

**Investigating Happiness in University Students: Does Relatedness mediate the Relationship
between Gratitude and Social Self-Efficacy with Happiness?**

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Abstract

The objective of this research paper was to investigate happiness in university students. It aimed to examine the relationship between gratitude and happiness, social self-efficacy and happiness, and whether these relations were mediated by relatedness. Two mediation models were created to explore these relationships. A quantitative and cross-sectional study was conducted using a survey comprising 79 items from various questionnaires. The questionnaires included the Basic Psychological Needs Satisfaction in General Scale (BPNSS) to measure relatedness, the Self-Efficacy Scale (GSES) to measure social self-efficacy, the Gratitude Questionnaire-Six Item Form (GQ-6) to measure gratitude, and the Oxford Happiness Questionnaire (OHQ) to measure happiness. A total of 114 participants participated in the study. The results clearly demonstrated that relatedness partially mediated the relationships between gratitude and happiness, as well as social self-efficacy and happiness. This suggests the presence of a direct relationship between gratitude and happiness, and social self-efficacy and happiness. Furthermore, relatedness emerged as a strong mediator in these relationships, highlighting its role as an intermediary process through which gratitude and social self-efficacy influence happiness. The findings underscore the importance of individuals feeling connected to others as an explanation for their levels of happiness. The process leading to these results, as well as the limitations that arose during the study, are examined in-depth below.

Keywords: students, relatedness, social self-efficacy, gratitude, happiness

Introduction

In recent years, well-being has become increasingly important in everyone's life. In particular, student well-being is increasingly important as it has a significant impact on their academic performance and vice versa (OECD, 2017). Studying at university can be rewarding as students gain academic skills, socialise with others and develop their personalities, all of which contribute to their well-being (Bücker et al., 2018). At the same time, it can also be a source of real challenge. It is common knowledge that students experience stress due to various factors such as academic performance, trying to maintain relationships with others, financial difficulties, and various other factors. Therefore, a work-life balance, life satisfaction and feelings of happiness are crucial to ensure higher student well-being and, accordingly, higher academic performance (OECD, 2017). The definition of well-being, however, lacks standardisation, primarily due to its multifaceted nature (Baldwin et al., 2021). However, psychological well-being (PWB) is the broadest and most all-encompassing term (Robertson, 2018). PWB encompasses two main types, namely eudaimonic and hedonic well-being terms. First, the concept of eudaimonic well-being refers to the purposeful aspect of PWB. This encompasses aspects such as autonomy and personal growth but above all social aspects such as positive relationships, mastery of the environment or, more generally, optimal functioning in society (Keyes, 2002). Moreover, hedonic well-being is usually referred to as subjective well-being. Subjective well-being can be conceptually divided into cognitive- (CWB) and affective (AWB) components (Diener & Chan, 2011, as cited in Zessin et al., 2015). The cognitive component of well-being on the one hand refers to domain-specific assessments, such as the reflection of a person's cognitive evaluation of life and life satisfaction (Luhmann et al., 2012). On the other hand, the affective component refers to the frequency and intensity of positive and negative emotions and moods.

Happiness

Hedonic well-being includes not only subjective well-being but also happiness (Veenhoven, 2017). Being made up of an affective and cognitive component, happiness constitutes a state of various positive emotions and cognitions. The affective component means the overall emotional experience of an individual, while the cognitive component describes one's perceived life satisfaction (Veenhoven, 2017). Additionally, several researchers suggest that happiness is strongly subjective and can be seen as the most important aspect in regard to subjective well-being which encompasses positive emotions (Mogilner et al., 2012). Most importantly, individuals tend

to prioritise happiness as the ultimate life goal which is believed to be attained through fulfilling their desires and needs (Veenhoven, 2017). Happiness has been widely studied in research. The pursuit of happiness has always been a crucial aspect of human life and is connected to a great deal of aspects such as relationships, mental and physical health, education and more (Veenhoven, 2017).

Happiness occupies a significant place in human experience. Particularly students aspire to experience happiness, recognise its significance and shape their overall quality of life and academic journey (Abecia et al., 2014). Studies support the notion that happiness plays a pivotal role in student performance. Happy students commonly perform better academically, compared to their unhappy co-students who are more often facing challenges in achieving academic success (Abecia et al., 2014). In order to understand the significance of students' happiness and its impact on academic performance, it is important to explore the theoretical framework that can shed light on the motivational aspects that influence their happiness. Thus, the following sections present other variables that are potentially associated with higher levels of student happiness. Furthermore, a theoretical framework will be applied to inform the examination of those factors.

Self-Determination Theory

This study is based on Deci & Ryan's (2008) self-determination theory (SDT), which provides the framework for this work. SDT connects personality, optimal functioning and motivation. It suggests that motivation can be divided into two types, namely intrinsic and extrinsic, both of which are significant when it comes to shaping one's identities and behaviours (Deci & Ryan, 2008). Extrinsic motivation can be defined as a type of drive that compels an individual to behave in a certain way based on external factors. This type of motivation is often fueled by external rewards such as grading systems, awards, recognition and esteem of others. Furthermore, intrinsic motivation is driven by internal aspects such as an individual's core values, interests and beliefs. Both types of motivation are crucial in determining behaviour, as well as in encouraging individuals to meet the three following basic needs: autonomy, competence and relatedness as stated by the SDT model (Deci & Ryan, 2008).

The first basic need is autonomy in which an individual has the impression that they can decide their own fate and possess a certain degree of control over their lives. In addition, autonomy indicates that an individual has the belief of being responsible for their own behaviour. The second basic need is competence which consists of an individual's desire to master knowledge and skills

in areas that are meaningful to them. The third and last need is relatedness which describes the urge to feel linked to others that one feels connected to. That is also the reason why relatedness is also called connection (Deci & Ryan, 2008). In the context of the current study, it is important to consider the three basic needs as fulfilling them has been shown to have a crucial role in an individual's overall well-being and psychological health (Lopez-Garrido, 2023). By empowering people to take charge of their own lives, self-determination promotes a sense of independence. Furthermore, self-determination has a significant impact on motivation. When individuals believe in their ability to effectively control themselves, they are more motivated to pursue and accomplish the tasks they desire. This sense of personal agency strengthens their drive and commitment to achieve their goals (Lopez-Garrido, 2023). Moreover, it was found that activities that align with personal goals and intrinsic motivation contribute to greater happiness (Lopez-Garrido, 2023). People who are guided by their own desires and values have a stronger sense of accountability and are more focused on the activities they choose. By following their intrinsic motivation, they can really focus on the activities they really want to undertake, which leads to feeling happier and more fulfilment.

