Competence as a mediator variable in the relationship between Gratitude, Self-efficacy and Happiness in University Students

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Date: June 28th, 2023

Abstract

A student's life could be bright and contrasting from the experiences students live through while undergoing their studies. Those experiences, whether good or bad, influence the mental state of university students. Therefore, this research aims to discover how university students' self-efficacy and their gratitude influence their happiness levels while accounting for the mediating effects of the variable competence in the Self-Determination Theory (SDT) framework. This research was conducted using a cross-sectional design. Data collection was made in a form of a survey among university students ($N = 149$) through the platform Qualtrics. The questionnaires used for the survey were Basic Needs Satisfaction in General Scale (BNSG-S) for the measurement of competence, the General Self-Efficacy Scale for the measurement of self-efficacy, the Gratitude Questionnaire- Six Item Form (GQ-6) for the measurement of gratitude and Oxford Happiness Questionnaire measuring happiness. In both models, the results were significant, meaning that competence partially mediated the relationship between gratitude and happiness, as well as the relationship between self-efficacy and happiness. Following the mediation analyses, it was also discovered that self-efficacy and competence, as well as happiness and competence, are correlated to a large extent ($r = .70$, $r = .74$) which were the strongest correlations in this research. The following results indicated that the levels of happiness students experience are linked with the levels of gratitude and self-efficacy they possess. Still, further research is needed to investigate possible causal relationships and extend the research to other regions.

Keywords: happiness, self-efficacy, gratitude, competence, Self-Determination theory.

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Introduction

The life of university students can be fascinating and fulfilling from various angles, both personally and academically. However, it could as well bring some challenges that are hard to deal with. While university life brings a lot of opportunities for meeting new people and learning novelty information and technologies, it could be hard to find the perfect work-life balance that would be easy to maintain (Hamill et al., 2022, as cited in Ryan et al., 2010). Furthermore, the inability to control this balance leads to elevated levels of anxiety, depression and overall negative affect that influence the overall well-being of the students (Hamill et al., 2022, as cited in Baik et al., 2015). University students experience various kinds of stress due to various reasons: academic performance, personal relationships, career choice, exam grades and many more that contribute to chronic stress that impairs the well-being of the students (Pozos-Radillo et al., 2014). Recent statistical analysis suggests that nearly 45% of college students experience "more than average stress", 33% are experiencing "average stress" and 12.7% are in a state of "tremendous" stress, suggesting that the issue is frequent (Bouchrika, 2023). In line with the data above, a study by Asif et al. (2020) suggests that nearly 84% of students are experiencing overall stress, which is in line with the statistics above. In addition, Pozos-Radillo et al. (2014) mentioned that the chronic stress that students experience may also contribute to burnout, as the correlation has been proved. Therefore, Hamill et al. (2022) concluded that feelings of stress may result in students' shifting their attention from their studies resulting in an inability to engage with their schedule of studying. Accounting for the amount of stress students experience, it is also vital to strengthen certain areas, such as happiness and gratitude to improve student's well-being. While it is important to maintain a healthy work-balance lifestyle to flourish, it is crucial that overall feelings of happiness and life satisfaction influence a student's life. Therefore, this paper aims to investigate the ways of possible influence on students' well-being while taking Ryan and Deci (2000) Self-Determination Theory as the main framework in this paper.

Well-being and Happiness in university students

It is clear that university students experience stress and pressure from studies, however, well-being plays crucial importance in the maintenance of a happy state. Though well-being has multiple definitions, it could be summarized as a state of feeling pleasure from doing day-to-day activities that positively affect long-term well-being (Hamill et al., 2022). Research has

shown that levels of well-being include the resources that individuals respond with, such as resilience, to life circumstances which in turn influence their well-being (Brett et al., 2022). Therefore, the life of the student is not only influenced by the stressors but also by their own response to the stressors (Brett et al., 2022). Considering different trajectories of psychological well-being, it is challenging to narrow it down to multiple terms and influences since it rather stands as a coherent whole of processes happening throughout life predicting well-being in adulthood starting from demographics and ending with perceived social support from the environment (Ryff & Keyes, 1995). Next sections elaborate more on different aspects of influences on students' well-being within the chosen framework for this research.

Additionally, while emphasizing the importance of overall well-being and satisfaction in life, it is vital for students to stay in a state of happiness to strive and achieve (Dar & Wani, 2017). Happiness is defined as a state or dimension of well-being which is linked with feeling good in general and experiencing pleasure (Dar & Wani, 2017). Dar and Wani (2017) also report that people in a happy mental state are more confident, cooperative, productive, efficient and experience higher income which stands to be important in overall human functioning. Therefore, it can be summarized that happiness plays a vital part in overall well-being which influences multiple dimensions of life not only for students but also for working adults. This paper will take happiness as a dimension of well-being to be measured among university students.

Self-Determination Theory (SDT) Ryan & Deci (2000)

This research will take Ryan and Deci (2000) Self-Determination Theory (SDT) as a framework for this paper. The SDT itself focuses on three basic concepts that are vital to flourishing human functioning, or so-called needs as Ryan and Deci established: the need for competence, relatedness and autonomy which are defined as "universal necessities" (Deci & Vansteenkiste, 2004). Those needs are most important, according to Ryan and Deci (2000), to maintain optimal human functioning, productivity and mental health (Deci & Vansteenkiste, 2004). However, those needs are not learned through the lifetime of practice but it is rather assumed that they are present within a human being from the point of birth (Deci & Vansteenkiste, 2004). To briefly outline the needs, firstly, the need for competence – "the desire to be effective in dealing with the environment", meaning mastering a certain field and being successful within it (Deci & Vansteenkiste, 2004, p.25). Second, the need for relatedness

– the desire to be connected to people and care for other people. Thirdly and lastly, the need for autonomy resembles the desire to have a certain choice when acting or making a decision (Deci & Vansteenkiste, 2004). Those three needs are the main fundamental terms which are crucial to maintaining normal functioning according to Ryan and Deci (2000) where lack of those could hinder motivation and personal growth development.

