SEMINARE

Resilience and Subjective Stress Among University Students: The Moderating Role of Sex

Resilience a subiektywny stres wśród studentów – moderacyjna rola płci

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Abstract: Introduction: The increasing level of stress among the university student population represents a major concern for both psychological well-being and academic functioning. Within this framework, resilience serves as a crucial protective factor, facilitating effective coping with adversity and mitigating the negative impact of stress. This research aims to examine the association between resilience and stress, with a specific focus on sex-based differences. Methods: The study was conducted in 2023 and included 389 university students (55% female, 45% male). The mean age of the participants was 21.5 years (SD = 4.14). Data were collected via an anonymous online survey. Perceived Stress Scale (PSS-10) and the Resilience Scale (RS-14) were administered. Results: A high prevalence of stress was noted in 58.6% of the participants. Females exhibited statistically significantly greater levels of stress than males. Furthermore, the moderation analysis indicated that sex moderates the association between resilience and stress; however, this effect was specific to males. Discussion: These findings highlight the necessity of considering gender differences in research on stress and resilience, as well as in designing psychological interventions. Such interventions should be adapted to address the distinct needs and coping mechanisms of both male and female university students.

Keywords: resilience, stress, university students, gender

Abstrakt: Wprowadzenie: Wzrastający poziom stresu wśród studentów stanowi poważne wyzwanie dla ich zdrowia psychicznego oraz funkcjonowania akademickiego. W tym kontekście rezyliencja jest kluczowym czynnikiem ochronnym, który umożliwia efektywne radzenie sobie z przeciwnościami i minimalizuje negatywne skutki stresu. Celem badań jest określenie zależności między rezyliencją a subiektywnym stresem w zależności od płci studentów. Ustalenia te są istotne dla opracowania skutecznych strategii wsparcia studentów w środowisku akademickim. Metody: Badanie przeprowadzono w 2023 roku i wzięło w nim udział 389 studentów uczelni wyższych (55% kobiet, 45% mężczyzn). Średni wiek uczestników wynosił 21,5 roku (SD = 4,14). Dane zebrano za pomocą anonimowej ankiety internetowej. Do pomiaru subiektywnie odczuwanego stresu wykorzystano Skalę Odczuwanego Stresu (PSS-10), a do oceny rezyliencji – Skalę Rezyliencji (RS-14). Wyniki: Wysoki poziom stresu zaobserwowano u 58,6% studentów. Silny stres dotyczył niemal dwóch trzecich studentek, podczas gdy wśród studentów odsetek ten wynosił połowę. Kobiety wykazywały statystycznie istotnie wyższy poziom stresu w porównaniu z mężczyznami. Analiza moderacyjna wykazała, że płeć studentów moderuje związek między rezyliencją a stresem, ale efekt ten dotyczy jedynie mężczyzn. Dyskusja: Uzyskane wyniki podkreślają konieczność uwzględniania różnic płci w badaniach nad stresem i rezyliencją, a także przy projektowaniu interwencji psychologicznych w środowisku akademickim.

Słowa kluczowe: resiliencja, stres, studenci, płeć

INTRODUCTION

In recent years, there has been a marked increase in scholarly interest in research on the mental health of the student population (Duffy, Twenge, and Joiner 2019; Gibbons, Trette-McLean,

and Crandall 2019; Juchnowicz et al. 2021; Kang et al. 2021; Kupcewicz et al. 2024; Lipson, Lattie, and Eisenberg 2019; Porrou et al. 2021). This rapidly developing field of inquiry focuses not only on the epidemiology of mental disorders among students but, more importantly, on the systematic identification and analysis of the multilevel determinants of psychosocial functioning. The primary aim of these studies is to precisely delineate both risk factors (e.g., chronic academic stress, achievement pressure, adaptation challenges, socioeconomic factors) and protective factors (e.g., psychological resilience, social support, effective coping strategies) that influence individual well-being and the capacity for effective participation in academic and social life (Camilleri et al. 2022). In addition to the aforementioned determinants, external global events—such as natural disasters, pandemics, and wars—over which societies have limited control, are also of significant importance, as they have the potential to impact mental health not only at the individual level but also at local, regional, national, and even international scales. Recent examples include the ongoing conflicts in Ukraine and the Middle East. The overarching objective of intensifying research within the academic environment is to develop empirically grounded knowledge that enables the identification of priority areas requiring intervention.

