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A study examining the relationship between personality traits and self-regulation.

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Abstract

Background Self-regulation enables people to override and alter their mainly unwanted immediate responses to achieve long-term goals and regulates behaviour in a healthy manner. Personality traits might predict both the types of self-regulation strategies that a person engages in, as well as the success of these strategies in modifying behaviour. Therefore, the present study investigates the possible associations between self-regulation strategies and the five-factor personality traits. **Method** The sample consisted of 52 adolescents from the Dutch-speaking population (76.9% women, mean age= 21.65). The participants completed an online questionnaire about their goals and self-regulation strategies they use to achieve these goals, their self-control and their five-factor personality traits. **Results** Conscientiousness was positively associated with the self-regulation strategies planning, monitoring, persistence, automation and inhibition. It was also found that there is a negative association between neuroticism and cognitive reappraisal and a positive association between extraversion and support seeking. No significant associations were found between the personality traits openness and agreeableness and the self-regulation strategies. In addition, also no significant correlations were found between situation selection or reward and the five-factor personality traits. **Discussion** Results indicate that conscientiousness may play a positive role in the application of several self-regulation strategies. For this reason, when trying to promote self-regulation among young adults in order to achieve goals, it is important to take into account the possible influence of personality traits on the self-regulation strategies young adults apply.

Keywords: self-regulation; self-regulation strategies; five-factor personality traits; self-control; goal achievement.

Introduction

Many of the behaviour, feelings and thoughts that characterize daily life concerns the pursuit of goals (Hoyle & Gallagher, 2015). These goals range from mundane goals (finishing your homework) to extensive goals (starting your own profitable business in a number of years). Some of these goals are relatively easy to achieve, whereas other goals are too extensive and must be abandoned or postponed. The consideration, pursuit and the possible abandonment of goals pose significant behavioural and motivational challenges. The processes and strategies by which these challenges are met constitute self-regulation (Hoyle & Gallagher, 2015).

Our capability to self-regulate is perhaps the most distinguishing feature of humans compared to animals. Self-regulation has provided us with an adaptive edge that enabled our ancestors to survive and even flourish when changing conditions led other species to extinction (Zimmerman, 2000). It has been argued that everybody attempts to self-regulate his or her functions to gain goals in life and that it is inaccurate to speak about the absence of self-regulation or "un-self-regulated persons" (Winne, 1997).

But what is self-regulation exactly? And how can self-regulation contribute to the achievement of one's goals? Self-regulation is the ongoing process of managing goal pursuit in the face of personal, interpersonal, and environmental forces that would derail it (Hoyle & Gallagher, 2015). It enables people to override and alter their mainly unwanted immediate responses to achieve long-term goals, including changing themselves so as to live up to social and other standards (Baumeister, Gailliot, DeWall & Oaten, 2006). The process of self-regulation is primarily characterized by cognition, motivation and behaviour (Hoyle & Gallagher, 2015). Baumeister, Galliot, DeWall and Oaten (2006) state that self-regulation is also an important process by which people seek to exert control over their thoughts, their feelings, their impulses and their task performance, in order to achieve one's goals and regulate behaviour in a healthy manner. It consists of, among other things, the self-monitoring of behaviour and consequences, planning of behaviour, the evaluation of performance against a relevant goal and self-evaluation of either satisfaction or dissatisfaction with the progress and seeking support (Creed, King, Hood & McKenzie, 2009).

Self-regulation is also known to play a positive role in a person's development (Berkman, Graham & Fisher, 2012) and thus one's future. Namely, individuals who are effective in regulating their behaviour, actively set goals, plan their time, decide on appropriate strategies, monitor their behaviour by seeking feedback on their performance and make appropriate adjustments for future activities and the achievement of goals (Puustinen &

Pulkkinen, 2001). In addition, self-regulation or the application of various self-regulation strategies is also known to lead to several positive outcomes, in for example academic performance (Puustinen & Pulkkinen, 2001), interpersonal relationships (Vohs & Ciarocco, 2004) and health-promoting behaviour (Terry & Leary, 2011). Therefore, properly applying self-regulation at a young age might affect a person's future goal achievement, development and future itself.

In general, self-regulation is thus seen to mediate between a person and his or her performance (Creed, King, Hood & McKenzie, 2009). Creed et al. (2009) state that goal orientation is to be associated with self-regulatory strategies employed by the individual. Self-regulation strategies steer an individual towards meeting a goal through the individual's investment of time, attention and effort to goal-relevant activities (Creed et al., 2009).

Gokee-LaRose, Gorin and Wing (2009) state that young adults are a group that struggles with self-regulation on a variety of (health-related) behaviours. Murray and Rosanbalm (2017) mention that some people believe that self-regulation has to be taught in childhood, but they state that it is actually not too late to make a difference during adolescence and young adulthood. In addition, research has now shown that there are major changes in the brain architecture that occur during adolescence, making interventions at this age important and timely. Given the fact that poor decisions during adolescence can have long-term negative consequences, self-regulation supports during this developmental period are critical (Murray & Rosanbalm, 2017). Therefore, this study is especially interested in the application of components and strategies of self-regulation among young adults.