SDT: Competence

This particular paper concentrates on competence within the framework of Ryan and Deci (2000) due to a number of reasons. First, competence influences the intrinsic motivation of individuals which could have certain effects on overall feelings of happiness and self-efficacy (Ryan & Deci, 2000). Another point Klein and Englund (2021) make is that academic success may be closely related to happiness while being an adult and competence plays a key role in determining the success of the individual in the future. The study by Klein and Englund (2021) also indicated that well-established competence within adolescence greatly influences general satisfaction with life while being an adult. Another study by Wang et al. (2022) found that satisfaction with competence in the field predicts students' achievement capabilities while in higher education facilities. Following, Rodgers et al. (2014) mention that self-efficacy might overlap with competence on certain factors since both terms commit to goal accomplishment and both of the terms are not considered to be an outcome. However, it is not clear whether self-efficacy explains competence or vice versa. Additionally, both self-efficacy and competence are in line with including skill acquisition, engagement and learning within themselves (Rodgers et al., 2014). Still, it was agreed by Rodgers et al. (2014) that self-efficacy does not satisfy the need for competence. It is not entirely clear whether competence could predict happiness among university students, therefore, this paper aims to also research this relationship.

Self-efficacy

While there are numerous factors playing a certain role within the university life of students, there is a variable directly influencing academic success – self-efficacy (Alhadabi & Karpinski, 2019). Self-efficacy can be defined as "…people's judgement of their capabilities to organize and execute courses of action required to attain designated types of performance" (Bandura, 1986, p.391 as cited in Alhadabi & Karpinski, 2019, p.523). Self-efficacy was found

to correlate with academic success (Alhadabi & Karpinski, 2019). However, a definition that is more in parallel with this paper is by Schwarzer and Jerusalem (1995, as cited in Luszczynska et al., 2005, p.439), stating that general self-efficacy is the "…belief in one's competence to cope with…challenging demands". Moreover, self-efficacy predicts attitudes that students may exhibit that relate to academic success, as well as learning strategies that aid in studying (Alhadabi & Karpinski, 2019).). Self-efficacy also contributed to the approaches students choose to study the materials and, consequently, provides pleasure associated with studying (Alhadabi & Karpinski, 2019).). Accounting that self-efficacy influences students in multiple ways, namely, attitude, learning abilities and self-regulation that influence academic success, it may also relate to the overall feeling of happiness students exhibit that should be examined. Another study by Hayat et al. (2020) also found that self-efficacy affects learning-related feelings and positive emotions which also affect overall academic performance. As it was stated in the section above by Rodgers et al. (2014), self-efficacy and competence are overlapping constructs, therefore, this paper also aimed at exploring this relationship in deeper detail.

Gratitude

Further, another crucial factor for overall happiness – experiencing gratitude. As it is mentioned by Garg and Sarkar (2020) gratitude is derived from the "Gratia" in Latin, which resembles being thankful for something. While there are numerous types of gratitude and more ways to express it, it could be generalized as a "…tendency to recognize and respond with grateful emotions to…positive experiences and outcomes that one obtains" (Garg & Sarkar, 2020, as cited in McCullough et al., 2002). Gratitude plays an important part in the life of individuals admiring things that they have and appreciating things they are given (Garg & Sarkar, 2020). A study by Alsukah and Basha (2021) confirmed that gratitude had a positive influence on happiness among university students, which could be another point to measure while accounting for students' mental health and overall well-being. In the research of Alsukah and Basha (2021) was mentioned another older study by Safaria (2014) found that gratitude was the most predictive variable of happiness within the population of university students, showing promising effects of gratitude. Therefore, it is safe to consider that gratitude brings up joy and pleasure to university students. With regard to psychological needs, Lee et al. (2015) suggested that there are associations between gratitude and competence, however, there is not

much more evidence to support whether gratitude influences competence in the long term or not. Therefore, this relationship is investigated in this paper.

Gratitude Interventions

While the potential barriers to high well-being and happiness have already been addressed in this paper, it is vital to stress on the potential ways to provide support towards students that experience elevated levels of stress and pressure from studies. Positive psychological interventions, as noted by Hamill et al. (2022, as cited in Leland, 2015) have been found to influence the well-being of the students, as well as their academic success. Moreover, Hamill et al. (2022, as cited in Waters, 2011) found that there is a link between well-being and positive psychological interventions that predict positive outcomes for a student, namely, academic performance and overall satisfaction from life.

This particular study does not aim at developing an intervention but rather creates a bridge to design an effective intervention in the future accounting for the insights gained from the collected data and literature analysis. Since the current state is lacking the factors that lead to knowing what is needed for a successful intervention, it is important to research the variables to know what should be targeted during an intervention. It is useful to aim at the specific needs of the target population and particular issues in the area of the Netherlands.

The current study

The main aim of this study is to assess two models of mediation where competence serves as a mediator while exploring the relationships among gratitude, self-efficacy and happiness in university students. The purpose of testing these particular models is to discover the effects of competence among university students on their happiness while accounting for the gratitude students experience and the extent of self-efficacy playing a role in student's life in the university. While it is clear that gratitude brings up happiness within the population, however, it is not entirely clear whether competence plays a substantial role in this relationship, accounting that the target population in this research is university students. It is useful to investigate and thoroughly research how the introduction competence changes the relationship between independent and dependent variables in the models. Therefore, the first research question is as follows:

RQ1: Does competence need satisfaction mediate the relationship between gratitude and happiness?

Self-efficacy is associated with pleasure and general life satisfaction, consequently, also explains a part of happiness within a human being. However, research lacks clear links to whether it is mediated by competence and could explain this relationship. The second research question is as follows:

RQ2: Does competence need satisfaction mediate the relationship between self-efficacy and happiness?

