to lead in lower levels of life satisfaction. As far as psychological distress is concerned, previous studies have shown that mental health has a huge effect on life satisfaction. Thus, students who have better mental health are more satisfied with their lives (Dessie et al. 2013; Swami et al. 2007). Specifically, life satisfaction is negatively associated with anxiety, depression, stress, illness and positively correlated with good mental health (Samaranayake et al. 2014; Abdulghani et al. 2011).

The Current Study

The aim of this study was to investigate the relationship between general and academic procrastination with mental health and life satisfaction among Greek University students. Based on previous research, we wanted to examine the relationship between the aforementioned variables across two student samples. We expected that procrastination would be positively related to psychopathology (study 1 and 2) and that emotional distress would mediate the relationship between procrastination and life satisfaction (study 2).

Study 1

Methods

Participants and Procedure

The sample comprised of 681 undergraduate students from a social science University department at Ioannina, in northwest

Greece. The questionnaires were given to students in the year 2017-2018, as part of a larger research program examining procrastination, defense mechanisms, approaches to learning and psychological well-being. The sample consisted of 535 (78.6%) female and 146 (21.4%) male students. The mean age of the participants was 20.3 years (sd = 3.1). Among them, 24.7% were first-year, 25.3% were second-year, 23.9% were third-year and 25.7% were fourth-year students. Participants were recruited using a convenience sample. More precisely, the investigator asked permission from the professors of undergraduate courses at the University to administer a battery of questionnaires at the beginning of the lecture to all students that were present in the classroom. Participation was voluntary and anonymous.

Descriptive statistics were used to answer the study's research questions. Pearson's correlation coefficients between psychopathology, academic procrastination, and courses left were also computed.

Measures

An improvised sociodemographic questionnaire was used to assess participants' sociodemographic characteristics such as age, gender, year of study, residence, cohabitation, courses left and parents' educational level.

To assess psychopathology, we administered the Brief Symptom Inventory (BSI), which is an abbreviated version of SCL-R-90 (Derogatis 1975; Derogatis and Cleary 1977). This scale consists of 53 questions covering nine symptom dimensions: Somatization (SOM, 7 items, $\alpha = 0.89 > 0.7$), Obsession-Compulsion (OC, 6 items, $\alpha = 0.77 > 0.7$), Interpersonal Sensitivity (IS, 4 items, $\alpha = 0.75 > 0.7$), Depression (DEP, 6 items, $\alpha = 0.85 > 0.7$), Anxiety (ANX, 6 items, $\alpha = 0.86 > 0.7$), Hostility (HOS, 5 items, $\alpha = 0.77 > 0.7$), Phobic anxiety (PA, 5 items, $0.81 > 0.7$), Paranoid ideation (PI, 5 items, $\alpha = 0.74 > 0.7$) and Psychoticism(PSYCH, 5 items, $\alpha = 0.77 > 0.7$) as well as three global indices of distress: Global Severity Index, Positive Symptom Distress Index, and Positive Symptoms Total score. In the present study, the Cronbach's alpha of the entire scale was $\alpha = 0.97 > 0.7$.

Procrastination Assessment Scale Students -PASS (Solomon and Rothblum 1984, adjusted in Greek by Xatzidimou 1994) was used to assess academic procrastination. The Greek version of the PASS assesses academic procrastination across 5 academic tasks, namely, a) writing term papers, b) studying for the exams, c) academic -administrative tasks, d) course attendance, and e) school activities in general on 5-point Likert scales (*1= never procrastinate to 5 = always procrastinate*). Also, respondents are asked to indicate the degree to which they feel procrastination on the task is a problem to them (1 = *not at all a problem;* 5 = *always a proble*m) and the degree to which they would like to decrease their tendency to procrastinate on the task (1 = *do not want to decrease*; 5 = *definitely want to decrease*). The total score is calculated by summing up the 2 first items of each of the five academic tasks. In the second section of the *PASS*, students are asked to rate on a 5 –point Likert scale (1 = *not at all reflects why I procrastinate;* 5 = *definitely reflects why I procrastinated*), the reasons for procrastinating on an essay assignment, with 26 items covering 13 types of motivation. Finally, the third section of the *PASS* investigates the attitudes of the respondents towards a potential anti-procrastination intervention program as well as the desired characteristics of such a program. In the present study, only the total score of the first section of the questionnaire was used. The overall Cronbach's alpha was $\alpha = 0.77 > 0.7$.

