# Character Strengths in Students:

# The Relationship between Strengths Knowledge and Positive Emotions

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Abstract

In positive psychology, strengths-based interventions showed to be effective to improve students' mental health. The knowledge of one's own strengths, so the awareness and recognition of them, showed to be a crucial part in those interventions. Thus, the current study aimed to investigate to what extent strengths knowledge and well-being are related to each other. Based on previous research, it was expected that a better knowledge of one's strengths would relate to a higher frequency of experienced positive emotions. This relationship was believed to be partially mediated by feelings of self-efficacy. Therefore, 130 German-speaking (mainly German and Dutch) university students were assessed using self-report questionnaires about their strengths, their general feelings of self-efficacy, and the frequency of experiencing positive emotions. Data was analysed with correlation and mediation analyses, the Sobel test, and the bootstrapping method. As expected, the results showed that knowing one's strengths would lead to a higher frequency of positive emotions. Additionally, this relationship could be partially explained by feelings of self-efficacy. Altogether, this research suggested that the awareness and recognition of one's own strengths might be an important factor leading to positive affect and therefore well-being. Thus, this research gave a possible solution how to improve well-being in students.

## Introduction

A steadily increasing number of students suffers from decreased mental well-being and is therefore handicapped in their accomplishments, both academically and personally (Grobe et al., 2018; Macaskill, 2013). Positive Psychology has already found several ways to make students and people in general reach their educational goals and develop personally. One way of doing so can be found in the identification and use of one's strengths (Clifton & Harter, 2003; Giehlen, et al., 2017; Linley et al., 2010). Strengths can be defined as positive character traits which can be individually identified in a person's cognitions, affects and behaviours (Park et al., 2004). Furthermore, the identification and more importantly, the knowledge of one's own strengths refers to recognising and being aware of a person's character strengths (Govindji & Linley, 2007). Strengths knowledge is believed to play one of the most important roles in strengths-based interventions, as a person must be aware of one's own strengths to be able to use them and therefore increase well-being (Quinlan et al., 2012). Strengths-based interventions have shown to be related to goal proficiency and increasing profitability as well as well-being (Clifton & Harter, 2003; Giehlen, et al., 2017; Linley et al., 2010). One reason for the effectiveness of those is focusing on one's own resources and therefore looking for one's personal coping strategies to overcome problems or reach goals instead of only identifying the issues or the lack in the needed areas. Finding one's deficits can help to find the problem to prevent further development, but it does not represent a lasting solution to those issues, because a human being needs to know how to efficiently make decisions to stay in that positive mindset (Clifton & Harter, 2003; Seligman & Csikszentmihalyi, 2000). Moreover, identifying and using strengths to pursue one's goals can have longer lasting benefits as they can become positive turning points for individuals, which means that their sense of self-concept might positively change overall, and not just for the targeted point (Clifton & Harter, 2003).

Although the current research focuses on the positive relations between strengths interventions including the identification of strengths and well-being, the negative side of strengths approaches needs also to be considered. Studies are concerned about the consequences of treating mental illnesses with positive psychology, namely positive psychopathology (Peterson, 2006; Littman-Ovadia & Freidlin, 2019). Littman-Ovadia and Freidlin (2019) for example present a range of mental disorders which result from non-optimal use of character strengths. Thus, the overuse of several strengths results in obsessive-compulsive symptoms. Especially the combination of underuse and overuse of certain strengths show symptoms of depression and obsessive-compulsive disorder. Nevertheless, more negative symptoms result from underuse of strengths compared to overuse (Littman-Ovadia & Freidlin, 2019).

There is already evidence showing strengths-based approaches to benefit goal proficiency in terms of education and personal development. However, strengths do have a facilitating factor which can not only be used in the domains mentioned above. As decreasing mental health in student populations is still problematic, it would be important to figure out a way for students to increase their mental well-being by being able to pursue their own individual mental health goals. As strengths-based approaches have already shown to have an enduring effect on mental health (Clifton & Harter, 2003), this research focuses on the extent of the relationship between student's strength knowledge and positive emotions. In the following, the different determinants of this study will be examined.

Knowing one's strengths

One crucial determinant for students to reach their mental health goals happens to be knowing one's own character strengths. This variable has been chosen for several reasons.

