

**Loneliness and Psychological Well-being during COVID-19: Exploring
relationship differences in undergraduate students with gender and self-
esteem.**

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Abstract

This paper presents the first-wave results of a four-part longitudinal study using the Student Wellbeing Monitor examining the mental health of students at Erasmus University Rotterdam during and post-COVID-19. The purpose was to examine the relationship between loneliness and wellbeing in university students during the pandemic and explore moderating effects of self-esteem and gender. Using a cross-sectional, correlational design, the sample consisted of 1045 bachelor students in their first and final year, between the ages of 16 to 68 ($M = 20.55, SD = 3.79$), and representing 85 different nationalities. During the period of December 2020, to February 2021, participants completed a survey that included the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), Gierveld Loneliness Scale - Short Form (GLS-SF) and Self-Esteem Rating Scale – Short Form (SERS-S). Results showed the student samples mean scores were below average on wellbeing and self-esteem scales compared to normative samples from the original articles and had moderate levels of total loneliness. Males presented with higher levels of self-esteem than females. Loneliness and wellbeing showed a significant negative relationship independently of gender. Self-esteem was a significant moderator in the relationship between loneliness and wellbeing. However, post-hoc analysis revealed the intensity of one's self-esteem did not affect the relationship. Implications highlight the importance of valuable social contact and encouraged interventions at the individual and institutional level to improve student mental health. Overall, EUR students experienced forms of psychological distress during the COVID-19 pandemic relayed by feelings of loneliness and worsened psychological wellbeing, and ones perceived self-esteem affected this relationship.

Key words: COVID-19, university, undergraduate students, mental health, loneliness, wellbeing, self-esteem, gender

The COVID-19 (or Sars-Cov-2) outbreak, first discovered in December 2019 in WuHan, China, has had a tremendous effect on the world. Countries have taken numerous measures to ensure the safety of their citizens and slow down the spread of the virus, including the enforcement of lockdowns and social distancing (Anderson et al., 2020). Due to this pandemic, there is a global concern about a surge in mental health problems, with limited available services that can meet them (WHO, 2020). The overall pandemic stress has had a detrimental effect on the mental health of all experiencing it, subjected to greater amounts of loneliness, most heavily on those between the ages of 16-30 (Macdonald & Hülür, 2021; Van de Velde et al., 2021). Within this age group, it notably effects emerging adults such as undergraduate university students.

Before the pandemic, students in higher education were already considered a high-risk group experiencing a heightened state of stress and anxiety from academic pressure than their non-student counterparts (Bewick et al., 2010; Mikolajczyk et al., 2008). Concerns with money, debt, and moving away from stable support networks adds another layer of mounting pressure (Burns et al., 2020). The accumulation of these demanding elements can become overwhelming. Researchers have already indicated worldwide levels of student psychological distress as worrying (Bewick et al., 2010). However, students have been largely underreported in research during previous non-COVID related pandemics or the research focus has been centralized on medical and nursing staff during the beginning of COVID-19 (Brooks et al., 2020; Van de Velde et al., 2021, Worfel et al., 2015). Whilst already engrossed in strenuous personal and academic strain, coupled with strict COVID-19 measures (i.e., social-distancing, curfews, quarantines, closing of non-essential stores, online teaching), the consequences of the pandemic can be immense on the already vulnerable psychological wellbeing of university students.

Our current understanding of psychological wellbeing is as a multidimensional umbrella state that “allows individuals to realize their abilities, cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their community” (WHO, 2004). Positive psychology has comprehensively interpreted wellbeing within the hedonic (pleasure-focused, pain-avoidance) and eudaimonic (meaning, self-realization, purpose) perspectives of happiness, focusing on three facets: overall life satisfaction, positive affect, and negative affect (Bradburn, 1969; Diener et al., 1999; Ryan & Deci, 2001). Fostering positive wellbeing is an important feature within university student life and has been found to be a predictor of student outcomes and academic attainment (El Ansari & Stock, 2010). However, the pandemic has witnessed worsened student wellbeing conveyed through higher rates of loneliness, anxiety, depression, and stress (Elmer et al., 2020; Groarke et al., 2020; Rogowska et al., 2020). One Swiss study observed these greater symptoms of loneliness, stress, and anxiety after only two weeks of physical distancing (Elmer et al., 2020). From this, one can infer the detrimental impact the pandemic has had on the wellbeing of university students.

Loneliness has a close relationship with wellbeing. As mentioned previously, loneliness has been consistently linked with lower reported wellbeing (Elmer et al., 2020; Groarke et al., 2020; Hombrados-Mendieta et al., 2012; Rogowska et al., 2020), even so during the pandemic. Pandemic research has also consistently reported loneliness among emerging adults; however, rates are surpassing those from pre-pandemic levels (Bu et al., 2020; Ernst et al., 2022; Groarke et al., 2020; Padmanabhanunni & Pretorius, 2021; Werner et al., 2021). Loneliness is broadly defined as a universal unpleasant experience that happens when an individual’s network of social relationships is deficient in some way, either quantitatively or qualitatively (Özdemir & Tuncay, 2008; Perlman & Peplau, 1981). Weiss (1973) distinguished between emotional loneliness - the absence of an intimate relationship or close emotional attachment, and social loneliness - the absence of a larger contact group or engaging social network. Pre-pandemic

research has showed that late adolescents and young adults are more at risk for higher levels of general loneliness than any other age group (Seepersad, 2005). Pre-pandemic cross-cultural studies have seen in Ethiopia, 49.5% of university students rated themselves as experiencing loneliness (Dagnew & Dagne, 2019), 60.2% in Turkey (Özdemir & Tuncay, 2008), and 23.6% in Norway (Hysing et al., 2020). Transitioning to university is a period for students to create and foster new bonds when moving away from their families, re-evaluate past relationships, and learn to cope with separation and attachment processes, aiding in psychological growth towards a sense of individuality (Özdemir & Tuncay, 2008). Yet, a lack of support for students in this transition period can contribute to greater feelings of social and emotional loneliness (Peplau & Perlman, 1982). Hence, the relevance of loneliness is significant in understanding overall student well-being.

Pre-pandemic research has supported an existing relation between loneliness and wellbeing. Loneliness has proven to be a negative predictor of psychological well-being; but psychological well-being also helps to negate feelings of loneliness by enhancing positive relationships with others (Bhagchandani, 2017; Ishaq et al., 2018; Ye & Lin, 2015), suggesting a bidirectional relationship between the two constructs. University students thrive on positive relations with others as they are characterized by larger social networks and more social activity during this period (Bu et al., 2020). It follows that the prolonged social isolation, because of the pandemic, had deprived students of opportunities to build these social networks and mature identity constructs. In the absence of these developmental processes, student loneliness has become more prevalent during COVID-19, almost seemingly unavoidable (Bu et al., 2020; Burns et al., 2020; Groarke et al., 2020). During the pandemic, creating and sustaining meaningful relationships has been predominantly done via digital platforms such as social media (Marzouki et al., 2021). However, online exchanges place certain limits on emerging adults from meaningful socialization thereby enhancing existing feelings of emotional

loneliness as one cross-cultural study observed (Bonsaksen et al., 2021). The restriction then possibly negatively affecting their wellbeing.

