The Relationship between Character Strengths and Perceived Stress in Students

Behavioral Management and Social Sciences

Positive Psychology and Technology

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Alexandra Hölscher- s1973169

Supervisors: E.S. Slatman MSc; Dr. L.M.A. Braakman-Jansen

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Abstract

Background. Stress is an ongoing and complex issue in our fast-paced society and is especially common among college students. This perceived stress can have tremendous consequences, such as getting cancer, burnout, and lowered well-being. To prevent these negative outcomes, positive psychology advanced progressively in promoting positive aspects, such as the individuals' character strengths. In line with this, previous research emphasizes the effectiveness of strength-based interventions in terms of increasing knowledge and usage of character strengths, and well-being, as well as reducing levels of perceived stress. This study aimed to investigate the relationship between character strengths 'love of learning', 'creativity', 'curiosity', and 'self-regulation' with regard to perceived stress in students.

Methods. To examine the relationship between these character strengths and perceived stress, correlation and regression analyses were conducted. In addition, a mediation analysis was conducted to evaluate whether 'planning' has a significant mediating effect on the relationship between self-regulation and perceived stress. A cross-sectional quantitative survey design was conducted using a convenience and snowball sample of 216 college students.

Results. The results displayed that for the character strength love of learning the aspect of reading nonfiction books showed to be a significant positive predictor for students' perceived stress levels (B=1.07, p=.03), and for creativity, the aspect alternative (B=1.99, p=.001) and imaginative thinking (B=2.44, p=.001) showed to be significant predictors. For curiosity, interest showed a significant negative relation to perceived stress (B=-1.25, p=.04). Further, Self-regulation displayed various negative significant predictors for students' perceived stress levels, namely physical activity (B=-1.22, p=.03), emotion control (B=-.97, p=.02), and efficient time management (B=-1.02, p=.03). The variable planning did not seem to have a significant mediating effect on the relationship between self-regulation and perceived stress.

Conclusion. Concluding, this study aimed to investigate the relationship between the character strengths and perceived stress in students. Results display a significant correlation between the character strength self-regulation and perceived stress. However, no significant correlations were established for the character strengths curiosity, creativity, and love of learning with regard to perceived stress. Suggestions for future research are accounting for confounding variables, giving the option of a translated online survey, reviewing the usage of (sub-) scales, and incorporating face-to-face interaction or an introductory video in the online survey.

Keywords: Perceived Stress, college students, character strengths, planning, love of learning, curiosity, creativity, self-regulation

Introduction

In modern psychology, there is an ongoing progressive shift from traditional to positive psychological practice. As the name might suggest, positive psychology is characterized by focusing on the positive, life worthy aspects compared to the traditional pathological and problem-centred approach (Seligman, & Csikszentmihalyi, 2014; Snyder & Lopez, 2007). Moreover, positive psychology is defined as "the study of what goes right in life" (Peterson, 2009, p.3) and focuses on the individuals' strengths and virtues, as well as human self-actualization and the principle of flourishing (Sheldon, & King, 2001). Human flourishing is a crucial concept within positive psychology and is defined as a state in which an individual experiences positive psychological and social functioning, as well as affirmative emotions which can lead to an individual's full functioning (Fredrickson, & Losada, 2005). Therapeutic approaches within positive psychology often focus on the enhancement, stabilization, and maximization of the individual's well-being, as well as the proactive prevention of illnesses and stress (Froh, 2004; Sheldon, & King, 2001).

One approach within the field of positive psychology is the strength-based intervention, which focuses on coping and tackling stress (Ghielen, van Woerkom, & Meyers, 2018). These interventions are said to be effective in terms of increasing well-being, reducing symptoms of stress and depression, along with enhancing knowledge and usage of the individual's character strengths (Boermans, et al., 2012; Gander, Proyer, Ruch, & Wyss, 2013; Sheldon, & King, 2001). Considering the effectiveness, modern psychologists see the need for incorporating character strength-based interventions (Jimerson, Sharkey, Nyborg, & Furlong, 2004). Ghielen, et al. (2018) explain that strength-based interventions focus on identifying character strengths, together with enhancing their usage to different areas in life. Thus, strength-based interventions aim to maximize the individuals' strength use (Boermans, et al., 2012).

Character strengths are defined as the individual's positive attributes which positively influence emotional, rational and operating areas in life (Niemiec, 2013; Park, Peterson, & Seligman, 2004). Further, character strengths can be explained in terms of pluralism or "family of positive characteristics" (Park, & Peterson, 2009, p. 3) since one positive character strength often comes in junction with other strengths (Park, et al., 2004). In line with this, Schutte and Malouff (2019) emphasize that curiosity and creativity seem to have a significant positive correlation. However, Morales-Sánchez and Cabello-Medina (2015) emphasize that a character strength must be distinctive. Character strengths are also described as varying individually and existing in various degrees (Park, 2004; Park, & Peterson, 2009). For instance, whereas one

individual might have a great degree of the character strength creativity, another individual might score low on creativity and instead has a higher degree of the strength self-regulation. One widely known and used questionnaire that measures character strengths is the 'Values in Action Inventory' (short 'VIA') (Proctor, Maltby, & Linley, 2011). This character strengths finder measures 24 character strengths, which are categorized into six basic virtues, namely courage, humanity, justice, transcendence, temperance, and wisdom (Peterson, & Seligman, 2004; Peterson, & Park, 2009) (Appendix A). The VIA character strengths are correlated to academic achievement and acceptance among classmates (Proyer, Gander, & Tandler, 2017). Thus, Proyer, et al. (2017) emphasize the positive effect of using character strengths in the educational context. However, out of the 24 character strengths, the four character strengths curiosity, creativity, love of learning, and self-regulation have been chosen for further investigation.

One reason for choosing these character strengths is not only their correlation to perceived stress, but also their correlation to academic success (Holmes, Fath, Zhang, Kaufman, & Hammer, 2017; Kitsantas, Winsler, & Huie, 2008; Nami, Marsooli, & Ashouri, 2014; Wagner, & Ruch, 2015). Considering the study's sample of college students, which was chosen due to convince and availability reasons, academic success and perceived stress levels might be especially important for them. Further explanation on specifically the relationship between these character strengths and perceived stress levels in students will be explained in the following.

Love of learning is one character strength that is placed within the virtue of wisdom and is defined as being motivated to gain and/or intensify (existing) knowledge (Peterson, & Seligman, 2004). Studies suggested that students with the character strength love of learning enjoy and are interested in learning new concepts and seem to be better in coping with stress (Peterson, & Seligman, 2004). Furthermore, they report to enjoy being independent and are more likely to regulate from challenges, so often have a higher frustration tolerance (Peterson, & Seligman, 2004).

The character strength curiosity is another point of interest. Curiosity falls under the virtue of wisdom and curious individuals are characterized by investigative behaviors and pursuing new knowledge without being a burden for others (Peterson, & Seligman, 2004; Reio, & Callahan, 2004). Moreover, curiosity is one crucial aspect concerning successful learning (Pluck, & Johnson, 2011). Silvia (2012) found a correlation between curiosity and motivation. She mentions that being curious enhances the motivation to learn and reduces uncomfortable and stressful situations (Silvia, 2012). Harzer and Ruch (2015) also emphasize the importance

of curiosity in effective stress management, thinking out of the box, and problem-solving.

Creativity, however, is defined as developing something convenient and unknown to modern society and also falls within the VIA virtue of wisdom (Peterson, & Seligman, 2004). Such as the character strength curiosity, is creativity also described as promoting problem-solving, coping with stress, and thinking out of the box (Harzer, & Ruch, 2015). Additionally, Talbot, Cooper and Barrow (1992) concluded that there is a negative relationship between levels of creativity and stress.

