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The moderating effect of relatedness on the relationship between self-regulation and well-being among university students

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Abstract

Mental health concerns among university students represent a prevalent issue. Research has outlined the positive effect of character strengths in the light of positive psychology on well-being. In particular, self-regulation was shown to positively predict well-being as well as academic achievement. In the context of the Self-determination theory (SDT), relatedness is also indicative for well-being and is said to promote engagement and achievement which undermines the possible positive effect of relatedness on self-regulation and consequently well-being in students. Based on previous research this study aims at investigating the relationship between self-regulation, relatedness and three different dimensions of well-being namely, satisfaction with life, positive affect and negative affect. It was hypothesized that relatedness moderates and strengthens the relationship between self-regulation and well-being. In total 132 participants took part in the cross sectional online survey. The survey included the Satisfaction with Life scale, Basic need satisfaction in general scale, Positive and negative affect scale as well as the Values in Action Inventory-72. Data was analysed by means of a correlation analysis and moderation analysis using a bootstrapping approach. Results indicated no significant prediction of self-regulation and relatedness on satisfaction with life and positive affect. However, self-regulation and relatedness significantly predicted negative affect with high scores on self-regulation predicting lower negative affect for student's high in relatedness. The outcome of the current study is in line with existing research confirming that self-regulation is positively associated with a dimension of well-being namely negative affect among university students. This substantiates the necessity of tackling the prevalent issue of mental health concerns in students and promoting their well-being by outlining the importance of self-regulation and relatedness on their mental health and performance.

Keywords: Character strengths, Self-regulation, Mental health, University students, Relatedness

Introduction

The past decades, the field of psychology paid a great amount of attention to the treatment of mental illness and pathology. However, the approach of positive psychology was established effectively and thereby, represents a favourable alternative for many psychologists (Marques, Pais-Ribeiro & Lopez, 2011). Gable & Haidt (2005) define positive psychology as “*the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups or institutions*” (p.103). According to Sheldon and King (2001), positive psychology invites to take into account potentials, motives and capacities of human beings. Thereby, it is concerned with the positive aspects of life rather than paying attention to damage (Peterson & Seligman, 2004). Domains positive psychology addresses are among others life satisfaction, happiness, interests and character strengths. Ultimately, an individual’s resources are targeted and encouraged which positively affects well-being (Park & Peterson, 2008).

A growing body of research investigated the development of well-being and mental health among university students. It became apparent that mental health concerns represent a prevalent issue in this population (Cooke, Bewick, Barkham, Bradley & Audin, 2006). Prince (2015) outlines the development of two trends regarding mental health among university students. Not only is the number of students seeking counselling increasing but mental health concerns are also more severe. One reason for that trend is the academic pressure students experience which consequently affect their well-being and performance negatively (Pedrelli, Nyer, Yeung, Zulauf & Willens, 2015).

One way for enhancing and maintaining well-being that was established is the promotion of character strengths (Gander, Proyer, Ruch & Wyss, 2012). According to Peterson & Seligman (2004), character strengths represent positive traits that transfer onto thought, feelings and behaviour. Moreover, they set a basis for healthy development and flourishing. By putting character strengths into practice, the experience of positive emotions is fostered which in turn facilitates well-being by enlarging a person’s capacity for action and thought. Supporting character strengths in this way enhances well-being (Gander, Proyer, Ruch & Wyss, 2012). Furthermore, encouraging character strengths not only positively influences development and well-being, but also reduces pathology. Among younger populations working with character strengths sets a fundamental basis for preventing social problems and foster healthy development of relationships (Park, Peterson & Seligman, 2004). Therefore, character strengths may be an important avenue for research to enhance well-being and reduce pathology in university students.

Character strengths refer to strategies and individual qualities humans possess (Duan & Bu, 2017). The Values in Action classification of strengths (VIA; viacharacter.org, 2020), outlines 24 character strengths that support optimal functioning. These are divided into six broader subgroups, namely wisdom and knowledge, courage, humanity, justice, temperance and transcendence. Different character strengths show different effects on certain areas in life (Park & Peterson, 2008). Self-regulation is recognized due to its effect on well-being as well as academic achievement and performance which highlights this character strength with regard to enhancing well-being among university students (Cooke, Bewick, Barkham, Bradley & Audin, 2006). Therefore, the current study focusses specially on self-regulation.