Research has continued to support the significance of psychological wellbeing and loneliness in university students; however, several factors play a critical role in understanding the two concepts and how they are related to each other. Most notably, factors such as level of study, self-esteem, and gender. Firstly, the subjective experience of loneliness and wellbeing can differ depending on the duration of being in university, especially within the lengthier three- to four-year undergraduate degree in comparison to a one- or two-year graduate degree. Undergraduate students have reported significantly higher rates of feelings and behaviors related to poor mental health and negative affect on academic performance than graduate and postgraduate students (Wyatt & Oswalt, 2013), therefore requiring more attention to explore this perspective. The first year of university is a large developmental transition period, as it may be the first many have lived away from their parents and hometown peers. Previous pre-pandemic literature has seen this period creating feelings of depression, anxiety, stress, and poor sleeping habits given the abrupt change in environment and shift in personal responsibilities, leading to a decrease in life satisfaction as an indicator for wellbeing (Alaviani et al., 2017; Dvoráková et al., 2017; Shek & Liu, 2014). Without appropriate social support, this can lead to social and emotional loneliness (Cutrona, 1982). However, some studies have argued that final year bachelor students have the lowest rates of psychological wellbeing and highest rates of depression given the transition from college to career and the stressors of paying student loans, lack of financial literacy, change of social systems and finding/interviewing for a job (Bewick et al., 2010; Golden et al., 2020). Research has predominantly noted first and final year students with the most psychological distress, but some scholars argue second-year students experience the highest rates of depression and loneliness (Alaviani et al., 2017; Liu et al., 2019). Overall, there have been contradictory findings on

which level of study have the lowest experiences of wellbeing and greatest feelings of loneliness prior to COVID-19. Current pandemic research has also seen loneliness and wellbeing differences within the various university student degree levels. However, studies have generally compared undergraduate to post-graduate levels of education (i.e., bachelor versus master/PhD students), evaluated each education level individually, or generalized the sample as “all university students” (Bobade & Naik, 2021; Dial et al., 2021; Dodd et al., 2021; Holzer et al., 2021; Plakhotnik et al., 2021; Rogowska et al., 2020). Hence, more inquiry around wellbeing and loneliness in levels within the undergraduate degree is needed due to the mixed findings and the more critical period of transition for students. This is addressed in this study.

Secondly, self-esteem is key to understanding the experience of loneliness and wellbeing during university. Self-esteem is an individual’s sense of self-value or worth (Blascovich & Tomaka, 1991). It can be viewed not as a trait- or state-like concept, but rather a self-concept fluctuating with social feedback and self-evaluations (Lecomte et al., 2006). Self-esteem has been linked to several aspects related to university education, such as academic achievement, study commitment, and procrastination (Kharsa & Latada, 2016; Saleem & Rafique, 2012). Beyond this, it has also been linked to key domains of emerging adulthood, like body appearance, life satisfaction, sex interest, and social media use (Goldenberg et al., 2000; Hawi & Samaha, 2016). These concepts related to self-esteem can affect symptoms of anxiety, depression, and stress as expressions of wellbeing and student loneliness (Blascovich & Tomaka, 1991; Pasha & Munaf, 2013; Rossi et al., 2020). Ishaq and colleagues (2018) found that those with high self-esteem experiencing increased levels of loneliness showed a decrease in wellbeing. A similar pattern was found for those with low self-esteem, but with even lower ratings of wellbeing. Additionally, further research has shown that when measuring internet usage as a factor of loneliness, students who had a low self-esteem used social networking websites (i.e., Facebook) more than those with high self-esteem as it helped increase their social

capital by having more “friends” (Ellison et al., 2011). But in doing so, they lacked positive adjustment and interpersonal communication within the new college environment, thereby negatively affecting their individual wellbeing (Bhagdachani, 2017; Kalpidou et al., 2011). These findings forecast a trend that self-esteem can be a significant moderator strengthening the negative relationship between loneliness and wellbeing. In contrast, current pandemic research has centered self-esteem mainly as a mediator, buffering or protecting against psychological threats to wellbeing (Chen et al., 2021; Çiçek, 2021; Rossi et al., 2020). Researchers have yet to determine whether self-esteem plays a moderating role in the context of COVID-19, instead of mediating one, in the relationship between loneliness and psychological wellbeing.

A final critical factor affecting well-being and loneliness is gender. Pre-pandemic research has provided robust evidence showcasing differences between males and females in these constructs. Gender has been found to be a significant moderator of the relationship between wellbeing and symptoms of depression and anxiety during adolescence, where stronger associations between anxiety and depression symptoms and lower functioning were found in males compared to females (Derdikman-Eiron et al., 2011). Chraif and Dumitru (2014) determined that females tend to score higher in some facets of wellbeing (e.g., personal growth, positive relationships, self-acceptance), whereas males score higher in others (e.g., control, autonomy). Among university students, males were found to be significantly higher in loneliness, predominantly in their final year of their bachelor program (Hysing et al., 2020; Wiseman et al., 1995). These existing gender differences have also been paralleled during the pandemic. For example, recent studies have shown females to be at greater risk for mental health problems during COVID-19 due to larger amounts of stress and anxiety compared to males (Elmer et al., 2020; Groarke et al., 2020; McQuiad et al., 2021; Wang et al., 2020; Wickens et al., 2021).

Additionally, scholars continuously report gender differences influencing self-esteem. Beginning from adolescence, females tend to show lower levels of self-esteem than males (Byrne, 2000; Golan et al., 2015). This gender trend of male superiority in self-esteem levels persists through early and middle adulthood and is observed cross-culturally, conveying clear differences throughout higher education as well (Bleidorn et al., 2016; Lawrence et al., 2006). Kling and colleagues' (1999) large meta-analytic review also found a small variation in self-esteem where males were favored in late adolescence, but this difference decreased in young adulthood to near nominal. Conclusive findings determining the concrete effect of gender on well-being, loneliness, and self-esteem continue to show males with higher ratings of self-esteem, however, there is no accepted integrative theoretical account that further explain the origins of these differences (Bleidorn et al., 2016; Chraif & Dumitru, 2014; Groarke et al., 2020; Ilhan, 2012; Kling et al., 1999; Pinquart & Sorensen, 2001; Roothman et al., 2003). Nonetheless, pre-pandemic and pandemic literature have supported the theory of robust gender differences in wellbeing, loneliness, and self-esteem, thereby giving it a significant moderating role when understanding how these concepts relate to each other.

The goal of this study is to explore the relationship between loneliness and wellbeing in university students, examining the moderating effect of self-esteem, and accounting for the effect of gender. This paper will report the results from the Erasmus University Rotterdam (EUR) Student Wellbeing Monitor study based in the Netherlands (NL). The Student Wellbeing Monitor is a cohort study along four years to determine longitudinal changes in student well-being and mental health. The focus of this study will be on the first wave of cross-sectional data collected during a two-month period during the first COVID-19 lockdown in NL, between December 2020 and February 2021. The present paper will investigate the following topics in a large sample of university students: (1) the evaluation of any gender- and bachelor year-related differences in loneliness, wellbeing, and self-esteem; (2) the investigation

of the relationship between loneliness and wellbeing across bachelor years, and if differences occur when controlling for gender; (3) the moderating effect of self-esteem on the loneliness and wellbeing relationship, whilst controlling for gender. Based on the previous literature, the following hypotheses were formulated:

H1a: Females within B1 will show lower levels of self-esteem and well-being, and higher levels of loneliness compared to males. Within B3, females will show lower levels of self-esteem, wellbeing, and loneliness compared to males.

H1b: Between bachelor years, first year students will show higher levels of loneliness and lower levels of psychological wellbeing than final year bachelor students, independently of gender.

H2: There will be a negative relationship between loneliness and psychological wellbeing in all bachelor students. The relationship will remain the same when controlling for gender.

H3: While controlling for gender, there will be a moderating effect of self-esteem on the relationship between loneliness and wellbeing. More precisely, low self-esteem will strengthen the existing negative relationship, whilst high self-esteem will suppress it in both first and final year students.

The results from this study can have large implications. They can support efforts in widening the literature scope of how the COVID-19 pandemic has affected university students. By investigating the levels of wellbeing, its relationship with loneliness, and how self-esteem and gender play a role, one can better understand the current university student experience. The findings of this paper could provide clearer direction for policy makers, administrators, and researchers in the understanding of the psychological impact of pandemic circumstances, with the goal of implementing efficacious interventions to give more support to vulnerable populations like higher education students.