Though there are only two research questions, the models themselves are containing more relationships that are also examined to account for possible effects in this research. The scheme explaining the relationship and the hypotheses to be examined in this research are as follows:

Figure 1

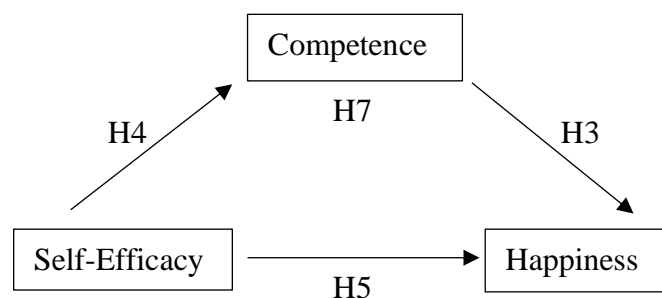*Mediation scheme of competence on the relationship between gratitude and happiness*
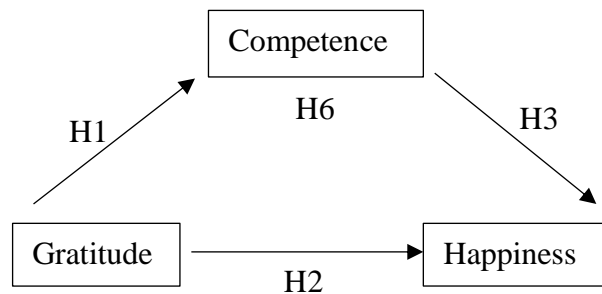
Figure 2

Mediation scheme of competence on the relationship between self-efficacy and happiness

H1: there is a (positive) relationship between gratitude and competence.

H2: there is a (positive) relationship between gratitude and happiness.

H3: there is a (positive) relationship between competence and happiness.

H4: there is a (positive) relationship between self-efficacy and competence.

H5: there is a (positive) relationship between self-efficacy and happiness.

H6: competence mediates the relationship between gratitude and happiness.

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

Methods

Design

An online questionnaire survey was conducted using the software Qualtrics. Data was collected using multiple questionnaires measuring participants' three basic psychological needs, happiness, gratitude and self-efficacy. Data was collected within a time frame of 27 days (March, 20th to April, 17th). This study used a cross-sectional design.

Participants

A calculation was made to determine the needed number of participants using a statistical regression sample calculator (*Regression and ANOVA - Sample Size Calculator*, n.d.). From the calculations, it was required to get a minimum of 90 participants in order to achieve statistical significance. The total number of respondents was 149 after the data collection was finished. From the achieved sample, 35 participants had to be excluded due to incomplete answers to the questionnaires or missing consent from the informed consent form. All the recruited participants were students understanding the English language. Therefore, 114 participants were included, ranging from 18 to 30 in their age (M = 21.85, *SD* = 2.44). The nationalities of participants were as follows: German ($N = 57$), Dutch ($N = 17$) and 40 participants ($N = 40$) from other countries such as Ukraine, the USA, Japan, Russia, Greece and others.

The participants were recruited accounting for the inclusion criteria being at least 18 years old and studying at a university. Ethical approval was requested and obtained from the BMS Lab of the University of Twente. The approval number is 230313. The sampling was distributed via SONA-system with an option of obtaining credits (0.5) by completing a survey and using convenient sampling via advertisements through social media and messengers such

as WhatsApp, Telegram, Instagram etc. The link to the study was posted in multiple group chats that were available to the researchers to gain as many participants as possible. This study additionally used snowballing as an additional sampling method to convenience sampling by asking the people who completed the survey to pass/send the study to other people of convenience.

Procedure

Once the participants were able to complete the survey through their smartphones, mobile devices or personal computers/laptops, they were provided with informed consent first (see Appendix B) where they were able to read the information about the procedure of completing the survey. The contact details of the researchers were also stated in case of need for support or any additional help, or to keep in touch in order to be informed about the final results of the study. Finally, a confidentiality statement was also provided to the participants. After the agreement with the informed consent, the participants were able to participate in a study and fill out the survey which consisted of five independent subsets. The approximate time of filling out the questionnaire was about 30 minutes.

Materials

Basic Psychological Needs: Competence

Information about participants' basic psychological needs was collected using Basic Needs Satisfaction in General Scale (BNSG-S) (Gagné, 2003). The questionnaire consisted of 21 items, measuring autonomy, relatedness and competence. Though this paper only takes competence into consideration, the other two constructs were measured for the remainder of the researchers in this project. An example of an item measuring one of the basic needs – competence: "Most days I feel a sense of accomplishment from what I do". Participants had an option to indicate to what level they agree or disagree with a statement using a 7-point Likert scale ranging from 1 = "not at all true" to 7 = "very true". BNSG-S has a high internal consistency .84 to .90 and a Cronbach's alpha of .89, indicating a good level of reliability (Gagné, 2003). For this particular sample taken for this paper, Cronbach's alpha was .78, indicating an acceptable level of reliability.

Self-efficacy

The information concerning the self-efficacy of the participants was collected using General Self-Efficacy Scale by Sherer et al. (1982), consisting of 17 items. An example item measuring the self-efficacy of the participants: "When I decide to do something, I go right to work on it". Participants were to rate the level of their agreement on a scale from 1 = "strongly disagree" to 5 = "strongly agree". The Cronbach's Alpha of the Self-Efficacy Scale was reported to be .86 which is considered to be good (Sherer et al., 1982). For this particular sample, Cronbach's alpha for the Self-Efficacy Scale resulted in .78, indicating an acceptable level of reliability.

Gratitude

The data collected about participants' gratefulness was measured with Gratitude Questionnaire- Six Item Form (GQ-6) by McCullough et al. (2002). An example item from this questionnaire is as follows: "I have so much in life to be thankful for". Participants were to rate their level of gratitude for something using a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". The reported Cronbach's alpha for this questionnaire was between .82 and .87 which is considered to be good (McCullough et al., 2002). For this particular sample, Cronbach's alpha for the Gratitude questionnaire appeared to be .79, indicating an acceptable level of reliability.

Happiness

Happiness in this research was measured using the Oxford Happiness questionnaire consisting of 29 items developed by Argyle and Hills (2002), measuring happiness as a unidimensional construct. An example item from this questionnaire is as follows: "I feel that life is very rewarding". Participants were to rate their levels of happiness using a scale ranging from 1 = "strongly disagree" to 6 = "strongly agree". The Cronbach's alpha for the Oxford Happiness questionnaire was reported to be .71 which is considered acceptable (Argyle & Hills, 2002). In the current sample, Cronbach's alpha for the Oxford Happiness questionnaire resulted in .75, indicating an acceptable level of reliability.