1. Stress as a Multidimensional Process: Theoretical Perspectives and Implications

The phenomenon of stress is a complex and multidimensional process that can be analysed from various perspectives, depending on the adopted point of view. From a biological standpoint, stress is primarily considered as the organism's response to external or internal factors that disrupt its homeostasis. Analyses in this domain focus on physiological symptoms such as increased heart rate, elevated blood pressure, muscle tension, and hormonal changes, as well as the long-term health consequences, including weakened immune function, sleep disturbances, and psychosomatic disorders. In contrast, the psychological perspective centres on the individual's subjective perception of stressful situations. Key factors in this context include the nature of stressors, individual sensitivity, coping styles, and personality traits such as anxiety levels, self-esteem, and previous life experiences. This approach also emphasises the role of cognitive mechanisms in the interpretation of threats and the strategies an individual employs

to manage challenging situations. Finally, the social perspective takes into account the influence of the social environment on the experience and consequences of stress. This approach considers both individual outcomes, such as reduced work performance or difficulties in interpersonal relationships, as well as contextual factors related to functioning within broader social systems—such as the family, professional groups, or society at large. Social factors that may either mitigate or exacerbate stress, including social support, cultural norms, and living conditions, are also considered.

In this article, we do not intend to provide a comprehensive review of the extensive literature on the definitions of stress, its indicators, underlying mechanisms, or the diverse coping strategies. Instead, we will focus on one of the most influential conceptualisations of stress, which has significantly shaped contemporary understanding of this phenomenon. Specifically, we refer to the classic transactional model of stress developed by Richard S. Lazarus, who emphasised the importance of the individual's subjective appraisal of a situation. As Lazarus (Lazarus, and Folkman 1986, 19) notes, "psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being." This approach posits that stress is not merely a reaction to an objectively challenging situation, but rather arises from the dynamic interaction between environmental demands and the individual's capacity to cope with them. Thus, cognitive appraisal—the way in which a situation is interpreted—plays a pivotal role in the emergence of stress and determines its intensity as well as its consequences for health and psychological functioning. Each person perceives stimuli from the surrounding environment in a unique manner; these differences stem from both biological predispositions and personal experiences, temperamental traits, as well as psychological and social factors. What may serve as a motivating challenge for one person can be perceived as an overwhelming threat by another, exceeding their coping resources. The interpretation of stimuli, the attribution of meaning, and the selection of coping strategies are therefore deeply subjective processes, shaped by a broad individual context.

From these considerations, it follows that stress can be conceptualised from both objective and subjective perspectives. Objective stress refers to external, measurable life events (e.g., job loss, illness) that are widely recognised as stressful. In contrast, subjective stress

pertains to the individual's perception and appraisal of these situations—what is difficult for one person may be neutral or even motivating for another. The subjective evaluation of resources and threats in social situations is of key importance here. This distinction underscores that the impact of stress depends not only on the event itself, but also on the way it is interpreted by the individual.

The literature on the subject highlights not only the destructive effects of chronic stress—referred to as distress—which can lead to psychophysiological exhaustion, reduced immune function, mood disorders, and difficulties in social functioning. University students constitute a population that is particularly vulnerable to mental health problems, both in terms of the exacerbation of pre-existing difficulties and the onset of such issues for the first time during this period of life. Research conducted as part of the WHO World Mental Health International College Student (WMH-ICS) project aimed to estimate the prevalence of mental disorders among first-year university students and to examine key socio-demographic correlates (Auerbach et al. 2018). A series of surveys was carried out at 19 universities located in 8 countries (Australia, Belgium, Germany, Mexico, Northern Ireland, South Africa, Spain, and the United States). Online self-report questionnaires were administered to students beginning their first year of study (overall response rate: 45.5%). The analyses included a sample of 13,984 full-time students: 35% of respondents met criteria for at least one of the assessed lifetime disorders, while 31% met criteria for at least one disorder within the past 12 months. Since the onset of the COVID-19 pandemic, an upward trend has been observed in the prevalence of psychological distress and mood disorders among students, as well as elevated levels of subjective stress (Bueno-Notivol et al. 2021; Fiorillo et al., 2020; Horigian, Schmidt, and Feaster 2021; Reyes-Portillo et al. 2022; Shpakou et al. 2023; Kobelski et al. 2024; Juchnowicz et al. 2021; Rogowska et al. 2022). Empirical studies indicate that undergraduate students frequently experience moderate to high levels of stress, resulting from academic pressure and high educational expectations (Anjala 2024). Research conducted in Poland among 721 university students in Łódź aimed to assess health status after two years of the pandemic (Talarowska et al. 2023). Among the surveyed students, 33% reported elevated stress levels after two years of the COVID-19 pandemic, and the overall mental health of Polish university students significantly deteriorated, particularly in terms of anxiety symptoms and