The planning and selection of the components and strategies of self-regulation requires cyclical adjustments, because feedback from prior performances can be used to make adjustments during current efforts (Zimmerman, 2000). These adjustments are necessary because personal, behavioural, and environmental factors are constantly changing during the course of learning and performance. Thus, no components of self-regulation will work equally well for all persons, and few, if any, strategies will work optimally for a person on all tasks or occasions (Zimmerman, 2000).

Although there is quite some research on components of self-regulation, most research focuses primarily on resisting temptations as a good self-regulatory strategy. However, resisting temptations is difficult to sustain and the application of other strategies or components of self-regulation might be important in order to obtain long-term goals. Therefore, in this study, there will be investigated which different components of self-regulation individuals apply when trying to achieve their goals.

Examples of these components are persistence, reward, initiation of behaviour, situation selection, monitoring, cognitive reappraisal and automation, seeking social support and planning.

Feedback or support seeking is an important self-regulation tactic for reducing the discrepancies between one's goals and one's current state. It is likely to affect someone's performance by directing individuals to effective performance strategies (Porath & Bateman, 2006).

Persistence is, for example, persisting in the face of difficult or boring tasks (Ommundsen, Haugen & Lund, 2005). Initiation of behaviour, involves an individual being able to pursue goals for which the intrinsic motivation or impulse is weak (Findley & Brown 2018). Inhibition or inhibitory self-regulation involves being able to over-ride impulses to engage in immediately rewarding, yet long-term counter-productive behaviour (Findley & Brown 2018). Rewarding behaviour is, for example, bundling rewards with long-term goals (e.g. preserving a rewarding guilty pleasure like an episode of a tv series for visits to the gym) (Duckworth, Gendler & Gross, 2016).

Situation selection is manipulating your surroundings/ situation to advantage. For example, buying candy with Halloween that you do not like yourself, keeping the treats out of sight and keep sugar-free gum as a substitute for high- calorie indulgences (Pearson, 2009, as stated in Duckworth, Gendler & Gross, 2016).

Other components of self-regulation are monitoring; checking if you are still on the right path and are making progress, cognitive reappraisal; re-evaluating emotional stimuli, to reduce the emotional impact (Gross & John, 2003) (e.g. looking at the positive sides when you experience a setback) and automation; making a habit of the things you have to do to achieve your desired goals (Gardner, Lally & Wardle, 2012).

Another self-regulation strategy is planning. Individuals with high self-regulation take time to plan. They consider whether their goals are relevant, valuable and achievable. Once they set a goal, they are motivated to achieve that goal and act accordingly. Persons who score high on self-regulation, view the goal as a destination, use the goal to prioritize the tasks and decide where to direct their attention (Midgley & Urdan, 2001). However, Porath & Bateman (2006) state that people are not always aware of useful self-regulation strategies and how to apply them. Therefore, it is important to know more about the different components and strategies of self-regulation that people apply. In that way, the most effective strategies and components of self-regulation under different circumstances can be identified, to help people recognize their behavioural patterns and how they can influence their behaviour in the process

of attaining their desired goals (Porath & Bateman, 2006).

Because of the influence of self-regulation on goal achievement, it is thus important to get to know more about the components and strategies of self-regulation that people apply when trying to achieve their goals. Especially since, as mentioned earlier, no components of self-regulation will work equally well for all persons (Zimmerman, 2000) and the majority of the research focused on resisting temptation or inhibition as a self-regulation strategy. However, inhibition is a demanding and energy-consuming process, which could make other self-regulation strategies possibly easier and better to apply.

The components or strategies of self-regulation are partially domain-specific: modifying one's drinking behaviour requires a different approach than improving one's study habits (McCrae & Löckenhoff, 2010). However, several broad themes emerge consistently, related to certain personality traits. McCrae and Löckenhoff (2010) state that personality traits might predict both the types of strategies that a person is likely to engage in, as well as the success of these strategies in modifying behaviour and its outcomes. Also, Hoyle (2006) mentions that stable tendencies to self-regulate in particular ways or with characteristic levels of success or failure are reflected in personality traits. Therefore, in this study will be investigated whether there is an association between personality traits and self-regulation. As mentioned earlier, most studies focus on inhibition as a self-regulation strategy, but this study especially investigates the associations between personality traits and self-regulation, by investigating the possible associations between the different self-regulation strategies that young adults apply in order to achieve certain goals and their five-factor personality traits.

Personality traits are conceptualized as stable individual difference characteristics explaining an individual's disposition to particular patterns of behaviour, emotions and cognitions (Hogan, Hogan, & Roberts, 1996). Research has established empirically a five-factor structure of personality (McCrae & Costa, 1987), which includes the dimensions of extraversion, agreeableness, conscientiousness, neuroticism (or emotional stability) and openness to experience. According to five-factor theory, these factors are endogenous basic tendencies that are rooted in biological bases and are substantially heritable (McCrae & Löckenhoff, 2010). These basic tendencies manifest themselves in characteristic adaptations, enduring patterns of psychological functioning which encompass attitudes, habits, and personal strivings as well as a person's self-concept (McCrae & Löckenhoff, 2010). Roberts, Walton and Viechtbauer (2006) mention that the five personality factors emerge from childhood temperamental tendencies, mature by adolescence and young adulthood, and remain comparatively stable throughout life, although modest changes in adulthood are

observed.