Results and Discussion

Correlation analyses between academic procrastination and psychopathology indicated that there was a positive correlation between overall PASS score and psychopathology. In fact, academic procrastination was positively correlated with Somatization ($r = 0.21$ $p < 0.001$), Obsession-Compulsion ($r = 0.29$, $p < 0.001$), Interpersonal Sensitivity ($r = 0.21$, $p = 0.005$), Depression ($r = 0.25$, $p < 0.001$), Anxiety ($r = 0.23$, $p = 0.006$), Hostility ($r = 0.16$, $p < 0.001$), Phobic Anxiety ($r = 0.25$, $p < 0.001$), Paranoid Ideation ($r = 0.22$, $p < 0.001$) and Psychoticism ($r = 0.23$, $p < 0.001$). Moreover, a positive correlation between courses left and academic procrastination ($r = 0.31$, $p < 0.001$), was found. Additionally, the total number of courses left demonstrated statistically significant positive correlations with overall psychopathology ($r = 0.10$, $p = 0.009 < 0.01$).

The results of the first study support previous literature indicating that procrastination is a maladaptive tendency as it is positively associated with psychopathology. In fact, the findings of the present study are in accordance with the findings of previous studies which found that procrastinators are more likely to develop depression (Constantin et al. 2018), obsessive-compulsive disorder (Ferrari and McCown 1994), anxiety (Scher and Osterman 2002), hostility (Ferrari et al. 1995) and worst mental health in general (Stead et al. 2010). Another finding is that the students who owe more courses are more likely to procrastinate, and they are also more likely to have mental health problems. These findings have been found in previous studies too (Ferrari et al. 1995; Saele et al. 2017).

Study 2

In this study, we explored the link between procrastination and life satisfaction. We also tested the hypothesis that emotional distress would mediate the relationship between procrastination and life satisfaction (Fig. 1). We also further

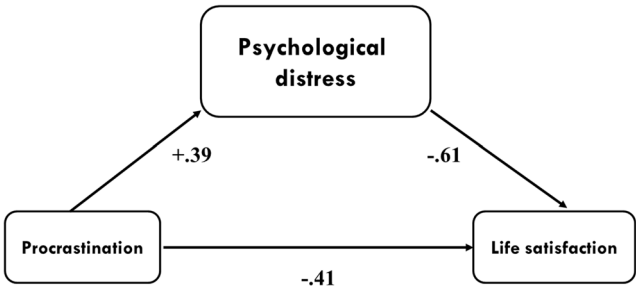

Fig. 1 Structural model result showing paths from procrastination to psychological distress and life satisfaction

expanded our investigation by assessing trait procrastination along with academic procrastination. Finally, the use of the Mental Health Inventory and BAI permitted a more detailed examination of the relationship between procrastination and mental health in various domains, in contrast to more global measures previously used.

Methods

Participants and Procedure

The sample comprised of 182 undergraduate students from several Greek universities located both in the capital (Athens) and in the province. In this sample 117 (64.3%) were female and 65 (35.7%) were male students. The mean age of the participants was 22.32 years (sd = 3,90). As far as the year of studies, 25,3% were first-year, 15,9% were second-year, 24,2% were third-year and 7,1% were fourth-year students, while 27,3% were 5th to 11th year of studies. Participants were recruited using a snowball sampling technique. Participation was voluntary and anonymous.