Data Analysis

After the end of data collection, the dataset was analysed using the RStudio version 2022.07.1 (RStudio Team, 2020). To check if the model fits the dataset, the assumptions of linearity, normality and homoscedasticity were checked. To answer the research questions, two

linear models were fitted to analyse if there is a relationship between the independent variables self-efficacy and gratitude and the dependent variable happiness (H2 and H5). To determine if the relationship turned out to be significant or not, a p-value of .05 was chosen. Next, the assumptions mentioned above, namely, linearity, normality and homoscedasticity were tested and visualized to check if this model is fitting the dataset. The assumptions of linearity and homoscedasticity were checked accordingly using a scatterplot. An assumption of linearity was checked using a histogram. To check the effects of mediation on the two models (H6 and H7), multiple linear regression analysis for performed. In the first model, the relationship between the independent variable gratitude and the mediator competence was tested first, then the relationship between the mediator and dependent variable happiness, and lastly the mediation was added to the model and tested. If the mediation effect turned out to be significant, the Sobel test was also applied to the RStudio output. The resulting test statistic and the p-value were also tested to determine if the mediator competence is significant. The second model with self-efficacy as an independent variable underwent the same procedure as the ascribed above model. The relationships between the variables determined in the hypotheses were also tested apart from the mediation models using linear regression.

Results

Preparation of the dataset

To gain the ability to conduct the hypothesis testing, the dataset exported from Qualtrics had to be cleaned and prepared for analysis. The first goal was to exclude the participants that did not fulfil the inclusion criteria and did not finish the questionnaire fully, namely the nonresponses (NAs). In order to exclude missing variables, a dichotomous variable "Finished" was made to exclude nonresponses. After running the new dichotomous variable, participants who did not finish the survey were excluded, leaving the dataset with 114 participants from the total of 149 for the analysis. A number of variables were renamed for the comfort of reading and analysing the data.

Then, the assumptions were tested. For this dataset, the assumptions of normality of the residuals, linearity, independence of the observations and homoscedasticity were tested in order to determine if the dataset is suitable to continue working on and whether there were any violations present. Normality was checked using a histogram in RStudio, distributed rather normally with one peak without skewing to the sides, with a range from -30 to +30 with outliers laying nearing -40 (see Appendix A for histograms). Linearity was checked using a plot with

predictions and residuals, indicating that plotted effects of the variables should add up together. This assumption also looked normal, with scores scattered around the line. The independence assumption was checked using a scatterplot by plotting the observations and checking whether they are randomly scattered (see Appendix A for scatterplots). For both models, the distribution of the data points was random without any inclinations present, indicating that the assumption is met. Homoscedasticity was checked by plotting the residuals, with equally scattered values, indicating that the assumption was met.

Descriptive statistics

As mentioned above, 149 participants in total participated in the study, out of which 35 were excluded due to missing data of any type, leaving a complete dataset with 114 credible participants ($N = 114$). Most of the participants were relatively young, with a mean age of 21.85 ($M = 21.85$, $SD = 2.44$), with a minimum of 18 and a maximum of 30 years old.

In addition, the average scores of the participants on the questionnaires present in this study were as follows: competence resulted in $M = 27.17$ ($SD = 6.06$) indicating that on average participants exhibited a moderate level of competence with a maximum of 42 and a minimum of 13. On the independent variable Gratitude, participants also were leaning closer to average with a mean of 33.21 ($M = 33.21$, $SD = 5.11$) with a minimum of 19 and a maximum of 42. On another independent variable – self-efficacy (SE), participants also scored an average value of 58.1 ($M = 58.1$, $SD = 11.2$) with a minimum of 26 and a maximum of 81. Lastly, on the dependent variable Happiness, participants scored average too, with a mean of 115.35 ($M = 115.35$, $SD = 20$), a minimum of 66 and a maximum of 162 (see Table 1 for descriptive statistics).

Table 1

Descriptive Statistics for Age, Happiness, Gratitude, Competence and Self-efficacy

Variable	*M*	*SD*	Min	Max
Age	21.85	2.44	18	30
Competence	27.17	6.06	13	42
Gratitude	33.21	5.11	19	42

Self-efficacy	58.1	11.2	26	81
Happiness	115.35	20	66	162

Note. M = mean; SD = standard deviation; Min = minimum; Max = maximum.

Then, Pearson's correlation was calculated along with Cohen's *d* to determine the effect size of the correlations. The results of Pearson's correlation are shown in Table 2 below:

Table 2
Pearson's correlation for Happiness, Gratitude, Self-Efficacy and Competence

Variable	r	r	r	r
	1.	2.	3.	4.
1. Happiness	-	.66*	.64*	.74*
2. Self-Efficacy	-	-	.35*	.70*
3. Gratitude	-	-	-	.35*
4. Competence	-	-	-	-

*Note. * Correlation is significant with a p-value of <.001*

The strength of the Pearson correlation was determined using an article by Turney (2022), where the values between 0 and .3 are considered weak, .3 and .5 are considered moderate and more than .5 are considered strong. Respectively, the effect size was determined using an article by Bhandari (2022), where Cohen's *d* less than .5 is considered small, less than .8 is considered moderate and more than .8 is considered large. As shown in Table 2, it could be seen that Happiness has the strongest positive correlation with all variables. While calculating Cohen's *d*, it was found that the effect of the correlation of happiness was large with competence (*d* = 5.96); the effect was also large between happiness and gratitude (*d* = 5.62); finally, the correlation effect between happiness and self-efficacy was also large (*d* = 3.52). The, the correlation between self-efficacy and competence was also reported to be positive and strong, with a large effect size according to Cohen's *d* (*d* = 3.42). Finally, the correlation between gratitude and competence was found to be moderate and positive with a large effect size (*d* = 1.07).

Direct effects

When the assumptions were met, it was possible to start testing the hypotheses. Therefore, this section is structured around the hypotheses that were mentioned in the introduction to this paper. It was mentioned earlier that this paper takes $p < .05$ for the reporting, however, since most of the values were a lot less than that value, a $p < .001$ is used for the comfort of reading. Figure 3 is shown below to correspond each hypothesis to an arrow in the model for the ease of reading.