Methods

Participants

The participants of the Student Wellbeing Monitor are students at the EUR, a research higher education institute based in Rotterdam, NL. The EUR Ethics Review Committee granted approval of the study prior to recruiting the participants. All EUR students were invited to participate to this study via emails including the link to the survey. In total, 3822 participants responded to the survey, however, by using convenience sampling, this study focused solely on the responses from undergraduate students in their first (B1) and final (B3) bachelor year collectively across nine different faculties and institutes. Students in their second bachelor year were excluded due to the focus on the contrast in students' mental health between the start of the undergraduate program and the end. Those studying a pre-master, master, or dual-study program were excluded from the sample to maintain consistency and avoid confounding effects from other programs and levels. To move beyond binary gender identifications, researchers included the "other" category alongside male and female labels, however, excluded "prefer not to say" as it does not denote a certain gender expression. Given these exclusion and inclusion criteria, the present study accounts for 40.2% ($N = 1045$) of the students from the original sample. Table 1 describes participants demographics of the study sample.

Table 1

Demographic characteristics of the total sample (N=1045).

Demographic Variable	n	%
Gender		
Male	313	30.2
Female	716	69.0
Other	8	0.8
Bachelor Level of Study		
One	709	67.8
Three	336	32.2
Faculty		
Erasmus School of Economics (ESE)	191	18.3
Erasmus School of Law (ESL)	124	11.9
Erasmus School of History, Culture, and Communication (ESHCC)	119	11.4
Erasmus School of Social and Behavioral Sciences (ESSB)	223	21.3
Erasmus School of Philosophy (ESP)	12	1.1

Table 1 (continued)

Demographic Variable	n	%
Faculty (Continued)		
Rotterdam School of Management (RSM)	222	21.2
Erasmus School of Health Policy (ESHP)	19	1.8
Erasmus MC (Medical Center; EMC)	115	11.0
Erasmus University College (EUC)	45	4.3
Moved to NL from Another Country		
Moved	212	22.7
Did Not Move	721	77.3
Birth Country		
Netherlands	704	67.4
Other	341	32.6

Materials

The EUR Student Well-being Monitor includes a wide range of measures that tap into various aspects of student wellbeing and mental health. However, for the purposes of this study only the relevant measures are used and described. The survey was offered both in Dutch and English. Individual questionnaires that were not initially available in Dutch were back translated by the Student Wellbeing Program Team. Additionally, existing translated questionnaires with altered options or texts were slightly adjusted to be identical with the original English version offered in the monitor.

Wellbeing

To explore the wellbeing of the students, the *Warwick-Edinburgh Mental Wellbeing Scale* (WEMWBS; Tennant et al., 2007) was used. The WEMWBS scale builds on previous measures encompassing a wide outlook on wellbeing. It assesses positive affect (feelings of optimism, cheerfulness, relaxation), interpersonal relationships, and positive functioning (energy, clear thinking, self-acceptance, personal development, competence, and autonomy). It includes 14-items rated on a 5-point Likert scale (1-none of the time, 5-all of the time). A wellbeing score is computed by adding the ratings together, with a total score ranging from 14 to 70. The higher the score the greater the wellbeing. Cronbach's alpha measured an internal

consistency of $\alpha = .89$, and the test-retest reliability was $r = .83$ (Tennant et al., 2007). Several cross-cultural studies also evaluated the WEMWBS to show good construct, criterion, and discriminant validity in various populations (Haver et al., 2015; Lloyd & Devine, 2012; Stewart-Brown et al., 2011)

Loneliness

The *Gierveld Loneliness Scale Short Form* (GLS-SF; Gierveld & Tilburg, 2006) was utilized to measure student loneliness. This measure is a short form of the De Jong Gierveld Scale to test large-scale populations. The items test for overall loneliness by measuring emotional and social loneliness. The 6-item scale is rated on a 5-point Likert scale, from 1 (“Yes!”) to 5 (“No!”). Items one, five and six are negatively formulated and assess emotional loneliness (i.e., “I experience a general sense of emptiness”); whereas items two, three, and four focus on social loneliness and are positively formulated (i.e., “There are enough people I feel close to”). The GLS-SF is scored dichotomously, with ratings given a single point. In the emotional loneliness scale, the responses “More or less”, “Yes”, “Yes!” are scored as one. In the social loneliness scale, responses “More or less”, “No” and “No!” are scored as one. “More or less” as a neutral response is considered an indication of loneliness therefore is also scored as one in the corresponding subscale. The other responses within the corresponding subscale are scored as zero. Individual subscale scores are computed by totaling the responses yielding a range between zero and three. In both emotional and social loneliness, a score zero is indicative of not feeling lonely, whilst a score of one to three is indicative of feeling lonely. A total loneliness score is computed by adding both emotional and social loneliness scores together to yield score ranges between zero to six. When interpreting total scores, the range is indicative from zero as “feeling the least lonely” to six as “extremely lonely”. The Cronbach’s alpha for the total score has shown in multiple studies a satisfactory internal consistency with a range of $\alpha = .70 - .76$, emotional loneliness with $\alpha = .68 - .74$, and social loneliness with

$\alpha = .69 - .73$ (Bisscheroux et al., 2001; Dykstra et al., 2004; Knipscheer et al., 1995). The 6-item scale also showed concurrent validity with the original 11-item study (Gierveld & Tilburg, 2006), and sufficient construct validity as well (Grygiel et al., 2019).

Self-esteem

Self-esteem was measured using the *Self-Esteem Rating Scale – Short Form* (SERS-S; Lecomte et al, 2006). The SERS-S investigates the negative and positive levels of self-esteem in adults over several aspects - overall self-worth, social competence, problem-solving ability, intellectual ability, self-competence, and worth compared to others. This measure comprises 20 items. Respondents rate each item statement from 1-never to 7-always. However, 10 (item 4, 6, 7, 8, 9, 10, 18, 19, 26, 36) are scored positively on a 7-point Likert scale as +1 to +7. The other 10 (item 2, 5, 16, 17, 20, 27, 30, 33, 34, 40) are scored negatively from -1 to -7. Scores for positive self-esteem are summed ranging from 10 to 70, where the higher the score the greater the positive self-esteem. Negative self-esteem scores range between -70 to -10, where the lower the score the greater one feels negative self-esteem. Lecomte and colleagues (2006) provided evidence of a unidimensional structure with items loading onto one-factor. Total scores are calculated by subtracting the negative subscale score from the positive one. Total scores range from -70 to 70. The higher the score the more positive self-esteem one feels, the lower the score the more negative self-esteem one feels. The positive scale has shown an internal consistency of $\alpha = .91$ and the negative scale of $\alpha = .87$; the test-retest reliability of the scales showed excellent stability, $r = .90$ for the positive scale and $r = .91$ for the negative (Lecomte et al., 2006). Studies further demonstrated evidence of good concurrent validity for both subscales (Nugent, 1994; Nugent & Thomas, 1993; Lecomte et al., 2006).

Procedure

Due to the COVID-19 regulations, all participants took part in the online survey from their homes. Only a laptop or mobile phone was required to access the survey. Participants were

recruited and data was collected within a two-month period from December 2020 to February 2021. All EUR students were sent an invitation email and accessed the survey by using a direct link delivered via Qualtrics. They were presented with general information on the Student Wellbeing Monitor, its purpose, a personal userID generator, participation conditions, and informed consent. Students had to agree to and provide informed consent to proceed with the survey. Given the full length of the survey, some questionnaires were offered as optional to limit the number of questions students had to respond to.

The purpose of the personal userID generator was to match the data for the participants in the future assessment waves. It consisted of 1) the first two letters of the student's mother's name, 2) the first two letters of the city or town the student was born in, and finally, 3) the number of the day the student was born.