Character strength self-regulation is positively correlated with well-being and predicts academic achievement (Zimmerman, 2000; McClelland et. al, 2017). Thus, it represents a character strength of greater interest in the context of university students as they possibly experience decline in performance when well-being suffers (Cooke, Bewick, Barkham, Bradley & Audin, 2006). Self-regulation is a regulative function of the self. Zimmerman (2000) refers to self-regulation as the ability to manage environmental influences. Corresponding to that is the ability to sense when to make use of that skill according to the context. More specifically, self-regulation contributes to the refraining of a situation, regardless of the influences of internal or external stimuli as well as controlling emotion and attention. Furthermore, by engaging in self-regulation thoughts, feelings and other processes are controlled. It plays a crucial role for goal-setting, action control and goal-direction but also helps individuals resist temptations they may encounter (Hofer, Busch & Kärtner, 2010). Goal-setting, action control as well as goal-direction are features of major importance for mastering challenges students encounter during their studies.

According to McClelland et. al (2017), self-regulation is a feature affecting adaptive and developmental encounters of life and is therefore crucial in educational contexts. It entails proactive engagement in the learning process, self-activation and self-directing efforts with the intention of promoting knowledge and skills. Thereby, academic performance is affected positively. By engaging in self-regulative behaviour students can counteract possible stressors by regulating their experience and dealings with certain situations which acts as a buffer on negative emotions and in turn facilitates well-being (Durand-Bush, McNeill, Harding, Dobransky, 2015). This substantiates the importance of engaging in self-regulating behaviour in order to maintain well-being and manage experienced pressure. In conclusion, self-regulation not only affects well-being but also promotes certain behaviours related to

educational contexts which emphasizes the importance of self-regulative behaviour especially in university students (McClelland et. al, 2017).

However, whether an individual will engage in self-regulative behaviour is dependent on several factors. The self-determination theory (SDT) by Ryan and Deci (2000) is a theory of human motivation and argues that satisfaction of three psychological needs namely autonomy, competence and relatedness highly correlate with well-being. These three needs serve as a basis for growth and motivation when being satisfied. In other words, when the need for autonomy, competence and relatedness are fulfilled, a foundation for motivation, growth and optimal functioning is set which in turn promotes self-regulative behaviour (Brown & Ryan, 2004). In educational contexts, satisfaction of autonomy, competence and relatedness positively affect subjective well-being as well as performance (Levesque, Zuelke, Stanek & Ryan, 2004). Much is known about the impact of autonomy and competence on self-regulation and well-being. However, less research is devoted to the exploration of relatedness and its association with self-regulative behaviour, especially among university students. Relatedness refers to feeling securely connected to others and represents a universal human need that facilitates overall functioning when being satisfied. Moreover, it promotes engagement and achievement as well as cognitive processes (King, 2015; Baumeister & Leary, 1995). Niemiec & Ryan (2009) report that students feeling related display a higher tendency of engaging in regulative behaviour related to learning processes. Thereby, relatedness serves as a resource for promoting self-regulative behaviour and possibly strengthens self-regulation which in turn enhances well-being. Due to the focus on student populations this research pays attention to feelings of relatedness to peers and family in the environment of students as they have been found to compose important relationships among young people (King, 2015).

The importance of the present research arises due to the prevalent issue of health concerns among the student population. Moreover, the use of character strengths is effective with regard to enhancement of well-being. A longitudinal study conducted by Duan and Bu (2017) showed the positive prediction of character strengths use in general on student's well-being. The importance of character strengths is widely recognized as well as the beneficial effect of self-regulation in particular. Moreover, relatedness shows encouraging effects on self-regulative behaviour which makes this study a contribution to research on promoting well-being among university students. Therefore, the research question reads as follows *“Does relatedness moderate the relationship between self-regulation and well-being among University students?”*. It is hypothesized that *self-regulation skills positively influence well-*

being among University students and moreover, that this relationship is moderated by feelings of relatedness. It is expected that relatedness predicts a stronger relationship between self-regulation and well-being (see Figure 1).