Figure 3

Model 1: the relationship between gratitude and happiness mediated by competence
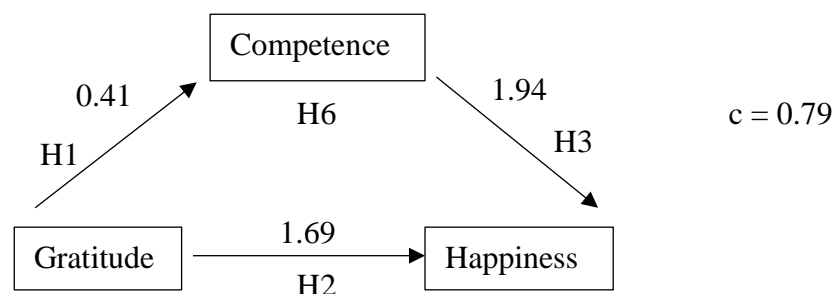
For the first hypothesis, namely, "*there is a relationship between gratitude and competence*" linear modelling was used to test the relationship between gratitude and competence. The relationship showed a significant effect ($b = .41$, $t(112) = 3.9$, $p < .001$), illustrating that the result is significant and the hypothesis (H1) can be accepted respectively. For the second hypothesis, namely, "*there is a relationship between gratitude and happiness*" a similar linear model was used to test the relationship. In this case, the effect was also present ($b = 2.49$, $t(112) = 8.77$, $p < .001$), illustrating that this result is significant, therefore, the second hypothesis (H2) can also be accepted. For the third hypothesis, namely, "*: there is a relationship between competence and happiness*" another linear model was used to investigate this relationship. The expected effects were present ($b = 2.44$, $t(112) = 11.6$, $p < 0.001$), indicating that this relationship is significant and therefore can be accepted (H3). Figure 4 is shown below to correspond the following hypotheses to the arrows demonstrating each relationship.
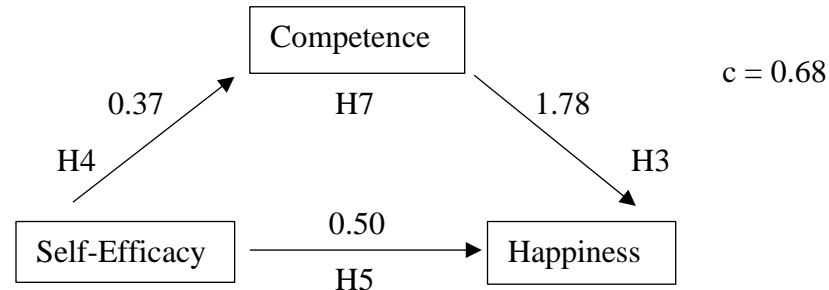
Figure 4

Model 2: the relationship between self-efficacy and happiness mediated by competence

For the fourth hypothesis, namely, "*there is a relationship between self-efficacy and competence*" another linear model was used to investigate this relationship. The effects between self-efficacy and competence were present ($b = .37$, $t(112) = 10.48$, $p < .001$), indicating that this relationship is significant and the hypothesis (H4) can therefore be accepted. For the fifth hypothesis, namely, "*there is a relationship between self-efficacy and happiness*" another linear model was used to investigate this relationship. The effects between self-efficacy and happiness were present ($b = 1.18$, $t(112) = 9.38$, $p < .001$), demonstrating that this relationship is also significant and therefore can be accepted (H5).

Mediating effects

Next, the mediation effects were checked upon finishing testing the relationships above. To test the mediation effects for both of the models, linear regression models were used to check the effects of competence on the relationships. For the first model (H6), namely, "*competence mediates the relationship between gratitude and happiness*" a linear model was used to investigate this relationship. The mediation effects of competence were present ($b = 1.95$, $t(111) = 10.88$, $p < .001$), while the relationship between gratitude and self-efficacy also remained significant ($b = 1.69$, $t(111) = 8.00$, $p < .001$). This indicates the significance of the mediation from competence on the relationship between gratitude and happiness therefore, this hypothesis is also accepted. Following, the Sobel test was applied with the resulting $z = 3.67$, $p < .001$, which indicates that the mediation is statistically significant. However, the mediation is partial, considering that the association between gratitude and happiness did not disappear afterwards.

Lastly, the second mediation model (H7), namely, "*competence mediates the relationship between self-efficacy and happiness*" another linear model was used to investigate this relationship. The mediation effects were present for this relationship ($b = 1.78$, $t(111) = 6.31$, $p < .001$), while the relationship between self-efficacy and happiness also remained significant ($b = .50$, $t(111) = 3.30$, $p < .01$), indicating the significance of mediation of competence on the relationship between self-efficacy and happiness. The last hypothesis can also be accepted. After completing linear regression, the Sobel test was applied again to the second model, revealing that $z = 5.40$, $p < .001$, indicating that mediation is statistically significant and partial since the association between self-efficacy and happiness also did not disappear in this case.

Discussion

The main objective of this paper was to find any potential association between students' self-efficacy and gratitude on their happiness while accounting for competence as a mediator. To achieve that, this study developed a survey consisting of various questionnaires that measured gratitude, self-efficacy, competence and happiness, taken among a sample of university students. The main purpose of this research was to discover how competence plays a role in the relationship between gratitude and happiness, and between self-efficacy and happiness. In the first model, the mediator competence influences the relationship between gratitude and happiness, while in the second case competence also plays the role of the mediator in the relationship between self-efficacy and happiness. Apart from testing the mediation, every bivariate relationship in the model has been investigated to understand the possible causes in students' life that affect the happiness they experience.

In the first model, four hypotheses are present that were analysed earlier in this paper. The first hypothesis predicting that there is an influence of gratitude on competence revealed that the expected effects are present, therefore, the hypothesis was accepted (H1). In this case, though Ryan and Deci (2000) mention that competence could play a role in various cases, such as motivation, happiness or self-efficacy, it is not clear whether gratitude could have a certain effect on competence. In addition, Lee et al. (2015) indicate that greater levels of gratitude predict better fulfilment of basic psychological needs, however, over time gratitude did not have an influence on competence, while gratitude still predicted other needs behind the scope of this paper. Lee et al. (2015) also presented contrary evidence, where competence, in turn, influenced gratitude over time. Therefore, this relationship needs to be further researched,

considering quite contrasting findings. Still, the effect was seen in this paper, indicating that the results may vary depending on numerous factors such as geographic location, age and others.