Once the participants had completed the survey, a debriefing page described what actions would be taken with the results, where to find support if needed, and the opportunity to be compensated through a lottery incentive valuing at 100, 50, or 15 euros. The participation in the reward was voluntary, and if elected, the student would be directed to an additional form to give their information and indicate whether they were willing to be contacted for future research. All email addresses were deleted once the lottery winners were identified, unless they agreed to being contacted in the future. EUR students were sent three reminder emails throughout the two-month period.

Data Processing

Data processing and statistical analyses were conducted using SPSS v.26. Cases with data entry errors were filtered out at the start of the analysis (i.e., impossible age values or incomplete answers). Bachelor year as a categorical variable was measured on a 6-point scale, however only responses to two points, 1 (B1) and 3 (B3), were included. Some participants were likely to be in their fourth bachelor year (i.e., Erasmus College students or

extending students) but were included in the B3 option given the survey did not include another option for this. Gender was also measured as a categorial variable at three levels: male, female and other. Descriptive statistics and frequencies were used to gather demographic characteristics of the participants.

Outliers were screened within each variable through examining scatterplots, standardized residuals, Mahalanobis distances, and Cooks values. In the measured surveys, several outliers were found. Within both the WEMWBS and GLS-SF scales, only one outlier was of concern. After closer inspection, only one case (St. Residual = -1.56, Mahalanobis Distance = 7.51, Cooks Value = 0.01) in the loneliness scale exhibited a large effect over the sample which was ultimately filtered out. The wellbeing outlier was not of concern. Within the self-esteem measure, seven outlier cases had an effect over the sample with differing values (St. Residual = -3.86 to -3.16, Mahalanobis Distance = 2.27 to 0.37, Cooks Value = 0.02 to 0.01) and were ultimately filtered out from the statistical analyses. Statistical significance was set at a level of $p < .05$. To analyze the intercorrelations between all primary variables, the Spearman rank-order correlation analysis (two-tailed) was used.

Statistical Analyses

Hypothesis 1a and 1b examined the influence of gender and bachelor year on loneliness, wellbeing, and self-esteem, including the interaction between gender and bachelor year. A one-way MANOVA analysis was used to examine their impact on the three dependent variables simultaneously, by including both gender (3-levels) and bachelor year (2-levels) as between-subject's factors to investigate main and interaction effects. A MANOVA was chosen over several ANOVAs due to its larger statistical power to detect smaller effects and avoid Type I errors, given the dependent variables being correlated. Effect sizes were measured using partial eta-squared (η_p^2). Bonferroni-corrected post-hoc comparisons were conducted to test specific significant group differences between the three levels of gender. Other relevant demographic

variables were also included in the MANOVA as covariates (i.e., moving to the Netherlands, birth country) to check interacting effects with gender and bachelor year. These covariates were chosen given the differences of an international population at EUR that likely interplay with gender and bachelor year. Observing the confounding effects of moving to NL and birth country will aid in improving statistical power and reduce error when explaining the variance predicted by gender and bachelor year.

Prior to conducting the analysis, certain assumptions must be tested. The assumption of multivariate normality was not tested given the Central Limit Theorem and was confirmed via histogram inspection. Independence of observations would also be assumed given participants would conduct the survey individually in their own homes. Any significant multivariate or univariate outliers were already identified prior to the analysis. Homogeneity of variance was measured through Levene's Test in which results were insignificant, providing equal variances across groups. Multicollinearity was investigated by examining the correlation matrix tolerance and variance inflation factor. Results showed no issues with multicollinearity, and this assumption was fulfilled. Given the dependent variables are a total sum measured on an ordinal scale, it is suggested the results of this test be treated with caution.

Hypothesis 2 analyzed the existing negative relationship between loneliness and well-being in B1 and B3 students, while controlling for gender. Two Spearman rank-order correlation analysis (one-tailed) were conducted with the effect size measured as Spearman's rho (ρ), one for each Bachelor year. The assumptions for this analysis were met; the two variables were both measured on an ordinal level since responses were ranked on a Likert-scale and the scores represented a paired observation as each participant completed all measures at one timepoint. The monotonic relationship was identified by evaluating the shape and distribution of scores via a scatterplot.

Two partial Spearman correlation analyses were performed to determine whether this relationship alters when controlling for gender. Effect sizes were measured by using the partial correlation coefficient ($r_{xy.z}$). All correlational effect sizes were interpreted using Hinkle and colleagues' (1979) correlation coefficients description.

To test hypothesis 3 on the moderating effect of self-esteem on the relationship between loneliness and well-being, two additional Spearman partial correlation analyses were done. A moderation analysis using PROCESS was considered, however, the bidirectional relationship between the loneliness and wellbeing precludes this as they can predict each other. Both self-esteem and gender were then included as variables to controlled for.

Finally, as a post-hoc analysis, subgroup differences in total self-esteem were examined. Participants were separated in low, medium, and high self-esteem based on the 33rd and 66th percentiles of the total SERS-S score distribution. Another series of partial-correlation analyses was then conducted with gender as a control variable to compare the correlations between loneliness and wellbeing across the three levels of self-esteem.

Results

Descriptive Statistics

Table 2 presents the descriptive statistics and correlations between all measured variables in the study. The total sample of participants reported a below average score in the wellbeing scale (WEMWBS; $M = 44.03, SD = 9.82$) in comparison to the mean of both the student and general population norm distribution (Tennant et al., 2007). A below average score was also found in positive self-esteem (SERS-S Positive: $M = 48.47, SD = 10.37$) and negative self-esteem (SERS-S Negative: $M = -24.14, SD = 8.89$) when compared to the mean of student normative sample from the original study (Lecomte et al, 2006). For total loneliness, on average students were experiencing moderate levels of loneliness (Total GLS-SF: $M = 2.82, SD = 1.88$), as well as with emotional loneliness (Emotional GLS-SF: $M =$

1.74, $SD = 0.97$). The average score on social loneliness subscale can be interpreted as indicative of low to moderate loneliness (Social GLS-SF: $M = 1.08$, $SD = 1.23$; Gierveld & Tilburg, 2006).

When examining the correlations, positive and negative self-esteem showed a moderate correlation ($\rho(1038) = 0.57, p < .01$) with each other. As a result, subsequent analysis would include them as a unidimensional total SERS-S score in accordance with the original Lecomte and colleagues (2006) study. Overall, wellbeing showed a moderate negative correlation with total loneliness ($\rho(1034) = -0.57, p < .01$), and a moderate positive correlation with total self-esteem ($\rho(1038) = 0.57, p < .01$). Total loneliness showed a moderate negative correlation with total self-esteem as well ($\rho(1038) = -0.55, p < .01$).

Table 2

Spearman correlations and descriptive statistics of the total sample for all measured

variables. Relevant correlations are highlighted in bold.

	n	M	SD	1	2	3	4	5	6	7
1. GLS-SF	1034	2.82	1.89	1.00						
2. GLS-SF (Emotional)	1034	1.74	0.97	0.83**						
3. GLS-SF (Social)	1034	1.08	1.23	0.87**	0.46**					
4. WEMWBS	1041	44.27	9.64	-0.57**	-0.54**	-0.44**				
5. SERS-S	1038	24.74	16.59	-0.55**	-0.51**	-0.45**	0.57**			
6. SERS-S (Positive)	1038	48.70	10.00	-0.54**	-0.45**	-0.48**	0.52**	0.90**		
7. SERS-S (Negative)	1038	-23.96	8.63	-0.43**	-0.45**	-0.31**	0.49**	0.87**	0.57**	

* $p < .05$ (2-tailed)

** $p < .01$ (2-tailed)

Gender Differences

A one-way MANOVA with gender¹ and bachelor year as the between-subjects factors, and emotional and social loneliness, wellbeing, and total self-esteem as the dependent variables was conducted to examine H1a and H1b. Additionally, the demographic variables of moving to NL and birth country were also included as covariates to evaluate their impact on the dependent variables, any interaction effects with gender and bachelor year, and account for possible variance that gender and bachelor year might explain when interacting with these variables to reduce error. No overlapping main effects for these specific variables were observed.