Relatedness

Although all of the needs are potentially beneficial to students learning outcomes and well-being, exploring all of them would be out of the scope of this study. Thus, the current study will start by examining the role of relatedness, while the remaining needs will be explored in further research. In the following section, the role of relatedness will be explored in more detail.

Relatedness includes the experiencing of emotional closeness and the feeling of belonging to a social group, as described by Lopez-Garrido (2023). Building relationships with others is crucial for promoting self-determination as it allows access to support and help. When individuals feel connected to and respected by others, and when they are part of an inclusive environment, their sense of connectedness is strengthened. These meaningful relationships promote the pursuit of self-determination. It becomes easier for individuals to follow their path towards autonomy and personal growth when they have a network of supportive relationships. These relationships provide support, encouragement and a sense of belonging, which contributes to the overall well-being of the individual and enables them to actively engage in the process of self-determination (Lopez-Garrido, 2023).

Indeed, the study by Jiang et al. (2022) found that having frequent contact with friends and a harmonious relationship with parents are associated with higher levels of happiness among students. Furthermore, feelings of relatedness are crucial for success in various areas of life, particularly in any learning environment (Butz & Stupnisky, 2017). Due to the established association of relatedness with happiness, it makes sense to explore factors that influence relatedness. An area in which research is still missing is the association of social self-efficacy with relatedness. Intuitively, it makes sense that students' beliefs about their social skills will be associated with how much relatedness they experience. Exploring this can yield insight into how individuals perceive their abilities to interact effectively with others and build meaningful relationships. It also makes sense to explore the role of social self-efficacy, as it has been found to play an important role in the outcome variable happiness (Gazo et al., 2020). Thus, Social self-efficacy will be explored in the following paragraph.

Social Self-Efficacy

Bandura's self-efficacy concept is an individual's belief that they are capable of achieving a certain level of performance that influences events that affect their lives (Bandura, 1994). The concept determines how individuals feel, think, self-motivate and behave. These beliefs introduce different effects through three main steps; emotional, cognitive and motivational.

The study by Hunagund & Hangal (2014) found that self-efficacy helps to achieve goals and promote academic achievement. In addition, self-efficacy was found to be a significant predictor of promoting physical and mental well-being and strengthening resilience in difficult life situations. Consequently, a strong positive relationship was discovered between self-efficacy and happiness among students (Hunagund & Hangal, 2014). Furthermore, another study suggested that the higher a person's self-efficacy, the greater their life satisfaction and happiness (van Zyl & Dhurup, 2018). This points to the fact that people believing in their abilities at managing social situations and building meaningful relationships tend to experience higher levels of satisfaction and happiness in their lives.

Besides the general concept of self-efficacy, social self-efficacy plays an important role in the happiness of students' lives (Gazo et al., 2020). Bandura (1997) conceptualised social self-efficacy as a belief of an individual, thinking that they are capable of successfully performing a specific social behaviour or task. It encompasses a range of social skills, such as the following; group participation, friendly behaviour patterns, social audacity and accepting and offering help.

Individuals with high social self-efficacy are more likely to initiate social interactions and make new friends. Previous studies have found a positive relationship between high levels of social self-efficacy and self-esteem, as well as a negative relationship between depression and social anxiety (Anderson & Betz, 2001).

Furthermore, Social self-efficacy has potential, as it may be changeable through interventions and thus may offer an avenue to increase happiness levels. Even if research on specific interventions to increase social self-efficacy is still lacking, findings concerning general self-efficacy may be applied. Self-efficacy can be improved by skills training focused on the sources of self-efficacy, such as task performance of the action in question (Margolis & McCabe, 2006). In this manner, one may think of applying social skills interventions aiming to teach university students to improve their social behaviour while focusing on tasks such as friendship skills, how to learn to accept and offer help and several more aspects (Latif, 2021). Because social self-efficacy might be manipulatable through intervention, it is of interest as a means to increase happiness in students. In conclusion, social self-efficacy is of interest due to its established association with happiness and its potential to be changed through intervention. A similar rationale explains the inclusion of the next variable; gratitude. Therefore, it will be discussed further in the next section.

Gratitude

Gratitude can be classified as one's attitude of acceptance in regard to what the person is receiving in their life (Triantoro, 2018). This refers to even the smallest life events and the extent to which the person can be grateful for them. Individuals who possess this skill tend to perceive positive emotions, even for small life events. Indeed, this skill can be practised and improved, for instance by keeping a gratitude list where individuals list three to five things for which they were grateful during the day (Cunha et al., 2019).

Moreover, gratitude can be expressed as an emotion (Triantoro, 2018). This can take the form of joy, for example, when one receives gifts or benefits. Further, an affective trait, also called disposition, is characterised by an individual's general tendency to react with feelings of gratitude and appreciation towards pleasant events and experiences. In fact, Triantoro (2018) found that grateful behaviour can be used as a coping mechanism in order to handle challenging everyday life situations among college students.

Furthermore, the development of gratitude has been found to produce positive outcomes in

adults, such as well-being, positive emotions and lastly, feelings of happiness (McCullough et al., 2002). A study conducted by Froh et al. (2008) found a strong and positive relationship between gratitude and various positive experiences and outcomes in life, including positive emotions, life satisfaction, optimism, social support and engaging in behaviours that benefit others.

There is a variety of evidence that suggests a connection of gratitude to relatedness. Research shows that gratitude improves relationships (Harvard Health Publishing, 2021). A study that focused on couples found that people who made a conscious effort to express gratitude for their partner had more positive feelings towards their partner. Furthermore, partners who expressed gratitude were more likely to openly address any problems in the relationship. Furthermore, research outcomes of the study of Naqshbandi et al. (2020) showed that when people receiving help from volunteers expressed their gratitude, it had a noticeable positive effect on how volunteers perceived relatedness. In the same study by Naqshbandi et al. (2020), volunteers expressed that their gratitude has a positive impact on personal growth, purpose in life, self-development and positive relationships.

Several studies conducted research on the relationship between gratitude and well-being (Sansone & Sansone, 2019). As a matter of fact, a link between gratitude and the outcome variable in this study, happiness, has been discovered (Gottlieb & Froh, 2019). Finally, all information obtained from the studies suggests that the benefits of gratitude in particular have a positive impact on the person's overall well-being, which is particularly interesting in this study examining student happiness.

Furthermore, a crucial finding in the context of the current study was that gratitude and happiness are significantly correlated. In the study by Gottlieb & Froh (2019), such a connection was found between conveying gratitude and experiencing happiness.

To summarise, gratitude might be associated with relatedness and the outcome variable happiness. Also, as mentioned above, it is a skill that can be trained, making it suitable for interventions. This increases the importance of researching gratitude, as it might act as a way to increase happiness in students if it can be manipulated through training. From the abovementioned relationships between variables, it also seems likely that relatedness might mediate the relationship between gratitude and happiness.