sleep disturbances. Other Polish studies indicate that a large proportion of students experience high levels of stress in daily life. In empirical research by Rogowska and colleagues (2022), 20% of 3,230 students reported high levels of stress. Similarly, in analyses by Juchnowicz (2021), approximately 41% of a group of 2,172 students declared high stress levels, while in a research report concerning 798 medical students, nearly 80% reported experiencing high stress (Kupcewicz et al. 2024). In the United Kingdom, a study involving $N = 1,273$ students assessed suicidal ideation, anxiety, depression, insomnia, mania, psychosis, and perceived stress. The results indicated that 37.3% of students were classified as being at high risk for suicidal behaviour (Akram et al. 2020).

Academic stress is characterised by a state of psychological or emotional tension resulting from the demands and expectations associated with the educational environment. It may also arise from other factors that affect the entire population, regardless of age. These include financial problems, difficulties in interpersonal relationships, health issues, addictions, low self-esteem, and mental disorders (Korolkiewicz et al. 2022; O'Reilly et al. 2014; Juchnowicz et al. 2021). Numerous international studies also indicate that high levels of stress among students are correlated with reduced quality of life and diminished psychological well-being (Barbayanniset al. 2022; Rogowska et al. 2022; Juchnowicz et al. 2021). This is particularly concerning given the developmental period of early adulthood, during which young people make a series of decisions with long-term consequences.

2. Resilience: Approaches, Models, and Research Contexts

University students are increasingly exposed to various stressors that may negatively affect their mental health. Recent reports indicate that students frequently experience low self-esteem, anxiety, depressive symptoms, stress, difficulties in adaptation, and challenges in family, peer, and academic relationships. The rapid pace of life and the demands inherent in academic environments make university years particularly challenging, often impacting academic performance and, in some cases, leading to dropout. Nevertheless, some students are able to cope effectively with these adverse circumstances and succeed academically. Understanding the mechanisms that facilitate such positive adaptation is therefore crucial.

In light of the numerous challenges faced by university students, understanding the mechanisms that facilitate, and often enable, positive adaptation and the maintenance of psychological equilibrium appears crucial. One such mechanism is resilience – a construct that, over the past decades, has gained significant attention in developmental, health, and educational psychology. Resilience is broadly defined as the capacity for positive adaptation in the face of stress and traumatic experiences, as well as a process of returning to a state of relative psychological balance (Masten 2014). Its multifaceted nature encompasses both individual predispositions and the influence of the social and cultural context in which the individual operates (*The Social Ecology* 2011). Resilience research has evolved from identifying individual traits and resources (first wave), through exploring the processes behind effective adaptation (second wave), and developing intervention programmes (third wave), to the current fourth wave, which embraces a dynamic, systemic, and contextual perspective that considers the complex interplay of biological, psychological, and social factors in adaptation to adversity (Masten et al. 2021).

It is important to note that contemporary models of resilience highlight not only its dynamic character but also its multidimensionality and cultural embeddedness. In the neurodevelopmental approach (Masten 2014), resilience is conceptualised as the result of interactions among multiple systems – from biological and cognitive to emotional, social, educational, and economic. This perspective allows for the inclusion of both innate resources (e.g., temperament, cognitive abilities) and environmental protective factors such as supportive teachers, peer relationships, and family resources. A review of theoretical models of resilience reveals diverse mechanisms that support adaptation. The compensatory and promotive models emphasise the role of resources that foster positive development regardless of the level of risk. In contrast, the protective model focuses on buffering factors that mitigate the impact of stressors. Lastly, the challenge model – though not always formally distinguished – posits that confronting adversity may paradoxically strengthen an individual's adaptive capacities (Fergus, and Zimmerman 2005). Resilience is therefore not a fixed trait but a process that can be strengthened or weakened depending on circumstances.

