The relation between positive emotions and strength use and their association with college students' mental well-being: modeling the mediation of study engagement

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Abstract

Today's college students' mental health is suffering, in part shown by a high demand for mental health services amongst college students. In terms of supporting positive mental health, the field of positive psychology suggests several theories for human flourishing, such as the broaden-and-build theory. Positive emotions and strength use are explored here, but the interactions with another variable of note, study engagement, have not yet been explored in this context. To add to the understanding of factors supporting college students' positive mental wellbeing, the current study hypothesised a model based on the broaden-and-build theory, adding study engagement as a possible mediator between strength use, positive emotions, and mental wellbeing. Dutch college students (N=77) were recruited to fill out an online questionnaire. Analyses on regression and mediation were conducted using the bootstrapping technique. The results showed that strength use and positive emotions were both significant predictors of mental wellbeing, but study engagement did not mediate this association. Study engagement by itself was significantly correlated with mental wellbeing and positive emotions. Due to these findings as well as contradictory previous findings, more research into the relationship between the broaden-and-build theory and engagement is advised. Suggestions for future research include consideration of more expansive, fitting mediation analyses as well as the usage of a more expansive instrument for measuring positive emotions.

Introduction

College students in the information age are dealt a mixed hand. On the one hand, information has never been easier to access, economic welfare is at an all-time high, and there are more possible study programmes to choose from than ever before (Cain, 2018; Levine & Dean, 2012). On the other hand, college students are massively in debt, emotionally overwhelmed, and the demand for mental health treatment is increasing (Cain, 2018; Levine & Dean, 2012, Britt, Ammerman, Barret, & Jones, 2017). The mental well-being of college students, defined by Keyes (2002) as "a syndrome of symptoms of positive feelings and positive functioning in life", is a topic that colleges could, should, and luckily, often do pay attention to. In order to help students perform better and feel better, research is to be conducted on how college students' mental health can be influenced and supported.

Especially well-suited for this goal is the field of positive psychology. Positive psychology is a field of research focusing on the conditions for human flourishing, posed as a countermovement to psychology's focus on pathologies (Seligman & Csikszentmihalyi, 2000). Human flourishing is defined as the presence of mental health, whereas the absence of mental health is called languishing (Keyes, 2002). The further definition of mental wellbeing includes several dimensions, namely psychological wellbeing, emotional wellbeing, social wellbeing (Keyes, 2002). Engaging in this focus on factors supporting mental wellbeing, positive psychology is still an emerging field of research with its first classifications dating back to 2000 (Seligman & Csikszentmihalyi, 2000). Still, the effectiveness of positive psychology has been shown through various interventions (Seligman, Steen, Park, & Peterson, 2005).

Character strengths is one of the mainstay topics of the field of positive psychology and are defined by Linley (as cited in Kwok & Fang, 2008) as "a pre-existing capacity for a particular way of behaving, thinking, or feeling that is authentic and energising to the user. It

enables optimal functioning, development and performance". Research in the field of positive psychology has found that character strengths are linked to overall wellbeing (Park, Peterson, & Seligman, 2004). This link, however, appears to more accurately concern the use of character strengths as opposed to the mere possession of character strengths, as using strengths increases the effects on subjective well-being. (Govindji & Linley, 2007; Proctor, Maltby, & Linley, 2011).

The association between strength use and mental well-being has been found in previous studies (Park, Peterson, & Seligman, 2004; Govindji & Linley, 2007; Proctor, Maltby, & Linley, 2011; Miglianico, Dubreuil, Miquelon, Bakker, & Martin-Krumm, 2020). In the current study, this relationship will be affirmed as part of the hypothesised model (see Figure 1).

H_1: Strength use predicts mental well-being.