Conscientious individuals are likely to utilize and succeed in these types of components of self-regulation, because of their high levels of organization and order (McCrae & Löckenhoff, 2010). Also, other types of personality traits might be related to the (un)successful deployment of self-regulation strategies.

With regard to goal setting, extraversion is for example associated with approach strategies and neuroticism with avoidance strategies and these basic tendencies influence whether goals are oriented toward producing desirable outcomes or avoiding undesirable outcomes (Depue & Collins, 1999). Also Judge and Llies (2002) state for example that agreeableness is associated with less ambitious personal goals and a preference for goals that require cooperation. And although openness does not predict goal type or degree of challenge, it is associated with the simultaneous pursuit of multiple goals (Little, Lecci, & Watkinson, 1992).

Because of the fact that self-regulation might play an important role in development, goal achievement (Berkman, Graham & Fisher, 2012) and possibly one's future, it is not only important to get to know more about the different strategies of self-regulation that young adults apply, but also to get to know more about the associations between these different strategies of self-regulation and how the personality traits of young adults might be related to the application of their these strategies. In this study, there will thus be investigated if young adults apply the following strategies or components of self-regulation: planning, monitoring, seeking support, situation selection, cognitive reappraisal, automation, persistence, inhibition, initiation/ procrastination and reward.

Because of the possible association between personality traits and self-regulation (self-regulation strategies), there will also be investigated if there is an association between the personality traits of young adults and their self-regulation strategies.

In the current study, the different components of self-regulation will be investigated through an explorative research design. Therefore, there are no specific expectations or hypotheses formed about possible associations. Even though there are no specific hypotheses, the research question that will be investigated is: Is there an association between the personality traits of young adults and the components of self-regulation that they apply when trying to achieve their goals?

Method

Participants

The number of persons that have filled in the Qualtrics questionnaire is 53. One of the respondents was excluded due to too much missing data. The number of participants who completed the questionnaire is 52 (N = 52, mean age = 21.65, SD = 2.34). Of the 52 participants 76.9% are women (N = 40) and 23.1% are men (N =12).

This study is conducted by the Utrecht University and has been approved by the research committee of the Utrecht University. The participants of this study were approached via social media; Facebook groups, Instagram, LinkedIn, via their personal network and via the Utrecht University Blackboard page. The participants had to be between 16 to 25 years old and were asked to participate in a study about goal achievement and self-regulation, via an online advertisement about the study. The participation to this study was completely voluntary and anonymous and the participants gave informed consent for their participation to the study.

Design

The design of the study is a quantitative explorative research design. The study is a correlational study, which investigates the possible associations between the variables of the study.

Procedure

The first page of this questionnaire is the informed consent page, where the participants were informed about the study and gave informed consent for their participation.

After giving their informed consent, the participants completed the Qualtrics questionnaire, where they filled in some demographic data including their sex, age, country of birth and highest level of education. After these questions, the participants were forwarded to the Brief Self-Control Scale (Tangney, Baumeister and Boone, 2004), the Goal Setting and Striving Questionnaire (GSSI) with questions about different goals, self-regulation strategies, the feasibility and importance of the goals and strategies that the participants thought applied to them, and the NEO Five-Factor Personality Inventory (McCrae & Costa, 2004). After the questions, a page followed where students from the Utrecht University could fill in their student number, to receive Sona-credits for their participation to the study.

Instruments

Demographic data. The participants first answered questions about their demographic data, such as gender, age and their highest level of education, their country of birth and the countries their parents were born.

Self-control. In this study, there will also be controlled for trait self-control.

Therefore, the participants answered the questions from the Brief Self Control Scale (Tangney, Baumeister & Boone, 2004). The Brief Self Control scale consists of 13 items.

Examples of these items are: “I am lazy” and “I wish I had more self-discipline”. The participants answered for each item on a five-point Likert scale, 1- *not applicable to me at all*, to 5- *fully applicable to me*, whether the statement of the item is applicable for them or not. The reliability and validity of the Brief Self-Control Scale were found to be sufficient in several studies with a Cronbach’s alpha of .75 (Unger, Bi, Xiao & Ybarra, 2016; Nebioglu, Konuk, Akbaba, & Eroglu, 2012).

Some of the items of the questionnaire were reverse coded and can be found in Table 2 in the appendix. A higher total score on the questionnaire means that there is more self-control.

Goals and self-regulation strategies. Goal setting and self-regulation strategies were measured with the Goal Setting and Striving Questionnaire (GSSI), a self-designed questionnaire by the Utrecht University. They first answered 34 items about different goals and answered for each different goal if the goal applies to him or her or not. The list of goals consists of goals that could all apply to young adults from 16 to 25 years old, such as finding a job, increasing one’s confidence or play an instrument. At the end of the goal-related items, they could fill in their own goal that is not listed in the questionnaire. After the items about their goals, the participants chose their most important goal and answered questions about that goal, their goal-perception and their self-regulation. The participants also filled in for each goal that they marked to be applicable to him or her, how feasible and how important on a scale from 0 to 100 (0- *not feasible or important at all*, 100- *very important or feasible*) they think the specific goals are.