To assess the relationship between procrastination scales and outcome measures Pearson's r product-moment correlations were conducted. To further investigate the theoretical relationship between procrastination, psychological distress, and life satisfaction we applied structural equation modeling using AMOS 17.0. Missing values were calculated using the expectation-maximization algorithm (see Muthén and Muthén 1998). The model tested consisted of 3 latent variables (procrastination, psychological distress, and life satisfaction) as indicated in Fig. 1. As for indicators of the latent variable procrastination, we used 2 parcels comprising of the total score of the 2 scales measuring procrastination, namely PASS and GPS. As for indicators of the latent variable psychological distress, we used 4 parcels comprising of the total scores of Anxiety, Depression, and Loss of emotional control subscales of the Mental Health Inventory, as well as BAI. Finally, in the case of life satisfaction, two parcels were used comprising of the total score of Life Satisfaction subscale of the Mental Health Inventory, as well as the Life Satisfaction Scale total score. To evaluate model fit, we used a) the relative chi-square (x2/df), which should be less than 2 or 3 (Kline 1998; Ullman 2001), but with values between 2 and 5 being considered acceptable (Schumacker and Lomax 2004), b) the Comparative Fit Index (CFI: Bentler 1990) and the Goodness of Fit Index (GFI: Joreskog and Sorbom 1984) with values >0.95 reflecting an ideal fit (Bentler 1995; Hu and Bentler 1995), and finally, c) the Root Mean Square Error Of Approximation (RMSEA: Browne and Cudeck 1993) and d) the Standardized Root Mean Square Residual (SRMR: Bentler 1995), such that values <0.08 being considered acceptable and <.05 ideal (see Browne and Cudeck 1993).

Measures

An improvised sociodemographic questionnaire was used to assess demographic information. Academic Procrastination was measured with Procrastination Assessment Scale-Student (Solomon and Rothblum 1984) adjusted in Greek by Chatzidimou (1994), as in the first study. In the present study, Cronbach's alpha was $\alpha = 0.84 > 0.7$. Additionally, to assess trait procrastination, participants also completed General Procrastination Scale (Lay 1986) comprising of 20 items on a five-point Likert-type scale ranging from 1 (not at all true) to 5 (totally true of me). In the present study, the Cronbach's alpha was $\alpha = 0.81 > 0.7$.

Participants also completed a 5-item Life Satisfaction Scale -LSS (Diener et al. 1985) designed to measure global cognitive judgments of one's life satisfaction. In the present study, the Cronbach's alpha was $\alpha = 0.83 > 0.7$. In addition, participants completed Mental Health Inventory (Veit and Ware 1983), which is a 38-item measure of psychological distress and well-being, developed for use in general populations. There is a hierarchical factor model composed of a general underlying psychological distress vs well-being factor called General Health Index ($\alpha = 0.96 > 0.7$); a higher order structure defined by 2 correlated factors—Psychological Distress ($\alpha = 0.94 > 0.7$) and Well-Being ($\alpha = 0.90 > 0.7$); and 6 correlated lower order factors—Anxiety ($\alpha = 0.90 > 0.7$), Depression ($\alpha = 0.82 > 0.7$), Emotional Ties (r = .48, $p < 0.001$), General Positive Affect ($\alpha = 0.90 > 0.7$), Loss of Behavioral/ Emotional Control (a =.81)& Life satisfaction (one item). Finally, participants also completed Beck's Anxiety Inventory - BAI (Beck and Steer 1993), a widely used 21-item self-report inventory used to assess anxiety levels in adults and adolescents. In the present study, the Cronbach's alpha was $\alpha = 0.87 > 0.7$.

Results and Discussion

General procrastination positively correlated with BAI (r = 0.22, $p = 0.003$), psychological distress (r = 0.26, $p < 0.001$), Loss of behavioral/ emotional control (r 0.29, $p < 0.001$) Depression (r = 0.19, $p = 0.010$) and Anxiety (r = 0.23, $p =$

0.002), while it was negatively related to Mental Health Index (r = −0.29, $p < 0.001$), Psychological wellbeing (−27, $p = 0.000$), Emotional Ties (−.25, $p = 0.001$), Life Satisfaction (r = −0.35, $p < 0.001$), General Positive affect (r = −0.24, $p < 0.001$) and LSS (r = −0.35, $p < 0.001$).