Additionally, in the field of positive psychology the relationship between positive emotions and mental wellbeing is studied. The construct 'positive emotions', defined as the experience of pleasant or desirable emotions such as joy or pride, relates to mental wellbeing strongly (Diener, Thapa, & Tay, 2020; Rusu & Colomeischi, 2020; Keyes, 2000). The current paper proposes that a correlation between positive emotions and strength use may be supported by the broaden-and-build theory by Frederickson (2001). First, in the 'broaden' step the attention and thought-action repertoires are broadened by the experience of positive emotions (Frederickson, 2001). Strength use factors into this through the fact that the selection of a character strength to apply is broadened as well, allowing strength use to be more prevalent amongst those who feel positive emotions (Kwok & Fang, 2020). Then, in the 'build' step through positive reinforcements, additional skills, or indeed, strengths, are built

up, meaning that strength use could be considered a type of a resource that is built up (Kwok & Fang, 2020).

For positive emotions affecting strength use, we refer to the interactions described by the broaden-and-build theory, namely both the implication of the broadening step enabling strength use as well as strength use being a possible personal resource that is built up as a result of positive emotions-induced behaviour (Frederickson, 2001; Frederickson & Branigan, 2005; Kwok et al., 2015; Kwok & Fang, 2020). Strength use affecting positive emotions has also been shown through a mediating relationship on satisfaction, as in a study by Lavy and Littman-Ovadia (2017) strength use had an effect on job satisfaction which was mediated by positive emotions. Since there are arguments for both directions of this relationship, the possibility of a correlation is hypothesised.

This interaction seemingly feeds back into itself, with the reinforcement of strength use broadening the perspective of additional situations to use strengths (Kwok & Fang, 2020). To again affirm this relationship and contextualize the remaining relationships, this study will test the relationship between positive emotions and mental wellbeing.

H_2: Positive emotions predict mental well-being.

H_3: Positive emotions and strength use have a positive correlation.

Of specific interest to the topic of student wellbeing, recent research has explored the relationship between strength usage and work or study engagement (Kwok & Fang, 2020; Van Wingerden & Van Der Stoep, 2018). Engagement, whether with work or study, can be defined as a state of mind characterised by absorption, vigour, and dedication (Schaufeli et al., 2002; Schaufeli & Bakker, 2004). This is referring to a persistent state rather than a momentary state (Schaufeli et al., 2002; Schaufeli & Bakker, 2004). Engagement has been

shown to be related to task and contextual performance, as well as turnover intentions and burnouts (Christian, Garza, & Slaughter, 2011; Hakanen, Bakker & Schaufeli, 2006; Salanova, Schaufeli, Martinez, & Bresó, 2009). In a recent study by Lavy and Littman-Ovadia (2017), engagement was shown to play a mediating role in the effect of strength use on job satisfaction. Several other studies have similarly found a relationship between strength use and engagement (Kwok & Fang, 2020; Van Wingerden & Van Der Stoep, 2018). Therefore, there is reason to build further on this relationship between strength use and engagement.

When it comes to relating engagement and mental well-being, engagement has on several occasions been shown to fulfil a mediating role in achieving well-being (Diener, Thapa, & Tay, 2020; Rusu & Colomeischi, 2020; Lavy & Littman-Ovadia, 2017). Strength use is related to mental well-being and also positively related to engagement (Miglianico, Dubreuil, Miquelon, Bakker, & Martin-Krumm, 2020; Lavy & Littman-Ovadia, 2017; Kwok & Fang, 2020). Engagement, in turn, affects mental well-being (Salanova, Schaufeli, Martinez, & Bresó, 2009; Hakanen & Schaufeli, 2012). Additionally, the effect of positive emotions on well-being is in part explained by an increase in engagement (Diener, Thapa, & Tay, 2020; Rusu & Colomeischi, 2020). The interactions found here are at times unclear, however, as another study instead showed that the effect of engagement on well-being is in turn explained by an increase in positive emotions (Levy & Littman-Ovadia, 2017). In an educational setting, some support has also already been found for strength use moderating the relationship between positive emotions and study engagement, but positive emotions in turn moderates one of the mediators of strength use's effect on life satisfaction (Kwok & Fang, 2020; Douglass & Duffy, 2015).

The spider-web of interactions around strength use and positive emotions is built on several theories within positive psychology, one of the main theories being the

aforementioned broaden-and-build theory (Frederickson, 2001). In the broaden-and-build theory, the role of positive emotions is emphasised as not merely indicative of well-being, but fundamentally causing well-being (Frederickson, 2001).