Another character strength that is worth mentioning is self-regulation and it is placed within the virtue temperance (Peterson, & Seligman, 2004). Self-regulation is defined as having control over oneself actions and emotions, as well as being able to regulate oneself in terms of relaxing and encouraging oneself after facing challenges (Peterson, & Seligman, 2004; Ramli et al., 2018; Vohs, & Baumeister, 2004). Further, it is commonly referred to or interchangeably used as 'self-control' (Baumeister, & Vohs, 2007). Regulatory processes are important with regard to controlling and regulating one's emotions, thus being able to stay calm and not letting emotions overrun oneself (Baumeister, & Vohs, 2007). In addition, the character strength self-regulation is positively correlated to effective stress management (Ramli, et al., 2018).

Stress is a widespread and an ongoing issue since today's society and students report experiencing high demands in various areas of life, which often results in feeling stressed and overwhelmed (Bulo, & Sanchez, 2014). Research has shown that the modern generation reports higher levels of stress and anxiety in comparison to older generations, which can be linked to high study demands and fast-paced learning (Ramli, et al., 2018). Stress arises when the individual does not feel capable of dealing with a situation or an event and generally does not feel capable of meeting societies' demands (Carver, & Connor-Smith, 2010; Lazarus, 1966). This can be academic demands, but also financial situations, illness, conflict, death and work-related situations (Lazarus, & Folkman, 1984). Consequently, this can lead to long-term stress and, in turn, increase the risk of getting illnesses, such as cancer, asthma, migraine headaches, as well as allergies, heart diseases and burnout (Lazarus, & Folkman, 1984; Ramli et. al, 2018). Furthermore, Harzer and Ruch (2015) point out other negative consequences of stress, such as lowered life satisfaction, and reduced productivity.

The character strengths love of learning, creativity, curiosity, and self-regulation are suggested to play a crucial role in how students perceive stress, as well as effective stress management. Not only the character strength love of learning is strongly correlated to effective stress management, but also curiosity plays an important role in this regard (Harzer, & Ruch,

2015). Further, Talbot, et al. (1992) concluded that when someone is more stressed, they are less creative. Both character strengths - curiosity and creativity - promote problem-solving strategies (Harzer, & Ruch, 2015). According to Ramli et. al (2018), the character strength self-regulation is positively correlated to effective stress management.

Prior research supports the idea of a correlation between self-regulation and planning abilities (Townsend, & Liu, 2012). Hence, Evans and Kim (2013) mention that self-regulation and effective coping are linked to abilities, such as planning and attention-control. In line with this, a relationship was found between time management and planning concerning perceived stress (Macan, Shahani, Dipboye, & Phillips, 1990; Misra, & McKean, 2000). Thus, individuals who manage and plan their time better, are more likely to perceive and report less stress (Macan, et al., 1990; Misra, & McKean, 2000; Roszler, & Brail, 2017). Due to the possible negative consequences of high levels of perceived stress, it is crucial to investigate possibilities that might reduce and manage stress, such as planning abilities. In line with the previously mentioned significant associations between time management (planning) and perceived stress, and between self-regulation and perceived stress, it will be investigated whether planning might have a significant mediating effect on the relationship between self-regulation and perceived stress, illustrated in Figure 1 (Misra, & McKean, 2000; Townsend, & Liu, 2012).
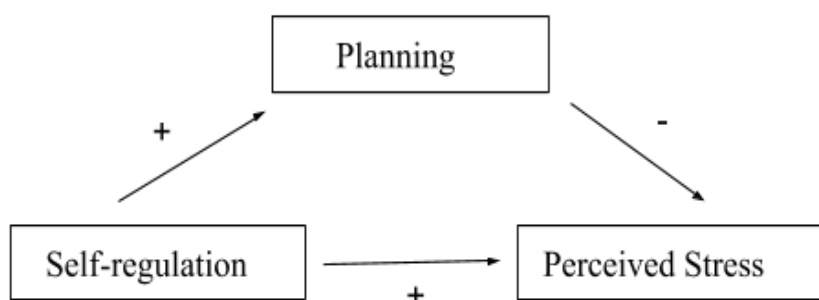

Figure 1. Schematic overview of planning as a mediator in the relationship between self-regulation and perceived stress

Considering the mentioned consequences and the tremendous impact that stress can have on society and specifically on students, further research and investigation in the relationship between character strengths and perceived stress, is of importance. Having said this, the following research questions emerged:

Research Question 1: *To what extent is 'love of learning' correlated to perceived stress?*

Research Question 2: *To what extent is 'creativity' correlated to perceived stress?*

Research Question 3: *To what extent is 'curiosity' correlated to perceived stress?*

Research Question 4: *To what extent is 'self-regulation' correlated to perceived stress?*

Research Question 5: *To what extent is 'planning' a mediating factor between the character strength 'self-regulation' and perceived stress?*

Method

Design

This research was conducted using convenience and snowball sampling of 216 participants and by utilizing a cross-sectional quantitative survey design in which participants were asked to first answer demographic questions, and secondly indicate their answers on a 5-point Likert scale.

Participants

The participation of 216 students in the online survey was voluntary, and students had to agree upon a (digital) informed consent (Appendix B) before continuing with the online survey. The following inclusion criteria were used: 1) being a student; 2) minimum age of 18 years; 3) sufficient English language skills. Data from the participants, who did not meet these inclusion criteria, were excluded from further analyses. The participants' demographics are displayed down below (see Table 1).

Table 1. *Demographic characteristics of the Respondents (N=216)*

Item	Category	N (%)
Gender, n (%)	Female	189 (87.5)
	Male	26 (12.0)
	Other	1 (.5)
Age mean (Standard Deviation)		21.6 (2.1)
Nationality, n (%)	German	178 (82.4)
	United States	11 (5.1)
	Dutch	4 (1.9)
	Other	23 (10.6)

Materials

To investigate the relationship between character strengths and perceived stress and whether planning is a mediator between self-regulation and perceived stress, the following scales have been used. All items were formulated positively.

Character Strengths

The chosen character strengths love of learning, creativity, curiosity, and self-regulation were investigated by means of the *Values-In-Action-Inventory* ('VIA'), which is the most frequently used character strengths finder when examining individuals' character strengths (Proctor, et al., 2011). This questionnaire measures 24 character strengths and categorizes them into six virtues, namely wisdom, courage, humanity, justice, temperance, transcendence (Appendix A). In this study, the VIA-IS (240 items version) was utilized, which is the longest VIA version and contains 10 items for each of the 24 character strengths. Since four out of the 24 items were investigated, only 10 items for each of the above-mentioned character strengths were taken out of the VIA-IS. Consequently 40 out of the initial 240 items

were utilized. Thus, items, such as "I find the world a very interesting place" (curiosity), "I am a true life-long learner" (love of learning), "I am always coming up with new ways to do things" (creativity), and "I am a highly disciplined person" (self-regulation) were taken out (Appendix C). Participants indicated their answers to the 40 questions on a 5-point Likert Scale, ranging from 1= "Very much unlike me" to 5= "Very much like me".

Overall, the VIA-IS shows adequate test-retest reliability and internal consistency (Peterson, & Seligman, 2004). Hence, test-retest correlations displayed to be substantial (>.70) and all scales represent satisfactory alphas with values of >.70 (Peterson, & Seligman, 2004). Specifically, the chosen scales from the VIA represented a Cronbach's Alpha of α= .84 for love of learning, α=.79 for curiosity, α=.84 for creativity, and α= .86 for self-regulation. Thus, it is noticeable that all used (sub-) scales from the VIA present good internal consistencies (Tavakol, & Dennick, 2011).