The current study

The main aim of the current study is to investigate whether relatedness acts as a mediator while examining the relationship between gratitude, social self-efficacy and happiness in university students. Figure 1 and Figure 2 depict the graphical representations of the mediation models in this research. As the SDT suggests that all humans have three basic psychological needs that underlie growth and development, exploring relatedness as a mediator offers valuable insights into the underlying mechanisms that connect these constructs. Additionally, exploring relatedness as a mediator aligns with the social nature of university student's experiences. Students navigate through their academic journey and often encounter social contexts and interactions that might impact their overall happiness.

The rationale for testing these particular models is to determine the effects of university students' relatedness on their sense of using happiness, taking into account student's experienced gratitude and the extent of experienced social self-efficacy. It was already established that gratitude increases people's sense of happiness, however, it is not yet fully evident whether relatedness plays a significant role in this relationship, considering that the targeted group for this research is university students. Therefore, two research questions and the corresponding hypotheses were formulated for each model. Thus, the first research question is: "*Is the relation between gratitude and happiness in university students mediated by relatedness?*". The second research question is as follows: "*Is the relation between social self-efficacy and happiness in university students mediated by relatedness?*". Consequently, the following hypotheses are proposed as follows:

H1: Gratitude is positively associated with happiness.

H2: Social self-efficacy is positively associated with happiness.

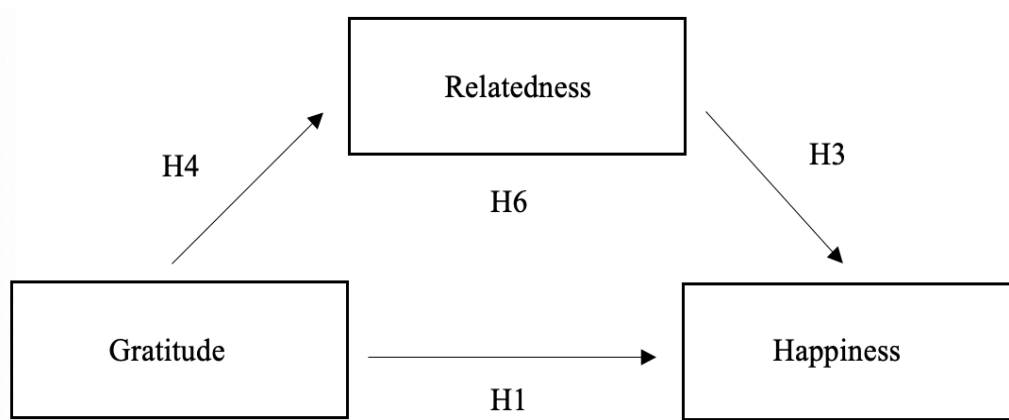
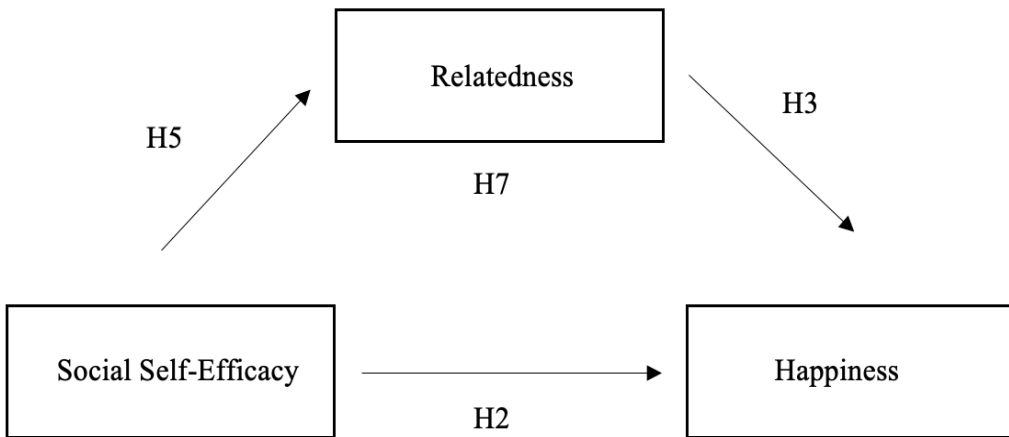
H3: Relatedness is positively associated with happiness.

H4: Gratitude is positively associated with relatedness.

H5: Social self-efficacy is positively associated with relatedness.

H6: Relatedness mediates the relationship between gratitude and happiness.

H7: Relatedness mediates the relationship between social self-efficacy and happiness.

Figure 1*Mediation Model 1***Figure 2***Mediation Model 2*

Methods

Participants

This study comprised a sample of 149 participants. The participants were students from different universities who voluntarily participated in exchange for 0.5 credits through Sona Systems or followed a link to Qualtrics without receiving credits. According to the calculation of Gpower, 90 participants were required for the data analysis to gain statistical significance (Erdfelder et al., 1996). Participants were excluded if they were under 18 years old and did not indicate they were students. After implementing exclusion criteria, 35 participants were removed, leaving a sample of 114 ($M_{age}=21.85$, $SD_{age}=2.44$) students. The distribution of gender percentages is missing due to researchers' error. The participant's countries of origin ranged from Germany ($n = 57$) to the Netherlands ($n = 17$), and other nationalities such as Russia, Ukraine, USA, Greece and others ($n = 40$). Finally, participants gave informed consent and ethical approval was granted in accordance with the guidelines of the ethics committee of the University of Twente.

Materials

Participants used the Qualtrics platform, which complies with all rules and regulations regarding the collection and storage of sensitive data, which therefore was well suited. Different questionnaires were used, all measuring the relevant variables. For this, four questionnaires were used in this study, namely the Basic Psychological Needs Satisfaction in General Scale (BPNSS) for measuring the needs of the Self-Determination Theory (SDT), the Self-Efficacy Scale for measuring social self-efficacy (GSES), the Gratitude Questionnaire-Six Item Form (GQ-6) for gratitude, and lastly, the Oxford Happiness Questionnaire (OHQ) to measure current Happiness. The psychometric properties are introduced below. Additionally, 79 items were used for the entire questionnaire.