To add to the current body of research, two hypotheses will be tested to further study the relationships between strength use, positive emotions and mental wellbeing as explained by study engagement.

H_4: Study engagement mediates the effect of strength use on mental well-being.

H_5: Study engagement mediates the effect of positive emotions on mental well-being.

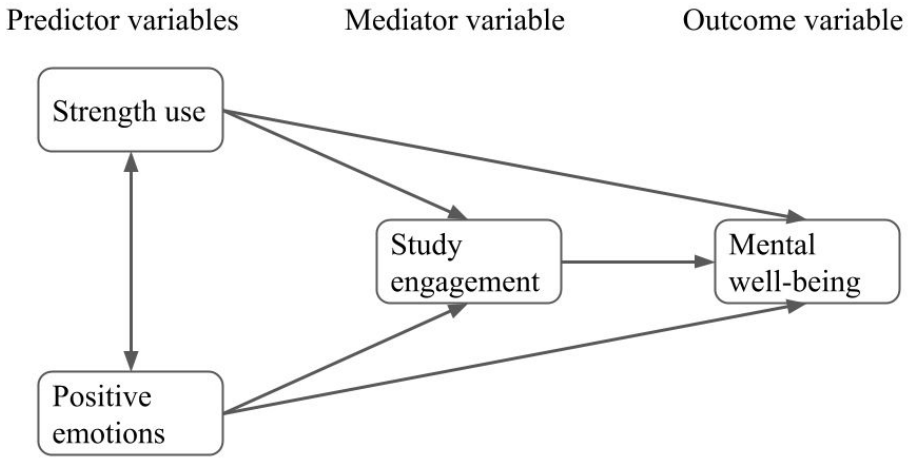
In sum, research has shown links between strength use and well-being, as well as with engagement and positive emotions (Kwok & Fang, 2020; Van Wingerden & Van Der Stoep, 2018; Park, Peterson, & Seligman, 2004). If these relationships can be properly modelled and are further supported by research, a compelling case for including some form of support based on positive psychology in education settings could be made, combining the potential of improved mental well-being with improved academic engagement (Salanova, Schaufeli, Martinez, & Breso, 2009). Therefore, this study aims to expand the support for the relationship between strength use, positive emotions, study engagement and mental well-being.

Current study

The current study uses a cross-sectional design to measure and model the interactions of strength use, positive emotions, study engagement, and mental well-being amongst college students. For this, several hypotheses are stated, which are summarized in the conceptual model (Figure 1).

Fig. 1

Hypothesised model of interactions between strength use, positive emotions, study engagement and mental wellbeing.



Methods

Design

The current study employs a cross-sectional survey design. It has been approved by the BMS Ethics Committee of the University of Twente (application number: 201255). In order to test the hypotheses, the variables 'positive emotions', 'strength use', 'study engagement' and 'mental well-being' were measured. As the hypotheses also concern mediation, the variables are divided into the following categories: predictors, being 'positive emotions and 'strength use'; a mediator, being 'study engagement'; and an outcome variable, being 'mental well-being'.

Participants

The participants were recruited from the target group of students, with the inclusion criteria of being 16 to 30-year-old and studying full-time in the Netherlands. A convenience sample of participants were recruited amongst college students in Enschede, through the SONA system of the University of Twente, which recruits psychology students, as well as through the personal network of the researcher. Recruitment took place for 2 months, namely during November and December, 2020.

Measures

Strength use

This study used the strength use scale (SUS) developed by Govindji & Linley (2007). This scale consists of 14 questions, e.g. 'I use my strengths to get what I want out of life' or 'I always play to my strengths', answered on a scale of 1 to 7, and focuses on the use of strengths as opposed to the presence of character strengths. It has been used and tested to

valid and reliable effect in the context of measuring strength use, both in adults and children (Govindji & Linley, 2007; Kwok & Fang, 2020). In the current study, this instrument's Cronbach's Alpha of 0.911 shows it to be reliable (Field, 2018).