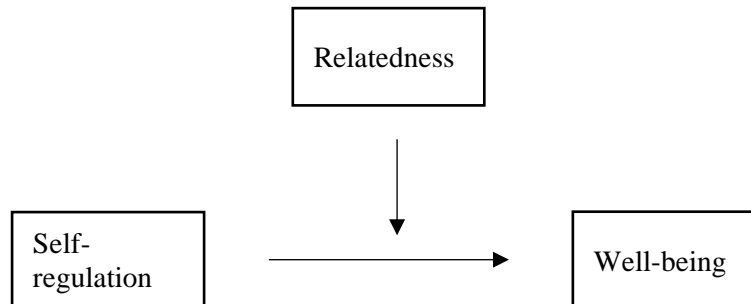


Figure 1. Model of the moderating prediction of relatedness on the relationship between self-regulation and well-being.

Methods

Design and Participants

For the sake of investigating the relationship between self-regulation and well-being with consideration of relatedness as a moderator, a cross-sectional online survey was conducted. As a means to collect data, a convenience sample was used. The sample was gathered through the distribution of an online survey. The survey was published on the University website Sona systems where students from the University of Twente gain (partial) study credits in exchange for taking part in the study. Moreover, the survey was distributed via social media in particular Facebook and Instagram as well as email by means of snowballing. Thereby, it was given to participants which were requested to distribute it further to people in their surroundings. The study has been approved by the Ethical Committee BMS of the University of Twente. The approval code for the study is BCE200274.

To be included in the study participants needed to fulfil certain inclusion criteria. Since the sample of the study focused on university student's participants needed to be student at a university. Moreover, to be able to conduct the survey, mastery of the English language was required. Consequential, exclusion criteria entailed not being a student and not understanding the English language. In total, 181 students took part in the study. 49 participants did not fulfil the requirements and were therefore excluded from the analysis. 30 students were not currently enrolled as students and did therefore not fulfil the inclusion criteria. Moreover, 19 students dropped out of the study after answering the demographic

questions. Hence, the final sample amounts to 132 participants. 82 (62.1%) of them are female and 49 (37.1%) male. The age of the participants ranged from 18 to 29 (see Table 1).

Table 1
Descriptive statistics of the participants (N=132)

Item	Category	Frequency	%
Gender	Male	49	37.1
	Female	82	62.1
Age	18 to 25	122	92.4
	26 to 29	10	7.6
Nationality	Dutch	4	3
	German	114	86.4
	Other	14	10.6
Student status	Undergraduate	107	81.2
	Postgraduate	25	18.8

Materials

Due to the collaboration of three students on the research on character strengths, the survey consisted of six questionnaires in total. For the purpose of investigating the aforementioned hypotheses, the “Satisfaction with life scale (SWLS; Pavot & Diener, 2009)”, “Basic need satisfaction in general scale (BNSG-S; Tajrishi, Besharat, Pourbohloul, Larijani, 2011)”, “Positive and negative affect schedule” (PANAS; Crawford & Henry, 2004) and “Values in Action Inventory-72” (VIA-72; viacharacter.org, 2020) were taken into account.

Self-regulation

Self-regulation was measured by using the VIA-72. The VIA-72 is a self-report survey and consists of 72 items measuring 24 character strengths. This represents a short version of the original VIA with 240 items. Short versions display several benefits compared to long versions such as reduced cost and time or possibility for repeated measures. Anjum & Amjad (2019) argue that the short version of the VIA is mostly comparable to the long version. Each strength is measured with three statements which could be answered on a 5-point Likert scale ranging from “1. Very much unlike me” to “5. Very much like me”. The overall scores represent to what extent the participant displays each strength. In this study, self-regulation is the target strength and therefore, only items measuring self-regulation were taken into

account. One example of a statement is: “I always keep my promises”. The reliability of the VIA-72 is $\alpha = 0.75$ and can therefore be classified as acceptable. Moreover, scores range from three to 15 with three indicating a low score on self-regulation and 15 a high score on self-regulation (viacharacter.org, 2020). The reliability of the subscale self-regulation in this study was $\alpha = 0.54$.