The strategies of self-regulation were measured by 10 statement items about the different self-regulation strategies: planning, monitoring, seeking support, persistence, situation selection, cognitive reappraisal, automation, inhibition, initiation/ procrastination and reward. Examples are: “I reward myself when I am a step closer towards achieving my goal” and “I look at the positive sides when things are hard”. For each item, the participants answered on a scale from 0 to 100 (0- *not applicable at all*, 100- *totally applicable*) whether the statements about the different strategies applied to them or not. The participants also filled in for each goal that they marked to be applicable to him or her, how feasible and how important on a scale from 0 to 100 (0- *not feasible or important at all*, 100- *very important or feasible*) they think the specific goals are.

Five-factor personality traits. After the goal-related questions, the five-factor model of personality traits will be measured: agreeableness, conscientiousness, openness, neuroticism and extraversion. To assess these variables the short version of the NEO Personality Inventory-Revised (McCrae & Costa, 2004) will be used. The NEO-FFI provides a comprehensive and detailed assessment of adult personality based on the Five-Factor Model of personality. The NEO-FFI has sufficient reliability and sufficient validity according to the COTAN-assessment, which can be found in Table 1 in the appendix. The NEO-FFI has 60 items (12 per domain). Examples of the items are: "I would rather cooperate with others than compete with them" (agreeableness), "I don't like to waste my time daydreaming" (openness), "I keep my stuff neat and clean" (conscientiousness), "I laugh easily" (extraversion) and "I seldomly feel lonely or blue" (neuroticism). The participants answered for each item on a five-point Likert scale (1- *strongly disagree*, 5- *strongly agree*) if they agreed with the statements of the items or not.

Different items of the subscales neuroticism, extraversion, openness, agreeableness and conscientiousness were reverse coded and can be found in Table 2 in the appendix.

Analyses

IBM SPSS Statistics 25 was used to perform the analyses (George & Mallery, 2016). A descriptive analysis was conducted prior to the main analyses; the averages and standard deviations of the background variables of the participants (e.g. age, gender, highest educational level) were calculated. Also, the reliability of the used measurement scales was investigated. After these calculations, the means and standard deviations of the variables planning, monitoring, seeking support, situation selection, cognitive reappraisal, automation, persistence, inhibition, initiation/ procrastination and reward and also agreeableness, conscientiousness, openness, neuroticism and extraversion were calculated.

After calculating the means and standard deviations, the data was tested for the assumptions of normality, homoscedasticity and linearity. After testing the assumptions, a Spearman correlation was calculated for each different strategy or component of self-regulation and the five personality traits, to determine if there are associations between personality traits and self-regulation strategies. After conducting the Spearman correlation, a regression analysis was executed to control for the possible influence of self-control on the significant associations.

Results

Descriptive analyses

While reverse coding items of the NEO-FFI it was found that due to an error in the Qualtrics questionnaire, one item of the subscale extraversion of the NEO-FFI did not receive any answers. Therefore, caution is needed with the interpretation of the results of this subscale.

Demographic data. After reverse coding the necessary items, the demographic data of the participants was analysed, which can be found in Table 3 to Table 6 in the appendix. Of the sample of 52 participants, the majority has completed an associate degree, bachelor's degree, master's degree (46.2%) or a high school degree (HAVO or VWO; pre-university or pre-scientific education, 42.3%).

The data also showed that 47 of the participants were born in the Netherlands (90.4%) and two participants in Aruba, Bonaire, Curacao, St. Eustatius or St. Maarten (3.8%). The remaining three participants (5.8%) stated that they were born in other countries. This distribution was also roughly reflected with the birth countries of the parents of the participants; 47 participants stated that their father was born in the Netherlands (90.4%) and 48 participants stated that their mother was born in the Netherlands (92.3%).

Assumptions. After analysing the demographic data of the participants, the data was first tested for the assumptions of linearity, homoscedasticity and normality in SPSS 25 (George & Mallery, 2016).

To test if there are outliers in the dataset, boxplots of the data were conducted. The boxplots showed that there were a few outliers in the data. The outliers were checked and were outliers by natural variation, which gives an accurate reflection of the reality. Therefore, the choice was made not to correct for the outliers in the dataset.

To determine if the data is normally distributed, the skewness and kurtosis values were calculated with a descriptive statistics analysis in SPSS 25 (George & Mallery, 2016). It was found that all but two variables met the assumption of normality based on their values for skewness and kurtosis: the values for kurtosis were between -2 and +2 and the values of skewness were between -1 and +1, which is considered acceptable in order to prove normal univariate distribution (George & Mallery, 2010). The items "I check if I am doing well" (monitoring) and "I talk about my goal with others" (seeking support) of the self-regulation scale did not meet the criteria for skewness with the values -1.197 to .330 and -1.195 to .330, because they did not fit in the range of 1- and +1.