Basic Psychological Needs Satisfaction in General

The primary questionnaire consists of 21 items utilised to measure autonomy, competence and relatedness (Gagné, 2003). Participants were asked on a 7-point Likert scale from 1 *not at all true* to 7 *very true* how much the described situations relate to their life. An example of autonomy would be “*I feel like I am free to decide for myself how to live my life*” or “*People I interact with on a daily basis tend to take my feelings into consideration*”. For competence, the instances are as follows “*I have been able to learn interesting new skills recently*” and “*People I know tell me I am good at what I do*”. The following examples of items were asked concerning relatedness “*I really*

like the people I interact with”, “I consider the people I regularly interact with to be my friends” and “I pretty much keep to myself and don’t have a lot of social contacts”. The scale has high validity for all variables with Cronbach’s alpha ranging from .84 to .90 (Johnston & Finney, 2010). Higher scores mean higher needs satisfaction. However, in this study, the focus is on only one scale out of these three, namely relatedness. In this current sample, Cronbach’s alpha coefficient for relatedness demonstrated high internal consistency, yielding a value of .80.

Self-Efficacy Scale

Moreover, general self-efficacy and their subscale of social self-efficacy comprise 23 items (Sherer & Maddux, 1982). The 5-point Likert scale ranged from 1 *strongly disagree* to 5 *strongly agree*. The scale consists of the subscale of general self-efficacy (17 items, e.g. “When I have something unpleasant to do, I stick to it until I finish it”) and the subscale of social self-efficacy (six items, e.g. “I have acquired my friends through my personal abilities at making friends” or “I do not handle myself well in social gatherings”). Nevertheless, the focus of the present study is on social self-efficacy, which is why only this subscale is considered. In this study, Cronbach’s alpha was .79 for social self-efficacy, indicating good internal consistency. Respectively, the higher the score, the higher the self-efficacy expectations.

Gratitude Questionnaire-Six Item Form

The next questionnaire consists of 6 items (McCullough et al. 2002). Participants indicated on a 7-point Likert scale from 1 strongly disagree to 7 strongly agree how much they agreed with the statements (e.g. “If I had to list everything that I felt grateful for, it would be a very long list” or “When I look at the world, I don’t see much to be grateful for”). In this study, an adequate level of internal consistency was found ($\alpha = .79$).

Oxford Happiness Questionnaire

The last questionnaire found by Hills & Argyle (2002) consists of 29 items. It indicates the current level of happiness on a 6-point Likert scale from 1 *strongly disagree* to 6 *strongly agree* (e.g. “ I am well satisfied about everything in my life and I am always committed and involved”). Finally, this study demonstrated sufficient internal consistency for this questionnaire ($\alpha = .75$).

Design

This cross-sectional research was conducted by use of an online survey within a larger research project concerned with promoting well-being on campus. More specifically, gratitude, general and social self-efficacy, happiness and the mediator-variables autonomy, competence and

relatedness were measured. In comparison to the other researchers, this paper examined whether there is a relation between gratitude, social self-efficacy and happiness and whether relatedness mediated this relation.

Procedure

For this study, convenience sampling and snowball sampling were used. Among various advantages of these sampling methods, the main reason for choosing them was that they are a simple and quick way to obtain a large sample size. An online survey was created on SONA whose link transferred the participants further to Qualtrics (Qualtrics, 2022). Students who do not study at the University of Twente and therefore do not have SONA were alternatively given the link directly to Qualtrics. The survey should last about 30 minutes. The time to complete the study ranged between 116 and 11132 seconds ($M_{seconds} = 936.41$, $SD_{seconds} = 1444.76$). Firstly, the participants were asked to consent to participate in the study. Next, the participants should agree they are students and are at least 18 years old (Appendix B). Further, the demographic data was asked, to be more precise, the age and nationality. After the questions were answered, the participants were done with the survey.

Data Analysis

For the analysis of the collected data, the statistical programme RStudio was used (RStudio Team, 2023). The design of the study was set up in such a way that participants could only proceed to the next page if all the questions on the page were answered in the survey. Participants with missing values reported as NA were dropped from the survey and thus removed from the data. Moreover, items were transformed into numeric variables, ensuring that negatively phrased items were converted. As the next step, participants' scores were calculated and respectively, the assumptions on normality, linearity, and independence for both models were tested and visualised to check the fitting of the dataset. Subsequently, means and standard deviations were calculated for all variables. Furthermore, a linear regression analysis was performed to investigate the relationships between the variables. For determining the significance of the relationships, a Pearson's correlation with a p-value of .05 was chosen. Finally, mediation was tested using a multiple linear regression analysis conducted for both models. This analysis was conducted to investigate, for the first model, whether relatedness mediates the relationship between gratitude and happiness. For the second model, the analysis was also conducted to examine whether relatedness mediates the relationship between social self-efficacy and happiness. Then, the Sobel

test was done to test whether the mediation effect was significant. The t-statistic and p-value were then also tested to examine if the association between the mediators was significant.

Results

Descriptives

To provide a comprehensive overview of the data, descriptive statistics were computed for the variables of interest. Table 1 shows the means, the standard deviations as well as Pearson's correlation of this study's results providing a concise summary of the data. A large amount of information can thus be captured together in a single value, making it easier to grasp the general characteristics of the data distribution.

The distribution of happiness scores revealed that participants scored moderately on happiness. Next, the mean scores of relatedness indicated a moderate level among the participants. Moreover, the distribution of the scores of gratitude showed a tendency toward moderate levels of gratitude and finally, the analysis revealed moderate mean scores for social self-efficacy as well.

In terms of correlation coefficients, strong and positive relationships were observed between the variables, with values above ± 0.50 and ± 1 according to Pearson's correlation coefficient (Turney, 2022). To compare, values between 0 and .3 are considered weak (Turney, 2022). In particular, happiness showed a strong positive correlation with all of the variables. Cohen's d was used to determine the effect size, where less than 0.5 is considered small, less than 0.8 is considered moderate and more than 0.8 is considered large (Cohen, 1998). In calculating Cohen's d , the effect of the correlation between happiness and social self-efficacy was shown to be strong and positive, with a large size ($d = 6.71$). Furthermore, a strong positive and large correlation was found while looking at the effect of happiness and gratitude ($d = 5.62$). Next, the correlation effect between happiness and relatedness was shown to be strong and positive too, with a large size ($d = 4.91$). The correlation between social self-efficacy and relatedness was found to be moderate and positive, and large as well ($d = 4.09$). Lastly, the correlation between gratitude and relatedness was shown to be moderate and positive as well, with a large effect ($d = 1.42$).