Positive emotions

To measure positive emotions, the positive affect subscale of the positive and negative affect schedule short form (PANAS-SF) was used (Mackinnon et al., 1999). In the original instrument, both positive and negative affect were measured using 5 items each for a total of 10 items, such as 'inspired' and 'determined', answered on a 1 to 5 scale as to what extent this feeling was experienced in the past week. It has been found to be reliable and valid following analysis both cross-sample and cross-cultural, and has been used in research (Thompson, 2007; Kwok & Fang, 2020). The shortened form in this study showed a Cronbach's Alpha of 0.576, which is somewhat lower than the preferred 0.7.

Study engagement

Study engagement was measured using the Utrecht Work Engagement Scale for Students (UWES-S) as discussed in Schaufeli, Salanova, Gonzalez-Roma and Bakker (2002). This measures the three aspects of engagement, namely vigour, dedication and absorption (Schaufeli et al., 2002; Schaufeli & Bakker, 2004). The 13 items include 'When I am studying, I feel mentally strong' and 'When I get up in the morning, I feel like going to class', which are answered on a seven-point scale as to how often the participants feelings are described by these items, ranging from never (1) to always (7). The Utrecht Work Engagement Scale for Students has been found to have significant internal validity and reliability, making for an adequate instrument to measure study engagement in the target group of students aged 18 to 30 years old (Carmona-Halty, Schaufeli, & Salanova, 2019). In

the current study, Cronbach's Alpha for this instrument was 0.885, which shows the test to be reliable.

Mental well-being

For mental well-being, the Mental Health Continuum Short Form (MHC-SF) was used (Keyes, 2002). This instrument measures several perspectives on mental health, including psychological, social, and emotional well-being. Each perspective includes several questions for a total of fourteen questions to be answered on a seven-point scale, such as 'During the past month, how often did you feel satisfied with life?' and 'During the past month, how often did you feel that you had experiences that challenged you to grow and become a better person?'. The MHC-SF has been found to be valid and reliable amongst participants aged 12 and up, in relation to internal validity, construct validity, and metric invariance (Luijten et al., 2019; Keyes, Wissing, Potgieter, Temane, Kruger, & Van Rooy, 2008). In the current study, Cronbach's Alpha was 0.883, which shows the test to be reliable here as well.

Procedure

Recruited participants were asked to complete an online Qualtrics questionnaire about the use of personal strengths in relation to study engagement and positive mental health. All questions were posed in English as to best cater to the international origin of college students in the Netherlands.

After providing consent through agreeing to an informed consent form (See Appendix A), the participants were presented with several questions about socio-demographic information such as age, gender, and educational status. Then, participants were presented with the online survey consisting of the 46 questions described earlier (See Appendix B). The completion of the questionnaire took approximately 15 minutes on average. After

completion, the participants were once again shown contact information of the researcher to provide an additional opportunity to ask questions. Participants recruited through the Sona system were awarded partial study credits after completing the study.

Data Analysis

The gathered data was analysed by means of the statistics software SPSS (version 26). Prior to starting analysis, incomplete and ineligible (participants not meeting the conditions of the target group) entries were deleted, leading to 4 of the collected 81 entries being removed from the study.

To test the hypotheses, several analyses were performed. For hypotheses 1 and 2, linear regression analyses were conducted. A Pearson correlation analysis between strength use and positive emotions was conducted for hypothesis three. The mediation hypotheses four and five were tested separately as the sample size did not allow for more complex models. For the mediation tests, conditions were checked and Sobel-tests were calculated based on the regression analyses' outcomes to assess whether a significant mediation effect could be found.

For both the regression and mediation analyses, the SPSS PROCESS macro was used, which employs bootstrapping (Hayes, 2017). Bootstrapping, a method in which a subset of the dataset is selected thousands of times to increase statistical power, was applied to compensate for the small sample size (Field, 2018). Additionally, because several separate tests were performed in favour of a single complex analysis, the analyses' alpha for significance was set at 0.01 instead of the often used 0.05 (Lakens et al., 2018).