Planning Behavior

Student's planning skills were measured through the '*Time Management Behavior Scale*', short 'TMBS' by Macan et al. (1990). Due to the fact that this scale has four sub-scales, particularly the sub-scale of interest 'setting goals and priorities' has been taken out and contains 10 items (Macan, et al., 1990). Claessens, Van Eerde, Rutte, and Roe (2004) define Macan's (1990) sub-scale 'setting goals and priorities' as planning behavior, which in turn is defined as prioritizing important tasks and handling complications (Claessens, et al., 2004). Claessens et al. (2004), also utilized the sub-scale 'setting goals and priorities' in their research. Items, such as "I review my goals to determine if they need revising." were answered on a 5-point Likert scale, ranging from 1= "Do not agree at all" to 5="Completely agree" (Appendix D).

Azar and Zafer (2013) report a composite reliability of α=.89 and a discriminant validity of .66 for the sub-scale 'setting goals and priorities', which they refer to as planning. Furthermore, the sub-scale presented a Cronbach's Alpha of α= .85.

Perceived Stress

In order to measure the level of perceived stress in students, the '*College Student Stress Scale*' (short 'CSSS') was utilized (Feldt, 2008). This scale contains 11 items, which determine various stress related areas, such as academic, personal, and economic matters, as well as the overall skill of maintaining control and the student's perception regarding college-related stress. Items, such as "Felt overwhelmed by difficulties in your life" were answered on a 5-point Likert Scale, ranging from 1= "never" to 5= "very often", thus higher scores displayed high levels of overall perceived stress (Feldt, 2008; Horton, 2015) (Appendix E).

Feldt's (2008) CSSS demonstrates representative psychometrics. Thus, Cronbach's alpha coefficient displayed a convergent validity of .76, and for reliability a Cronbach's alpha coefficient of $\alpha=.87$. Furthermore, Feldt (2008) recorded a mean score of .73 for the test-retest reliability.

Procedure

Before investigating and collecting data, this research was approved by the Ethics Committee of the University of Twente, specifically from the Faculty of Behavioral Sciences (Request number: 200278). This online survey was generated through the platform 'Qualtrics' and was distributed by means of the SONA-System platform of the University of Twente, which is the university's test subject pool, and through the medium of social media (e.g. Facebook, Whatsapp, Instagram). Students who completed the online survey through the SONA platform were motivated by receiving credits after their participation.

At the beginning of the online survey, students were informed about the study itself, including the purpose of the study, the procedure, but also about the usage, confidentiality and anonymity of the data. Furthermore, contact details of the researcher were given in case of any questions and/or concerns that the participant might have had before, during, or after filling out the survey. Participants were also being informed that they had to be students and over the age of 18 years to participate.

After reading and agreeing with the informed consent (Appendix B), students were asked to answer firstly demographic questions and secondly indicate their answers on a 5-point Likert sale. These demographics were gender, age, and nationality. Later on, participants were asked to answer questions concerning their character strengths (specifically the following strengths: love of learning, curiosity, creativity, self-regulation), along with questions concerning their level of perceived stress and their planning behavior. At the end of the online survey, students were again given the researcher's contact details for questions and/or concerns and were thanked for their voluntary participation.

Data Analysis

First of all, through utilizing SPSS, the dataset was screened for insufficient data, for instance, answers of those who did not agree with the informed consent, those who dropped out, or participants under the age of 18 years were excluded from the dataset. Moreover, the internal consistency was examined by determining Cronbach's alpha for the reliability of the used (sub-) scales, which were sub-scales from the VIA, the sub-scale 'setting goals and

priorities' from the TMBS, and the scale of the CSSS. According to van Griethuijsen, et al. (2015) Cronbach's Alpha appears to be acceptable above .6 or .7. Also, the data set was visually checked for its normal distribution by computing a histogram, boxplot, and was checked for outliers, but also by checking its values for kurtosis and skewness. The acceptable range for kurtosis and skewness was between +/- 2 standard errors (Brown, 1997). A 1-tailed Pearson correlation test was going to be conducted in case the data set met the normality assumption. However, in case one of the to be tested variables did not meet the normality assumption, a Spearman rank correlation would have been chosen. A correlation analysis was going to be conducted to investigate the overall correlation between the independent variables love of learning, creativity, curiosity, and self-regulation, and the dependent variable, perceived stress, which were measured through the VIA and CSSS. The correlation analysis was administered with the computed total scores of the independent variables, which was done by adding the 10 respective items for each of the four character strengths into one total score for each strength, and adding the 11 items for perceived stress and 10 items for planning. The total scores were computed with a possible minimum score of 10 and possible maximum score of 50 (for the character strengths and planning) and 55 (for perceived stress). In order to interpret and understand the correlation coefficient between the variables, Mukaka (2012), represented a rule of thumb for the interpretation of the correlation coefficient (Table 2). Besides, a mean total score was computed for each participant for the six variables, namely the four character strengths, perceived stress, and planning. Moreover, standard deviations and means of the data set were determined.

Table 2. Guideline for the Interpretation of the Correlation Coefficient (Mukaka, 2012)

Size of the Correlation Coefficient	Interpretation
(-) .90 to (-) 1.00	Very strong correlation
(-) .70 to (-) .90	Strong correlation
(-) .50 to (-) .70	Moderate correlation
(-) .30 to (-) .50	Weak correlation
.00 to (-) .30	Very weak correlation

Subsequently, a multiple linear regression analysis was administered to predict the dependent variable perceived stress, based on the independent variables, namely the 10 items of the four character strengths. The confidence interval was set to 95%, thus the Alpha level was set to $p < .05$ in order to label a correlation and/or relationship as significant.

For RQ5 a mediation analysis was conducted to test whether planning has a mediating effect on the relationship between self-regulation and perceived stress, which was administered using Hayes's (2013) program 'PROCESS'. For the mediation analysis, the outcome variable was perceived stress, the predicting variable was self-regulation, and the mediator was planning behavior. A complete mediation effect was characterized by a significant relation between (1) self-regulation and perceived stress, (2) self-regulation and planning, (3) planning and perceived stress, and (4) with the condition that the effect of self-regulation on perceived stress vanished after including the mediator (Baron, & Kenny, 1986). Thus, for a complete mediation effect, all four steps had to be fulfilled, and the 95% confidence interval did not include zero for the indirect effect (Baron, & Kenny 1986, Mascha, Dalton, Kurz, & Saager, 2013). On the contrary, Baron and Kenny (1986) characterized a 'partial mediation' as the fulfillment of the first three steps, except the fourth step.
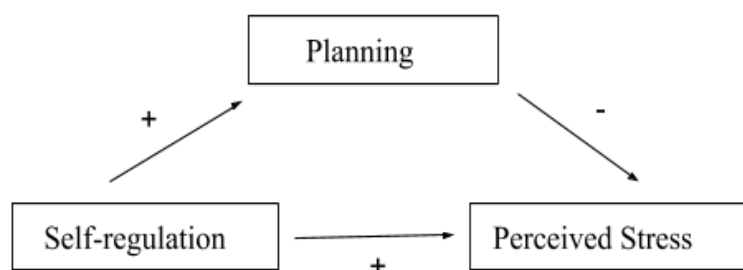

Figure 2. Schematic overview of planning as a mediator in the relationship between self-regulation and perceived stress

Results

After the exclusion of 203 participants who did not meet the inclusion criteria, the data analysis was conducted with a total sample of 216 university students. Since the data set displayed a normal distribution, a Pearson Correlation was chosen.

Table 3. *Overview of the Descriptive Statistics*

Variables	N	M	SD
1. Self-regulation	214	33.70	7.14
2. Creativity	209	35.62	5.69
3. Curiosity	211	38.20	4.95
4. Love of Learning	212	35.10	6.47
5. Perceived Stress	215	28.24	6.69
6. Planning Behavior	209	34.95	6.07

After the examination of Table 3, it becomes noticeable that the mean scores are close to 35, except for the stress score (M=28.24). This indicates that the study's sample of college students displayed relatively high levels of self-regulation, creativity, curiosity, love of learning, and planning behavior. Curiosity seemed to be the most distinctive character strength among the participants.