Table 1*Descriptive Statistics and Pearson's Correlations*

Variables	<i>n</i>	<i>M</i>	<i>SD</i>	<i>r</i>			
				1.	2.	3.	4.
1. Happiness	114	115.35	20.01	-			
2. Gratitude	114	33.21	5.12	0.63*	-		
3. Social Self-Efficacy	114	18.09	4.45	0.55*	0.30*	-	
4. Relatedness	144	41.84	6.91	0.62*	0.46*	0.50*	-

Note. *Correlation is significant at the level of $p < .001$; *M* = mean; *SD* = Standard deviation

Assumption Testing

In addition, a rigorous assessment of the assumptions was made for both models. To evaluate the assumption of normality of the residuals, histograms were created for visualisation. By plotting the residuals on the histograms, it was evident that the assumption was met, as the histograms resembled a bell-shaped curve. Moreover, scatter plots were created for the assumptions of linearity and independence by plotting them against the predictor variables. All three assumptions were met as well as the plots showed a normal distribution (Appendix C).

Inferential Statistics

In this study, a simple linear regression analysis was conducted. A significant relation between the independent variable gratitude and the dependent variable happiness which supports the first hypothesis ($b = 2.5$, $t(112) = 8.77$, $p < 0.001$). Second, a significant relation between the independent variable social self-efficacy and the dependent variable happiness was found, also supporting the second hypothesis ($b = 2.47$, $t(112) = 6.95$, $p < 0.001$). Third, a significant relation was found between the mediator variable relatedness and the outcome variable happiness,

supporting the third hypothesis ($b = 0.78$, $t(112) = 6.18$, $p < 0.001$). Fourth, a significant relationship between gratitude and relatedness was demonstrated, supporting the fourth hypothesis ($b = 0.32$, $t(112) = 6.18$, $p < 0.001$). Regarding the relation between social self-efficacy and relatedness, a significant relation was determined, supporting the fifth hypothesis as well ($b = 0.34$, $t(112) = 5.60$, $p < 0.001$).

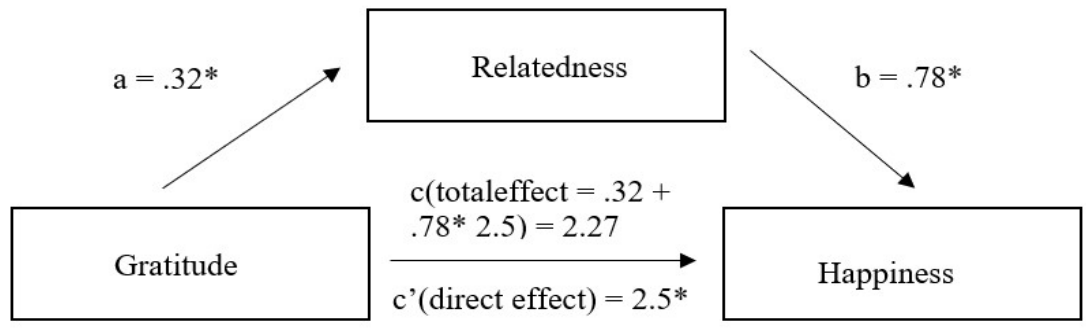
Mediation effects

Moreover, results revealed a significant mediation effect of relatedness on the relation between gratitude and happiness, supporting the sixth hypothesis ($b = 1.73$, $t(111) = 6.11$, $p < .001$). Because there is still a significant remaining direct effect of gratitude on happiness, the mediation is considered as partial. Figure 3 shows the mediation figure with the corresponding standardized coefficients to illustrate the path effects. Similarly, results showed a significant mediation effect of relatedness on the relation between social self-efficacy and happiness, supporting the seventh hypothesis ($b = 1.42$, $t(111) = 3.91$, $p < .001$). Since there still remains a significant direct effect of social self-efficacy on happiness, mediation is considered partial. Figure 4 shows the mediation figure with the corresponding standardized coefficients to illustrate the path effects too.

A Sobel test was performed to further examine whether the reduction in the effect of gratitude on happiness by including relatedness as a mediator was significant, and it indeed yielded a significant result ($z = 4.00$, $p = .001$). In extension, this test was also carried out for the second model to see if the reduction in the effect of social self-efficacy on happiness by including relatedness as a mediator was significant, and it also yielded a significant result as well ($z = 4.21$, $p = .001$).

Figure 3

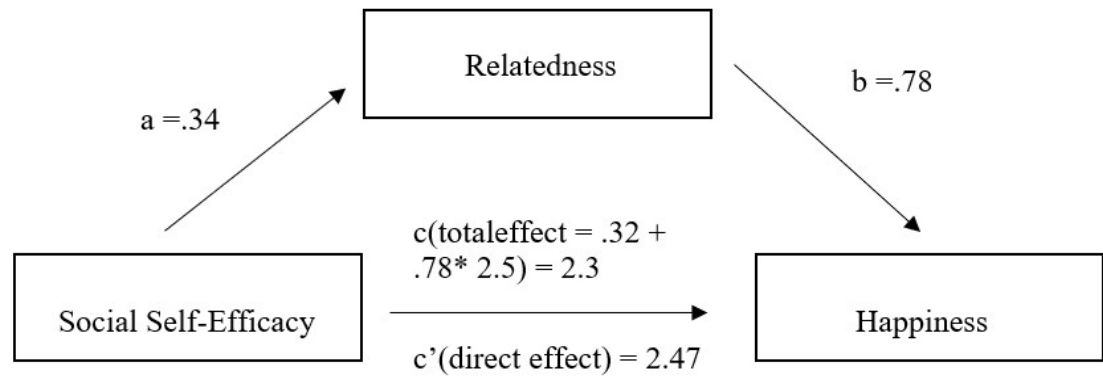
Mediation Model 1: The relationship between gratitude and happiness mediated by relatedness



Note. Standardized coefficients. c' = direct effect of X on Y; c = combined effect of direct and indirect effect of X on Y; solid lines represent significant effects. * $p < .001$.

Figure 4

Mediation Model 2: The relationship between social self-efficacy and happiness mediated by relatedness



Note. Standardized coefficients. c' = direct effect of X on Y; c = combined effect of direct and indirect effect of X on Y; solid lines represent significant effects. * $p < .001$.

Discussion

This study aimed to investigate happiness in university students. More specifically, the main objective was to investigate whether relatedness was mediating the relationship between gratitude and happiness, as well as the relationship between social self-efficacy and happiness. Besides the mediation effect, the relationships between the variables were measured as well. To achieve this, a survey consisting of several questionnaires was developed that measured the above-mentioned variables within a sample of $N = 114$ students. In the following, the main findings are discussed below.

The first hypothesis, predicting that there is a positive association between gratitude and happiness, suggested that the expected effects are existing. These results align with previous research conducted that demonstrated a strong and positive relationship between gratitude and various positive experiences in life, including positive emotions, life satisfaction and optimism (Froh et al., 2008). The present study extends these findings to the context of university students and may predict the importance of cultivating gratitude as a way to enhance happiness.