Academic procrastination also positively correlated with BAI (r = 0.24, $p = 0.001$) Psychological distress (r = 0.32, $p < 0.001$), Loss of behavioral/ emotional control (r = 0.35, $p < 0.001$), Depression (r = 0.30, $p < 0.001$) and Anxiety (r = 0.28, $p < 0.001$). Accordingly, negative correlations were found between PASS and Mental Health Index (r = -0.33, $p < 0.001$), Psychological wellbeing (r = -0.28, $p < 0.001$), Emotional Ties (r = -0.28, $p < 0.001$), Life Satisfaction (r = -0.27, $p < 0.001$), General Positive affect (r = -0.25, $p = 0.001$) and Life satisfaction Scale (r = -0.39, $p < 0.001$).

An inspection of the SEM results suggested that the relative chi-square test and all the other fit indexes indicated that the model fitted well to the data: x^2 / df = 2.41(<3), CFI = 0.97 (>0.95), RMSEA=0.09 (>0.08) & SRMR = 0.04 (<0.08), while all standardized regression weights were large and statistically significant. As depicted in Fig. 1, Procrastination was positively related to psychological distress (r = 0.39, $p < 0.001$) and negatively related to Life Satisfaction (r = -0.41, $p < 0.001$), while psychological distress was negatively related with Life Satisfaction (r = -0.61, $p < 0.001$).

To test the hypothesis that Psychological distress would mediate the relationship between procrastination and life satisfaction we performed nonparametric bootstrapping analysis (see Preacher and Hayes 2004; Preacher et al. 2007). In order to find a statistically significant mediation, the 95% Bias Corrected and accelerated confidence intervals for the indirect effect should not contain the value 0 (Preacher and Hayes 2004; Preacher et al. 2007). Results based on 2000 bootstrapped samples indicated that the bootstrapped standardized indirect effect of procrastination on life satisfaction was -0.24, the 95% confidence interval ranged from -.38 to -.14 and was statistically significant ($p < 0.001$). Moreover, both standardized total effect of procrastination on life satisfaction (-0.65, $p < 0.001$) and the direct effect (-0.18, $p < 0.001$) were significant. Thus Psychological distress partially mediated the relationship between procrastination and life satisfaction.

Results revealed that students who had the tendency to procrastinate in general, or their academic obligations, in particular, reported less psychological well-being, more anxiety, more psychological distress, less emotional ties, less general positive affect, more loss of behavioral and emotional control, more depressive symptoms and less life satisfaction. Findings are in line with previous research suggesting a negative correlation between procrastination and university students' mental health (Steel 2007; Sirois et al. 2003; Ferrari et al. 1999). In another study, it was found that much of procrastination's effect on life satisfaction was mediated through anxiety and regret (Caldwell and Mowrer 1998). Sirois (2014) also found that trait procrastination was associated with lower levels of self-compassion and higher levels of stress. The role of depression, however, or the loss of emotional and behavioral control was not taken into account in previous studies.