Research Question 1: To what extent is 'love of learning' correlated to perceived stress?

Correlation Analysis

First of all, a correlation analysis was conducted with the total variable of perceived stress and love of learning, which showed that there was no significant correlation of r=.05, p=.50 (Appendix F).

Multiple Linear Regression Analysis

A multiple regression analysis was administered in order to predict the outcome perceived stress based on the ten predictor variables regarding the character strength love of learning (Appendix G). The character strength love of learning did not reveal a significant regression equation ($F_{(10, 200)}$= .95, p=.49), with an R^2 of .05. The equation for the predicted perceived stress level is to 32.52 - .44 (IV_1) - .49 (IV_2) -.05 (IV_3) - .08 (IV_4) - .54 (IV_5) - .07 (IV_6) + .22 (IV_7) - .32 (IV_8) - .19 (IV_9) + 1.07 (IV_{10}). Only IV_{10} "I love to read nonfiction books for fun." revealed to be a significant predicting variable (p=.03) regarding the participant's perceived stress level, which increased by 1.07 for each unit of IV_{10} (Appendix G).

Research Question 2: To what extent is 'creativity' related to perceived stress?

Correlation Analysis

The conducted correlation analysis did not display a significant correlation between the total score perceived stress and the character strength creativity, with $r = -.004$, $p = .96$ (Appendix F).

Multiple Linear Regression Analysis

Secondly, a multiple regression analysis was conducted to investigate whether the character strength creativity plays a crucial predicting factor in students' perceived stress level (Appendix G). Thus, the ten items that were used to measure creativity, were investigated individually with regard to perceived stress. A significant regression equation was illustrated $F(10, 197) = 2.54$, $p < .007$), with an R^2 of .114. The participant's prognosed perceived stress level is equal to $33.52 - .14$ (IV_1) $+ 1.99$ (IV_2) -2.44 (IV_3) $- .91$ (IV_4) $- .41$ (IV_5) $+ .05$ (IV_6) $+ .69$ (IV_7) $+ .16$ (IV_8) $+ .56$ (IV_9) $- .84$ (IV_{10}). Out of the 10 IVs, IV_2 ("When someone tells me how to do something, I automatically think of alternative ways to get the same thing done."), and IV_3 ("I like to think of new ways to do things."), showed significant p-values (IV_2: $p = .001$; IV_3: $p = .001$). Thus, for each unit of IV_2, the participant's perceived stress level increased by 1.99, and for each unit of IV_3, the perceived stress level decreased by -2.44.

Research Question 3: To what extent is 'curiosity' correlated to perceived stress?

Correlation Analysis

The correlation analysis showed that there was no significant correlation between the total score of perceived stress character strength curiosity, with $r = -.12$, $p = .09$ (Appendix F).

Multiple Linear Regression Analysis

A multiple linear regression analysis was conducted to predict perceived stress based on curiosity (Appendix G). A significant regression equation was displayed ($F(10, 199) = 2.57$, $p < .006$), with an R^2 of .114. Participant's predicted perceived stress level was equal to $39.39 - 1.10$ (IV_1) $+ .24$ (IV_2) $-.46$ (IV_3) $+ .69$ (IV_4) $- .53$ (IV_5) $+ .53$ (IV_6) $- .74$ (IV_7) $- 1.12$ (IV_8) $- 1.25$ (IV_9) $+ .68$ (IV_{10}). However, only IV_9 "I think my life is extremely interesting.", displayed to be a significant predictor ($p = .04$) for perceived stress. The participants' perceived stress level decreased by -1.25 for each unit of IV_9.

Research Question 4: To what extent is 'self-regulation' correlated to perceived stress?

Correlation Analysis

The correlation analysis presented a significant correlation between the total score variable perceived stress and self-regulation, with $r = -.154$, $p = .033$ (Appendix F).

Multiple Linear Regression Analysis

A multiple regression analysis was conducted in order to measure the extent to which self-regulation predicts the participant's perceived stress level (Appendix G). In this analysis, a significant regression analysis was demonstrated $F(10, 202) = 2.75$, $p < .003$), with an R^2 of .120. The perceived stress level was equivalent to $36.500 + .65 (IV_1) - .58 (IV_2) + .55 (IV_3) - .97 (IV_4) - .08 (IV_5) + .28 (IV_6) - .53 (IV_7) - 1.02 (IV_8) + .45 (IV_9) - 1.22 (IV_{10})$. The IVs, namely IV_4 ("I control my emotions."), IV_8 ("Without exception, I do my tasks at work or school or home by the time they are due."), and IV_{10} ("I exercise on a regular basis."), demonstrated to be significant (IV_4: $p = .02$; IV_8: $p = .03$; IV_{10}: $p = .03$). Hence, for IV_4 ($p = .024$) the participants perceived stress level decreased by $-.97$, for IV_8 ($p = .03$) perceived stress decreased by -1.02, and lastly for IV_{10} ($p = .03$) perceived stress decreased by -1.22.

Research Question 5: To what extent is 'planning' a mediating factor between the character strength self-regulation and perceived stress?

Correlation Analysis

The correlation analysis between planning behavior and perceived stress (Appendix F), presented a significant correlation between the total score of perceived stress and self-regulation with $r = -.15$, $p = .04$, and between self-regulation and planning behavior with $r = .45$, $p < .01$. However, there was no significant correlation between planning behavior and perceived stress $r = -.09$, $p = .28$.

Mediation Analysis

Further, a mediation analysis was conducted to answer RQ5, which aims to investigate the question whether planning has a mediating effect on the relationship between self-regulation and perceived stress (see Figure 3). The mediation analysis was performed using Hayes' (2013) program PROCESS in SPSS. The outcome variable for this mediation analysis was perceived stress, the predictor variable was self-regulation, and the mediator variable planning behavior.
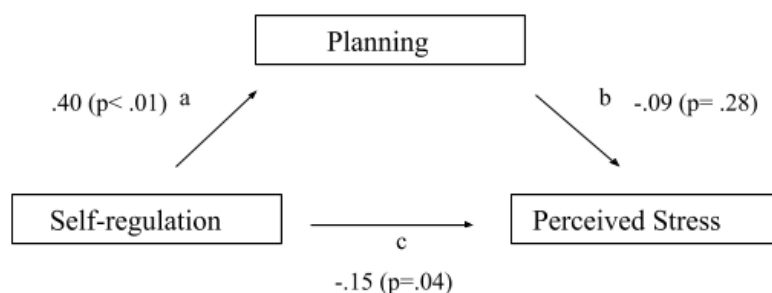
Figure 3. Overview of the mediating effect of planning behavior on the relationship between self-regulation and perceived stress.

According to the four steps for the fulfilment of a complete or partial mediation wich were mentioned above by Baron and Kenny (1986), the variable planning could not be defined as being a significant mediator for the relationship between self-regulation and perceived stress (Appendix H). A significant relationship (p< .01) was found between (path a) self-regulation and planning behavior, as well as a significant (p= .04) relationship between self-regulation and perceived stress (path c; see Appendix H). However, no significant relationship could be established between planning behavior and perceived stress (p=.28). Thus, Baron and Kenny's (1986) step (1) and step (2) were fulfilled. However, steps (3) and (4) for a partial and complete mediation could not have been fulfilled, since there was no significant relationship between planning behavior and perceived stress, and there was no significant fading of the relationship between self-regulation and perceived stress, after including the mediating variable planning behavior. In addition, the confidence interval (of 95%) for the indirect effect included zero, which was another indication that there was no significant mediation effect (Kenny, & Baron, 1986; Mascha, et al., 2013). Concluding, the variable planning behavior could not be explained as having a significant mediating effect on the relationship between self-regulation and perceived stress.