Taking the second hypothesis into consideration (H2), where it was found that there is an influence of gratitude on happiness, numerous papers including Ryan and Deci (2000) confirm that there is a visible effect of gratitude on happiness. This could happen due to elevated states of gratitude that make an individual feel happiness (Alsukah & Basha, 2021). Therefore, it could be the case that the skill of gratitude that individuals possess directly influences the levels of happiness they experience throughout their lives. Alsukah and Basha (2021) also found in their study that gratitude influenced happiness among university students, which also lies in parallel to this paper.

The next hypothesis analysed in this model was the influence of competence on happiness (H3), which also repeats itself in the second model, therefore, would only be discussed once. In the present study, the effect of competence on happiness was also found to be significant. This means that the amount of competence students feel is associated with how happy they are. In a study by Sapmaz et al. (2012), it was also revealed that the satisfaction of basic psychological needs is significantly and positively associated with the happiness people experience, further confirming the results in this paper. In addition, DeHaan and Ryan (2014) view happiness as a further fulfilment of the basic psychological needs, competence in the case of this paper. Therefore, when discussing the third hypothesis, happiness serves not as an independent value existing on its own but rather as an extension which further helps an individual to be confident in their actions when taking competence into account (DeHaan & Ryan, 2014).

Lastly, the final hypothesis in this model, namely, the mediation of the relationship between gratitude and happiness by competence was also found to be significant, which means that competence plays a mediating role in this relationship. This could further be explained as competence bringing a sense of fulfilment to the students, therefore, also contributing to the happy state students experience. However, as abovementioned, DeHaan and Ryan (2014) mention that the effect of competence could be further predicted by happiness, which should be researched more to determine whether competence influences happiness or vice versa, accounting that this relationship could be two-sided. Overall, this model could be explained through the skill of gratitude individuals possess that influences competence, while competence also has a contribution to feeling happy, though the latter could hypothetically influence vice

versa. Accounting that the skill of gratitude also predicts the levels of happiness one experiences, competence was found to contribute to this relationship. Though every relationship in this model was found to be significant, it should further be explored how gratitude contributes to the competence students experience while in higher education facilities.

In the second model, the fourth hypothesis investigated the relationship between self-efficacy and competence (H4) which turned out to be significant. Contrasted with these findings, Rodgers et al. (2014) suggest that self-efficacy does not satisfy the need for competence and, therefore, count self-efficacy and competence as two similar constructs that both contribute to academic success. It could also be related to the present study since during the exploration of the correlations between the variables, the correlation between competence and self-efficacy was very large, hinting that they both might relate to the same latent construct which needs further exploration. In line with Rodgers et al. (2014), Alhadabi and Karpinski (2020) also relate self-efficacy with academic success, which does not stand exactly with satisfying the need for competence but still contributes to a similar topic. The evidence suggests that the relationship between efficacy and competence needs satisfaction remains somewhat unclear though they are interrelated. Further analyses are needed in order to determine the concrete effects.

Next hypothesis (H5), namely, the relation of self-efficacy with happiness was also found to be significant. In this case, the capabilities of students to learn and apply the material contribute to feelings of happiness. Hayat et al. (2020) found somewhat similar results, where self-efficacy related to positive emotions, which further contributed to academic success. While this paper did not account for happiness influencing competence or academic success, it could be the case that needs further investigation to determine whether there is an effect of happiness itself on self-efficacy or academic success. Shilpa and Prasad (2017) and Van Zyl and Dhurup (2018) also found that self-efficacy influenced the happiness that students experience, which is in line with this paper. Therefore, the evidence suggests that students' belief in their capabilities is related to the levels of happiness they experience.

The last hypothesis for this model was the mediation of competence on the relationship between self-efficacy and happiness which turned out significant (H7). Competence has a significant influence on both of the models, which could further mean that the overall determination of students to strive for improvement influences their happiness, while self-efficacy and gratitude in turn affect the mediator. It was determined in the paragraph above that self-efficacy predicts happiness in some cases (Shilpha & Prasad, 2017; Van Zyl & Dhurup,

2018), however, it still needs further investigation to determine the role of competence in this case. In this paper, the mediating effects were present, meaning that satisfying the need for competence intervenes with the relationship between self-efficacy and happiness which contributes to the present research.

Limitations and Recommendations

While the key results have been interpreted above, it is crucial to mention any possible drawbacks that prevented progress in this study, as well as recommendations that could aid in further research. Starting with limitations, there were errors present that may have influenced the outcome of the results. The first limitation of this study is that study itself was cross-sectional, which does not allow for measurement of the causal effects of each variable which could explain more with regards to the influences of self-efficacy and gratitude on happiness. Considering that this study used a cross-sectional design, a recommendation could be made to use a different study design that allows for the investigation of a causal relationship between the variables and explore the possible changes in the results, for instance, a longitudinal design that will also allow introducing interventions and manipulations into the research (Wang & Cheng, 2020). Exploring the variables from various angles can be time-consuming, however, it is still vital to investigate every possibility and influence of the variables on each other before making certain conclusions.

Another limitation occurred, while setting up the survey, an error on the researchers' behalf was made, resulting in omitting the question in the demographics section about the gender of the participants. Not only that prevented the possibility to interpret the results per gender, but it also became impossible to count the number of participants per gender, possibly violating the representativeness of the population that participated in the study. Therefore, further cautiousness and external reviews are advised while setting a study prior to launching the survey.

Next, since participation came mostly from the students at the University of Twente, it is not possible to make conclusions about a larger population – for instance, students in the Netherlands. Therefore, since the information was mostly received from the respondents studying at the University of Twente, it is harder to generalize the results and apply them in a broader context (Nikolopoulou, 2023). Not only that but also the number of participants was only a little above 100 which also hinders the possibility to make conclusions about a larger

population. Since this study mainly considered participants from the University of Twente, it can be recommended to include more universities from across the Netherlands to explore the effects in other regions apart from Overijssel.