The results showed no main effect of gender on emotional loneliness [$F(2, 898) = 0.57, p = .56, \eta_p^2 = .001$] and social loneliness [$F(2, 898) = 0.23, p = .79, \eta_p^2 = .002$]. There were additionally insignificant interaction effects found in emotional loneliness for gender x bachelor year [$F(2, 898) = 1.69, p = .19, \eta_p^2 = .004$], gender x moving to NL [$F(2, 898) = 0.42, p = .66, \eta_p^2 = .001$], and gender x birth country [$F(2, 898) = 0.87, p = .42, \eta_p^2 = .002$]; and social loneliness for gender x bachelor year [$F(2, 898) = 2.06, p = .13, \eta_p^2 = .005$], gender x moving to NL [$F(1, 898) = 1.97, p = .14, \eta_p^2 = .004$], and gender x birth country [$F(2, 898) = 1.12, p = .33, \eta_p^2 = .002$].

The results for wellbeing showed no effect of gender on the WEBWEMBS scale [$F(2, 898) = 0.56, p = .57, \eta_p^2 = .001$]. There was also no interaction between gender x bachelor year [$F(2, 898) = 0.73, p = .39, \eta_p^2 = .001$], and gender x birth country [$F(2, 898) = 1.80, p = .17, \eta_p^2 = .004$]. The results did observe a statistically significant interaction between gender x moving to NL [$F(2, 898) = 3.77, p = .02, \eta_p^2 = .008$]. More precisely (see Figure 1), females who did move ($M = 42.61, SD = 10.27$) have a much

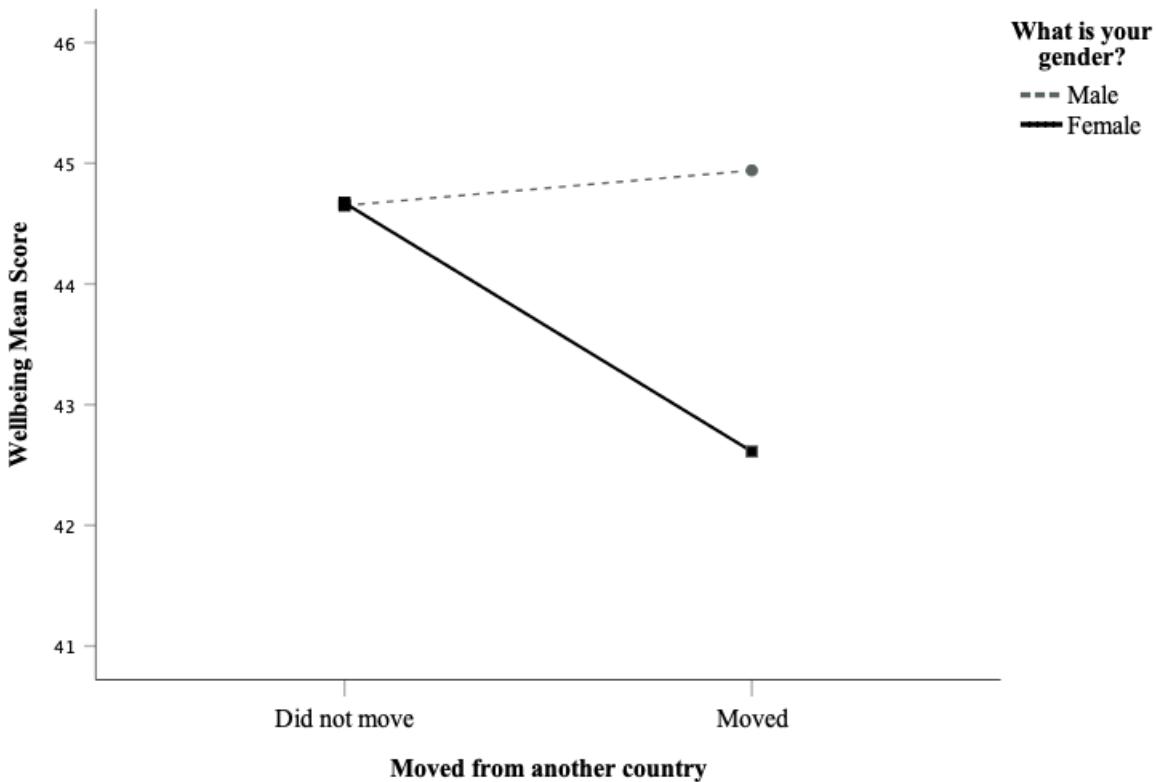
¹ Given the extremely limited number of participants identifying with the “other” gender group, a sensitivity analysis was conducted comparing results including or excluding this group. No significant differences in results were seen, therefore, results described for the MANOVA are with this group removed.

lower wellbeing score than females who did not move ($M = 44.67, SD = 8.75$).

Contradictory to this, males who did move ($M = 44.94, SD = 10.94$) only had a slightly better wellbeing score than males who did not move ($M = 44.65, SD = 46.08$).

Figure 1

Interaction on wellbeing score between gender and moving to NL.



In contrast, a main effect of gender was identified for the total self-esteem score [$F(2, 898) = 4.12, p < .02, \eta_p^2 = .009$]. Bonferroni-corrected pairwise comparisons revealed males having a higher total self-esteem (Total SER-S: $M = 28.22, SD = 16.20, Mdn = 31.00$) than females (Total SER-S: $M = 23.42, SD = 16.41, Mdn = 25.00$; $Mean Difference = 4.37, p < .001, 95\%CI = 1.58 - 7.16$). Similarly to the prior two dependent variables, there were no significant interaction effects between gender x bachelor year [$F(2, 898) = 1.10, p = .33, \eta_p^2 = .002$], gender x moving to NL [$F(2, 898) = .44, p = .65, \eta_p^2 = .001$], and gender x birth country [$F(2, 898) = 0.93, p = .39, \eta_p^2 = .002$].

Bachelor Year Differences

The one-way MANOVA further examined the main effect of bachelor year on loneliness, wellbeing, and self-esteem when controlling for gender as per H1b. Results revealed the absence of a main effect² for bachelor year on all measured variables. More specifically, there was no effect of bachelor year on emotional loneliness [$F(1, 898) = 1.57, p = .21, \eta_p^2 = .002$], and social loneliness [$F(1, 898) = 1.78, p = .18, \eta_p^2 = .002$]. Insignificant interaction effects were found for emotional loneliness for bachelor year x moving to NL [$F(1, 898) = 0.02, p = .88, \eta_p^2 = .000$], and bachelor year x birth country [$F(1, 898) = 0.87, p = .35, \eta_p^2 = .001$]; and social loneliness for bachelor year x moving to NL [$F(1, 898) = 1.10, p = .30, \eta_p^2 = .001$], and bachelor year x birth country [$F(1, 898) = 2.56, p = .11, \eta_p^2 = .003$].

The MANOVA also revealed no significant main effects of bachelor year on wellbeing [$F(1, 898) = 0.73, p = .39, \eta_p^2 = .001$]. There were also no significant interaction effects for bachelor year x moving to NL [$F(1, 898) = 1.10, p = .30, \eta_p^2 = .001$], and bachelor year x birth country [$F(1, 898) = 0.04, p = .85, \eta_p^2 = .000$].

Finally, there were also no significant main effects in bachelor year for total self-esteem [$F(1, 898) = 1.22, p = .27, \eta_p^2 = .001$]. No significant interaction effects for bachelor year x moving to NL [$F(1, 898) = 0.47, p = .49, \eta_p^2 = .001$], and bachelor year x birth country [$F(1, 898) = 0.002, p = .96, \eta_p^2 = .000$] were seen for the self-esteem variable either.