Discussion

Main Findings

This study investigated the overall correlation between perceived stress and the four character strengths (love of learning, creativity, curiosity, self-regulation), as well as the mediating effect of planning on the relationship between self-regulation and perceived stress, and the relationship between the 10 items of each character strength in relation to perceived

stress. In doing so, a significant correlation was found between self-regulation and perceived stress. Even though no significant correlation could be established between the character strengths love of learning, creativity, and curiosity with regard to perceived stress, further multiple regression analyses provided other significant relations between the character strengths and perceived stress. Furthermore, the variable planning behavior did not seem to have a significant mediating effect on the relationship between self-regulation and perceived stress.

Love of Learning and Perceived Stress

The mediation analysis showed that the item „I love to read nonfiction books for fun" was significantly positively related to the students' perceived stress level. One possible explanation for this unexpected result might be that according to Soubelet and Salthouse (2010), reading nonfiction books is correlated to the character trait openness. In consonance, Trapp and Ziegler (2019) investigated in the first trial of their study that openness was correlated with the engagement of learning and reading books and newspapers. The latter was correlated with an increase in stress level, especially for women (Marin, et al., 2012). Concluding, the significant relation between reading non-fiction and stress might be explained by the correlation found between reading nonfiction books and openness, which in turn was correlated with reading the newspaper (Marin, et al., 2012; Soubelet, & Salthouse, 2010; Trapp, & Ziegler, 2019).

Another aspect to consider is that Elliott (2007) found in her survey of college students a high demand for nonfiction books in libraries. This might suggest that students are generally a target group for reading nonfiction books. A study conducted by the American Psychological Association (2018), revealed that students reported to experience higher levels of perceived stress compared to other generations. This might indicate the positive correlation between reading nonfiction books and a higher level of perceived stress since students were suggested to have higher levels of stress compared to other generations and might show a higher demand for reading nonfiction books (APA, 2018; Elliott, 2007).

Creativity and Perceived Stress

After analyzing the results of the multiple regression analyses, the two items "When someone tells me how to do something, I automatically think of alternative ways to get the same thing done.", and "I like to think of new ways to do things." were found to be significantly related to a decreased stress level in students.

Both items refer to finding alternative ways and/or solutions to a problem. This is in line with the definition of alternative thinking as developing and thinking of various solutions

to a problem (Coleman, Wheeler, & Webber, 1993). Further, Coleman, et al. (1993) point out the relation between alternative thinking and effective problem-solving skills. Effective problem-solving abilities have been linked to stress management and can decrease levels of perceived stress (D'Zurilla, 1990). Moreover, finding alternative solutions and ways is also characterized as divergent thinking or thinking 'out of the box' (Notar, & Padgett, 2010; Simon, & Bock, 2016). Simon and Bock (2016) found a significant relationship between divergent thinking and age, thus younger individuals seemed to show better skills in divergent, 'out of the box' thinking compared to older individuals. Due to the fact that this study's sample was conducted with younger individuals with a mean age of 21 to 22, this might suggest that this sample generally seemed to be better in alternative, 'out of the box' thinking, which might, in turn, indicate the significant correlation of this item. In addition, the term "cultural tightness" (Chua, & Zremski, 2016, p.57) explains that Asian culture is often characterized by strict rules and conformity, which might hinder 'out of the box' thinking. Since the majority of the participants came from Western countries, this might have also impacted this result (see Table 1).

Because creativity is often linked to imagination, a significant correlation between the item "My imagination stretches beyond that of my friends" and perceived stress, was expected (Gaut, 2003). However, no significant relationship was established. Imagination is often closely linked to creativity and is defined as being related to delusion, reality, and unreality and contributes to novelty and moderation (Gaut, 2003; Li, et al., 2015; Mellou, 1995). As previously mentioned, Talbot, et al. (1992) suggested a negative relationship between perceived stress and creativity. This combined with the current uncertain situation of the Coronavirus causing distress to many individuals might explain why this item did not confirm the expected significant correlation to students' perceived stress level (Wang, et al., 2020; Zhao, Lan, Li, & Yang, 2020). Furthermore, the need for social acceptance and social desirability can hamper individuals' imaginary capacities (Annarella, 1999; Durkin, Wolfe, Clark, 1999; Hsu, & Reid, 2012; Lee, Geisner, Patrick, & Neighbors, 2010). Durkin, et al. (1999) defined this phenomenon utilizing the 'social bond theory', which states that college students are more prone to act in a socially desirable and acceptable manner, even if this might involve negative consequences for them. In addition, Annarella (1999) emphasized that social norms might not leave space for imagination, which might be an explanation for the non-significant correlation of the above-mentioned item.

Curiosity and Perceived Stress

For curiosity, the item "I think my life is extremely interesting.", was found to be significantly related to a decrease in students' stress levels. Generally, the character strength curiosity has been linked to openness to experience and being interested in various areas and aspects in life (Silvia, & Sanders, 2010). The concept of 'interest' is linked to personal relevance, knowledge expansion, and happiness (Hidi, & Harackiewicz, 2000; Wade, 2001). Happiness, in turn, showed to be significantly related to a decrease in stress levels (Veenhoven, 1988). As mentioned, students experience a transition and many changes while entering college (Brougham et al., 2009; Garrosa, Blanco-Donoso, Carmona-Cobo, & Moreno-Jiménez, 2017). This phase is characterized by new and exciting experiences and students seem to be more open and interested in experiencing new concepts and aspects (Brougham et al., 2009; Donnellan, & Lucas, 2008). Thus, this highly interesting stage that students face might have been one reason for this significant result of students defining their life as interesting.

Besides this, there might be explanations for non-significant relationships between other items of curiosity and perceived stress. Such an item is "It is very easy for me to entertain myself". Individuals living during these modern times are constantly overloaded by an excess of information from the entertainment industry, which can lead to a dependence on this kind of external amusement (Clair, 2011). Winter (2002) adds that one issue regarding this dependency of external entertainment can be that the individuals are no longer able to entertain themselves. In addition to this, a study demonstrated that adolescents have shown to use social media more frequently compared to (older) adults (Bell, et al., 2013). Thus, combining these research outcomes, one might suggest that this above-mentioned item did not significantly correlate to the student's perceived stress level because students have issues -and perhaps unlearnt- entertaining themselves due to the provided amusement and an overload of information by the entertainment industry (Clair, 2011; Bell, et al., 2013; Winter, 2002).

Self-regulation and Perceived Stress

For the character strength self-regulation, various items seemed to be significantly related to student's perceived stress levels. Firstly, emotional control showed to be significantly negatively related to the students' perceived stress level. In line with this, previous studies showed that stress is often linked to and resulting from the absence of emotional control (Lyons, et al., 2010). This relation has also been found in Lok's and Bishop's (1999) study, which investigated the relationship between emotion control, health, and stress. After conducting this study, Lok and Bishop (1999) suggested a significant relation between perceived stress and emotion control. Thus, individuals who displayed a distinctive emotion

control seemed to experience less stress (Lok, & Bishop, 1999). Interestingly, emotion control was suggested to be influenced by culture, thus, individuals from Western countries showed to have different ways of expressing, controlling, and suppressing emotional feelings, compared to individuals from Eastern countries (Lok, & Bishop, 1999). This is in line with Benita, et al. (2020) who emphasized that individuals from collectivistic (mostly Eastern) countries tend to control their emotions by suppression, whereas individuals from individualistic (mostly Western) tend to acknowledge their emotions. Due to the fact that the sample of the current study came mostly from Western countries, the participants might have admitted their emotions more, which might have affected the studies' results. Previous research suggested that acknowledging one's emotions promotes the basic needs of the 'self-determination theory', which are relatedness, autonomy, and competence (Benita, et al., 2020; Ryan, & Deci, 2000). As the name might suggest, the self-determination theory generally focuses on the extent to which an individual's actions are self-chosen, determined, and inherently motivated (Adams, Little, & Ryan, 2017; Deci, & Ryan, 2012; Ryan, & Deci, 2000). Thus, a student who experiences stress about an upcoming exam, would act according to his/her needs by acknowledging his/her emotions, being true to him/herself (autonomy), investing more time in studying (competence), and opening up (relatedness) to others (Benita, et al., 2020).