Lastly, there could have been a selection bias present since recruitment for the study was not randomized but rather distributed to a sample that was convenient to reach. Therefore, since this study largely made use of convenient sampling, which is highly selective, a randomized selection is recommended to ensure the reliability of the sample.

Strengths

Though this study has a number of limitations, some strengths that aided while conducting this study shall also be considered. Firstly, according to the calculations of the statistical regression calculator, which required 90 subjects to participate in order for this study to be statistically significant, this study fulfilled this prerequisite, and could therefore be considered reliable since the total number of fitting participants was 114. Regarding the design of the study, which was cross-sectional, it could be highlighted that this design is not challenging to conduct since this method is quick and does not require external financial aid (Wang & Cheng, 2020). Lastly, the questionnaires used in this study were reliable and comprehensive to ensure a thorough investigation of the selected variables, which could also be considered a strength of this study.

Practical Implications

As it was suggested in the introduction to this paper, a particular way of supporting students is positive psychological interventions that ease the amount of stress that students experience and elevate their happiness (Hamill et al., 2022). As it was found in this paper, gratitude predicts happiness of the university students, therefore, it is safe to consider implementing gratitude interventions, as well as others of a researcher's choice, in future studies. By doing that, it will become possible to determine to what extent positive psychological interventions elevate students' happiness and influence their academic success, as it was also mentioned by Hamill et al. (2022).

Conclusion

To sum up the main points of this study, this paper aimed to explore two models mediated by competence. In this first model, mediation accounted for the relationship between

gratitude and happiness, while in the second model, competence mediated the relationship between self-efficacy and happiness. The topic itself is not only emergent nowadays and among university students but also among other populations at different times, making it always useful to investigate from another point of view. Since the influence of self-efficacy and gratitude on competence was not quite clear, those needed further investigation to understand whether there is an influence of those variables. The investigated relationships were found to be significant, further, the mediation explored was also found to be significant, indicating that there is indeed an influence coming from self-efficacy and gratitude on happiness while competence mediates this relationship. Though the results found were significant, the research still needs to continue exploring the extent and ways to which an influence comes from the chosen variables. It is important to consider the indicated limitations and exclude them in further research while accounting for possible changes in the study design while researching to deepen the understanding of the topic.

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Appendices

Appendix A: assumptions of normality and independence

Table 1.

Assumption of normality for two models
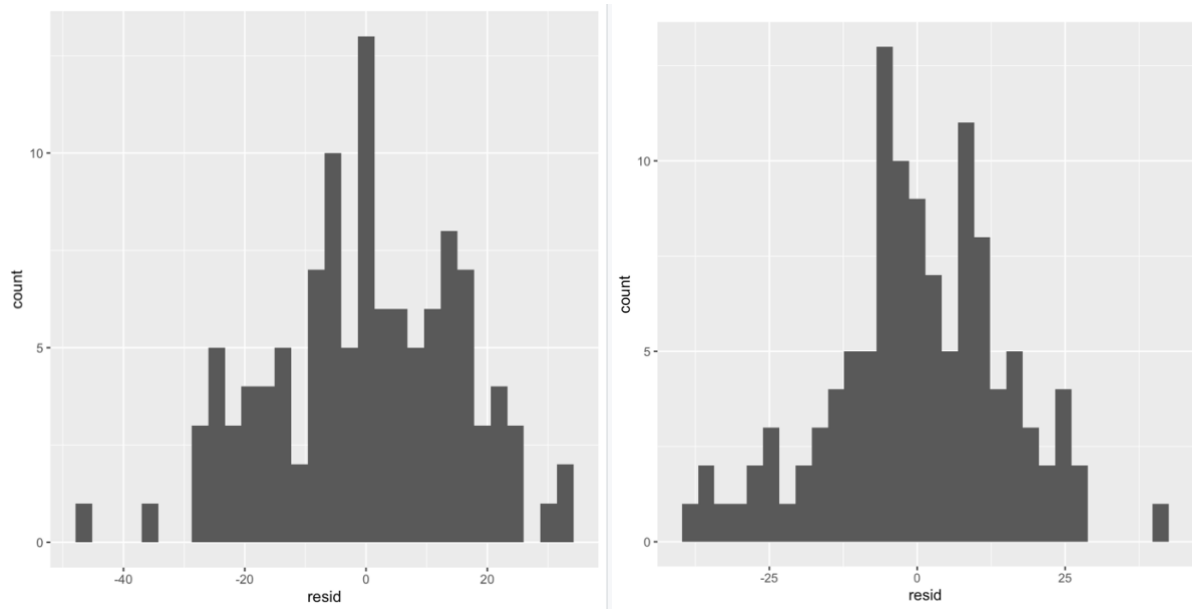
Table 2.

Assumption of independence for two models
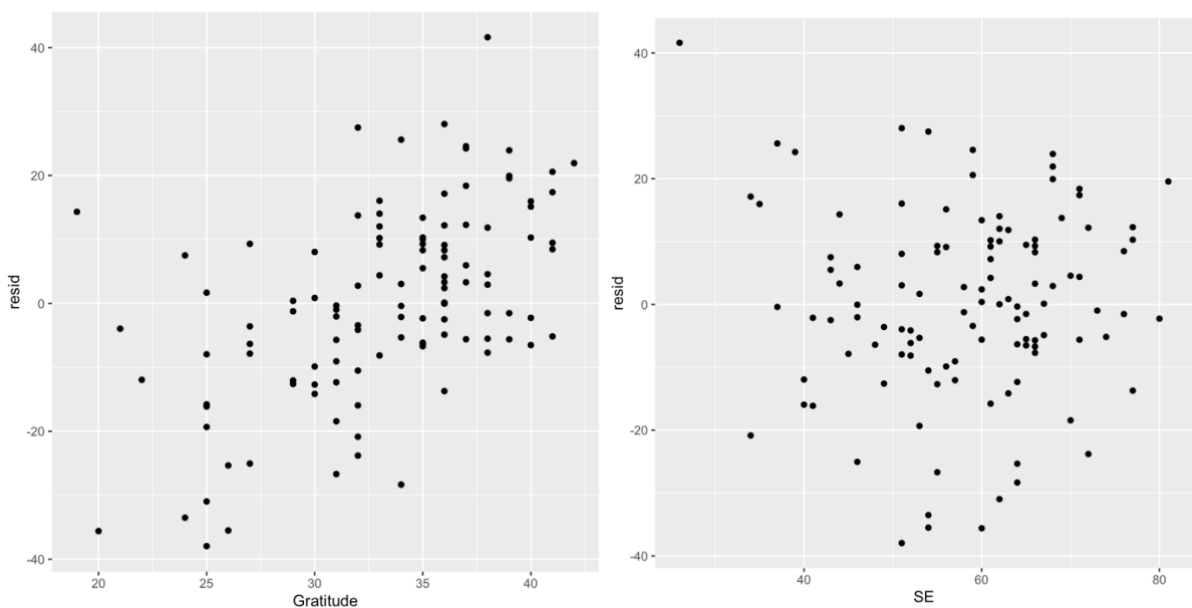
Appendix B: Informed consent