Loneliness and Wellbeing

² Given no significant differences between bachelor years across the measured variables, and comparable correlations between the main variables across bachelor years (see Table 3 and 4), all subsequent analyses will use the total sample (B1 and B3 together).

The results of the Spearman Rank Order Correlation analysis within each bachelor year without controlling for gender and when controlling for it are presented in Table 3³ and 4, respectively. The results show a consistent moderate negative correlation between wellbeing and all loneliness scores, with no notable difference between bachelor years and independently of whether gender is controlled for.

Table 3

Spearman correlations between loneliness and wellbeing without correcting for gender in B1(below diagonal) and B3 students (above). Relevant correlations are highlighted in bold.

		1	2	3	4	
B1	1. GLS-SF Total	-	0.43*	0.85*	-0.56*	B3
	2. GLS-SF Emotional	0.83*	-	0.82*	-0.53*	
	3. GLS-SF Social	0.88*	0.48*	-	-0.47*	
	4. WEMWBS	-0.56*	-0.54*	-0.43*	-	

*p < .001 (1-tailed)

Table 4

Partial Spearman correlations between loneliness and wellbeing correcting for gender in B1 (below diagonal) and B3 students (above). Relevant correlations are highlighted in bold.

		1	2	3	4	
B1	1. GLS-SF Total	-	0.80*	0.88*	-0.58*	B3
	2. GLS-SF Emotional	0.82*	-	0.43*	-0.52*	
	3. GLS-SF Social	0.89*	0.47*	-	-0.48*	
	4. WEMWBS	-0.56*	-0.52*	-0.44*	-	

*p<.001(1-tailed)

Moderating Effects of Self-Esteem

When examining the moderating effect of self-esteem on the main relationship between loneliness and wellbeing (see Table 5), while correcting for gender⁴, the partial correlation analysis demonstrated a consistent moderate negative relationship between all loneliness

³ A sensitivity analysis was conducted with the inclusion and exclusion of the “other” gender group. No significant differences in results were seen within the partial correlation results. Results are described excluding the “other” group.

⁴ The “other” gender group was similarly excluded for the moderating effect of self-esteem and exploratory post-hoc analysis of subgroup differences based on the conclusions of a sensitivity analysis.

scales and wellbeing across all bachelor years. Compared to the correlation analysis on the total sample without controlling for the contribution of self-esteem (see Table 4), excluding the proportion of variance explained by self-esteem weakens the association between wellbeing and loneliness, which remains negative.

Table 5

Partial Spearman correlations between loneliness and wellbeing correcting for self-esteem and gender in all bachelor students. Relevant correlations are highlighted in bold.

		1	2	3	4
SERS-S (Total)	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.74*	-		
	3. GLS-SF (Social)	0.86*	0.29*	-	
	4. WEMWBS	-0.34*	-0.32*	-0.24*	-
SERS-S (Positive)	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.76*	-		
	3. GLS-SF (Social)	0.85*	0.30*	-	
	4. WEMWBS	-0.38*	-0.37*	-0.26*	-
SERS-S (Negative)	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.77*	-		
	3. GLS-SF (Social)	0.88*	0.37*	-	
	4. WEMWBS	-0.43*	-0.38*	-0.34*	-

*p<.001 (1-tailed)

Subgroup Differences among Levels of Self-esteem

An exploratory analysis was conducted to identify subgroups within total self-esteem and how relationship between loneliness and wellbeing may change among the three groups, while controlling for the impact of gender. The Partial Spearman Correlation analysis continued to confirm the negative relationship between loneliness and wellbeing (see Table 6), with no substantial difference in the pattern of correlations among the subgroups with one exception.

Results showed a weak negative relationship between wellbeing and emotional loneliness within the low self-esteem group [$r_{emotional\ loneliness,wellbeing\ gender}(352) = -0.28, p <$

.001], while the association between the same variables was stronger (albeit still moderate in correlation value) in the medium and high groups (see Table 6).

Table 6

Correlations between loneliness and wellbeing for all bachelor students based on total self-esteem subgroups when controlling for gender. Relevant correlations are highlighted in bold.

		1	2	3	4
Low Self-esteem	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.73*	-		
	3. GLS-SF (Social)	0.90*	0.36*	-	
	4. WEMWBS	-0.40*	-0.28*	-0.36*	-
Medium Self-esteem	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.73*	-		
	3. GLS-SF (Social)	0.86*	0.27*	-	
	4. WEMWBS	-0.39*	-0.38*	-0.26*	-
High Self-esteem	1. GLS-SF Total	-			
	2. GLS-SF (Emotional)	0.82*	-		
	3. GLS-SF (Social)	0.86*	0.40*	-	
	4. WEMWBS	-0.43*	-0.44*	-0.29*	-

*p<.001 (1-tailed)

Discussion

The purpose of this study was to examine the relationship between loneliness and wellbeing in undergraduate students during COVID-19, more precisely in first and final year students. Self-esteem was included as a moderator to determine if the relationship is affected by the extent of one's perceived self-confidence. Past research also consistently established gender as an individual differences factor affecting loneliness, wellbeing, and self-esteem (Chraif & Dumitru, 2014; Elmer et al., 2020; Hysing et al., 2020; Wang et al., 2020; Wiseman et al., 1995), prompting the inclusion of gender as an additional covariate to control for. This study was based on data collected during the first assessment wave of a longitudinal cohort study among EUR students to systematically inquire over their wellbeing and mental health during and after the pandemic. As the main takeaway, both first and final year undergraduate students during the strict lockdown in December 2020 and January 2021 in NL

reported their mean levels of wellbeing and self-esteem as below average compared to the mean of the student and general population normative samples (Lecomte et al, 2006; Tennant et al., 2007). The students were also seen as having, on average, moderate levels of total and emotional loneliness, with low to moderate in social loneliness (Gierveld & Tilburg, 2006). Moreover, there was a consistent negative relationship between loneliness and wellbeing regardless of study year and gender, indicating students who experienced greater loneliness saw a decline in their individual wellbeing, or that a decline in one's wellbeing led to greater experiences of loneliness during the pandemic.

In contrast to previous research, the results did not confirm any main gender effect on overall psychological wellbeing and loneliness for males or females. Although a few previous studies found no gender differences in wellbeing (e.g., Malinauskas & Dumciene, 2017; Stamp et al., 2015), the absence of a main effect of gender is unexpected, given that the majority of previous studies have provided findings supporting the notion for it (e.g., Chraif & Dumitru, 2014; Derdikman-Eiron et al., 2011; Elmer et al., 2020; Hysing et al., 2020; Mavali et al., 2020; Wang et al., 2020; Wiseman et al., 1995). In this study, the null gender differences in wellbeing may possibly be explained by the measure used. The WEMWBS investigates three aspects of positive wellbeing: 1) positive affect as feelings of optimism, cheerfulness, and relaxation; 2) satisfying interpersonal relationships; 3) positive functioning as energy, clear thinking, self-acceptance, personal development, competence, and autonomy (Tennant et al., 2007). However, previous studies detailed gender differences within other aspects linked to wellbeing. For example, studies have provided clear gender differences in depression, stress, and anxiety as proxy measures of wellbeing (Derdikman-Eiron et al., 2011; Elmer et al., 2020; Wang et al., 2020). But the WEMWBS focuses on broader positive aspects of psychological functioning and does not specifically assess severity of symptom of mental problems such as depression or anxiety. Although, the lack of a gender difference

using this measure does support an emerging group of cross-cultural studies who also produced the same null finding using the WEBWMBS among various population types (i.e., Castellví et al., 2014; Cooper et al., 2013; Lloyd & Davine, 2012; Smith et al., 2017).