The second item "Without exception, I do my tasks at work or school or home by the time they are due.", refers to time management. Previous studies suggested that time management, which can be defined as an active coping mechanism in terms of making to-do lists and setting time limits, was significantly related to an increase in work/school effectiveness and well-being, as well as a decrease in perceived stress levels (Forbus, Newbold, & Mehta, 2011; Kearns, & Gardiner, 2007). In addition to this, Misra and McKean (2000) conducted a study investigating the associations of student's perceived stress level within the academic setting and found that female students were more efficient in managing their time compared to male students. Linking this to the sample of the current study with a majority of female students (87,5%) might explain the relatively high score of this item.

The third item "I exercise on a regular basis" refers to consistency in exercising. According to Carmeli (2013), exercising regularly showed to decrease the level of perceived stress. These findings are also substantiated by various studies which emphasized the decreasing effect that exercising on a regular basis can have on stress, as well as enhancement of stress management and well-being, and feeling more capable of meeting study demands (Carmeli, 2013; Welford, & O'Brien, 2019; Marques, Balle, & Curado, 2018). Furthermore, being physically active on a regular basis can increase the individuals sleep quality, which in

turn, can increase well-being and decrease levels of perceived stress (Reid, et al, 2010). In addition to this, previous studies investigated the total amount of physical activity in relation to age and found a significant relationship between physical activity and a decrease with age (Chodzko-Zajko, et al., 2009; Takagi, Nishida, & Fujita, 2015). This might suggest that the study's sample of college students might commonly display higher levels of physical activity compared to older generations (Chodzko-Zajko, et al., 2009; Takagi, et al., 2015).

However, other items of the strength self-regulation were suggested to be significantly related, such as the item „I have no trouble eating healthy foods.", which can be substantiated by studies suggesting a significant positive correlation between healthy eating patterns and self-regulation (Kalavana, Maes, & De Gucht, 2010). Considering the study's sample of college students, Sogari, Velez-Argumedo, Gómez, and Mora (2018) investigated college students' eating choices and discovered that students experienced issues during the transition from high school to college and that stress was one determining factor for unhealthy eating. Combining these outcomes with the outcome of APA's (2018) conducted survey that college students experience a greater amount of stress, might explain the non-significant outcome.

Planning as a Mediator on the relationship between self-regulation and perceived stress

The relationship between self-regulation and perceived stress could not be explained by a third mediating effect, namely planning. A mediation effect of planning was hypothesized with the background of previous studies, which confirmed a significant correlation between self-regulation and perceived stress, self-regulation and planning, and lastly between planning and perceived stress (Evans, & Kim, 2013; Macan, et al., 1990; Misra, & McKean, 2000; Ramli et. al, 2018; Townsend, & Liu, 2012). Thus, planning behavior was expected to have a significant mediating effect on the relationship between self-regulation and perceived stress.

One explanation for this unexpected result might be other unknown extraneous variables that could have impacted the studies' internal validity (Brown, 2002). This research was conducted with a relatively homogeneous sample of mostly female students with German roots and a mean age of 21-22 years (see Table 1). Hence, Brougham, Zail, Mendoza, and Miller (2009) point out that generally, students report experiencing moderate to high levels of perceived stress, which can be explained by a transformation from being an adolescent to becoming an adult. Especially during this growth, students face new obstacles, such as identity development, moving out, handling study demands, as well as maintaining and creating new friendships (Brougham, et al., 2009). In addition to this, Matud (2004) found that overall female students have shown to report a higher perceived stress level compared to men, which might have impacted the results since most of the participants were female (87.5%). This is

also in line with the conducted stress survey done by the American Psychological Association (2018), which revealed that students experience compared to other generations, higher levels of stress.

As already mentioned, there might have been extraneous variables, such as the Coronavirus situation, gender, age, and occupation that might have affected the outcome of the mediation analysis. Recent studies showed that the Coronavirus impacted individuals psychologically in terms of increased levels of perceived stress and sleeping problems (Wang, et al., 2020; Zhao, et al., 2020). Christensen (1985) explains in order to effectively plan, the individuals need to be provided with sufficient information, thus, during this time of uncertainty and facing this new and unknown virus, might not give the individual all necessary and needed information for planning. Individuals might experience more stress than usual and might have trouble planning.

Furthermore, one reason for this non-significant mediating effect of planning behavior might be the selection of the scale and/or the decision of only using the sub-scale 'setting goals and priorities' rather than Macan's et. al. (1990) whole TMBS. Oppositely, using the whole scale rather than only using the mentioned sub-scale, might present a more accurate and representative overall picture of time management behavior. However, even though significant correlations have been reported between self-regulation and planning, as well as self-regulation and perceived stress, planning does not necessarily need to be a significant mediator. This is also supported by Baron and Kenny (1986) who mention that a significant relationship between variables can be established without having displayed a significant mediation effect. Additionally, as mentioned earlier, a hidden fourth variable could have impacted the results of the mediation analysis.

Limitations and Implications

Limitations

When considering these presented results, cautions have to be drawn to some limitations that might have affected these outcomes. As already mentioned, one limitation of this research might be the homogenous and biased sample. This study was conducted with only students, and homogeneity can be explained by the fact that the majority of participants were German, female, and aged between 21-22 years. As mentioned college students, and especially female students showed to experience more stress, which might have affected the outcomes (Brougham, et. al, 2009; Misra, & Castillo, 2004). Thus, the stress level of this study might

have been automatically higher due to the study's sample, which might have increased the stress score.

Furthermore, since most participants reported to be German this might have caused misunderstandings and difficulties properly understanding the English online survey, which might also explain the relatively high drop-out rate of the online survey, with 419 participants starting and 216 completing the survey. Misunderstandings and drop-outs might have falsified the results of the study and the participants might have given unintentional answers.

Strengths

However, this study also has its strengths, such as relatively high Cronbach's Alpha scores, displaying a good internal consistency and reliability regarding the used items. Further, Friedhoff, et al. (2013) emphasize that quantitative studies target a good replicability of the conducted research. One more strength of this research is the necessity of investigating this comparatively new field of positive psychology, specifically focusing on the incorporation of character strengths. The idea of investigating whether planning behavior might have a significant mediating effect on the relationship between self-regulation and perceived stress can also be described as one strength of this study, because this is a relatively new investigation and is worth further research. Moreover, this research might have opened up new ways of thinking in the general investigation of a mediating effect between self-regulation and perceived stress. Both self-regulation and perceived stress seem to have considerably various factors influencing them, thus it might be interesting to investigate possible mediating effects.

Implications and Future Research

After examining the current study, there are some implications for future research. Considering the relatively high drop-out rate, it might be advisable to include a face-to-face interaction personally, or in terms of a short introduction video. This introductory video could address details about the purpose, course and background of the study. This might cause a higher commitment from the participants to properly finish the survey. Moreover, other extraneous variables, namely age, gender, occupation, and other special circumstances, such as the current Coronavirus, have to be accounted for as confounding variables. Due to the high percentage of non-native English speakers, it might be advisable to give more language options for the participants of the study. However, when translating, cautions have to be drawn to any changes regarding the survey's reliability and validity, since the meaning of a questionnaire can be threadend due to an unsuccessful translation (Auchter, & Stansfield, 1997).