Firstly, a direct link has been found between knowing one's own strengths and positive well-being (Park et al., 2004; Proctor et al., 2011). This correlation can be explained by the general relationship between personality and subjective well-being, as well as the relationship between strong knowledge of one's character strengths and life satisfaction (Park et al., 2004). Further explained, the higher any character strength can be associated to one's self-perception and -concept, the higher people seem to be satisfied with their lives and reporting to feel good. On top of that, not only knowing one's strengths in general but, more than that, knowing one's five signature strengths has also shown to be related to subjective well-being (Proctor et al., 2011). Also, Ryan and Deci (2000) suggest that strengths knowledge raises well-being, because of intrinsic motivation. Thus, their self-determination theory explains that if a person is aware of one's own strengths, there is a higher motivation to change or improve one's current life situation which therefore results in perceiving a high level of well-being (Ryan & Deci, 2000). Additionally, studies have also shown the power of strengths on recovering from mental illnesses, which is another indicator for the relationship between strengths knowledge and well-being (Peterson et al., 2006). Moreover, Loton and Waters (2017) found a relationship between parenting styles promoting the children's knowledge of their own strengths and experiencing positive emotions. Also, studies found parenting styles promoting the knowledge of strengths to be a significant contributor to life satisfaction as well as subjective well-being (Jach et al., 2017; Waters, 2015). Overall, studies show that knowing one's strengths is an important aspect of well-being (Jach et al., 2017; Loton & Waters, 2017; Ryan & Deci, 2000; Waters, 2015).

Secondly, knowing one's character strengths showed to be related to one's self-efficacy. This process was explained by the relationship between strengths identification and one's awareness to goal attainment which results in a person feeling capable of mastering experiences (Woerkom & Meyers, 2019). Another reason for this connection can be found in parenting styles which promote the children's knowledge of their own strengths which showed to be a major factor on building a high level of self-efficacy (Loton & Waters, 2017).

## Self-efficacy

Another crucial determinant is self-efficacy as it could be found to relate to several components of well-being (Milam et al., 2019). Firstly, it showed to reduce emotional exhaustion, increase personal accomplishments, and increase overall psychological well-being as higher self-efficacy enables a person to feel capable of actively changing one's situation and therefore feeling less helpless when facing problems (Milam et al., 2019).

Secondly, it also has been suggested that strengths use can also result in subjective well-being if self-efficacy has already been accounted for, which could further indicate the mediating role of the mentioned relation between also knowing one's strengths and mental health in general (Proctor et al., 2011).

Thirdly, self-efficacy has shown to have an increasing effect on happiness as well as a decreasing effect on anxiety which could mean that self-efficacy influences well-being by promoting positive emotions and reduce negative emotions (Loton & Waters, 2017).

## Mental health and well-being

A person's well-being or mental health in general can be defined in different ways and can be classified in different dimensions (Dodge et al., 2012). Thus, past studies used all kinds of determinants to account for a person's mental health. One way is to categorise well-being in either hedonism or eudaimonia. Hedonism sees well-being as resulting from happiness and pleasure (Kahneman et al., 1999), whereas eudaimonia defines well-being as the actualisation of human potentials (Waterman, 1993). Although studies have shown that these two dimensions show large overlap in the way they have been influenced, they can still be differentiated (Baselmans & Bartels, 2018). Furthermore, Rean and Shagalov (2018) have shown that hedonistic happiness is especially important for young people when referring to well-being.

As the current study needed to choose for the dimension to be best measurable by self-report, a high frequency of positive emotions has been chosen as a part of hedonic happiness, and as it has shown to be a crucial factor of one's perceived mental health and well-being

(Kashdan, Biswas-Diener & King, 2008; Ryan & Deci, 2001). Moreover, Loton & Waters (2017) found that the frequency of positive emotions has shown to be a good indicator of an individual's perceived well-being.

Altogether, knowing one's strengths, self-efficacy, and the frequency of positive emotions have been chosen as the current study's three determinants. Followingly, the hypotheses of the current research are namely:

**H1:** Students who know their strengths have a higher frequency of experiencing positive emotions.

**H2:** Students who know their strengths have a higher frequency of experiencing positive emotions, because they feel more self-efficacious.

As can be seen in the figure below (Figure 1), the variable self-efficacy is only believed to partially explain the relationship between knowing one's strengths and the frequency of positive emotions. Thus, knowing one's strengths would still have a direct effect on the frequency of positive emotions and this relationship could additionally be explained by the feelings of self-efficacy. This can be explained since knowing one's strengths was found to be directly linked to well-being (Park et al., 2004; Proctor et al., 2011) and self-efficacy is related to multiple components of well-being (Milam et al., 2019) and to strengths knowledge (Woerkom & Meyers, 2019), but cannot be found to be the only possible explanation for the relationship between strengths knowledge and the frequency of positive emotions.