Well-being

Well-being was measured by means of the SWLS and PANAS which tests for two different dimensions of well-being. SWLS assesses the participants’ satisfaction with life and represents a reliable measure for well-being because of its assessment of “*conscious evaluative judgement of life*” (Pavot & Diener, 2009, p.101). It consists of five statements with answer option ranging from “1. Strongly disagree” to “7. Strongly agree” on a 7-point Likert scale. One example statement is: “If I could live my life over, I would change almost nothing”. Scores range from five to 30 with five representing extreme dissatisfaction with life and 30 extreme satisfaction. The reliability of SWLS is $\alpha = 0.89$ and can be classified as good to very good (Pavot & Diener, 2009). The reliability as analysed in the present study was $\alpha = 0.85$.

The second instrument used was the PANAS. PANAS measures positive and negative affect. The scale consists of 20-items showing emotional states. A 5-Point Likert scale ranging from “1. Very slightly or not at all” to “5. Extremely” represents the answer options. Positive states such as “Interested” or “Determined” measure positive affect whereas states such as “Distressed” or “Upset” measure negative affect. Reliability for positive affect measures ranges from 0.86 to 0.90 whereas negative affect measures display a reliability of 0.84 to 0.87 (Crawford & Henry, 2004). The reliability for the positive affect scale in this study was $\alpha = 0.81$ and for the negative affect scale $\alpha = 0.84$. The SWLS and PANAS were used and analysed separately as they are measuring different dimensions of well-being. SWLS measures a dimension of well-being concerned with satisfaction of life in general, whereas PANAS rather concerns emotional states of an individual (Huebner & Dew, 1996).

Relatedness

Relatedness was measured by using the BNSG-S. BNSG-S assesses satisfaction of the three psychological needs autonomy, competence and relatedness. Therefore, the scale consists of three subscales. In total, the measure consists of 21 items of which eight items assess relatedness. Answer options are represented by a 7-point Likert scale ranging from “1. Not at

all true” to “7. Very true”. Due to the importance of the need relatedness, only the subscale measuring satisfaction of relatedness is taken into account. One example item is: “I pretty much keep to myself and don’t have a lot of social contacts”. Scores range from eight to 56 with high scores representing greater satisfaction and low scores representing lower satisfaction. The reliability of for the subscale relatedness was $\alpha = 0.83$ (Tajrishi, Besharat, Pourbohloul, Larijani, 2011). The present study displays reliability of $\alpha = 0,55.$, which could be considered low (Tavakol & Dennick, 2011).

Procedure

Participants received an invitation for the survey via social media, e-mail or sona systems (a website where students from the University of Twente gain credits in exchange for participating in studies). The study started by clicking the link that was provided. The aim of the study as well as an informed consent were displayed (see Appendix A). The participants thereby got informed about the duration, confidentiality and anonymity of provided answers as well as their right to withdraw from the study at any given point of time. The participant needed to agree to the terms and conditions in order to proceed. The following section requested to give demographical information about age, gender, nationality and occupation. After that, the participants started answering the survey questions related to well-being, relatedness and self-regulation (see Materials). In order to continue to the following sections every question needed to be answered. Completion of the survey was accompanied by an acknowledgment from the researchers. Contact details of the researchers were presented at the end of the survey which allowed participants to ask questions that may arise. The duration of the study was approximately 20 minutes.

Data analysis plan

The data was analysed by means of the statistical program SPSS v24 (IBM 2015). First the data set was prepared for analysis by labelling the items of interest and computing a total score of each scale. To ensure completion and representativeness of the data, missing data was deleted by applying the list wise deletion approach. In order to visualize the distribution of the data set, means, standard deviations, as well as minimum and maximum ranges for all scales were computed. The reliability of each scale was estimated by calculating the Cronbach’s alpha. In order to assess the correlations between the variables, a Pearson correlation was performed. The moderation analysis was implemented by a bootstrapping approach, using Process Macro by Andrew F. Hayes (Hayes & Rockwood, 2017). The

program investigated three distinct relationships when performing a moderation analysis. At first, the relationship between self-regulation and well-being was analysed. Subsequently, the relationship between relatedness and well-being was investigated. Thereupon, the interaction effect of relatedness on the relationship between self-regulation and well-being was analysed. The model is classified as statistically significant when $p < 0.05$.