Results

Demographic

The majority (77.9%) of the study population identified as female. Males took up 20.8%, and 1.3% of the study population identified as non-binary (see Table 1). The population's mean age was 20.96 years old. The participants' mean score on the four variables closely matched expected values (see Table 2), with positive emotions' mean score of 17 out of 24 being the exact average for the Mackinnon et al. (1999) study.

Regression analyses

The first hypothesis stated that strength use predicts mental well-being. The analysis of the data shows this prediction was significant ($b = .343$, 95% CI = [.107, .577], $t = 3.126$, $p = 0.002$, see Figure 2). Positive emotions also predicted well-being (H2), ($b = 1.221$, 95% CI = [.490, 1.976], $t = 3.268$, $p = 0.002$, see Figure 2).

Correlation analysis

For the third hypothesis, a significant positive correlation was found between the variables positive emotion and strength use ($r = .435$, 95% CI = [.195, 0.625], $p = 0.000$, see Figure 2).

Mediation analyses

For the fourth hypothesis, 'study engagement' mediating the relationship between 'strength use' and 'mental well-being', the total effect of the predictor ('strength use') on the outcome ('mental well-being') has been tested in the form of hypothesis 1. The effect of 'strength use' on 'study engagement' was found to be insignificant, with a significance score outside of set alpha levels ($b = .190$, 95% CI = [0.000, 0.428], $t = 1.852$, $p = 0.068$). The effect of the mediator 'study engagement' on the outcome variable 'mental well-being' was significant ($b = .404$, 95% CI = [.124, .674], $t = 3.597$, $p = 0.001$).

Table 1.

Sociodemographic characteristics of the study participants.

Characteristics	n	%
Gender		
Male	16	20.8%
Female	60	77.9%
Non-binary	1	1.3%
Age		
16-17	1	1.3%
18-19	24	31.2%
20-21	27	35.1%
22-23	17	22.1%
24-25	9	3.9%
26-30	5	5.5%

Note. $N = 77$. Participants were on average 20.96 years old.

Table 2.

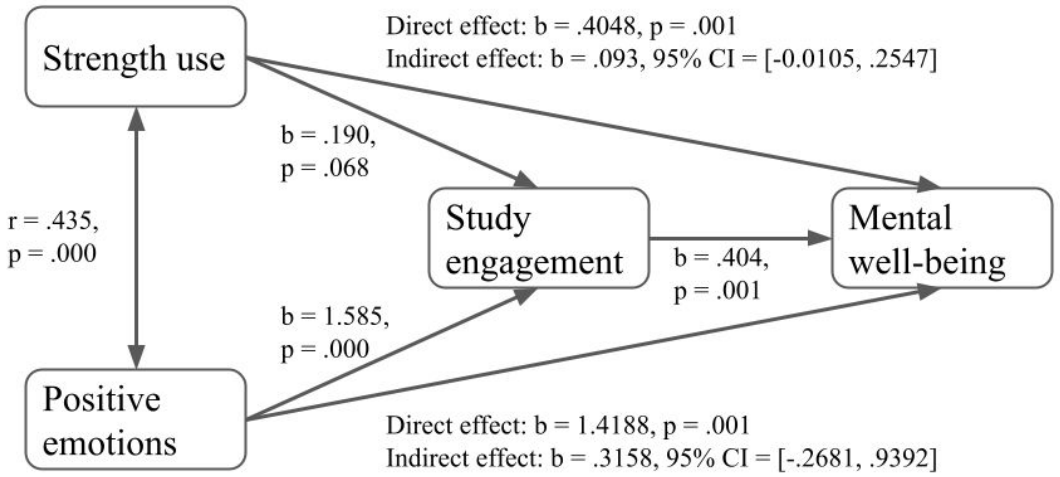
Means, standard deviations, and minimum and maximum scores on measured constructs.

	Mean	SD	Scale	Minimum	Maximum
Strength use	57	11.08	0-84	17	84
Positive emotions	17	3.22	5-25	9	24
Study engagement	45	10.83	0-78	16	78
Mental well-being	40	11.39	0-70	12	62

The mediation of hypothesis four was tested and shown to be non-significant, with a direct effect (b = .4048, p = 0.001) and an indirect effect (b = .093, 95% CI = [-0.0105, .2547]) with a confidence interval that includes zero. This would mean that strength use' prediction of mental well-being is not significantly explained by study engagement.