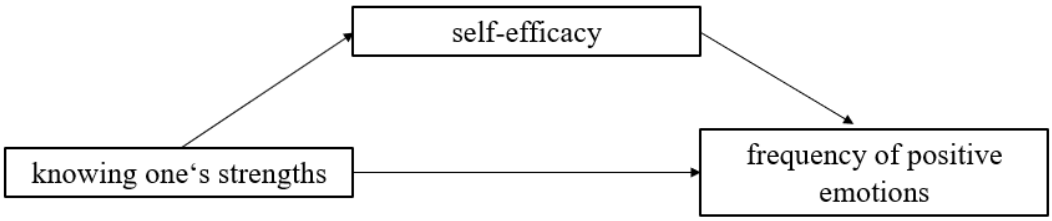


*Figure 1.* Expected relations between the variables.

## Method

### Participants

The current research was conducted with a population of native German speakers mostly with German or Dutch study location. The German language was mainly used as German speaking students could be easily accessed which resulted in a larger sample size. The participants were asked to complete several questionnaires mainly about their strengths. The goal was to obtain about 150 participants which ended up being a number of 177. Finally, a number of 130 participations could be used for further analyses because participants had to be removed as they did not finish the survey. The participants were mainly gathered through personal invitation by receiving the study link or through social media which consisted of the researchers' acquaintances. Additionally, the study recruitment system "SONA" was used to gather participations from undergraduate psychology students at the University of Twente. However, SONA could not be used in the first four weeks of the study, because of a programming mistake between the survey and the website. The participants could access and continue the study at any time through the anonymous link. The average age of the included participants was 22 years ($M$ = 21.78, $SD$ = 2.7). Further descriptive statistics can be found in the table below (Table 1).

Table 1

*Characteristics participants* ($N$=130)

| | Number | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 31 | 23.8 |
| Female | 99 | 76.2 |
| Intersex | 0 | 0 |
| **Study Location** | | |
| Netherlands | 27 | 20.8 |
| Germany | 97 | 74.6 |
| Other | 6 | 4.6 |

*Note.* The age was ranging between 18 and 32.

### Research Design and Materials

In this research a nonexperimental correlational design was employed. The generated survey was approved by the Ethics Committee BMS of the University of Twente (request

number 190234). These questionnaires were the Inventory of Strengths (VIA), the Strengths Use Scale (SUS), the General Self-Efficacy Scale (GSE), the Rosenberg's Self-Esteem Scale (RSS), and the Positive and Negative Affect Schedule (PANAS). For the current study, analyses were only conducted of the collected data of the VIA, the GSE, and the PANAS as the other questionnaires were not needed to examine the research questions. As the researcher worked in a group of two people to ensure a broader range and higher number of participants, the questionnaires of the other researcher (SUS, RSS; Nieder, 2019) were included in the survey.

An overview of the scales' psychometrics can be found in the table below (Table 2). The reliability analyses were compared to the scales' past analyses (see Cronbach's α – scale) and measured with Cronbach's α.

Table 2

*Overview of used scales' psychometrics*

| Scale | No. of Items | Cronbach's α - scale | Cronbach's α - study | Assessment |
|---|---|---|---|---|
| **VIA** | 72 | .75[1] | .87 | 5-point |
| **GSE** | 10 | .80 - .90[2] | .79 | 4-point |
| **PANAS** | 20 | .83 - .93[3] | .83 (PA)<br>.79 (NA) | 5-point |

*Note.* [1]Peterson & Seligman, 2004; [2]Schwarzer & Jerusalem, 1999; [3]Breyer & Bluemke, 2016.