Results

Descriptive statistics

Table 2 displays the means, standard deviations and Pearson's correlation for self-regulation, well-being and relatedness. Participants indicated moderate self-regulation ($M=8.45$, $SD=2.56$) (viacharacter.org, 2020). Scores on relatedness display a mean in the upper range ($M=41.09$, $SD=5.56$) representing on average somewhat high feelings of relatedness (Tajrishi, Besharat, Pourbohloul, Larijani, 2011). Positive affect displays a value in the mid-range of the scale ($M=31.96$, $SD=6.56$) indicating moderate positive affect. In comparison, negative affect indicates a value in the lower range of the scale ($M=20.57$, $SD=6.11$) representing somewhat low feelings of negative affect among the sample (Crawford & Henry, 2004). Moreover, on average, participants were "slightly satisfied" ($M=25.48$, $SD=6.11$) with life (Pavot & Diener, 1993).

Table 2
Means, Standard deviations and Pearson's correlation for each scale

	Mean	Standard deviation	Self-regulation	Relatedness	Correlations		
					Positive affect	Negative affect	Satisfaction with life
Self-regulation	8.45	2.56	-	-	-	-	-
Relatedness	42.09	5.56	.125	-	-	-	-
Positive affect	31.96	6.56	.046	.083	-	-	-
Negative affect	20.57	7.06	.041	-.251**	.171*	-	-
Satisfaction with life	25.48	6.11	.050	.178*	.282**	-.266**	-

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Moderation analysis

The investigated interaction effect is the prediction of relatedness on the relationship between self-regulation and well-being. Since satisfaction with life, positive as well as negative affect are used to assess well-being the moderation is implemented for each dimension separately. At first, moderation with satisfaction with life is tested. This overall model was found to be not significant ($F(3,128) = 1.44$, $p = 0.23$; see Table 3). The first relationship analysed by PROCESS is the one between self-regulation and well-being. Corresponding to the overall moderation model, this relationship was found to be not significant ($b = -0.17$, $[-2.97, 2.62]$) indicating that self-regulation does not predict well-being. Next, the effect of relatedness on well-being is displayed and was also shown to be not significant ($b = 0.11$, $[-0.45, 0.68]$). Thus, relatedness does not predict well-being within university students. Lastly, the interaction effect of self-regulation and relatedness is in line with the previous findings and not significant ($b = 0.005$, $[-0.06, 0.07]$). Based on the aforementioned findings, it can be concluded that relatedness does not moderate the relationship between self-regulation and well-being with SWLS as a well-being measure.

Table 3
Linear model of predictors of satisfaction with life

	b	SEB	t	p	R ²
Constant	20.22 (-3.97, 44.41)	12.22	1.65	$\rho = .10$	
Self-regulation	-.17 (-2.97, 2.62)	1.41	-.12	$\rho = .90$	
Relatedness	.11 (-.45, 0.68)	.28	.39	$\rho = .69$	
Self-regulation x Relatedness	.005 (-.06, .07)	.03	.16	$\rho = .86$.18

Furthermore, another moderation analysis is conducted with PANAS as a well-being measure. The PANAS is separated into two subscales that are analysed for moderation separately. At first the positive affect scale is analysed. Corresponding to the previous findings, this model can be classified as being not significant ($F(3, 128) = 0.45$, $p = 0.71$; see Table 3.1). According

to the displayed results, self-regulation does not predict well-being ($b=-0.85$, $[-4.19, 2.49]$) as well as relatedness does not predict well-being ($b=-0.10$, $[-0.78, 0.57]$). At last, the interaction of self-regulation and relatedness is displayed which is not significant ($b=0.02$, $[-0.05, 0.10]$). Based on the previous findings it can be concluded that there is no interaction effect and relatedness does not moderate the relationship between self-regulation and well-being among university students with the positive affect scale as a well-being measure.

Table 3.1
Linear model of predictors of positive affect

	b	SEB	t	p	R ²
Constant	35.47 (6.58, 64.37)	14.60	2.42	$\rho = .02$	
Self-regulation	-.85 (-4.19, 2.37)	1.69	-.50	$\rho = .61$	
Relatedness	-.10 (-.78, .55)	.34	-.30	$\rho = .76$	
Self-regulation x Relatedness	.02 (-.05, .10)	.04	.57	$\rho = .57$.10