It was also found that some variables did not meet the assumption of normality based on the Shapiro Wilk test for normality. The personality traits extraversion and agreeableness did not meet the assumption of normality with significant p-values of $p = .029$ for

agreeableness and $p = .005$ for extraversion. The individual self-regulation strategies did not meet the assumption of normality based on the Shapiro Wilk test, because they each had significant values.

Furthermore, the assumption of homoscedasticity was tested using scatterplots. These scatterplots showed that for all the variables, the dots were even distributed among the fit lines in the scatterplots and the assumption of homoscedasticity was thus met. To determine the assumption of linearity, scatterplots were conducted. The scatterplots show some degree of linearity, but that degree varies by variable. Therefore, the assumption of linearity cannot be fully met.

Spearman Correlation. Because not all the assumptions are fully met and not all the variables are normally distributed, a Spearman correlation was conducted to investigate the data. The Spearman correlation resulted in several significant relationships, which can be found in Table 7 in the appendix.

A significant negative correlation was found between the personality trait neuroticism and the self-regulation cognitive reappraisal ($r = -.304$, $p = .028$). This means that a high degree of neuroticism correlates with a low degree of cognitive reappraisal. Also, a significant positive correlation was found between the personality trait extraversion and support seeking ($r = .281$, $p = .043$), which means that a high level of extraversion correlates with a high level of support seeking.

Furthermore, several significant correlations were found between the personality trait conscientiousness and the self-regulation strategies. It was found that conscientiousness has a significant positive relationship with planning ($r = .378$, $p = .006$), monitoring ($r = .439$, $p = .001$), automation ($r = .406$, $p = .003$), persistence ($r = .358$, $p = .009$) and inhibition ($r = .332$, $p = .016$).

This means that conscientiousness correlates with a high degree of planning, monitoring, automation, persistence and inhibition. Conscientiousness also has a significant negative correlation with procrastination ($r = -.425$, $p = .002$). Which means that a high degree of conscientiousness correlates with a low degree of procrastination or a high degree of initiation.

No significant results were found for the correlation coefficients between the personality traits openness and agreeableness, and the different self-regulation strategies.

In addition, also no significant correlations were found between the self-regulation strategies situation selection or reward and the five-factor personality traits.

Self-control. The data and correlations found in this study were controlled for trait self-control.

First, the correlations were investigated by conducting a Spearman correlation with the variable self-control obtained from the Brief Self Control Scale (Tangney, Baumeister & Boone, 2004). A significant negative correlation was found between self-control and initiation or procrastination (r = -.300, p = .031). This means that a high degree of self-control is associated with a low degree of procrastination or a high degree of initiation. There were no other significant correlations found between self-control and the self-regulation strategies, but a significant negative correlation was found between self-control and extraversion (r = -.294, p = .017) and a significant positive correlation between self-control and conscientiousness (r = .574, p = .000).

After looking into the correlations, the associations found in this study were controlled for trait self-control by conducting a regression analysis, which can be found in Table 9 in the appendix.

Before controlling for self-control, the results showed that the association between extraversion and seeking support was significant with the following statistics: B = 15.478, SE = 6.200, β = .333, p = .016. After controlling for self-control, the association remained significant with the statistics B = 13.283, SE = 6.516, β = .286, p = .047. Also, the association between conscientiousness and monitoring remained significant with the statistics B = 21.531, SE = 6.525, β = .423, p = .002 before controlling for self-control and the statistics B = 17.194, SE = 7.978, β = .338, p = .036 after controlling for self-control. In addition, the association between conscientiousness and automation with the statistics B = 24.673, SE = 7.498, β = .422, p = .002) remained significant after adding self-control to the analysis, with the statistics B = 28.406, SE = 9.204, β = .486, p = .003. Furthermore, the negative association between conscientiousness and procrastination was significant before controlling for self-control with the statistics B = -31.504, SE = 9.342, β = -.430, p = .001 and remained significant after controlling for self-control with the statistics B = -28.508, SE = 11.503, β = -.390, p = .017. This means self-control is does not influence the association between extraversion and support seeking, the association between conscientiousness and automation and conscientiousness and procrastination and conscientiousness and monitoring.

The association between conscientiousness and inhibition was significant before controlling for self-control with the statistics B = 21.010, SE = 9.081, β = .311, p = .025, but was no longer significant after controlling for self-control with the statistics B = 16.480, SE = 11.147, β = .244, p = .146. Also, the association between conscientiousness and planning was

significant with the statistics B = 24.128, SE = 8.991, β = .355, p = .010, but was no longer significant after controlling for self-control with the statistics B = 21.530, SE = 11.074, β = .317, p = .058. In addition, the association between conscientiousness and persistence was significant with B = 21.632, SE = 8.065, β =. 335, p = .010, but was no longer significant after controlling for self-control with the statistics B = 17.809, SE = 9.894, β = .292, p = .078. This would indicate that self-control has a possible influence on the association between the self-regulation strategies inhibition, planning and persistence and conscientiousness.