General Discussion

The current study aimed to explore the link between procrastination, mental health, and life satisfaction across Greek university students. Current findings suggest that the difficulty to meet deadlines within a specific time-frame is linked to worse mental health and overall life satisfaction. In fact, students who engage more often in dilatory behaviors are more likely not only to suffer from anxiety and depression, but also from many other psychological symptoms and disorders, such as somatization, obsessive-compulsive symptoms, interpersonal sensitivity, hostility, phobic anxiety, paranoid ideation, and psychoticism. This is in line with previous literature suggesting that although procrastinators experience less stress and have better physical health when deadlines are far off (Tice and Baumeister 1997; Tice et al. (2001), when a deadline approaches, procrastinators, feel pressured and become pessimistic in their outlook, especially about their ability to achieve satisfactory results (Ferrari et al. 1992). Consequently, their thoughts of self-doubt and inadequacy increases the chance of failure and induces feelings of guilt and depression (Steel et al. 2001). In the long run, university students high on procrastination not only receive lower grades but also report higher levels of stress along with poor self-rated health (Tice and Baumeister 1997). In fact, in the current study, we found that students who have more uncompleted courses demonstrate higher levels of procrastination, as well as worst overall mental health. Previous researchers have also found that the more uncompleted tasks a student leaves behind the greater was his/her tendency to procrastinate (Ferrari et al. 1995). Moreover, these students also tended to develop more mental health disorders (James and Kendell 1997).

Furthermore, in our study students who procrastinate more seemed to be less satisfied with their lives, which is in accordance with Diener's study (Diener et al. 1997). More importantly, the findings of the present study support the hypothesis that procrastination has such a detrimental impact on life satisfaction partially through the elevated levels of emotional distress experienced by procrastinators. Previous studies have also found that higher levels of anxiety can possibly lead to lower levels of life satisfaction (Caldwell and Mowrer 1998).

The findings of the present study enrich current academic procrastination literature by testing the hypothesis that emotional distress is mediating the relationship between procrastination and life satisfaction in a previously understudied population namely, Greek University students, therefore adding

ecological validity to previous research. Moreover, in this study, we examined not only anxiety and depression, as in previous studies but also more diverse psychopathological symptoms, as well as the ability of the students to regulate their feelings and behavior in relation to procrastination and life satisfaction. Additionally, we also explored the relationship between procrastination and positive states, such as emotional ties, general positive affect, and well-being. Finally, we tested our hypotheses using powerful statistical techniques, such as structural equation modelling which allowed us to make use of several indicator variables per construct simultaneously, therefore, reaching more valid conclusions on the construct level. Moreover, using this method, the conclusions about the relationships between our constructs were not biased by measurement error.

One limitation of the current study was the exclusive reliance on self-reported measures. Future research would benefit from the inclusion of behavioral measures of procrastination. Another limitation is that due to the protection of the personal data, it was not possible to obtain the official records of students, so the number of courses left was based on the students' estimation. Moreover, the sample consisted exclusively of University students using convenience samples. Future research could benefit from the inclusion of more diverse and random samples. The inclusion of clinical samples would also be a useful extension to the current study. Our mediation analysis is also based on a single-occasion data set. Collecting longitudinal data would result in obtaining more clear and unambiguous mediation results (Paul 2016).

Another interesting direction of future research would be to investigate the impact of treatment of procrastination and of underlying psychological problems on life satisfaction. According to the Dynamic Model of Procrastination and Goal Focus, which centers on the role of goal focus in influencing procrastination during goal pursuit & on dynamic contextual factors (e.g. distance to a given deadline), interventions should focus more on the development and changes of procrastination over time and across contexts. Educators and therapists should also, center more on the means of goal pursuit rather than the outcome, especially at the beginning of the task, when the reward is distant and fear of failure is high. In contrast, when the deadline is near or task aversion is high, it may be more beneficial to concentrate on the outcome (Krause and Freund 2014). Furthermore, they could help students to reinforce their ability to resist in peers' pressure, develop their social abilities, and organize their time effectively, because, according to Tan et al. (2008) procrastinators' academic responsibilities have to do with the development of help-seeking behaviors and time management skills.

In conclusion, difficulty to meet deadlines within a specific time-frame is related to worse mental health and overall life satisfaction. Early diagnosis and effective treatment of procrastination or underlying psychological disorders are thus crucial to diminish the suffering and to increase overall well –being of students.

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Compliance with Ethical Standards

Ethics Declarations On behalf of all authors, the corresponding author states that there is no conflict of interest. All procedures performed in the current study were in accordance with the ethical standards of the institutional research committee of the University of Ioannina and with 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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