The existing literature indicates that resilience is associated with numerous positive outcomes, including improved emotional and cognitive functioning, the achievement of

developmental tasks, resistance to the negative effects of stress, lower risk of mental health disorders, and the promotion of psychological health and wellbeing (Aburn, Gott, and Hoare 2016; Liu, and Cao 2022). In light of current research, the application of the resilience construct in the context of higher education appears particularly relevant, as students are increasingly exposed to chronic academic stress, especially during periods of uncertainty and transition (Joseph et al. 2021). Studies conducted during the COVID-19 pandemic demonstrated that resilience served as a significant buffer in the relationship between stress and academic burnout, with students exhibiting higher levels of resilience reporting lower burnout symptoms (Liu, and Cao 2022; Bajaj, Khoury, and Sengupta 2022).

In Poland, empirical research on academic resilience among university students has been systematically developing in recent years. Recent validation studies of the Polish version of the Academic Resilience Scale (ARS-30) conducted on a large sample of students (N = 380; M = 22.06; SD = 2.79) provide evidence that academic resilience is a multidimensional construct encompassing both adaptive and maladaptive cognitive, emotional, and behavioural responses to academic adversity (Gabryś, Boczkowska, and Konaszewski 2025). Importantly, adaptive dimensions of academic resilience—such as perseverance and support-seeking—were positively associated with general resilience, self-efficacy, and mental well-being, whereas maladaptive responses were negatively related to these indicators of psychological functioning. These findings confirm the protective role of academic resilience in the mental health of Polish students and highlight its relevance in understanding individual differences in coping with academic stress within the Polish higher education context.

Despite the growing body of research on resilience in academic contexts, significant gaps remain. Firstly, data from Central and Eastern European countries, including Poland, are limited. Secondly, studies rarely examine the role of moderating variables such as sex, socioeconomic status, or living conditions. Research conducted among Spanish university students found that women and individuals with lower income or less living space were more likely to experience deteriorated mental health and heightened emotional distress (Parrado-Gonzalez, and Leon-Jariego 2020). These findings suggest the need for a more nuanced approach to resilience research—one that considers structural factors, cultural context, and

individual differences. In particular, empirical investigation of the relationship between resilience, perceived stress, and sex among Polish university students is still lacking.

The aim of the present study was twofold: (1) to establish the relationship between students' sex and perceived stress and resilience, and (2) to examine whether sex moderates the relationship between resilience and stress among university students.

3. METHODS

3.1. Participants

The study involved 389 university students. The majority of the sample were females (55.50%), while males constituted 45.50% of the participants. The mean age of participants was 21.5 years (standard deviation = 4.14). Students primarily resided in Lublin Province (52.70%) and Masovian Province (47.30%). Regarding place of residence, the largest group comprised individuals from rural areas (35.48%), followed by those from cities with populations up to 500,000 (20.57%) and towns with 20,000 to 99,999 inhabitants (19.02%). Smaller proportions of respondents came from cities with populations between 100,000 and 500,000 (9.77%) and towns with up to 19,999 inhabitants (15.17%).

Data were collected in October 2023 using anonymous and voluntary online questionnaires administered via Microsoft Forms. The average completion time for the questionnaire was approximately 12 minutes.

The inclusion criterion for participation was active university student status. The study employed a non-random, self-selected volunteer sample. Participants were recruited through invitations distributed via university communication channels and online platforms addressed to students. Participation was entirely voluntary. Due to the self-selection nature of the sample, the results cannot be generalised to the entire population of Polish university students; however, the relatively large sample size allows for robust statistical analyses and provides valuable insight into relationships between resilience and perceived stress within the Polish academic context. Participants were informed about the study's aim and procedure, as well as their right to withdraw at any time without consequences. Informed consent was obtained by ticking an appropriate box on the form prior to participation.

3.2. Measures

Resilience Scale (RS-14) originally developed by G. Wagnild and H. Young translated into Polish and adapted by J. Surzykiewicz et all (Surzykiewicz, Konaszewski, and Wagnild 2019). The scale consists of 14 items assessing different aspects of resilience: self-esteem, interpersonal competence and ability to adapt and cope with difficulties. Each item is rated on a 7-point Likert scale from 1 (I definitely disagree) to 7 (I definitely agree). Test items in the scale included, e.g.: "I can always find a way to cope with unpredictable situations" or "I look positively into the future". In this study, Cronbach's alpha reliability coefficient was 0.88.