Similarly, the second hypothesis, predicting that there exists a positive association between social self-efficacy and happiness revealed that the effects are evident. Previous research has not explicitly examined social self-efficacy in regard to happiness and relatedness. Nevertheless, findings already showed that social self-efficacy is a crucial part of students' happiness (Gazo et al., 2020). This study emphasises the significance of individuals' beliefs in their ability to successfully navigate social interactions and relationships. The positive association between social self-efficacy and happiness suggests that individuals who feel more confident in their social skills and abilities are more likely to experience higher levels of happiness.

Further, the third hypothesis, predicting a positive association between relatedness and happiness, also suggests that the effects are present. The results of the current study are in line with previous research findings emphasising the relevance of having positive relationships and a sense of connection to others for overall well-being and happiness (Jiang et al., 2022). This study extends the knowledge by focusing particularly on the university student population, while suggesting the importance of relatedness in the context of higher education.

The fourth hypothesis, suggesting that gratitude is positively associated with relatedness revealed that this effect is indeed present. This hypothesis predicts that individuals who show higher levels of gratitude may be more likely to feel connected to others and have positive

relationships. Prior findings by Naqshbandi et al. (2020) showed that gratitude of individuals who receive help from volunteers has a noticeable positive effect on volunteers' perceptions of relatedness. This emphasises the fact that students may increase their sense of relatedness, and when they feel such a sense of relatedness, it can also increase their sense of gratitude.

Next, the fifth hypothesis, predicting social self-efficacy is positively associated with relatedness revealed that the findings are evident too. To be more precise, students who have confidence in their social skills and abilities might be more likely to experience a sense of connection and belonging with others. Additionally, students are more likely to participate in groups, and accept and offer help (Bandura, 1997). The results of the study are consistent with previous research suggesting that individuals with high levels of social self-efficacy are more likely to initiate social interactions and make new friends (Anderson & Betz, 2001).

Furthermore, the sixth hypothesis suggesting that relatedness mediates the relationship between gratitude and happiness disclosed that the expected findings are present. Hence, the findings predict that students who possess a grateful disposition are more likely to experience greater relatedness. While students might experience greater relatedness, this can result in higher levels of happiness. In addition, gratitude promotes positive social interactions and enhances one's ability to appreciate and value relationships (Sansone & Sansone, 2019). As mentioned in the results section, relatedness only partially explains the relationship. However, there still exists a relationship between gratitude and happiness even when relatedness is taken out. In comparison to a full mediation, the effect of gratitude on happiness does not completely diminish (Bhandari, 2021). The positive indirect effect of gratitude on happiness through relatedness highlights its potential role of relatedness as a significant mediator in the relationship between gratitude and happiness.

Lastly, the seventh hypothesis predicting that relatedness mediates the relationship between social self-efficacy and happiness revealed support as well. Similarly to Hypothesis 6, relatedness only partially explains the relationship as there is still a relationship between social self-efficacy and happiness, even when relatedness is taken out of the model (Bhandari, 2021). The results predict that the higher the level of social self-efficacy among students, the more likely they are to experience a sense of relatedness, which in turn contributes to their happiness. The mediation effect of relatedness suggests that fostering social self-efficacy can be a valuable approach to promoting happiness among university students. One approach to promote social self-efficacy is the example

of social skills training (SST), which involves group games and role-playing. This is aimed at improving social behaviour and interactions with others (Latif, 2021). Components such as accepting and offering help, friendly behaviour or, most importantly, group participation can be trained for this purpose.

Strengths of the current study

The first strength of this study is the representativeness of the sample population. The generalisability of the research findings depends on a representative sample that adequately reflects the characteristics of the target population (Walker, 2005). In this study, this is the case as the research was done at the University and the sample consists of university students which is the target group. The statistical power of the study and the accuracy of the results is increased by including participants who are representative of the target group of the study (Erdfelder et al., 1996). A larger sample size reduces the risk of sampling error and allows for more robust conclusions, which in turn not only increases the reliability of the results but also their generalisability. This idea is in line with G*Power's suggestions for an appropriate sample size (Erdfelder et al., 1996). Hence, the sample size of this study can be considered a strength as well since it contributes to the representativeness of the sample population.

Additionally, a cross-sectional study was conducted, which was simple and not time-consuming in the form of a survey (Thomas, 2020). Therefore, the study design can also be seen as a strength. Well-established questionnaires with good psychometric properties were used in this study. All scales used to measure the corresponding variables have been widely used and shown good internal validity and consistency. Furthermore, this study employed appropriate statistical analysis techniques such as Pearson's correlation coefficient and linear regression analyses to examine the relationships between the variables and test hypotheses. Using established statistical methods enhances the reliability of results (Dhar et al., 2014). In addition, a mediation analysis was conducted and this current study explored the mediating role of relatedness in the relationships between gratitude and happiness, as well as between social self-efficacy and happiness. To explain, mediation analysis provided a deeper understanding of the underlying mechanisms and processes involved in these relationships.

Limitations and future research

Although the current study showed strengths, some limitations need to be addressed as well. In the present study, an inadvertent error emerged caused by the researchers, in fact, it was

neglected to collect data regarding the participant's gender. As a consequence, the gender distribution of the participants could not be counted, resulting in a lack of interpretation. Gender differences may have played a role in shaping the responses and outcomes measured in the study, which potentially affected the generalisability and validity of the findings. Therefore, future research should place an emphasis on the inclusion of gender as a variable of interest. A review of the setup of the study is recommended as well.

Another limitation of the current research paper is that it focused solely on one basic need, namely relatedness, out of the three basic psychological needs outlined in the SDT. This approach may overlook the potential influence of the other two needs, autonomy and competence, on the variables under consideration. According to the SDT (Deci & Ryan, 2008), all three needs are essential for an individual's overall well-being, psychological development and motivation. Additionally, all three basic needs are interconnected with each other and thus, influence each other (Deci & Ryan, 2008). Therefore, it would be advisable to include all of the basic needs in the study to provide an even more comprehensive understanding of the factors influencing happiness. By disregarding autonomy and competence needs, this study may not fully capture the complex interaction between these needs and the variables of interest, potentially limiting the depth of the conclusions drawn from this research. In the future, the research could consider incorporating all three basic needs to obtain a more comprehensive understanding of the contributions to happiness in students.