The results also showed that the negative association between neuroticism and cognitive reappraisal was not significant in the regression analysis with B = -9.496, SE = 5.192, β = -.350, p = .073 and remained non-significant after controlling for self-control with B = -9.646, SE = 5.207, β = -.254, p = .070. Which indicates that self-control does not influence the association between neuroticism and cognitive reappraisal.

Discussion

The goal of the current explorative study was to gain insight in the association between the five-factor personality traits, the different components or strategies of self-regulation that young adults apply in order to achieve goals and the possible association between the five-factor personality traits and self-regulation.

The results of this study showed that conscientiousness is associated with a higher level of most of the self-regulation strategies; planning, monitoring, automation, persistence and inhibition. Conscientiousness is also negatively associated with procrastination. In addition, it was found that there is a negative association between neuroticism and cognitive reappraisal and a positive association between extraversion and support seeking. No significant associations were found between the personality traits openness and agreeableness and the different self-regulation strategies.

The finding that (higher) conscientiousness is associated with several self-regulation strategies, is in line with previous findings in the literature. Hoyle and Gallagher (2015) state that conscientiousness often facilitates goal pursuit and is associated with more challenging goals, that conscientious persons are prone to planning and are likely to persevere in following plans. In addition, McCrae and Löckenhoff (2010) mention that the facets of conscientiousness; competence, dutifulness, achievement striving, order, deliberation and self-discipline, are characteristic patterns that support self-regulation. Furthermore, conscientiousness is associated with persistence, efficiency of time use, input of effort (Kelly & Johnson, 2005) and motivation (Chamorro-Premuzic & Furnham, 2003). Conscientiousness

is thus associated with good control of impulses and behaviour.

The results of this study also showed a negative association between neuroticism and cognitive reappraisal. A high level of neuroticism is thus associated with a low degree of cognitive reappraisal. This negative association could possibly be explained by the fact that neuroticism is associated with a lack of effective cognitive skills (Eysenck, 1967; in Hoyle & Gallagher, 2015). In addition, neuroticism is associated with a style of self-reflection that is ruminative (Trapnell & Campbell, 1991), which contributes to the fact that individuals high in neuroticism are inclined towards worry and overly negative self-revaluation. Therefore, persons high in neuroticism might have a negative bias on their progress (Little, Lecci & Watkinson, 1992) that keeps them from applying cognitive reappraisal when trying to achieve goals.

Conversely, Norem and Cantor (1986) state that there is also some evidence that neuroticism can facilitate input of effort and motivation; when a person high in neuroticism anticipates a failure, he or she could gear up their effort to prevent failure in goal achievement. However, Matthews and Zeidner (2004) state that neuroticism is linked with poor critical thinking skills, conceptual understanding and analytic ability, presumably because neuroticism tends to freeze higher-order cognitive functioning, which does not contribute to the application of self-regulation strategies in order to achieve certain desired goals.

Steel (2007) states that low conscientiousness and high neuroticism are associated with a tendency to procrastinate. The combination of low neuroticism and high conscientiousness is optimal and supports a style that favours successful self-regulation. Conversely, high neuroticism and low conscientiousness mark an uncontrolled style that works against the regulation of impulses, behaviour and control (Hoyle & Gallagher, 2015).

Furthermore, the results of this study showed an association between extraversion and support seeking. High extraversion is thus associated with high levels of support seeking. This result is also in line with the literature and could be explained with the fact that people high in extraversion tend to rely on input from others (Courneya & Hellsten, 1998). Morossanova (2003) states that extraversion has a negative connection with indicators of planning, but shows a positive association with modelling, regulatory flexibility and independence. However, next to the association between support seeking and extraversion, the results did not show any other association found between extraversion and the self-regulation strategies, which is not in line with the literature. It is stated in the literature that individuals high in extraversion rely on input from others (Courneya & Hellsten, 1998) and seek, desire, and

enjoy pleasurable activities to a greater extent than do individuals low in extraversion (Lucas & Diener, 2001). Therefore, individuals high in extraversion might rely primarily on others when trying to achieve goals and seek out pleasurable activities instead of applying the sometimes unpleasant self-regulation strategies in order to achieve a certain goal, which would cause for a negative association between extraversion and self-regulation strategies, instead of no association.

A possible explanation for not finding any other associations between extraversion and the other self-regulation strategies might be the missing item from the extraversion subscale in the Qualtrics questionnaire. Future research could replicate this study with a complete extraversion subscale, which may demonstrate significant associations between extraversion and the self-regulation strategies.

In contrast with these findings, the results also showed a negative association of extraversion with trait self-control, which is consistent with findings from the literature.

The results showed no associations for the personality traits openness or agreeableness and the self-regulation strategies, which is not in line with the literature.

People high in openness tend to prefer spontaneity over scheduling (Courneya & Hellsten, 1998) and high openness is associated with the simultaneous pursuit of multiple goals (Little, Lecci & Watkinson, 1992). Therefore, a negative association between openness and self-regulation would be expected.