Regarding the interaction effects in the wellbeing variable between gender and the covariates birth country and moving to NL, the only significant interaction was found between gender and moving to NL, and none with birth country. This indicates that moving to NL from another country had a negative impact on the wellbeing of females as their response average was lower than females who did not move and males from both groups. The finding is one of the first to determine gender differences in wellbeing in relation to moving specifically for university. However, it is in support of early literature investigating general migration effects on wellbeing with expressed gender differences. It falls in line with women experiencing greater stress and negative psychological effects after moving (Brett, 1980; Gullotta & Donohue, 1983; Magdol, 2002), leading to reduced wellbeing. However, given the effect was minute and there were no main effects, caution is suggested when forming conclusions from this result.

Concerning loneliness, previous evidence and theoretical accounts have argued that males are lonelier than females in the period after adolescence (Hysing et al., 2020; Koenig & Abrams, 1999). In spite of this, the lack of gender differences in loneliness through null differences in emotional and social loneliness was not as unexpected as for wellbeing due to the fact that pre-pandemic literature has reported inconsistent results, including a meta-analytic study showing a close-to-zero effect of gender on loneliness across the lifespan (Maes et al., 2019; Mullen et al., 2019). However, the current study stands relatively unique compared to most of the pandemic literature given its null effect. Pandemic literature has consistently demonstrated females at greater odds of loneliness due to their sensitivity to and exacerbated symptoms of depression and anxiety that males do not typically experience as

severely (Elmer et al., 2020; Groarke et al., 2020; McQuaid et al., 2021; Wang et al., 2020; Wickens et al., 2021). Though, a longitudinal study during the pandemic by Wu and colleagues (2022) also found no gender differences in loneliness scores when linked to anxiety and depression. One reason for this null effect in the current study could be that in gender research, males typically score lower than females in loneliness due to societal stigmatization and a reluctance to express their true emotions (Borys & Perlman, 1985; Rokach, 2018). It may be that the males in the current study sample were equally as open to admitting their loneliness as females. It could simply be because in the period when the Student Wellbeing Monitor was running, the Netherlands had entered its strictest lockdown to date. This might imply that the introduction of the most severe restrictive measures led to everybody suffering from increased levels of loneliness, as both male and female students spent relatively the same amount of time in solitude with no opportunities to socially develop. Another plausible explanation could be that males reporting greater loneliness than previously reached the same higher levels of females because of a ceiling effect (i.e., regression to the mean). However, with no longitudinal data providing evidence for changes in loneliness, it is impossible to identify whether the null finding is consistent over time or a transitory effect due to circumstances and where the source of the effect is.

The results add to the consistent amount of evidence demonstrating gender differences in self-esteem (Bleidorn et al., 2016; Byrne, 2000; Golan et al., 2015; Lawrence et al., 2006). Males demonstrated a higher overall self-esteem in all undergraduate students in comparison to females. Consistently, results further showed that males have higher levels of positive self-esteem and lower levels of negative self-esteem compared to females. These findings in self-esteem are consistent with cross-cultural research showcasing male dominance in self-esteem beginning in adolescence and through early adulthood (Bleidorn et al., 2016; Byrne, 2000; Golan et al., 2015; Lawrence et al., 2006). There are several reasons why this robust

difference exists. For example, the cultural pressure on women's physical appearance has intensified. This increasing strain has led women to have greater dissatisfaction with their body appearance leading to a poorer perception of one's own attractiveness and affecting their self-esteem (Kling et al., 1999). Men also tend to generally have less of a discrepancy between their perceived ideal body type and their current body type than females (Golan et al., 2015), experiencing less dissonance than females do. These suggest factors determining how high self-esteem individuals might develop their greater sense of worth. In sum, the conclusion of gender differences in loneliness and wellbeing adds to the mixed views existing in research and garners much need for further exploration. However, the ultimate findings of self-esteem continue to support what has already been put forward heavily in research. Thus, H1a is only partially supported.

When investigating bachelor year, there was no main influence of this variable on student wellbeing, loneliness, and self-esteem and did not have any interaction with moving to NL and birth country. This opposes what has been concluded in pre-pandemic research of existing differences in wellbeing, loneliness, and self-esteem between bachelor years (Alaviani et al., 2017; Bewick et al., 2010; Dvoráková et al., 2017; Golden et al., 2020; Shek & Liu, 2014; Wyatt & Oswalt, 2013). The likeliest reason for this being the context of when this study was conducted, similar to the interpretation of the null gender differences result in loneliness. The unique circumstances and overwhelming experience of the pandemic and the COVID-19 regulations imposed during the third and harshest lockdown within NL could have led to the lack of significant differences on any of the measured variables. Moreover, first and final year students are positioned in transition phases entering and exiting their higher-education career (Alaviani et al., 2017; Bewick et al., 2010; Dvoráková et al., 2017; Golden et al., 2020; Shek & Liu, 2014, Özdemir & Tuncay, 2008). In this period, there are a plethora of confounding factors that could have affected their experience that were not

observed in this study (e.g., coping style, perceived level of social support, job prospects, financial stability, academic achievement) but could have been critical for determining any differences. Overall, H1b is not supported.

This study proposed a negative relationship between loneliness and wellbeing in both first and final year students, independently of gender. Results showed that loneliness and wellbeing share a moderate negative relationship. Overall results are in line with previous literature postulating that as one's level of loneliness rises, their perceived level of wellbeing declines and vice versa (Çiçek, 2021; Bhagchandani, 2017; Ishaq et al., 2018; Ye & Lin, 2015). The relationship between the two was consistent when gender was and was not accounted for, with minimal differences in strength. One might suggest the pandemic had an equally adverse effect on a large proportion of students. Social isolation and restrictive measures from educational institutions and government bodies had a large negative impact on young adults further supporting the value of amiable social activity for university student's wellbeing (Bu et al., 2020; Burns et al., 2020; Groarke et al., 2020; Macdonald & Hülür, 2021). Loneliness has a damaging effect on one's wellbeing, and a deteriorating wellbeing increases feelings of loneliness when limited or completely uprooted from daily socialization practices (Çiçek, 2021).

When examining the sub-facets of loneliness, the correlations with wellbeing were comparable to that of the main relationship of total loneliness and wellbeing. Moreover, social loneliness showed a slightly weaker relationship with wellbeing than emotional loneliness in both first and final year students, regardless of whether gender was controlled for. One might suggest that in times of complete repressive measures, the absence of having close, intimate relationships with other individuals could have a (slightly) worse effect than the absence of a large surface-level social community. Bu and colleagues (2020) found that social factors such as having three or more close friends and having high perceived social

support were resilience factors against loneliness. However, students who have poorer psychological wellbeing might also be passive in improving the quality of their relationships (Ishaq et al., 2018), which could cyclically lead to more loneliness. Nonetheless, the difference in association strength between social and emotional loneliness is not significantly large and does support previous literature on the link between wellbeing and higher emotional and social loneliness (McWhirter et al., 2002). Altogether, the pattern of findings in B1 and B3 students continues to support the existing negative relationship between loneliness and psychological wellbeing. Therefore, H2 is supported.