For the VIA (Peterson & Seligman, 2004), its German version was adapted by Ruch et al. (2010). This questionnaire (also called "Inventory of Strengths") was used to examine the students' strengths knowledge as the items ask for character strengths (Appendix A). The variable knowing one's strengths was measured with the VIA, because the composition of the VIA, including 24 character strengths out of the six main virtues, covers a wide range of possible traits. Another reason was the comparison with other strengths finders, one example being the Personality Strengths Project (Linley, 2008). The VIA sees character strengths as rather fixed personal traits (compared to the Personality Strengths Project), which is crucial for the identification for one's top strengths. Thus, knowing one's strengths on a basis of flexible or changing character strengths would be difficult to assess or even be irrelevant for drawing conclusions. Regarding the assessment of the responses of the VIA, each item is rated from "völlig unzutreffend" to "völlig zutreffend" ("very much unlike me" to "very much like me"). An example for one item is "Ich habe meinen Standpunkt schon häufig gegen starken

Widerstand verteidigt“ (“I have taken frequent stands in the face of strong opposition”) which in this case belongs to the trait “bravery”. Overall, the survey measured 24 strengths. With regard to reliability, the reason for the higher values in the current study (see Table 2) could be due to similar characteristics of the participants. Further explained, the participants possibly had a more homogenous understanding and interpreting of the different questions which therefore resulted in a more homogenous construct. Considering construct validity MacDonald et al. (2008) question the six virtues as they do not rely on six factors. Nevertheless, the authors confirm construct validity for the 24 character strengths, although they recommend further analyses (MacDonald et al., 2008). The research of Azañedo et al. (2014) supported the construct validity of the VIA for a Spanish sample, which could indicate the universal validity for all different countries.

The GSE tested for the participant’s self-efficacy (Appendix B). In this study, the German version by Schwarzer and Jerusalem (1999) was used. This survey was used to examine the mediating variable self-efficacy as it showed to be the best option to examine general self-efficacy compared to self-efficacy in specific contexts. One example for comparison would be the Self-Efficacy Questionnaire (SEQ; Bandura, 1997). Considering the different levels of self-efficacy to be able to assess general self-efficacy have shown to be overall inconsistent in the SEQ (Martin, 2010), which is thus no better alternative to the GSE. Regarding item assessment, each item is rated ranging from “stimmt nicht“ to “stimmt genau“ (“not at all true“ to “exactly true”). An example for one item is “Es bereitet mir keine Schwierigkeiten, meine Absichten und Ziele zu verwirklichen.” (“It is easy for me to stick to my aims and accomplish my goals.”). GSE’s validity has been critically evaluated by several studies. Zhou (2016) reports high predictive validity, but also low content validity which makes interpretation of the results seemingly difficult. However, Nilsson et al. (2015) support the GSE’s construct validity in their sample of people with Parkinson’s disease.

The PANAS tested for the participant’s current emotional state (Watson, Clark & Tellegen, 1988). For the current study, the German version by Breyer and Bluemke (2016) was used. This questionnaire was used to examine the participants’ positive and negative affect states for the dependent variable frequency of positive emotions (Appendix C). Although the relationship between the positive and negative affect scale was referred to as controversial at times (Schmuckle et al., 2002), PANAS has been chosen mainly for its easy and time-efficient application, which was confirmed by Ziemainz & Peters (2010). As the current research used a survey containing out of five different questionnaires, time-efficiency was important to not further fatigue the participants with time-consuming questions on their well-being. The

participants were asked to rate their current general emotional state (no further specification on time; Breyer & Bluemke, 2016). Regarding response assessment, the items are rated ranging from “gar nicht” to “äußerst” (“not at all” to “extremely”). An example for one item for positive affect is “stolz” (“proud”) and for the negative affect scale is “feindseelig” (“hostile”). Ten items are used to measure positive affect whereas the other ten account for negative affect of the participant’s emotional state. Reliability analyses showed the negative affect scale to be slightly lower compared to past studies (see Table 2), which could be due to a higher agreement of positive emotions than negative in the student sample. Construct validity has been examined by Crawford and Henry (2004), which showed supporting results of the PANAS’ construct validity despite the authors’ concerns at first.

**Procedure**

The questionnaires for the current research were arranged and conducted in Qualtrics. First of all, the participants were informed about the purpose of the survey and therefore received an informed consent. After agreeing to the terms and conditions electronically, the participants got to fill in their demographic data including the age, the gender, and the country they are currently studying in. Subsequently, the participants answered the questions of the VIA, the SUS, the GSE, the RSS, and the PANAS.

**Data collection, preparation and analysis**

Data was collected in a time frame of eight weeks and the 177 participants were firstly checked for missing values. This was done manually by going through the list of participations and removing unfinished responses. In this research, no participations with missing values were used for further analysis. Moreover, frequency distributions were conducted to inspect if the overall data looks plausible and to examine the participants’ characteristics. Furthermore, the data was prepared for the analyses by recoding reversed items and adapting labels and values to the variables if needed.