Moreover, this study is a quantitative and cross-sectional study, which brings some limitations with it as well. The questionnaires used in this study were structured which may restrict participants' responses to predefined options, limiting their ability to fully express their thoughts and perspectives. One may overlook important insights that participants may have and may not be able to capture the complexity and depth of human experiences which are better addressed through qualitative approaches, using an interview, for instance. This would give the participants the possibility to express their thoughts as well. One idea to incorporate this would be to use a mixed methods design. This would be a mixture of quantitative and qualitative research. The advantages of this are, for example, that by mixing methods one can contextualise the results and make the conclusions more detailed (George, 2021). Further, using qualitative data to illustrate quantitative results can help give more meaning to the analysis and to the findings of the variables that influence happiness. Another advantage is that different methods are used to collect data on the same subject

which in turn makes the results more credible (George, 2021). By using this method, one can ensure to gain detailed, contextualised insights from the participants as happiness is a truly subjective and multifaceted approach. These insights in turn deepen and enrich the quantitative results.

Furthermore, cross-sectional studies may suffer from selection bias, potentially affecting the generalisability of the findings (Bhandari, 2020). In this research, convenience and snowball sampling were used. Particularly convenience sampling, as it involves selecting participants who are easily accessible to the researcher, does not accurately represent the target population, introducing sampling bias. Participants may have made use of self-selection bias or volunteer bias in comparison to other participants. Nevertheless, it is worth noting that every study design has its limitations and this restriction is not considered a major concern as the focus was on university students which were reached.

Finally, it was not possible to capture changes or developments over time. By focusing on a single time point, important fluctuations, trends, or long-term effects of variables may be missed. Therefore, it holds back from discovering the relations between the variables over a longer period of time and the impact of change on one variable onto another. Nonetheless, it is important to mention that due to time constraints, it was suitable to conduct a cross-sectional study and that is why it was decided to use such a study design.

Conclusion

In conclusion, this study gives a clear indication that relatedness mediates the relationships between gratitude and happiness and between social self-efficacy and happiness among a sample of 114 university students. The findings revealed significant strong and positive correlations between gratitude and happiness, social self-efficacy and happiness, as well as relatedness and happiness. These results provide evidence for the importance of fostering gratitude, social self-efficacy, and relatedness in promoting happiness among university students. However,, some research should still be conducted to explore the variables in more detail and perhaps in different educational contexts over a longer period of time. Additionally, it might be crucial to investigate where the influence comes from. Nevertheless, the study's findings contribute to the understanding of factors influencing well-being and have implications for interventions aimed at enhancing happiness and overall psychological well-being in educational settings.

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Appendix A

Basic Psychological Needs Satisfaction in General Scale

1. I feel like I am free to decide for myself how to live my life.
2. I really like the people I interact with.
3. Often, I do not feel very competent.
4. I feel pressured in my life.
5. People I know tell me I am good at what I do.
6. I get along with people I come into contact with.
7. I pretty much keep to myself and don't have a lot of social contacts.
8. I generally feel free to express my ideas and opinions.
9. I consider the people I regularly interact with to be my friends.
10. I have been able to learn interesting new skills recently.
11. In my daily life, I frequently have to do what I am told.
12. People in my life care about me.
13. Most days I feel a sense of accomplishment from what I do.
14. People I interact with on a daily basis tend to take my feelings into consideration.
15. In my life I do not get much of a chance to show how capable I am.
16. There are not many people that I am close to.
17. I feel like I can pretty much be myself in my daily situations.
18. The people I interact with regularly do not seem to like me much.
19. I often do not feel very capable.
20. There is not much opportunity for me to decide for myself how to do things in my daily life.
21. People are generally pretty friendly towards me.

Self-Efficacy Scale

General Self-efficacy

1. When I make plans, I am certain I can make them work.
2. One of my problems is that I cannot get down to work when I should.
3. If I can't do a job the first time I keep trying until I can.
4. When I set important goals for myself, I rarely achieve them.

5. I give up on things before completing them.
6. I avoid facing difficulties.
7. If something looks too complicated, I will not even bother to try it.
8. When I have something unpleasant to do, I stick to it until I finish it.
9. When I decide to do something new, I go right to work on it.
10. When trying to learn something new, I soon give up if I am not initially successful.
11. When unexpected problems occur, I don't handle them well.
12. I avoid trying to learn new things when they look too difficult for me.
13. Failure just makes me try harder.
14. I feel insecure about my ability to do things.
15. I am a self-reliant person.
16. I give up easily.
17. I do not seem capable of dealing with most problems that come up in life.

Social Self-efficacy

18. It is difficult for me to make new friends
19. If I see someone I would like to meet, I go to that person instead of waiting for him or her to come to me.
20. If I meet someone interesting who is hard to make friends with, I'll soon stop trying to make friends with that person.
21. When I'm trying to become friends with someone who seems uninterested at first, I don't give up easily.
22. I do not handle myself well in social gatherings.
23. I have acquired my friends through my personal abilities at making friends.

Gratitude Questionnaire-Six Item Form (GQ-6)

1. I have so much in life to be thankful for.
2. If I had to list everything that I felt grateful for, it would be a very long list.
3. When I look at the world, I don't see much to be grateful for.
4. I am grateful to a wide variety of people.
5. As I get older I find myself more able to appreciate the people, events, and situations that have

been part of my life history.

6. Long amounts of time can go by before I feel grateful to something or someone.

Oxford Happiness Questionnaire

1. I don't feel particularly pleased with the way I am.
2. I am intensely interested in other people.
3. I feel that life is very rewarding.
4. I have very warm feelings towards almost everyone.
5. I rarely wake up feeling rested.
6. I am not particularly optimistic about the future.
7. I find most things amusing.
8. I am always committed and involved.
9. Life is good.
10. I do not think that the world is a good place.
11. I laugh a lot.
12. I am well satisfied about everything in my life.
13. I don't think I look attractive.
14. There is a gap between what I would like to do and what I have done.
15. I am very happy.
16. I find beauty in some things.
17. I always have a cheerful effect on others.
18. I can fit in (find time for) everything I want to.
19. I feel that I am not especially in control of my life.
20. I feel able to take anything on.
21. I feel fully mentally alert.
22. I often experience joy and elation.
23. I don't find it easy to make decisions.
24. I don't have a particular sense of meaning and purpose in my life.
25. I feel I have a great deal of energy.
26. I usually have a good influence on events.
27. I don't have fun with other people.

28. I don't feel particularly healthy.
29. I don't have particularly happy memories of the past.

Appendix B

Informed consent form

Thank you for participating in our research project!

The purpose of this research is to examine happiness among university students while accounting for other variables, such as self-efficacy and gratitude. Furthermore, this research aims to investigate the mediating relationship while taking into account three basic psychological needs from Deci & Ryan's Self-Determination Theory: autonomy, relatedness and competence.

We will first ask you about your demographics such as age, gender, nationality and level of education. Then, you will be filling out five short questionnaires which will take approximately 30 minutes. In these questionnaires, you will be asked about your feelings of gratitude, self-efficacy, your current levels of happiness and information regarding the three essential psychological needs: autonomy, relatedness and competence.