Perceived Stress Scale (PSS-10) originally developed by S. Cohen, T. Kamarck and R. Mermelstein (1983), translated into Polish and adapted by Zygfryd Juczyński and Nina Ogińska-Bulik (2009). It is one of the most widely used scales to assess the level of stress perceived by individuals in different life situations. PSS-10 measures the degree to which an individual has perceived and responded to stressful situations over the previous month. It consists of 10 items rated by the respondents on a 5-point Likert scale, from 0 (never) to 4 (very often). Test items in the scale included, e.g.: "In the last month, how often have you felt you were unable to control important things in your life?" or "In the last month, how often have you felt that things were not going your way?". The scores can range from 0 to 40, and higher scores indicate higher subjective stress. In this study, Cronbach's alpha reliability coefficient for PSS-10 was 0.86.

3.3. Statistical procedure

The statistical analyses were conducted using IBM SPSS Statistics version 29. In the first stage, descriptive statistics were calculated for the variables of subjective stress and resilience among the university students. Subsequently, Pearson's correlation analysis was performed to examine the relationship between the variables. Independent samples t-tests and chi-square (χ^2) tests were then used to assess group differences based on gender and field of study. In the final stage, moderation analysis was carried out using the PROCESS macro for SPSS (Model 1; version 5.0; Hayes 2013), with a bootstrapping procedure (5,000 resamples) and 95% confidence

intervals, to examine whether gender moderates the association between resilience and subjective stress.

4. Results

The first stage of the analysis involved determining the descriptive statistics of the variables under study among the participating students.

The data for subjective stress showed scores extending from 5.00 to 34.00, with a mean of 20.61 and a standard deviation of 5.61. This mean value is indicative of a moderate stress level across the cohort. The breadth of the score range, however, implies a sample composed of individuals at both a very low and a very high end of the stress spectrum. Regarding resilience, the results pointed to a relatively high mean score *(M* = 71.47, *SD* = 13.56). Nevertheless, the substantial range of scores, from 28.00 to 98.00, underscores considerable individual variation in resilience among the participants. The Pearson correlation analysis revealed a statistically significant but weak negative association between psychological resilience and subjective stress levels (r = -0.22, $p < 0.001$). This inverse relationship indicates that individuals with higher resilience scores demonstrated lower levels of subjective stress. These findings suggest that enhanced psychological resilience, defined as the capacity to adapt successfully in the face of adversity, may serve as a protective factor against stress perception.

A statistically significant gender difference was observed in subjective stress levels ($p < 0.001$). Female participants exhibited significantly higher levels of subjective stress compared to males *(M*_female = 21.47, SD = 5.23; *M*_male = 19.53, SD = 5.89; $p < 0.001$). This finding indicates that women within the study sample experienced greater daily stress than their male counterparts. Consequently, these results suggest a potential need for targeted stress-reduction interventions tailored for female populations. In contrast, no statistically significant gender difference was identified in resilience levels ($p = 0.86$). The mean resilience scores for both genders were highly comparable (M_female = 71.57, SD = 13.33; M_male = 71.33, SD = 13.85), indicating similar resilience capacity across groups.

The subsequent analysis aimed to investigate whether there is a relationship between subjective stress and the selected academic discipline. In the studied student cohort, 184

participants were enrolled in humanities and social sciences programs, while 201 were pursuing degrees in science, technology, engineering, and mathematics (STEM) fields. No significant differences were observed between the field of study and experienced stress levels, indicating that students of humanities and social sciences exhibit comparable stress exposure ($M = 20.63$, $SD = 5.31$) to those enrolled in exact science, technology, engineering, and mathematics (STEM) fields ($M = 20.55$, $SD = 5.90$; $t(383) = 0.137$, $p < 0.89$).