Regarding to analyses, the current research firstly conducted correlation analyses with Pearson correlation coefficients to give an overview of all tested relations. Secondly, mediation was tested with regression analyses between the independent variable knowing one’s strengths, the mediating variable self-efficacy, and the dependent variable frequency of positive emotions. To further test for the significance of the mediation analysis, a Sobel test has been conducted. Additionally, bootstrapping was used estimate the indirect effect (the effect of the mediation)

and to compute the confidence intervals, as this method gives insight in the degree of mediation in the data. Therefore, PROCESS (a macro for SPSS) was used (Hayes, 2018).

## Results

### Relationships between knowing one's strengths, self-efficacy, and the frequency of positive emotions

Overall, participants had comparable results to past studies on the variable knowing one's strengths ($M$ = 3.77; on a 5-point scale). For example, the study of Ruch et al. (2010) found results starting slightly above the scale's mean of 3 ($M$ = 3.02 to 3.92). This means that students are overall aware of their strengths and are able to recognise them. Moreover, the scores on frequency of positive emotions were slightly higher ($M$ = 3.93; on a 5-point scale) than the suggested reference scores by Breyer and Bluemke (2016). The study suggested a reference score of 3.20 for the age of 40 years and younger (PA: $M$ = 3.21; NA: $M$ = 1.82). This means that the tested student sample was overall regularly feeling positive emotions. Results on self-efficacy (on a 4-point scale) however were found to be surprisingly high ($M$ = 3.82). On the contrary, Brähler et al. (2001) found comparably low results for their sample ($M$ = 2.9). This means that students in the tested sample felt overall highly self-efficacious.

Moreover, testing for the different expected relations between the variables by computing the Pearson correlation coefficients found significant positive moderate relationships between all three variables (see Table 3).

Table 3

*Descriptives of correlations between the most relevant variables* ($N$ = 130)

| | M | SD | 1 | 2 | 3 |
|---|---|---|---|---|---|
| 1. Knowing one's strengths | 3.77 | .28 | - | .452** | .385** |
| 2. Self-efficacy | 3.82 | .45 | | - | .450** |
| 3. Frequency of positive emotions | 3.93 | .50 | | | - |

*Note.* Knowing one's strengths and Frequency of positive emotions are measured on a scale from 1 to 5; Self-efficacy is measured on a scale from 1 to 4; Pearson significance level.
*$p$ < .05, **$p$ < .001.

### Strengths knowledge in relation to the frequency of positive emotions

The first hypothesis stated that students who know their strengths have a higher frequency of experiencing positive emotions. This hypothesis was additionally tested with a

regression analysis to estimate the exact line between the two variables strengths knowledge and the frequency of positive emotions. The analysis showed that the relation between knowing one's strengths and the frequency of positive emotions could be proven to be significant ($b$ = 0.68, CI 95% [0.39; 0.96], $t(128) = 4.71$, $p < .001$). This means that students who know their strengths are highly probable to experience a high frequency of positive emotions. Therefore, the first hypothesis could be confirmed.

**Strengths knowledge leads to a higher frequency of positive emotions through self-efficacy**

The second hypothesis stated that students who know their strengths have a higher frequency of experiencing positive emotions, partly because they feel more self-efficacious. By further conducting the mediation analysis, linear regression coefficients showed significant results for all three relations. This also includes the significant relationship between knowing one's strengths and self-efficacy ($b = 0.72$, $t(128) = 5.74$, $p < .001$) and between self-efficacy and the frequency of positive emotions ($b = 0.38$, $t(128) = 4.00$, $p < .001$). Additionally, 24.3% of the variance ($R^2 = .243$; $F(2, 127) = 20.42$; $p < .001$) in the data could be explained by the predictor variables strengths knowledge and self-efficacy.

Moreover, bootstrapping confirmed the indirect effect of knowing one's strengths on the frequency of experienced positive emotions through the feeling of self-efficacy ($b$ = .16 BCa CI [0.06; 0.27]).

As a last confirmatory analysis to prove the significance of the mediation analysis, the Sobel test showed the relationship between knowing one's strengths and the frequency of positive emotions to be mediated by self-efficacy ($z = 3.28$, $p = .001$).

Overall, the expected hypotheses could be confirmed. As suggested earlier, self-efficacy could partially mediate the relationship between knowing one's strengths and the frequency of positive emotions. The direct effect between the dependent and independent variable still remained to be significant.