Fig. 2.

Tested hypothesis model showing the correlation between strength use and positive emotions, as well as the mediated prediction of both on mental well-being through study engagement.



For the fifth hypothesis, 'positive emotions' predicting the mediator 'study engagement' was found to be significant (b = 1.585, 95% CI = [0.720, 2.362], t = 4.494, p = 0.000). Then, the effect of the mediator 'study engagement' on the outcome variable 'mental well-being' was also significant, as noted above (b = .404, 95% CI = [.124, .674], t = 3.597, p = 0.001). The mediation of hypothesis five was also found to be non-significant, with a direct effect (b = 1.4188, p = 0.001) and an indirect effect (b = .3158, 95% CI = [-.2681, .9392]) which includes zero in the confidence interval. This would mean that the effect of positive emotions on mental well-being is not significantly explained by study engagement.

Discussion

The current study used a cross-sectional design to measure and model the interactions of strength use, positive emotions, study engagement, and mental wellbeing amongst college students. The broaden-and-build theory was used to support the relationships between strength use, positive emotions, and mental wellbeing, and the current study attempted to add study engagement to this model. The results showed that the hypothesized model of interactions cannot be confirmed in its entirety. The relationships between strength use, positive emotions, study engagement, and mental wellbeing were all found to be significant, but the study's proposed mediating role of study engagement was rejected.

The current study found that H_1 and H_2 were both confirmed, with strength use and positive emotions both significantly predicting mental well-being in college students. Additionally, for H_3, strength use and positive emotions are also significantly correlated with each other. For the mediation hypotheses H_4 and H_5, study engagement by itself was also a significant predictor of mental well-being. The mediation hypotheses for study engagement mediating the relationships between positive emotions and mental well-being as well as strength use and well-being, however, were found to be non-significant. This can be taken to mean that the association between strength use and mental wellbeing cannot be explained by study engagement. Likewise, for positive emotions and mental wellbeing.

Whilst the current study did find significant predictions, the proposed mediating role of study engagement on how strength use and positive emotions predict mental wellbeing respectively, was rejected. The direct prediction of study engagement by strength use was nonsignificant. Other studies did find a similar relationship, but the difference between those respective models and the current study's model can be reasoned (Kwok & Fang, 2020; Van Wingerden & Van Der Stoep, 2018). The study by Kwok and Fang (2020) showed that

strength use did predict study engagement, but as a mediator between positive emotions and study engagement. In the study by Van Wingerden and Van Der Stoep (2018), study engagement was a mediator for strength use, but as it relates to job performance rather than wellbeing. This can be taken to mean that engagement and strength use work together to explain performance, but work independently when it comes to mental wellbeing. This, combined with the current study, seems to imply that strength use and study engagement do not have a clear direct relationship in the context of mental wellbeing.

For the variable of positive emotions, the mediation interaction through study engagement showed that the prediction of mental well-being by positive emotions cannot be significantly explained by study engagement. This is in contradiction to several previous studies (Diener, Thapa, & Tay, 2020; Rusu & Colomeischi, 2020). Possible explanations for this discrepancy could be the fact of different target groups, or a different operationalization of mental wellbeing. In the Rusu & Colomeischi study (2020), subjective wellbeing was used as opposed to mental wellbeing. Subjective wellbeing is often operationalized with a higher emphasis on experienced emotions as a measure of a person's self-evaluated wellbeing, whilst mental wellbeing encompasses subjective wellbeing whilst expanding from emotional wellbeing to also include a measure of functional wellbeing. Therefore, study engagement being a state of experienced feelings, it would seem reasonable why the mediation in the Rusu & Colomeischi study (2020) is present, but not in the current study. As noted above, positive emotions did have a significant effect directly on study engagement, which is in line with other studies (Kwok & Fang, 2018; Reschly, Huebner, Appleton, & Antaramian, 2008).