Table 1

Distribution of Stress Levels in University Students (N = 389)

Stress Level	Total Sample ($N = 389$) N (%)	Females ($N = 216$) N (%)	Males ($N = 173$) N (%)
Mild	44 (11.3)	16 (7.4)	28 (16.2)
Moderate	117 (30.0)	62 (28.7)	55 (31.8)
Severe	228 (58.6)	138 (63.9)	90 (52.0)

The presented data in Table 1 illustrate the distribution of stress levels across a comprehensive sample of 389 university students, stratified by gender. The stress categorisation reveals a nuanced pattern of psychological distress within the academic population. The aggregate sample demonstrates a predominant prevalence of severe stress, accounting for 58.6% ($N = 228$) of participants. Moderate stress was observed in 30.0% ($N = 117$) of the sample, while mild stress represented the smallest category at 11.3% ($N = 44$). Sex -specific analysis unveils notable variations in stress manifestation. Female participants exhibited a markedly higher proportion of severe stress (63.9%, $N = 138$) compared to their male counterparts (52.0%, $N = 90$). Conversely, males demonstrated a higher representation in the mild stress category (16.2%, $N = 28$) relative to females (7.4%, $N = 16$). The data suggest a significant psychological burden among university students, with nearly 90% experiencing moderate to severe stress levels. The sex-based disparities in stress perception and manifestation warrant further investigation into potential underlying psychosocial mechanisms and institutional support strategies. A chi-square test was performed to investigate the

relationship between students' sex and levels of subjective stress. The results revealed a statistically significant association ($\chi^2(2) = 9{,}15$, $p < 0{,}01$; *Cramer`s V* = 0,11). Given the significance level set at $\alpha = 0.05$, the null hypothesis of variable independence was rejected. Standardised residual analysis indicated that women reported higher stress levels compared to men. Men were twice as likely as women to be classified in the low-stress category (16.2% vs. 7.4 %), whereas women were over-represented in the high-stress group (63.9 % vs. 52%). These findings contribute to the growing body of literature on academic stress, highlighting the critical need for targeted mental health interventions in higher education settings.

Subsequently, a moderation analysis was conducted to examine whether student`s sex serves as a moderator in the relationship between the level of resilience and subjective stress perception. Model 1 from the PROCESS macro v5.0 was applied for this purpose, allowing for the assessment of whether the strength and direction of this relationship differ depending on the gender of the participants.

Table 2. Resilience and subjective stress – gender as a moderator

Variable	b	SE	t	p	95% CI
Intercept	20.7142	4.5370	4.5656	<.001	[11.7939 ; 29,6345]
Resilience (RS14)	0.0381	0.0623	0.611	.542	[-0.0845 ; 0.1607]
Gender (1=Female, 2=Male)	4.3560	2.9350	1.484	.139	[-1.4147 ; 10.1267]
Interaction RS14*gender	-0.0884	0.0404	-2.189	.029*	[-0.1677 ; -0.0090]

* p < .05

The moderation analysis revealed that student`s sex significantly moderates the relationship between resilience and subjective stress perception (B = – 0.0884; $p = 0.029$). This indicates that the effect of resilience on subjective stress differs between men and women. Detailed results show that, among men, an increase in resilience was associated with a statistically significant decrease in stress levels (B = – 0.1386; $p < 0.001$). In contrast, among women, a weaker effect was observed — while higher resilience was also related to lower stress, this relationship did not reach statistical significance (B = – 0.0503; $p = 0.068$).

5. Discussion

The aim of the present study was to examine the relationship between resilience and subjective stress among university students, as well as to investigate the moderating role of sex in this relationship.

The data suggest a significant psychological burden among university students, with nearly 90% experiencing moderate to severe stress levels. The prevalence of severe stress among students was 58.6%. This finding is consistent with previous research on Polish student populations, which also documented exceptionally high stress scores. Recent Polish studies have reported high levels of students' stress, with findings including 58% of 400 students (Kulawska 2020), 41% of 2,172 students (Juchnowicz et al. 2021), 49% of 150 students (Kobelski et al. 2024), and 80% of 798 students (Kupcewicz et al. 2024). This suggests that Polish students experience significant stress and may struggle with effective coping mechanisms.

In our study, severe stress affected nearly two-thirds of female students compared to half of males. Females reported statistically significantly higher levels of stress compared to males. This result is in line with previous research on student populations in Poland and internationally (Graves et al. 2021; Juchnowicz et al. 2021; Porru et al. 2021; Rogowska et al. 2022; Talarowska et al. 2022;). Within the present sample, a statistically significant association was observed between sex and self-reported stress levels. Females were more likely to report high stress, whereas males were more likely to report low stress. This disparity could be attributable to a combination of genuine differences in lived experience and sociocultural norms governing the expression of psychological distress.