Figure 2 illustrates the significant relationship between knowing one's strengths and the frequency of positive emotions, through self-efficacy.

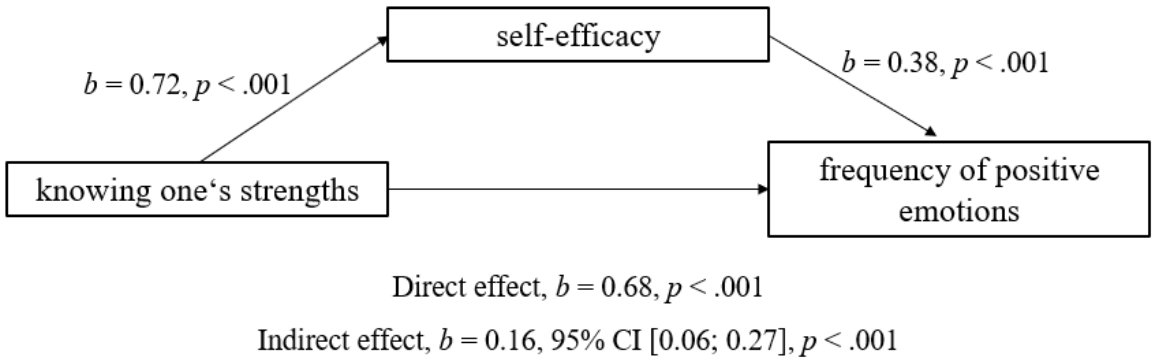


*Figure 2.* Mediation model for the partial mediation between the variables knowing one's strengths, self-efficacy, and the frequency of positive emotions including standardised regression coefficient, 95% confidence interval, and significance level.

## Discussion

The current research had the purpose to examine the strengths knowledge in students and how this affected the frequency of them experiencing positive emotions. The study was conducted with native German speaking students mainly studying in Germany and the Netherlands. Participants in this study showed a high level of self-efficacy and overall good scores on the knowledge of their strengths and the frequency of experienced positive emotions. It was expected that the knowledge of one's strengths would result in a high frequency of positive emotions. Additionally, feelings of self-efficacy were expected to relate to the knowledge of one's strengths as well as the frequency of experienced positive emotions. However, self-efficacy was expected to only partially mediate the relationship between knowing one's strengths and the frequency of positive emotions, because feeling self-efficacious was not assumed to fully and solely explain the relationship between the other two variables. Moreover, previous research still indicated a direct relationship between strengths knowledge and the frequency of positive emotions.

The research could confirm both assumptions for the student sample. The knowledge of one's strengths associated with higher feelings of self-efficacy was in line with the findings of Woerkom and Meyers (2019) who showed that identifying one's strengths was related to goal attainment. Additionally, this could be compared to past findings on the effectiveness of strengths knowledge to result from internal states like a positive self-concept (Clifton & Harter, 2003), having intrinsic motivation (Ryan & Deci, 2000), and developing personal coping strategies and improving decision-making processes (Clifton & Harter, 2003; Seligman & Csikszentmihalyi, 2000).

Moreover, self-efficacy leading to a higher frequency of positive emotions was in line with the findings of past studies connecting feelings of self-efficacy to an overall feeling of well-being (Milam et al., 2019). Loton and Waters (2017) showed the reason for this relationship to be because self-efficacy would promote positive emotions and reduce negative ones. Indeed, the current study could confirm those beliefs as the frequency of positive emotions was found to be higher when feeling self-efficacious.

Furthermore, self-efficacy could be confirmed to partially mediate the relationship between students who know their strengths and therefore experience a higher frequency of positive emotions. These findings were in line with Proctor et al. (2011), because of their findings showing strengths knowledge to improving mental health if self-efficacy was already been accounted for.

With regard to the findings of steadily increasing stress levels and decreasing mental health in students (Grobe et al., 2018; Macaskill, 2013), the current study could not confirm these concerns. Nevertheless, as the study assumed that strengths knowledge would improve well-being in students, the findings were in line with the assumptions. The students were overall aware of their strengths and did regularly experience positive emotions.

Although Littman-Ovadia and Freidlin (2019) reported a possible overuse of strengths, the current study could not find any negative aspect in this particular setting, as the tested negative affect did not rise by a higher recognition of one's strengths.