UNIVERSITY OF TWENTE.

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 a 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 safely stored for a certain amount of time if it is needed for the replication of the research. 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:
a.lazhentseva@student.utwente.nl
l.a.komnik@student.utwente.nl
a.d.jagosz@student.utwente.nl
BMS email: ethicscommittee-hss@utwente.nl

Please tick the appropriate boxes:

☐ I have read and understood the information above

☐ I understand that the information I will provide will be used for an educational research project

☐ I confirm that I study at a university and I am at least 18 y.o

☐ I consent

☐ I do not consent

Appendix C: Basic Needs Satisfaction in General Scale (BNSG-S) – Competence

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond.

	Not at all true (1)	2	3	Somewhat true (4)	5	6	Very true (7)
Often, I do not feel very competent	○	○	○	○	○	○	○
People I know tell me I am good at what I do	○	○	○	○	○	○	○
I have been able to learn interesting new skills recently	○	○	○	○	○	○	○
Most days I feel a sense of accomplishment from what I do	○	○	○	○	○	○	○
In my life I do not get much of a chance to show how capable I am	○	○	○	○	○	○	○
I often do not feel very capable	○	○	○	○	○	○	○

Appendix D: General Self-Efficacy Scale

Please read each statement carefully and describe the extent to which you agree with each statement, using a 5-point scale where 1 indicates "strongly disagree" and 5 indicates "strongly agree".

	Strongly disagree (1)	Disagree (2)	Neither agree or disagree (3)	Agree (4)	Strongly agree (5)
When I make plans, I am certain I can make them work	○	○	○	○	○
One of my problems is that I cannot get down to work when I should	○	○	○	○	○
If I can't do a job the first time I keep trying until I can	○	○	○	○	○
When I set important goals for myself, I rarely achieve them	○	○	○	○	○
I give up on things before completing them	○	○	○	○	○
I avoid facing difficulties	○	○	○	○	○
If something looks too complicated, I will not even bother to try it	○	○	○	○	○
When I have something unpleasant to do, I stick to it until I finish it	○	○	○	○	○
When I decide to do something new, I go right to work on it	○	○	○	○	○
When trying to learn something new, I soon give up if I am not initially successful	○	○	○	○	○
When unexpected problems occur, I don't handle them well	○	○	○	○	○
I avoid trying to learn new things when they look too difficult for me	○	○	○	○	○
Failure just makes me try harder	○	○	○	○	○
I feel insecure about my ability to do things	○	○	○	○	○
I am a self-reliant person	○	○	○	○	○
I give up easily	○	○	○	○	○
I do not seem capable of dealing with most problems that come up in life	○	○	○	○	○

Appendix E: Gratitude Questionnaire - Six Item Form (GQ-6)

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neutral (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I have so much in life to be thankful for	○	○	○	○	○	○	○
If I had to list everything that I felt grateful for, it would be a very long list	○	○	○	○	○	○	○
When I look at the world, I don't see much to be grateful for	○	○	○	○	○	○	○
I am grateful to a wide variety of people	○	○	○	○	○	○	○
As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history	○	○	○	○	○	○	○
Long amounts of time can go by before I feel grateful to something or someone	○	○	○	○	○	○	○

Appendix F: Oxford Happiness Questionnaire

Please read the statements carefully, some of the questions are phrased positively and others negatively. Don't take too long over individual questions; there are no "right" or "wrong" answers (and no trick questions). The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

	Strongly disagree (1)	Moderately disagree (2)	Slightly disagree (3)	Slightly agree (4)	Moderately agree (5)	Strongly agree (6)
I don't feel particularly pleased with the way I am	○	○	○	○	○	○
I am intensely interested in other people	○	○	○	○	○	○
I feel that life is very rewarding	○	○	○	○	○	○
I have very warm feeling towards almost everyone	○	○	○	○	○	○
I rarely wake up feeling rested	○	○	○	○	○	○
I am not particularly optimistic about the future	○	○	○	○	○	○
I find most things amusing	○	○	○	○	○	○
I am always committed and involved	○	○	○	○	○	○
Life is good	○	○	○	○	○	○
I do not think that the world is a good place	○	○	○	○	○	○
I laugh a lot	○	○	○	○	○	○
I am well satisfied about everything in my life	○	○	○	○	○	○
I don't think I look attractive	○	○	○	○	○	○
There is a gap between what I would like to do and what I have done	○	○	○	○	○	○
I am very happy	○	○	○	○	○	○
I find beauty in some things	○	○	○	○	○	○

I always have a cheerful effect on others	○	○	○	○	○	○
I can fit in (find time for) everything I want to	○	○	○	○	○	○
I feel that I am not especially in control of my life	○	○	○	○	○	○
I feel able to take anything on	○	○	○	○	○	○
I feel fully mentally alert	○	○	○	○	○	○
I often experience joy and elation	○	○	○	○	○	○
I don't find it easy to make decisions	○	○	○	○	○	○
I don't have a particular sense of meaning and purpose in my life	○	○	○	○	○	○
I feel I have a great deal of energy	○	○	○	○	○	○
I usually have a good influence on events	○	○	○	○	○	○
I don't have fun with other people	○	○	○	○	○	○
I don't feel particularly healthy	○	○	○	○	○	○
I don't have particularly happy memories of the past	○	○	○	○	○	○