The data you provide to the researchers is completely anonymous, and confidential and will only be used for the purpose of this educational research project. The participation is entirely voluntary.

After the research project is completed (approximately: end of July, 2023), all data will be deleted.

You can decide to withdraw from this study at any time without giving a reason and without any consequences. If you have any questions or are in need of support, you can contact the researchers or contact BMS committee of the University of Twente.

Researchers' emails:

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a.d.jagosz@student.utwente.nl

a.lazhentseva@student.utwente.nl

BMS email: ethicscommittee-hss@utwente.nl

Please tick the appropriate boxes:

	Yes/No
I have read and understood the information above	<input type="checkbox"/> <input type="checkbox"/>
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	<input type="checkbox"/> <input type="checkbox"/>
Use of the information in the study	
I understand that the information I will provide will be used for an educational research project	<input type="checkbox"/> <input type="checkbox"/>

Appendix C

Figure C1

Assumption Check on Normality of Model 1

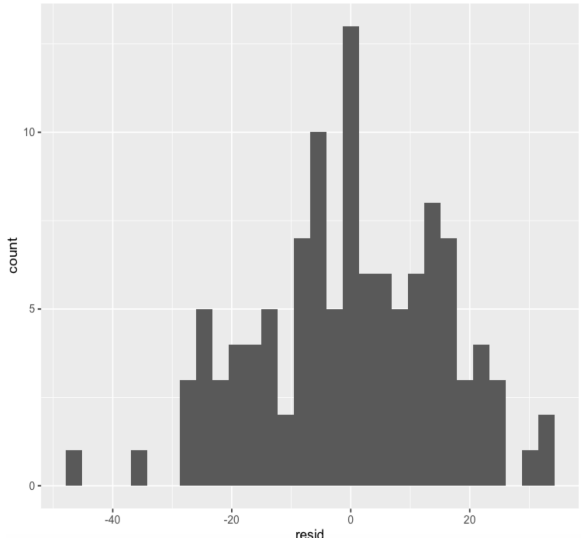


Figure C2

Assumption Check on Normality of Model 2

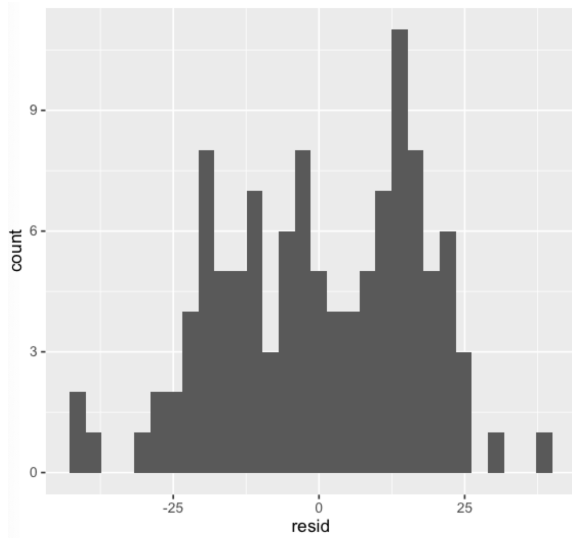


Figure C3

Assumption Check on Linearity of Model 1

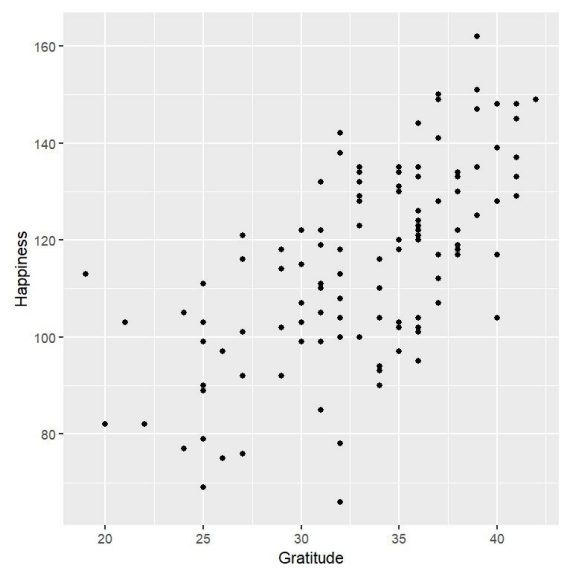


Figure C4

Assumption Check on Linearity of Model 2

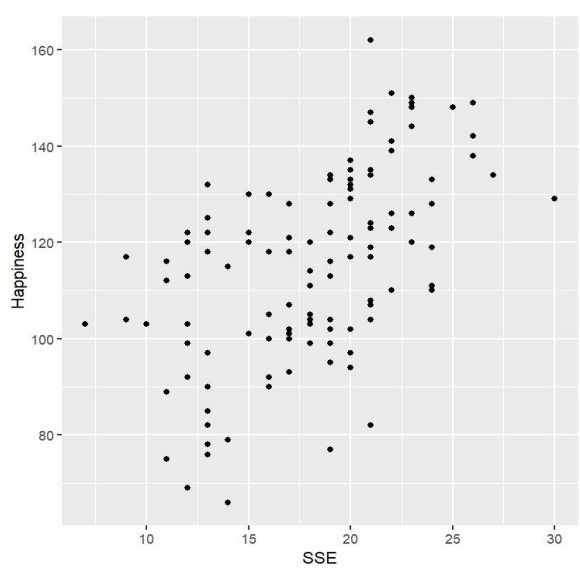
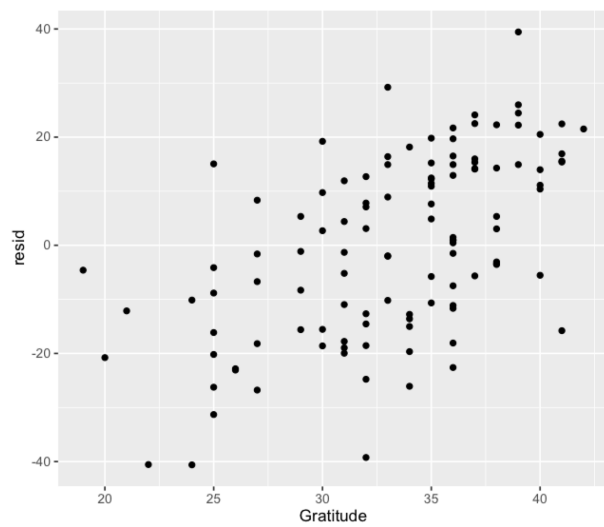


Figure C5

*Assumption Check on Independence
of Model 1*

**Figure C6**

*Assumption Check on Independence
of Model 2*