Other findings of interest showed to be in the study of Bu and Duan (2018), which examined mental health in first year students. The authors found a fully mediating effect of strengths knowledge on the relationship between negative emotional states and thriving. Comparing those with the findings of the current study, strengths knowledge could even be an essential part to thriving or well-being in general.

Moreover, the findings of Weber et al. (2013) in Israeli adolescents were of special interest, as they showed that character strengths would contribute to a greater life satisfaction, but especially in terms of a higher level of positive affect and affect balance (the difference between positive and negative affect). Additionally, they confirmed the relationship to general self-efficacy with both, character strengths and positive affect. Interestingly, this study also used the VIA (Peterson & Seligman, 2004) as well as the GSE (Schwarzer & Jerusalem, 1999), which further emphasise the findings of the current study and could even imply for generalisability to other student populations and nationalities.

Another important point of discussion was if the VIA represents the best possible instrument to measure the knowledge of strengths. As mentioned before, compared to other

strengths finders like the Personality Strengths Project (Linley, 2008), the VIA measures strengths knowledge more accurately. The Strengths Knowledge Scale by Govindji and Linley (2007) did ask specific questions to strengths knowledge (e.g. “I know my strengths well” or “I have to think hard about what my strengths are”), however participants would only have a high score who had already been confronted with strengths finders before to know the whole list of their strengths. In contrast, with the VIA, participants who do have a high strengths knowledge but were not necessarily able to name the whole list of their strengths, could still be included.

**Strengths and Limitations**

Referring to the strengths and weaknesses of the current study, several points have been evaluated. Firstly, by using an online questionnaire, there should be a reduced margin of error as the participants directly entered their answers into the system and no transferring mistakes could emerge. Thus, this quantitative method showed to be more accurate compared to other methods. Additionally, through the anonymity of the internet, responses were expected to be more honest.

Secondly, by using highly rated, already existing scales to measure the study’s variables, reliability and variability could be better ensured than creating own scales, because of the comparability with previously conducted research.

Thirdly, by using German items, errors due to possible language barriers could be ruled out. Thus, the native German speaking sample could not wrongly interpret the questions, which ensured further accuracy of the results.

Considering the study’s findings, limitations need to be taken into account. First of all, the current study showed lower reliability results on the negative affect scale of the PANAS instrument compared to past studies (Breyer & Bluemke, 2016). Although the reliability was still good, limitations could be a lower accuracy of this scale or even the entire instrument for this specific sample of German speaking students compared to other population samples, which would mean that item improvement might be possible using the PANAS for a student sample.

Furthermore, another limitation could be the homogenous sample of the study, which could result in other findings when adding students of different speaking languages or with a different university system compared to the mainly Dutch and German university locations, as the study systems in these two countries are not too different from one another. Thus, generalisability to the general student population might be difficult.

Moreover, it needs to be acknowledged that the assessment method of conducting data through questionnaires could result in far better scores on the different variables. When

comparing using questionnaires to using interview techniques, it could be possible that students would not rate themselves highly on particular strengths, because they would not even consider identifying themselves with multiple character strengths when not being directly confronted with a list of strengths (or questions about strengths). This could also be the case in for example rating one's self-efficacy or the experienced frequency of positive emotions. Although the current research finds the questionnaire to be more helpful in finding one's own strengths and estimating one's self-efficacy and frequency of positive emotions, students' self-reports through interviewing might still indicate different or even opposite results.

Another limitation concerning the sample is the way how the participants have mainly been chosen. The current research mainly included participants who knew one of the two researchers which might have resulted in overall better results on the mean scores of the different scales due to social desirability. Further explained, some participants expressed some concerns about hoping not to have made any mistakes, although the survey explained that there were no right or wrong answers. The study's findings indicated a possible ceiling effect on the variable self-efficacy as those showed nearly perfect scores. Additionally, this could explain the low variance of the model.

Referring to the definition of strengths knowledge compared to strengths attribution, another of the study's limitation was the difficulty of clearly separating measuring strengths knowledge versus attribution with the VIA. Strengths knowledge can be defined as being aware and recognising strengths (Govindji & Linley, 2007) whereas strengths attribution would be defined as characterising a certain trait to a person (Attribute, n.d.). Considering those definitions for the use of the VIA, strengths knowledge cannot be clearly separated from strengths attribution as the VIA could be measuring both. Deciding on the term strengths knowledge instead of attribution was nevertheless more suitable as measuring strengths attribution might include additional measurements on personality and therefore a broader range of research.