The second subscale of the PANAS that was tested for moderation is the negative affect scale. The overall model shows a significant outcome ($F(3, 128) = 4.61$, $p=0.004$; see Table 3.2). First the relationship between self-regulation and negative affect is analysed and shows significant results indicating that self-regulation predicts negative affect ($b=3.68$, $[-0.26, 7.10]$). The effect of relatedness on negative affect does not show significant results ($b=0.39$, $[-0.31, 1.08]$) indicating that relatedness solely does not predict negative affect. Lastly, the interaction of self-regulation and relatedness is analysed and can also be classified as being significant ($b=-0.08$, $[-0.16, 0.002]$). This demonstrates a prediction of self-regulation with relatedness on negative affect. Participants scoring high on self-regulation display low scores on negative affect. Moreover, this tendency is applicable for participants with high scores on relatedness (see Figure 2.2). Whereas, low self-regulation predicts high negative affect in participants scoring low on relatedness. In conclusion, the to be investigated hypothesis that the relationship between self-regulation and well-being among university students is moderated by relatedness can be rejected for satisfaction with life and positive

affect. However, outcomes of the negative affect scale show a prediction of self-regulation and relatedness on negative affect. This is in line with the expected outcome and can therefore be confirmed for negative affect as a well-being measure.

Table 3.2
Linear model of predictors of negative affect

	b	SEB	t	p	R ²
Constant	2.45 (-27.03, 31.97)	14.90	.17	$\rho = .86$	
Self-regulation	3.68 (.26, 7.10)	1.72	2.13	$\rho = .003$	
Relatedness	.38 (-.31, 1.08)	.35	1.09	$\rho = .27$	
Self-regulation x Relatedness	-.08 (-.16, .002)	.04	-2.03	$\rho = .004$.31

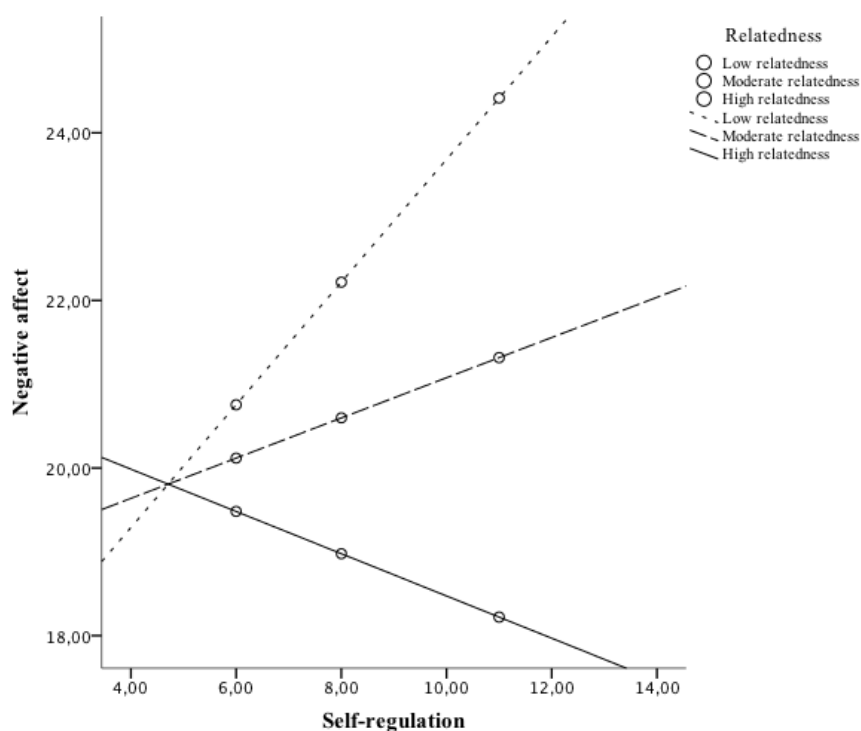


Figure 2.2 Interaction plot of self-regulation and relatedness on negative affect

Discussion

Mental health concerns among university students represents a prevalent issue affecting several aspects of life such as their well-being and performance (Cooke, Bewick, Barkham, Bradley & Audin, 2006). The aim of this study was to analyse whether relatedness predicts the relationship between self-regulation and well-being among university students. Hereby, well-being was classified into three dimensions that were tested separately namely satisfaction with life, positive affect and negative affect. Different effects were observed depending on the well-being measure. Results showed no significant interaction of self-regulation and relatedness on satisfaction with life, indicating that student's self-regulation and feelings of relatedness do not predict their satisfaction with life. Similar findings apply to positive affect as a measure of well-being. Self-regulation and relatedness did not predict positive affect students experience. In contrast, results of negative affect as a well-being measure deviate from the previous findings. Self-regulation solely as well as the interaction of self-regulation and relatedness showed a significant prediction of negative affect. Thus, it was observed that student's high in self-regulation experience less negative affect. This is especially true for students with high feelings of relatedness. Whereas, low self-regulation is associated with higher negative affect especially in students with low feelings of relatedness.