In contrast to the observed gender differences in stress levels, no statistically significant gender differences were found in resilience in our study among university students. This means that, regardless of gender, the surveyed students demonstrated comparable levels of psychological resilience, i.e., the ability to effectively cope with adversity and adapt to changing conditions. This finding is consistent with some previous research, which also did not show significant gender differences in resilience within student populations (e.g., Arı, and Çarkıt, 2020; Boczkowska 2023). A meta-analysis conducted by Arı and Çarkıt (2020) on a large group

of participants also indicated a negligible and statistically non-significant effect of gender on resilience levels, suggesting comparable resilience levels in males and females. Furthermore, our study revealed a significant negative correlation between resilience and subjective stress among students. This finding suggests that individuals who report higher levels of resilience—defined as the ability to cope effectively with adversity and adapt to changing circumstances—also tend to report lower levels of subjective stress. In other words, the more psychologically resilient a student is, the less subjective stress they tend to experience. This result is consistent with prior findings in the scientific literature. For example, Campbell-Sills et al. (Campbell-Sills, Cohan, and Stein 2006) also reported a negative association between resilience and psychiatric symptoms (often linked to ineffective stress coping) as well as a positive relationship between resilience and adaptive coping styles. This indicates that resilience functions as a protective factor, buffering the negative impact of stressors. Individuals with high resilience may be more inclined to employ effective, problem-focused coping strategies and to reinterpret difficult situations in a more positive light, which, in turn, leads to lower subjective stress (Lazarus, and Folkman 1984). This may be due to their greater capacity to 'bounce back' from adverse experiences, maintain a positive outlook, and retain a sense of control even when faced with academic or personal challenges.

Importantly, sex appears to be a significant moderator in the relationship between resilience and subjective stress—but only among male students. These results are essential for understanding the complex interplay between resilience and stress experiences among university students. The fact that sex serves as a significant moderator suggests that the mechanisms through which resilience affects stress perception may differ between men and women. Among male students, resilience appears to be a stronger buffer against high levels of stress in challenging situations. This may imply that highly resilient men are better equipped to manage stressors effectively—perhaps by employing more problem-focused coping strategies (Lazarus , and Folkman 1984) or by perceiving stressful events differently.

Among female students, although the trend also indicates that greater resilience is associated with lower levels of stress, this effect is not statistically significant. This may imply that, in women, the relationship between resilience and stress is influenced by other factors not captured in the present model. Possible explanations may include gender-based social roles,

differences in emotional expression, or a greater propensity among women to report subjective stress, regardless of their level of resilience. Women may also be more likely to adopt emotion-focused coping strategies (Tamres, Janicki, and Helgeson 2002), which may not be as directly associated with a significant decrease in subjective stress in this context. The study by Tamres and colleagues (Tamres, Janicki, and Helgeson 2002) found that women were more likely than men to engage in coping strategies involving emotional support seeking and rumination. It is therefore worth considering whether sex-specific coping strategies—such as seeking social support, rumination, or avoidance—may influence the strength of the relationship between resilience and subjective stress, particularly among women.

These findings underscore the importance of taking student`s sex into account in studies on stress and resilience, as well as in the development of psychological interventions, which should be tailored to the specific needs and functioning mechanisms of both male and female. Beyond traditional sources of academic stress, it is also necessary to consider the impact of non-academic stressors, the effects of which may persist beyond the university period. Such an approach, combined with an analysis of the deeper, underlying causes of these stressors, may contribute to a more adequate, proactive, and effective response to the global mental health crisis (Emmerton, Camilleri, and Sammut 2024).

Future research should focus on identifying gaps in systemic support, assessing the effectiveness of current preventive and therapeutic programmes, and formulating precise policy recommendations for universities to foster academic environments that promote both mental health and personal development—while taking sex/gender differences into consideration. Of particular interest would be an investigation into which specific coping strategies are most effective for highly resilient men and women, and which factors (e.g., social support, emotional intelligence, attribution style) may modulate the relationship between resilience and stress among female students.

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Kulawska Ewa: conceptualization, methodology, data analysis, writing text – 50%
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