Taking all strengths and limitations of this study into account, it can be concluded that although there were some concerns about the accuracy of the results, the findings still represent important determinants to explain well-being in students. In addition, the current research still showed enough evidence to conclude the findings to be accurate. Further research should therefore be considered on different measures to confirm the current study's findings as well as on different determinants explaining well-being in students.

**Future Research**

As the current study used the frequency of positive emotions to measure well-being in students, it would be interesting to measure if other constructs are more accurate in assessing for well-being in a student population. These could for example include measures on eudemonic happiness (Waterman, 1993) instead of hedonism. Especially, as the study used an instrument (PANAS; Breyer & Bluemke, 2016) which was partly lower in reliability on the chosen sample compared to past studies using the same scale.

Another interesting aspect to conduct future research on would be finding new instruments to specifically measure the students' knowledge of their strengths. These could be improvements in the way of assessment, by for example adding a qualitative part to the VIA (Peterson & Seligman, 2004) to ensure to get information about the students' own belief of their strengths, not solely by confirming or rejecting proposed strengths suggested by a questionnaire.

As mentioned before, studies expressed concerns about the negative aspect of strengths-based interventions, which refers to character strengths being misused by means of under- but also overuse (Littman-Ovadia & Freidlin, 2019). Although the current study could not confirm those concerns, future research on the downsides of particularly strengths knowledge would be of interest. For instance, possible downfalls of wrongly believing to have a high number of strengths, could include an individual to have an exaggerated self-concept and therefore misperceiving or -interpreting certain situations or behaviours.

**Implications**

This research provided insight into the knowledge of strengths and the impact of it on one aspect of well-being. As knowing one's strengths has shown to lead to a high frequency of positive emotions partly by the feeling of being self-efficacious, this study can be used to further explore the field of strengths' knowledge and its impact on different parts of well-being.

As students still suffer a lot from mental problems and are often focused on achieving in their studies (Macaskill, 2013), this research was important to examine some underlying factors of how to improve mental health in students.

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## Appendices

Appendix A

Items for VIA-72 – Inventory of Strengths to measure the variable “knowing one’s strengths” (measured on a 5-point scale)

As the items (German as well as English) are confidential and not allowed for publication, the reader can contact the VIA (research@viacharacter.org) to get access to the full lists of items.

## Appendix B

Items for the General Self-Efficacy Scale to measure the variable “self-efficacy” (measured on a 4-point scale)

1. Wenn sich Widerstände auftun, finde ich Mittel und Wege, mich durchzusetzen.
2. Die Lösung schwieriger Probleme gelingt mir immer, wenn ich mich darum bemühe.
3. Es bereitet mir keine Schwierigkeiten, meine Absichten und Ziele zu verwirklichen.
4. In unerwarteten Situationen weiß ich immer, wie ich mich verhalten soll.
5. Auch bei überraschenden Ereignissen glaube ich, dass ich gut mit ihnen zurechtkommen kann.
6. Schwierigkeiten sehe ich gelassen entgegen, weil ich meinen Fähigkeiten immer vertrauen kann.
7. Was auch immer passiert, ich werde schon klarkommen.
8. Für jedes Problem kann ich eine Lösung finden.
9. Wenn eine neue Sache auf mich zukommt, weiß ich, wie ich damit umgehen kann.
10. Wenn ein Problem auftaucht, kann ich es aus eigener Kraft meistern.

Appendix C

Items for Positive and Negative Affect Schedule to measure the variable "frequency of positive emotions" (measured on a 5-point scale)

| No. | German | English | Dimension |
|---|---|---|---|
| 1 | aktiv | active | PA |
| 2 | bekümmert | distressed | NA |
| 3 | interessiert | interested | PA |
| 4 | freudig erregt | excited | PA |
| 5 | verärgert | upset | NA |
| 6 | stark | strong | PA |
| 7 | schuldig | guilty | NA |
| 8 | erschrocken | scared | NA |
| 9 | feindselig | hostile | NA |
| 10 | angeregt | inspired | PA |
| 11 | stolz | proud | PA |
| 12 | gereizt | irritable | NA |
| 13 | begeistert | enthusiastic | PA |
| 14 | beschämt | ashamed | NA |
| 15 | wach | alert | PA |
| 16 | nervös | nervous | NA |
| 17 | entschlossen | determined | PA |
| 18 | aufmerksam | attentive | PA |
| 19 | durcheinander | jittery | NA |
| 20 | ängstlich | afraid | NA |