Relating the current study's findings to the broaden-and-build theory, Frederickson (2001) herself speculated whether the theory could be applied to feelings of engagement as well. With this she suggested feelings of engagement as possible additions to the tested positive emotions of contentment and amusement in terms of having a direct effect on mental

wellbeing (Frederickson, 2001). In contrast, the current study tested the interactions of the emotions of contentment and amusement as having an affect on mental wellbeing in part due to feelings of engagement; meaning mediation. This is a different model and seems to add an additional level of complexity to the broaden-and-build theory, namely that of an additional step for engagement somewhere between broadening and building. The results of the current study reject this hypothesised additional level. However, the Reschly, Huebner, Appleton and Antaramian (2008) study, did find a role for engagement in the broaden-and-build theory, namely as a form of flourishing. Combined with the lack of mediation found in the current study, this implies that mental wellbeing and engagement exist on the same level in the broaden-and-build theory: the level of flourishing. An individual who is flourishing could be perceived to have positive mental wellbeing, as well as feeling engagement. They are complimentary, perhaps even enough to warrant the exploration of correlation. Nevertheless, whether engagement is still part of mental wellbeing or exists promptly outside it, to fully understand the interactions between positive emotions, engagement, and mental wellbeing, more research on the role of engagement in the broaden-and-build theory is required. A first step could be to further explore the forms flourishing can take: if study engagement is to be regarded as a form of flourishing, does it fit into the current definition of mental wellbeing? And if not, does mental wellbeing encompass all forms of flourishing or is it only part of the construct of human flourishing?

Limitations

The current study did have certain limitations. First of all, and perhaps most significantly, the analyses conducted using the PROCESS macro do not fully reflect the hypothesized model. The hypothesized model featured several variables, whereas the analyses conducted only accounted for a single predictor variable and mediator. Conducting multiple analyses where

one, more complex analysis could have sufficed leads to an increase in possible false positives. This means that the analyses could have been chosen to better fit the hypothesized model. Weighing up against this, however, is the limited sample size which made using more complex mediation analyses less likely to provide representative results. A lower alpha was set in an attempt to compensate for the chosen method of several separate analyses. Nevertheless, the analyses chosen could have affected the results. Future research would do well to consider more appropriate mediation analyses if possible.

Another limitation is the PANAS Short Form instrument. As reported, the reliability of said instrument was lower than is preferable. The short form variant of the PANAS was used for its convenience, but this likely cost the study instrument reliability. There have been no studies to use only the positive affect subscale of the PANAS short form, which makes the exact results of this lower reliability unclear. As the PANAS short form has been empirically tested, the validity of the measured constructs is likely not an issue (Thompson, 2007; Kwok & Fang, 2020). The low reliability, however, calls into question the replicability of the current study's results. To improve the reliability of future studies into the topic of positive affect, a longer form of the PANAS should be considered, such as the PANAS-X (Watson & Clark, 1999).

Strengths

The current study does present certain strengths as well. The sample population is representative of the population, with most participants around the age of 21 and all currently studying at college. This was possible due to participants being awarded study credits for participating in university research as part of their study programmes.

Additionally, despite the mediation hypotheses being rejected, the current study was able to find significant relationships between the separate variables and mental wellbeing.

This serves to further cement their potential relevance for future research into college students' mental wellbeing, whilst simultaneously rejecting one possible model these interactions could form. Similarly, a correlation between strength use and positive emotions was found, adding to the narrative of their mutual effects.

Conclusion

This study found that college students' strength use and positive emotions significantly predict their mental well-being, but this was not significantly explained by study engagement. The introduction of engagement as a mediator into the broaden-and-build theory was rejected. Strength use and study engagement do not seem to relate to each other significantly in the context of mental wellbeing in college students, whereas positive emotions and study engagement are. Study engagement itself did relate significantly to mental wellbeing along with strength use and positive emotions, but the specifics of these interactions remains unclear. The study did also find that strength use and positive emotions are positively correlated. More research is needed into the relationship between engagement and the broaden-and-build theory. The current study supports the prediction of strength use and positive emotions on mental wellbeing but cannot make recommendations as to how study engagement relates to this in the context of interventions. Finally, recommendations for future research include considering the usage of more appropriate mediation analyses for multivariate analysis, as well as the usage of the PANAS-X positive affect subscale as opposed to the PANAS-SF positive affect subscale.