Moreover, due to the relatively homogenous sample of students, it might be interesting to also concentrate on differences in age and gender, since college students were suggested to

generally experience high levels of stress (Leppink, Odlaug, Lust, Christenson, & Grant, 2016). It might also be beneficial to investigate other possible mediating effects rather than planning behavior as a mediator between self-regulation and perceived stress. One such example of another mediating effect could be meditation, which is said to be a stress-reducing activity (Oman, Shapiro, Thoresen, Plante, & Flinders, 2008). Exemplarily, a student with a high level of self-regulation might practice mediation more frequently, which might lower stress.

Even though the current study revealed no significant overall correlations between the investigated character strengths and perceived stress, significant relationships between specific components within these character strengths and perceived stress were detected. Thus, it might be important for the implementation of strength-based interventions to investigate character strengths and their respective aspects in detail rather than superficially investigating them. This, in turn, can prevent individuals and interventions from drawing superficial conclusions or leaving room for undetected important aspects, such as components within the investigated character strengths.

Furthermore, this current study displayed that the character strength self-regulation, specifically physical activity, emotion control, and effective time management, seemed to have a crucial relationship with students' perceived stress levels. Thus, it might be beneficial to further explore this field and examine whether there is a causal relationship between self-regulation and perceived stress, which can be done by including a control group or conduct pre- and post-test measures. In case future research investigates that there is a causal relation, thus that self-regulation decreases stress, it might be helpful for society to promote and enhance this character strength and its components by, for instance, introducing a new subject 'Health' or modules in schools and colleges. The focus can be on health and stress management, and incorporating physical activity, meditation, and time management lessons. Overall the resulting knowledge extension from this study might help society in the future by focusing on their strength and by inventing or improving strength-based interventions, which can help in effectively managing stress.

Conclusion

Overall, this research investigated the relationship between character strengths and perceived stress, as well as planning behavior as a mediating factor between self-regulation and perceived stress. The character strength self-regulation showed to be significantly correlated to perceived stress. On the other side, the character strengths love of learning, creativity, and curiosity did not display a significant correlation to perceived stress. However,

a closer look at the multiple regression analyses revealed that some components within the character strengths seemed to be significantly related to perceived stress. For the character strength creativity, aspects such as imaginative, alternative thinking seemed to be significantly related to perceived stress. Further, for curiosity, the aspect of interest seemed to be a significant predictor for perceived stress levels in students. The character strength self-regulation seemed to have various aspects, namely effective time management, emotion control, and physical activity, predicting a student's perceived stress level. Surprisingly, within love of learning, the aspect of reading nonfiction books was positively related to perceived stress. Lastly, planning behavior did not seem to be a significant mediator between the self-regulation and perceived stress. Further research could give more insights into the relationship between character strengths and perceived stress and other potential mediating factors. It would be interesting to see whether further research with the implementation of the above-mentioned suggestions might yield different results.

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Appendix

Appendix A. VIA classification

1. Wisdom and Knowledge

- creativity: thinking of novel and productive ways to do things
- curiosity: taking an interest in all of the ongoing experience
- open-mindedness: thinking things through and examining them from all sides
- love of learning: mastering new skills, topics, and bodies of knowledge
- perspective: being able to provide wise counsel to others

2. Courage

- authenticity: speaking the truth and presenting oneself in a genuine way
- bravery: *not* shrinking from threat, challenge, difficulty, or pain
- perseverance: finishing what one starts
- zest: approaching life with excitement and energy

3. Humanity

- kindness: doing favors and good deeds for others
- love: valuing close relations with others
- social intelligence: being aware of the motives and feelings of self and others

4. Justice

- fairness: treating all people the same according to notions of fairness and justice
- leadership: organizing group activities and seeing that they happen
- teamwork: working well as member of a group or team

5. Temperance

- forgiveness: forgiving those who have done wrong
- modesty: letting one's accomplishments speak for themselves
- prudence: being careful about one's choices; *not* saying or doing things that might later be regretted
- self-regulation: regulating what one feels and does

6. Transcendence

- appreciation of beauty and excellence: noticing and appreciating beauty, excellence, and/or skilled performance in all domains of life
- gratitude: being aware of and thankful for the good things that happen
- hope: expecting the best and working to achieve it
- humor: liking to laugh and joke; bringing smiles to other people
- religiousness: having coherent beliefs about the higher purpose and meaning of life

Figure 1. VIA classification of the six core character strengths (Peterson, & Park, 2009).

Appendix B. Informed Consent

In this research, I am going to investigate the relationship between character strengths and perceived stress and planning behavior. You will be asked questions regarding the character strengths 'self-regulation', 'love of learning', 'curiosity', and 'creativity', as well questions regarding your perceived stress level and your planning behavior.

This online survey will take approximately 10 minutes and your data will be treated confidentially and anonymously. Your participation is voluntary, and you have the right to withdraw from the research without reasoning yourself. There is no right or wrong answer.

It is important that you are a student and at least 18 years old.

In case any questions arise before, during or after the research, you can contact the responsible researcher Alexandra Hölscher under the following email address: a.holscher@utwente.nl.

I declare that I have considered and read the provided information about the research.

o Yes, I agree

o No, I do not agree.

Appendix C. Values-In-Action-Inventory (VIA-IS)

Curiosity:

1. "I find the world a very interesting place."
2. "I am never bored."
3. "I am always busy with something interesting."
4. "I am always curious about the world."
5. "I am excited by many different activities."
6. "I have many interests."
7. "I can find something of interest in any situation."
8. "It is very easy for me to entertain myself."
9. "I think my life is extremely interesting."
10. "I really enjoy hearing about other countries and cultures."

Self-regulation:

1. "I have no trouble eating healthy foods."
2. "Even when candy or cookies are under my nose, I never overeat."
3. "I am a highly disciplined person."
4. "I control my emotions."
5. "I never want things that are bad for me in the long run, even if they make me feel good in the short run."
6. "I can always stay on a diet."
7. "I can always say "enough is enough."
8. "Without exception, I do my tasks at work or school or home by the time they are due."
9. "For me, practice is as important as performance."
10. "I exercise on a regular basis."

Love of Learning:

1. "I always go out of my way to attend educational events."
2. "I love to learn new things."
3. "I am thrilled when I learn something new."
4. "Every day, I look forward to the opportunity to learn and grow."
5. "I am a true life-long learner."
6. "I always go out of my way to visit museums."

7. "I read all of the time."

8. "If I want to know something, I immediately go to the library or the Internet and look it up."

9. "I read a huge variety of books."

10. "I love to read nonfiction books for fun."

Creativity:

1. "Being able to come up with new and different ideas is one of my strong points."

2. "When someone tells me how to do something, I automatically think of alternative ways to get the same thing done."

3. "I like to think of new ways to do things."

4. "I pride myself on being original."

5. "I am always coming up with new ways to do things."

6. "My friends say that I have lots of new and different ideas."

7. "I am an original thinker."

8. "My imagination stretches beyond that of my friends."

9. "In the last month I have found an original solution to a problem in my life."

10. "I have a powerful urge to do something original during this next year."

Appendix D. Time Management Behaviour Scale ('TMBS')

'Setting goals and priorities':

1. "When I decide on what I will try to accomplish in the short term, I keep in mind my long- term objectives."
2. "I review my goals to determine if they need revising."
3. "I break complex, difficult projects down into smaller manageable tasks."
4. "I set short-term goals for what I want to accomplish in a few days or weeks."
5. "I set deadlines for myself when I set out to accomplish a task."
6. "I look for ways to increase the efficiency with which I perform my work activities."
7. "I finish top priority tasks before going on to less important ones."
8. "I review my daily activities to see where I am wasting time."
9. "During a workday I evaluate how well I am following the schedule I have set down for myself."
10. "I set priorities to determine the order in which I will perform tasks each day."