In addition, Judge and Ilies (2002) state that high agreeableness is associated with less ambitious personal goals and a preference for goals that require corporation with others. Also, Courneya and Hellsten (2002) state that high agreeableness is associated with a preference for working in a corporative group setting in which expectations are clear. Therefore, individuals high in agreeableness may have less motivation or feel less inclined to employ self-regulation strategies to achieve goals. For this reason, you would also expect a negative association for agreeableness and self-regulation.

A possible explanation for these non-significant findings could be the number of participants that contributed to the data of this study. A total of 52 participants personality traits and self-regulation strategies were measured. A larger sample could potentially result in more power, which could cause significant associations.

Finally, the results of the study indicated that self-control has a possible influence on the association between the self-regulation strategies inhibition, planning and persistence and conscientiousness. This could possibly be explained by the fact that self-control focuses on the efforts people exert to stimulate desirable responses and inhibit undesirable responses and

that self-control thereby constitutes an important prior condition for self-regulation (Tangney, Baumeister & Boone, 2004). Future research should look more closely at this possible coherence and influence of self-control.

A strength of the current study is that this study allows for further insight into the different components or strategies of self-regulation that young adults apply when trying to achieve a certain goal. By investigating an extensive list of possible self-regulation strategies that young adults possibly apply, this study contributes to the knowledge of the actual self-regulation strategies that young adults apply and the association with the five-factor personality traits. This knowledge can, for example, be implemented into the education of children: testing the student's personality characteristics may inform the teachers and parents about the personality traits of the children and the likability that they will naturally develop self-regulation skills, without detailed training. For example, the chances of a conscientious child to develop good "study habits" in terms of self-regulatory skills are much higher than for a child who does not possess these qualities (Duckworth, Akerman, MacGregor, Salter & Vorhaus, 2009).

Another strength of this study is the questionnaire used to measure the self-regulation strategies. A complete questionnaire that provides a broad picture of different self-regulation strategies does not yet exist. Therefore, this study made use of a self-conducted questionnaire, which consists of a wide range of questions about specific self-regulation strategies. In addition, this study also used the self-regulation questionnaire to look at the validation of this questionnaire, which can contribute to future research about self-regulation strategies. Furthermore, when answering the self-regulation questionnaire, the participants answered self-regulation questions about a personal goal they were trying to achieve, which results in specific information about the self-regulation strategies that young adults actually apply when trying to achieve their desired goals.

The current study also has a number of limitations. This study has a limitation regarding the sample size of the study. As calculated with G-Power (power of .80, Cohen's effect size of .30 and alpha level of .05), the sample size of the research population should at least consist of 84 participants ($N = 84$). The current study has a sample of 52 participants. Due to the COVID-19 epidemic (Wynants, et al., 2020) and the regulations of the Dutch government, the Dutch population was obligated to stay at home, elementary schools, high schools and universities were closed, the students had to participate in online education from home and the population had to participate in social distancing. Therefore, only social media could be used to gather participants, instead of also reaching out directly to high schools, flyer at universities or advertise during lectures or classes. Consequently, the sample size is smaller

than expected, which might have a negative influence on the generalization of the results of this study.

Also, the generalization of the results must be interpreted with caution due to the overrepresentation of women (40 women and 12 men) and individuals with higher education. Due to the relatively small sample size and overrepresentation of women in the sample size, the results may not be representative of the population. Therefore, the results of this study should be interpreted with caution. A replication of this study, with a larger sample and a larger representation of men in the sample, may obtain more representative and accurate results.

Another limitation of the study is the missing question of the NEO-FFI subscale extraversion. Due to an error in the Qualtrics questionnaire, one item of the extraversion subscale did not receive any answers from the participants. This could be a problem for the reliability of the findings on extraversion. Therefore, even though the results are in line with earlier findings in the literature, the interpretation of the results from this study regarding extraversion should be interpreted with a critical mindset.

Future research

It is important for future research to get to know more about the associations between personality traits and self-regulation strategies. It is also important to learn more about other variables that may influence personality traits and self-regulation strategies and the association between self-regulation and personality traits.

Future research could also take a more detailed look into the possible causal relationships between the variables and the possible influence of self-control on the variables and associations. Future research should have a focus on the associations with self-control and could conduct a regression analysis to get to know more about the causal relations between the variables. Furthermore, future research could also look into the use of self-regulation strategies by young adults over a time period. This could be done with a longitudinal study, to investigate if young adults stick with the same self-regulation strategies or change their strategies over time and how their personality traits might be related. This could, for example, be investigated with the use of ecological momentary assessment, which involves repeatedly assessing current behaviours in the natural environment (Shiffman, 2008), which will allow for further insight in the day to day application of self-regulation strategies and goal achievement.

Conclusion

In summary, this study contributes to obtaining a clearer picture of the relationship between self-regulation strategies and personality traits. The current study also increased knowledge about which self-regulation strategies young adults actually apply in order to achieve their goals. It can be concluded from the results that the personality trait conscientiousness has the most associations with self-regulation strategies.

Despite the fact that there was no association with personality traits found for every self-regulation strategy, based on the results, this study provides evidence for the existence of important connections between components of self-regulation and the five-factor personality traits. It can be cautiously stated that this research has contributed to the knowledge about the possible influence that the personality traits of young adults can have on their self-regulation strategies. Future research may elaborate on this topic.