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Appendix A

Consent Form

Welcome and thank you for participating in this study!

Your participation will take approximately 15 minutes. Participation is restricted to individuals 16 years of age or older.

This research aims to study the relationships between positive emotions and the use of personal strengths on study engagement and positive mental health amongst college students.

If at any point you do not feel comfortable answering the questions, be informed that you have the right to revoke your participance at any moment. Your consent means your voluntary and continuing permission, which can therefore be withdrawn at any point without providing a reason.

The data collected here will be anonymised and handled with care. Your data will not be shared with any third party. The data may be used in a future scientific publication.

If you have any further questions, feel free to contact the researcher at: m.g.b.westerneng@student.utwente.nl.

This study has been approved by the University of Twente BMS Ethics Committee. If you have questions about your rights as a research participant, or wish to obtain 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.

I read and understand the study information. I have been able to answer questions and these questions have been answered to satisfaction.

[yes/no]

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

[yes/no]

I understand that taking part in this study involves filling in a questionnaire truthfully.

[yes/no]

I understand the information I provide will be used for a bachelor thesis research paper.

[yes/no]

I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared beyond the study team.

[yes/no]

Appendix B

Questionnaire

Personal Details:

What is your gender?

[Male/Female/Other, please describe your gender]

Are you a full-time student?

[Yes/No]

Please note your field of study.

[Text field]

What is your age?

[Number between 16-99]

Strength use:

The following questions are about strength use. Please read the statements carefully and indicate to what extent you agree with them by selecting one of the options.

[Strongly Disagree/Disagree/Somewhat Disagree/Neither Agree Nor Disagree/Somewhat Agree/Agree/Strongly Agree]

I am regularly able to do what I do best.

I always play to my strengths.

I always try to use my strengths.

I achieve what I want by using my strengths.

I use my strengths everyday.

I use my strengths to get what I want out of life.

My study gives me lots of opportunities to use my strengths.

My life presents me with lots of different ways to use my strengths.

Using my strengths comes naturally to me.

I find it easy to use my strengths in the things I do.

I am able to use my strengths in lots of different situations.

Most of my time is spent doing the things that I am good at doing.

Using my strengths is something I am familiar with.

I am able to use my strengths in lots of different ways.

Positive emotions:

The following questions are about your positive emotions. Please read each item and then indicate to what extent you have felt this way during the past few weeks.

[Very sleight or not at all/A little/Moderately/Quite a bit/Extremely]

Inspired

Alert

Excited

Enthusiastic

Determined

Study engagement:

The following questions are about how you feel about your study. Please read each statement

carefully and decide if you ever feel this way about your study. Indicate how often you feel it by selecting the option that best describes how often you feel this way about your study.

[Never/Almost never/Rarely/Sometimes/Often/Very often/Always]

When I'm studying, I feel mentally strong.

I can continue for a very long time when I am studying.

When I study, I feel like I am bursting with energy.

When studying I feel strong and vigorous.

When I get up in the morning, I feel like going to class.

I find my studies to be full of meaning and purpose.

My studies inspire me.

I am enthusiastic about my study.

I find my studies challenging.

Time flies when I'm studying.

When I am studying, I forget everything else around me.

I feel happy when I am studying intensively.

I can get carried away by my studies.

Mental wellbeing:

The following questions are about your mental well-being. Please read the statements and indicate how often you feel this way. Select the option that best describes this.

During the past month, how often did you feel ...

[Never/Almost never/Rarely/Sometimes/Often/Very often/Always]

happy

interested in life

satisfied with life

that you had something important to contribute to society

that you belonged to a community (like a social group, or your neighborhood)

that our society is becoming a better place for people like you

that people are basically good

that the way our society works makes sense to you

that you liked most parts of your personality

good at managing the responsibilities of your daily life

that you had warm and trusting relationships with others

that you had experiences that challenged you to grow and become a better person

confident to think or express your own ideas and opinions

that your life has a sense of direction or meaning to it