Prior research paid a great amount of attention to character strengths and their effect on well-being. According to Zimmerman (2000) as well as Gander, Proyer, Ruch & Wyss (2012), self-regulation positively influences well-being by fostering positive emotions. Moreover, Pedrelli, Nyer, Yeung, Zulauf & Willens (2015) outlined that self-regulation among university students acts as a buffer on the experience of negative emotions. This is in line with the findings of the current study on the dimension of negative affect which indicated that experienced negative affect declines with higher self-regulation. Furthermore, the moderator relatedness represents a psychological human need that was widely researched especially in correspondence with the SDT by Ryan and Deci (2000). Research conducted by King (2015) and Baumeister & Leary (1995) substantiate these findings and moreover, outline that relatedness promotes engagement, achievement and cognitive processes.

Therefore, it was assumed that relatedness may serve as a promoter of self-regulative behaviour in university students which in turn promotes well-being. These findings can again be confirmed by the present study for negative affect indicating that students displaying high self-regulation experience less negative affect when scores on relatedness are high and vice versa. Ultimately, the present study confirms that self-regulation and relatedness predict at least one dimension of well-being namely negative affect and therefore, represent properties

with potential of making a difference in the steadily growing problem of mental health issues among the university student population. The above-mentioned findings could be seen as a possible explanation for why this moderation showed a significant prediction. Relatedness may stimulate cognitive processes, engagement and achievement which in turn promotes self-regulative behaviour. This could be further explained by arguing that these factors possibly encourage reflection on someone's internal processes, how to achieve certain goals and attain these. In order to realize goal-setting and goal-direction the character strength self-regulation is used (McClelland et. al, 2017). Consequently, negative affect is buffered.

Moreover, the aforementioned results give rise to dig deeper into why the outcome was observed for negative affect but not for satisfaction with life and positive affect. Satisfaction with life and positive affect represent positive dimensions of well-being whereas negative affect represents a negatively framed dimension of well-being. Therefore, observations of low negative affect are indicative for well-being. The findings in the present study demonstrate that self-regulation and relatedness do not predict the extent to which students feel satisfaction with life and positive affect but they act as a buffer on negative affect by reducing the experience of negative emotions. Especially with regard to the prevalent issue that students display deterioration in well-being due to pressure and stress they experience, some students may not be able to label their well-being in terms of positive aspects such as satisfaction with life and positive affect. It rather be easier to express their experience of well-being in terms of the extent of negative affect when being in a stressful state. Du, Huang, An & Xu (2018) outline the close link between stress and negative emotions and found that among university student's high levels of stress are associated with negative emotions. Thereby, students in this study are possibly more able to reflect on negative framed states of well-being than positive framed ones. This serves as a possible explanation for the deviating outcomes for the different well-being measures. With regard to relatedness, it needs to be considered that feelings of relatedness may be evaluated differently for different cultures (King, 2015). Thereby, students from different cultures possibly defined relatedness different from other cultures which consequently leads to uneven outcomes.

Furthermore, the present study measured whether participants display self-regulation as a character strength. However, displaying a strength does not imply using it. Govindji & Linley (2007) argue that strengths use positively influences experienced well-being. Therefore, it can be reasoned that simply measuring self-regulation may not be sufficient to determine its association with satisfaction with life and positive affect and adding a measure of strength use would be necessary. The responses on measures of self-regulation the students

gave might have been determining enough to show prediction on negative affect but not strong enough to shift experiences of well-being from solely low negative affect to being satisfied with life and experiencing positive affect. This suggests why in this study self-regulation predicted negative affect without a measure of strength use.