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Appendix

Table1

Cotan-assessment NEO FFI

Cotan-assessment (1991)	
Quality of the testing material	Good
Quality of the manual	Good
Norms	Insufficient*
Reliability	Sufficient
Concept validity	Sufficient
Criterium validity	Insufficient**

*The standards are no longer usable due to obsolence

**No research

Table 2

Reverse coded items NEO-FFI subscales and reverse coded items BSCS

NEO-FFI and BSCS										
NEO-FFI Neuroticism	1	16	31	46						
NEO-FFI Extraversion	12	27	42	47						
NEO-FFI Openness	3	8	18	23	38	48				
NEO-FFI Agreeableness	9	14	24	29	39	44	54	59		
NEO-FFI Conscientiousness	15	30	45	55						
BSCS total scale	2	3	4	5	7	8	9	10	12	13

Table 3

Sex of the participants

Sex	Frequency	Percent	Valid percent	Cumulative percent
Women	40	76.9	76.9	76.9
Men	12	23.1	23.1	100.0
Total	52	100.0	100.0	

Table 4

Age of the participants

	Frequency	Percent
16	2	3.8
17	1	1.9
18	1	1.9
19	4	7.7
20	8	15.4
21	2	3.8
22	11	21.2
23	10	19.2
24	6	11.5
25	7	13.5
Total	52	100.0

Table 5

Birth country of the participants, participant's fathers and participant's mothers

	Birth country participants		Birth country participant´s fathers		Birth country participant's mothers	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Netherlands	47	90.4	45	86.5	45	86.5
Surinam	2	3.8	1	1.9	1	1.9
Germany	-	-	1	1.9	-	-
In another country	3	5.8	4	7.7	5	9.6
I don't know	-	-	1	1.9	1	1.9
Total	52	100.0	52	100.0	52	100.0

Table 6

Highest completed education

	Frequency	Percent
Primary education	1	1.9
Secondary general education (MBO-short, VMBO)	1	1.9
Higher general (HAVO) or prepatory scientific education (VWO, atheneum, gymnasium)	22	42.3
Higher professional education (hts, heao, hbo-v)	3	5.8
Scientific education (university)	24	46.2
Not applicable	1	1.9
Total	52	100.0

Table 7

Correlations self-regulation strategies, personality traits and self-control

	Planning	Monitoring	Seeking support	Situation selection	Cognitive reappraisal	Automation	Persistence	Inhibition	Procrastination	Reward
Neuroticism	-.048	-.038	-.006	-.183	-.304*	-.046	-.256	-.089	.266	.179
Openness	.147	-.133	-.039	-.221	.057	-.034	-.025	-.113	.062	-.067
Extraversion	.155	.073	.281*	.248	.186	.059	.006	.003	-.081	-.057
Agreeableness	.184	-.099	-.119	.182	-.103	.065	-.166	-.248	-.014	-.082
Conscientious-ness	.378**	.439**	.130	.172	.162	.406**	.358**	.332*	-.425**	.169
Self-control	.197	.198	-.205	-.026	.056	.171	.246	.166	-.300*	.039

**Correlatie is significant met p<0.01
*Correlatie is significant met p<0.05

Table 8

Means and standard deviations self-regulation strategies, personality traits and self control

	Mean	SD
Planning	61.731	32.179
Monitoring	72.135	24.094
Seeking support	69.923	30.366
Situation selection	64.808	30.312
Cognitive reappraisal	60.789	27.022
Automation	65.789	17.673
Persistence	63.192	28.835
Inhibition	59.885	31.972
Procrastination	46.039	34.634
Reward	43.000	27.450
Neuroticism	2.798	.713
Openness	3.152	.399
Extraversion	3.442	.653
Agreeableness	3.708	.483
Conscientiousness	3.619	.473
Self-control	3.210	.399

Table 9

Regression analysis controlling for self-control

Self-regulation strategies	Personality traits	B	SE	β	P
Cognitive reappraisal	Neurotism	-9.496	5.192	-.250	.073
	Controlled for self-control	-9.646	5.207	-.254	.070
Seeking support	Extraversion	15.478	6.200	.333	.016*
	Controlled for self-control	13.283	6.516	.286	.047*
Planning	Conscientiousness	24.128	8.991	.355	.010**
	Controlled for self-control	21.530	11.074	.317	.058
Monitoring	Conscientiousness	21.531	6.525	.423	.002**
	Controlled for self-control	17.194	7.978	.388	.036*
Persistence	Conscientiousness	21.632	8.056	.355	.010**
	Controlled for self-control	17.809	9.894	.292	.078
Automation	Conscientiousness	24.673	7.498	.422	.002**
	Controlled for self-control	28.406	9.204	.486	.003**
Inhibition	Conscientiousness	21.010	9.081	.311	.025*
	Controlled for self-control	16.480	11.147	.244	.146
Procastination	Conscientiousness	-31.504	9.342	-.430	.001**
	Controlled for self-control	-28.508	11.503	-.390	.017*

**Is significant met $p<0.01$
*Is significant met $p<0.05$