Appendix E. College Student Stress Scale' ('CSSS')

1. "Felt anxious or distressed about personal relationships."
2. "Felt anxious or distressed about family matters."
3. "Felt anxious or distressed about financial matters."
4. "Felt anxious or distressed about academic matters."
5. "Felt anxious or distressed about housing matters."
6. "Felt anxious or distressed about being away from home."
7. "Questioned your ability to handle difficulties in your life."
8. "Questioned your ability to attain your personal goals."
9. "Felt anxious or distressed because events were not going as planned."
10. "Felt as though you were NO longer in control of your life."
11. "Felt overwhelmed by difficulties in your life."

Appendix F. Pearson Correlation

Table. *Pearson Correlations between Variables*

Variables	1	2	3	4	5	6
1.Perceived Stress						
2. Creativity	-.004					
3. Curiosity	-.12	.49**				
4. Love of Learning	.05	.46**	.49**			
5. Self-regulation	-.15*	.32**	.38**	.44**		
6. Planning	-.06	.26**	.29**	.32 **	.45**	

Note. ** p <.01, * p <.05, N=192

Appendix G. Multiple Linear Regression Analyses

Table. *Multiple Linear Regression Analysis Summary for Love of Learning' Items predicting Perceived Stress*

Variable	B	95% CI	ß	t	p
(Constant)	32.52	[26.50, 38.54]		10.65	.00 **
1 ."I always go out of my way to attend educational events."	-.44	[-1.57, .69]	-.06	-.77	.44
2. I love to learn new things."	-.49	[-2.13, 1.16]	-.05	-.59	.56
3. "I am thrilled when I learn something new."	-.05	[-1.47, 1.37]	-.01	-.07	.95
4. "Every day, I look forward to the opportunity to learn and grow."	-.08	[-1.50, 1.35]	-.01	-.11	.91
5. "I am a true life-long learner."	-.54	[-1.98, .90]	-.07	-.74	.46
6. "I always go out of my way to visit museums."	-.07	[-.98, .84]	-.01	-.15	.88
"7. I read all of the time."	.22	[-1.13, 1.57]	.04	.32	.75
8. "If I want to know something, I immediately go to the library or the Internet and look it up."	-.32	[-1.37, .73]	-.05	-.60	.55
9. "I read a huge variety of books."	-.19	[-1.49, 1.11]	-.03	-.29	.77
10. "I love to read nonfiction books for fun."	1.07	[.13, 2.02]	.20	2.24	.03 *

Note. ** p <.01, * p <.05, R²adjusted= -.003, CI= confidence intervals for B.

Table. *Multiple Linear Regression Analysis Summary for Creativity' Items predicting Perceived Stress*

Variable	B	95% CI	ß	t	p
(Constant)	33.52	[27.58, 39.45]		11.14	.00 **
1."Being able to come up with new and different ideas is one of my strong points."	-.14	[-1.41, 1.14]	-.02	-.21	.83
2. "When someone tells me how to do something, I automatically think of alternative ways to get the same thing done."	1.99	[.80, 3.20]	.24	3.29	.001 **
3. "I like to think of new ways to do things."	-2.44	[-3.86, -1.03]	-.30	-3.41	.001 **
4. "I pride myself on being original."	-.91	[-2.09, .26]	-.12	-1.53	.13
5. "I am always coming up with new ways to do things."	-.41	[-1.95, 1.13]	-.05	-.52	.60
6. "My friends say that I have lots of new and different ideas."	.05	[-1.38, 1.47]	.01	.07	.95
7. "I am an original thinker."	.69	[-.57, 1.94]	.09	1.08	.28
8. "My imagination stretches beyond that of my friends."	.163	[-1.07, 1.40]	.02	.26	.80
9. "In the last month I have found an original solution to a problem in my life."	.56	[-.51, 1.64]	.08	1.03	.30
10. "I have a powerful urge to do something original during this next year. "	-.84	[-1.96, .29]	-.12	-1.47	.14

Note. ** $p < .01$, * $p < .05$, R^2adjusted= .114, CI= confidence intervals for B.

Table. *Multiple Linear Regression Analysis Summary for Curiosity' Items predicting Perceived Stress*

Variable	B	95% CI	ß	t	p
(Constant)	39.40	[31.94, 48.86]		10.42	.000 **
1. "I find the world a very interesting place."	-1.10	[-2.73, .53]	-.11	-1.33	.19
2. "I am never bored."	.24	[-.94, 1.41]	.03	.40	.69
3. "I am always busy with something interesting."	-.46	[-1.83, .91]	-.06	-.66	.51
4. "I am always curious about the world."	.69	[-.49, 1.88]	.09	1.16	.25
5. "I am excited by many different activities."	-.53	[-1.96, .91]	-.06	-.72	.47
6. "I have many interests."	.53	[-.89, 1.95]	.07	.74	.46
7. "I can find something of interest in any situation."	-.74	[-1.87, .39]	-.10	-1.29	.12
8. "It is very easy for me to entertain myself."	-1.12	[-2.27, .03]	-.15	-1.92	.06
9. "I think my life is extremely interesting."	-1.25	[-2.42, -.08]	-.17	-2.10	.04*
10. "I really enjoy hearing about other countries and cultures."	.68	[-.53, 1.90]	.08	1.11	.27

Note. ** $p < .01$, * $p < .05$, R^2adjusted $= .114$, CI= confidence intervals for B.

Table. *Multiple Linear Regression Analysis Summary for Self-regulations' Items predicting Perceived Stress*

Variable	B	95% CI	ß	t	p
(Constant)	36.50	[31.59, 41.41]		1.35	.00 **
1."I have no trouble eating healthy foods."	.65	[-.30, 1.61]	.11	1.35	.18
2. "Even when candy or cookies are under my nose, I never overeat."	-.58	[-1.59, .43]	-.11	-1.13	.26
3. "I am a highly disciplined person."	.55	[-.58, 1.67]	.09	.96	.34
4. "I control my emotions."	-.97	[-1.81, -.13]	-.17	-2.28	.02*
5. "I never want things that are bad for me in the long run, even if they make me feel good in the short run."	-.08	[-1.08, .92]	-.01	-.15	.88
6. "I can always stay on a diet."	.28	[-.75, 1.31]	.05	.54	.59
7. "I can always say "enough is enough."	-.53	[-1.66, .61]	-.09	-.91	.36
8. "Without exception, I do my tasks at work or school or home by the time they are due."	-1.02	[-1.93, -.10]	-.17	-2.19	.03 *
9. "For me, practice is as important as performance."	.45	[-.91, 1.81]	.06	.66	.51
10. "I exercise on a regular basis."	-1.22	[-2.32, -.13]	-.18	-2.20	.03 *

Note. ** $p < .01$, * $p < .05$, R^2adjusted= .076, CI= confidence intervals for B.

Appendix H. Mediation Analysis

Table. *Mediation Analysis involving Planning as the Mediator of the relationship between Self-regulation and Perceived Stress*

Parameter	R^2	b	SEb	t	Sig.	95% Confidence Interval	
Effects						Lower Bound	Upper Bound
From self-regulation to planning	.233	.40	.05	7.89	.00	.30	.50
(Constant)		21.70	1.73	12.56	.00	18.29	25.11
From self-regulation and planning to perceived stress (total effect)		-.19	.06	-3.01	.003	-.31	-.07
(Constant)		36.60	2.86	12.82	.00	30.97	42.24
Self-regulation (direct effect of X on Y)		-.15	.07	-2.12	.04	-.29	-.01
Indirect effect of X on Y		-.04	.04			-.11	.03

Note. N= 207; b= unstandardized regression coefficient.