Ultimately, the outcome of self-regulation and relatedness on negative affect outlines the importance of promoting these factors among university students. Therefore, practical implications for future research can be suggested. With regard to self-regulation incorporating strengths building interventions with a focus on self-regulation skills and how to apply these into the university routine could be a starting point for tackling deterioration of mental health in students. An intervention assessed by Rosario, P. et al. (2010) in which students reported their academic experience over a period of time showed improvement of student's self-regulation skills afterwards. These findings are promising and indicate that self-regulation skills can be improved. Moreover, considering relatedness King (2015) noted the importance of perception. Therefore, offering students a different perspective on their social environment may already help acknowledging feelings of relatedness differently. With regard to the university setting Niemiec & Ryan (2009) argue that feelings of relatedness can be enhanced by displaying respect and care towards students.

Strengths and limitations

The present study contains strengths as well as limitations that may have had an effect on the outcome and may serve as a basis for future research. First of all, the research was devoted to the positive psychological branch character strengths which represents a useful approach for enhancing well-being. Due to rising growth of positive psychology this constitutes a topic of interest for improving mental health and can therefore, be seen as a contribution to research on character strengths and their prediction of well-being among university students. The results from the present study deviate partly from what previous research reports, however this might stimulate to take a different perspective. Generally speaking, due to the quantitative online nature of the study, it can be easily replicated, a large number of respondents can be reached and it is time effective for researcher and participant. Moreover, the online survey enables participants to answer questions anonymously which possibly encourages participants to answer as honest as possible (Van Selm & Jankowski, 2006).

Next to the strengths of the study, limitations need to be taken into account when making statements about results and their interpretation as well. To begin with, self-regulation was measured by means of a subscale of the VIA-72 which consisted of three items.

Generally, the VIA displays good reliability when used as a complete questionnaire. However, in this study three out of 72 items were used which possibly affected its reliability. This gives rise to the assumption that three items are less expressive in determining someone's level of self-regulation. Furthermore, the reliability of the BNSG-S was rather low in the present study which makes reliability and validity of the outcome scores of relatedness questionable.

In addition, self-regulation may be more difficult to identify in oneself, therefore incorporating a multifaceted scale measuring for several dimensions of self-regulation possibly facilitates identifying self-regulation skills. Moreover, since the study was conducted online possible biases such as response bias cannot be assessed properly. Thus, participants may have indicated more desirable answer options or simply had difficulties assessing certain tendencies in themselves which consequently led to misleading responses. With regard to the findings in this study response bias may resulted in a floor effect and thereby, influenced the results indicating weak tendencies of self-regulation and relatedness in a large number of students causing the present outcome on satisfaction with life and positive affect. Lastly, as the study was implemented cross sectional it was carried out at a certain point of time, which does not enable inference in the long run as well as determining causality (Levin, 2006).

Recommendations for future research include incorporating a more representative measure for self-regulation to be able to determine someone's level of self-regulation more precise. Furthermore, including an instrument measuring strength use should be considered as this possibly shows stronger predictions on well-being than solely self-regulation.

Conclusion

This study aimed to explore the relationship between self-regulation, relatedness and well-being among the population of university students. Self-regulation and relatedness have been shown to predict negative affect but not satisfaction with life and positive affect. It was demonstrated that self-regulation and relatedness reduce negative affect in students. This gives insight into the importance of character strengths in particular self-regulation and relatedness to reduce negative affect among university students. Thereby, possible factors for tackling mental health concerns and enhancing well-being by promoting self-regulation and relatedness in students are outlined. By considering findings and implications from the present study another step towards improving mental health in university students can be made.

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Appendix

Appendix A

Informed consent

Thank you for wanting to participate in our study. Please read the following information carefully.

The aim of this study is to investigate the relationship between character strengths and mental health of individuals.

By proceeding to the next page, I agree that ...

I understand that I consent voluntary to the study. I can refuse to answer questions and can withdraw from the study at any time without having to give a reason.

I understand that the data collected in this online survey will be treated strictly confidential. All analysis of the collected data occurs anonymously and only for the purpose of this study. If the data is published, measures will be taken to ensure that no data of any individual is recognizable as such.

I understand that personal information collected about me that can identify me will not be shared beyond the study team.

I understand that all information I provide will be anonymized.

If you have any further questions, please contact the researchers:

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If you have questions about your rights as a research participant, or wish to obtain more information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-bms@utwente.nl