This study further hypothesized self-esteem as a moderator in the relationship between loneliness and wellbeing. Prior literature had only focused on self-esteem as a mediator and has overlooked its role as a moderator (i.e., Chen et al., 2021; Çiçek, 2021; Rossi et al., 2020; Szcześniak et al., 2020). Therefore, this study is among the first to date to test this alternative role of self-esteem. Current results support previous literature in explaining self-esteem's univariate relationship with loneliness and wellbeing (Blascovich & Tomaka, 1991; Hawi & Samaha, 2016; Ishaq et al., 2018; Pasha & Munaf, 2013; Rossi et al., 2020). Findings showed an inverse relationship of self-esteem with all facets of loneliness and a significant positive relationship with wellbeing within the total sample. This indicates that a greater sense of self-value and worth are associated to lower loneliness and greater wellbeing (Çiçek, 2021; Hu et al., 2016; Ishaq et al., 2018). Independent of the variance explained by self-esteem, the correlations between loneliness and wellbeing became weaker compared to that of when self-esteem's variance was included in the model. This trend was seen within the sublevels of emotional and social loneliness as well. It falls in line with the conclusions of Ishaq and colleagues' (2018) who similarly tested self-esteem's moderating role in loneliness and wellbeing's relationship. In their study, self-esteem presented a clear moderating role in which it strengthened the negative relationship between loneliness and wellbeing (Ishaq et al.,

2018). In the present study, the correlation between loneliness and wellbeing was moderate when not accounting for self-esteem in the model, and weak when including it, highlighting a similar strengthening effect. Despite this, in the post-hoc analysis investigating the effect of different levels of self-esteem on the loneliness-wellbeing relationship, findings showed negative relationships between loneliness and wellbeing that were comparable in strength between all groups of self-esteem. These results suggest that the specific degree of self-regard and worthiness ones feels does not have a large interference in the association between level of loneliness and wellbeing - the relationship remains stable independently of the level of self-esteem. Nonetheless, self-esteem, as a general phenomenon, does play a buffering role in the relationship between loneliness and wellbeing. Thus, H3 is partially supported.

Limitations

The study did suffer from limitations. Firstly, as this study was measured cross-sectionally, no causal relationship between the variables can be inferred. In addition, responses of lower levels of wellbeing and self-esteem or higher loneliness could also be attributed to general university trends. For example, first year students could experience loneliness and lower wellbeing due to the adjustments made when leaving a meaningful social system at home; whereas final year students could show the same due to final university deadlines and looking to enter the job market. Thus, it adds to the difficulty in determining causation as these ratings in loneliness and wellbeing can be typically observed in students outside of pandemic times. Moreover, the study did not differentiate between a non-clinical and clinical population, therefore results could have been skewed by those who are chronically lonely or have diagnoses of prolonged despondent moods and affect. Nonetheless, as this is only the first part of a longitudinal study, this causality limitation could possibly be addressed at the end of the four-year research to determine if the pandemic

influenced student wellbeing and loneliness in comparison to student wellbeing research prior to the pandemic.

Secondly, the sample population was also unequally distributed among demographic characteristics. Those in the faculties ESSB, RSM and of Dutch nationality were the most represented. Although there were no effects of moving to NL or birth country demographics, there is possibility for an effect of other demographics on loneliness and wellbeing (e.g., socioeconomical status, presence of care duties, perceived study habit at home). Moreover, there was a minimal number of students identifying with the “other” gender, which limits exploring the impact of identifying with the non-binary gender category. Furthermore, the second bachelor year, pre-master, master, and dual-study program levels were not included in the study thereby limiting the scope of the holistic undergraduate experience during COVID-19. Those in their fourth bachelor year were additionally forced to be included as a “third” year bachelor student. This might inaccurately represent their study level, possibly biasing the analysis given the extra year they had attended EUR. Overall, other demographic variables could have acted as covariates and only a few were accounted for in this study.

Finally, all the measures investigating student mental health used online self-report questionnaires. Although the responses are subjective, this practice is not uncommon when investigating mental health among students and all measures have been previously validated and show good psychometric properties. Yet, self-report evaluation can be subject to recall or self-presentation bias affecting the overall validity of the results. Responses could have also been impacted by those with seasonal affective disorder or the general trend of increased negative affect from reduced daylight experienced during the winter.

Implications

The findings from this study have valuable implications for not only undergraduate students, but also for professionals aiming to support students while emerging from the

pandemic. Beyond widening the literature scope of how COVID-19 has affected higher education students, this study has continued the emphasis placed on university students building and improving meaningful social relationships during the pandemic. Fostering these meaningful connections provide social support that may help in mitigating feelings of loneliness. One might even do so by finding creative ways for physical social interaction as this may be more impactful. However, with safety and health concerns, online social activities that build these types of relationships might be a suitable alternative (i.e., cooking together, building social intimacy card games, joining association events). In addition, workshops that educate on the concept of student wellbeing, loneliness, and self-esteem and provide emotion-regulation strategies to cope can provide preliminary and baseline intervention before receiving personalized help, although professional capacity for this might be limited. In line with the present study's results, this can be targeted to all students, regardless of bachelor year. Despite this, previous research still has shown differences between first and final year students. Exploring options for each individual year could still be efficacious, regardless of the null differences in this study. For example, first year students could receive more support in terms of structuring their daily lives and information for learning general administrative matters (i.e., how to file taxes, find a part-time job, understanding Dutch law, budgeting). This would aid in their transition into an independent life. Final year students could receive support in their transition from university to career by helping in job searching and interview skills, learning methods to maintain a healthy work-life balance in their career, or learn/improve their coping skills for final examination and thesis periods when isolated. The goal for final year students to have clear guidance when leaving university in a post-pandemic job market.

At an institutional level, universities can look towards educative practices that relieve stress and anxiety thereby improving general wellbeing. For example, online group sessions

with counsellors/psychologists, teaching staff, administrators and other students discussing their experiences during the pandemic, providing up-to-date news on the pandemic to reduce the spread of misinformation, or facilitating activities for university-wide peer-to-peer interaction such as a virtual calls or matching students to explore outdoor activities. Universities together with teaching staff can also explore methods to ease academic and career pressure that may even be sustainable after the end of the pandemic (e.g., short breaks after examination periods, career services tailored for preparing graduates for a hybrid/online job environment, alternative online examination methods). It is also encouraged for universities to work directly with students when designing interventions to have direct feedback on how they want to be supported.

Future Research

With respect to future directions, one promising area could be to continue exploring the direct influence of self-esteem on loneliness and wellbeing. This area needs to be researched further to elucidate a clearer direction of influence, which would then assist in understanding its moderating effect between loneliness and wellbeing. Alternative studies could also explore the effect of COVID-19 on distinguished population types prior to the pandemic. The current study did not distinguish between a non-, sub- or (chronic) clinical population, opening the possibility to explore how loneliness and wellbeing individually influenced each of these types after the pandemic. Future research should also continue exploring online education during the pandemic and the mounted academic pressure within this specific population of students. More concisely, how academic attainment and/or stress and burnout interact as a mediator with perceived loneliness and wellbeing. Finally, researchers should investigate in detail the impact of demographic variables such as living condition, relationship status, family contact, etc., on loneliness and wellbeing. One can even step further and conduct a meta-analysis to investigate university student experiences in loneliness and wellbeing across

different countries as government restrictions did vary in severity (e.g., France, Sweden, Italy, Switzerland, China, US, Indonesia).

Conclusion

COVID-19 has weighed a heavy toll on higher education students not only at EUR but also at other universities cross-culturally. Examining university students during the pandemic has added to the growing knowledge on the crucial phase of emerging adulthood and the necessary factors for positive development. As part of the first wave in a longitudinal study, the present results provide valuable insight into the mental health of first and final year undergraduate students at the height of the COVID-19 pandemic, with the key takeaway being that these university students were experiencing psychological distress to various degrees. All bachelor students did experience feelings of loneliness and a declining wellbeing, with the two moderately related to one another. Furthermore, self-esteem did play a significant role in determining how severe the psychological experiences would be for the students, implying how much one's loneliness affects your wellbeing and vice versa is dependent on one's self-value. However, the degree of one's self-value does not make a large difference in this relationship. Coming measurement waves will cast more understanding into the longitudinal effects of the pandemic and explore long-term outcomes. Results will help shape how university administrators, educators, and mental health professionals can effectively monitor the psychological health of university students, how to continuously support them through the academic journey, and place emphasis on student wellbeing as a forefront policy within its decision-making.

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