Engagement, boredom, and burnout among students: Basic need satisfaction matters more than personality traits ☆

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ABSTRACT

Drawing on the Five Factor Personality Model and Self-Determination Theory, the current study examines the relations between three different kinds of well-being - engagement, boredom, and burnout- and personality, and evaluates whether basic need satisfaction has an incremental contribution over personality in explaining these types of well-being. In a sample of 255 students we found that agreeableness and neuroticism were significantly related to each well-being dimension, whereas conscientiousness was only significantly related to engagement and to boredom, and extraversion being only significantly related to burnout. Need satisfaction significantly contributed to well-being, over and above personality. Results indicate that certain personality factors play a role in well-being, but that the fulfillment of the needs for autonomy, competence, and relatedness is of additional importance.

1. Introduction

Drawing on the Five-Factor Model of personality traits (FFM; McCrae & Costa, 2003) and Self-Determination Theory (SDT; Deci & Ryan, 2000), the present study examines whether personality traits and satisfaction of basic psychological needs are associated with three types of study-related well-being – engagement, boredom, and burnout–, and whether satisfaction of these needs explains students' well-being above and beyond stable personality traits. Although engagement, boredom, and burnout are explained to a certain degree by personality traits (e.g., Alarcon, Eschleman, & Bowling, 2009) and need satisfaction (e.g., Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008a), there is virtually no research that considers personality traits and need satisfaction simultaneously in explaining these forms of well-being. A notable exception is a study by Andreassen, Hetland, and Pallesen (2010) that showed the incremental validity of need satisfaction over personality traits as far as workaholism is concerned.

Engagement, boredom, and burnout are usually examined among employees, but recently, research on students is starting to focus on these forms of well-being as well (e.g., Salanova, Schaufeli, Martínez, & Bresó, 2010). Like employees, students are involved in structured and compulsory activities (e.g., taking part in classes and doing projects) which are focused on specific goals (i.e., passing exams and graduating). Hence, students' activities can be seen as "work". Building on previous research on engagement and burnout among students (e.g., Hu & Schaufeli, 2009; Schaufeli, Martínez, Marques Pinto, Salanova, & Bakker, 2002), this study aims to provide insight into personality traits and motivational factors that may foster or thwart well-being. Specifically, it contributes to the literature in at least two ways. First, we provide a detailed analysis of personality traits correlates for the well-being components. Second, we analyze the incremental contribution of need satisfaction over personality measures. Such analyses will contribute to an explanatory model of well-being that focuses on traits, which are relatively stable (McCrae & Costa, 2003), and on psychological needs, that represent motivational dimensions that are influenced by the social environment (Deci & Ryan, 2000).

2. Well-being

Engagement, boredom, and burnout are three different forms of well-being. Engagement refers to a positive, affective state of mind that is characterized by high levels of energy, enthusiasm, and immersion in activities so that time flies by (Schaufeli, Bakker, & Salanova, 2006). Engagement is fostered by resources (e.g., high autonomy) and challenging demands (e.g., high levels of responsibility; Crawford, LePine, & Rich, 2010), and has positive consequences for students

(high grades, Salanova et al., 2010; low drop out, Archambault, Janosz, Fallu, & Pagani, 2009).

Boredom refers to an unpleasant, affective state of mind characterized by a pervasive lack of interest in activities and experiencing difficulties with concentrating (Fisher, 1993). Research on boredom has focused on task characteristics (e.g., repetitive work, low stimulation, or variation; Fisher, 1998). Boredom at school was found to be associated with missing lectures and maladaptive student behaviors (Mann & Robinson, 2009). Furthermore, low challenge is related to boredom in the case of gifted students (Preckel, Götz, & Frenzel, 2010).

Lastly, burnout can be defined as a state of exhaustion in which one is cynical about the value of one's activities and uncertain about one's capacity to perform (Maslach, Jackson, & Leiter, 1996). Lack of resources (e.g., insufficient teacher support) and high academic demands (e.g., study overload) are significantly associated with students' burnout (Salanova et al., 2010). Like boredom, burnout is associated with detrimental consequences for students (decreased academic performance, Schaufeli et al., 2002).

In brief, engagement, boredom, and burnout are associated with different antecedents and underlying processes. They are conceptually and psychometrically distinct from each other (Reijseger, Schaufeli, Peeters, Taris, Van Beek, & Ouweneel, 2013). Below, we explain how personality traits and basic need satisfaction relate to well-being.

3. Personality

The FFM is currently the dominant paradigm in personality research (McCrae, 2009) and reflects five broad domains: neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience. Neuroticism refers to an individual's tendency to experience distress and negative affect (Costa & McCrae, 1992). Individuals with low levels of neuroticism are likely to perceive themselves positively, to pursue self-concordant goals (i.e., values and interests; Judge, Bono, Erez, & Locke, 2005), be more engaged (Inceoglu & Warr, 2012; Mostert & Rothman, 2006), less bored (Hill & Perkins, 1985) and less burned-out (Alarcon et al., 2009; Hochwälder, 2006). Neuroticism mirrors high stress sensitivity (Suls, 2001). Therefore individuals high in neuroticism might experience their environment as threatening and, in turn, experience negative emotions and burnout (Langelaan, Bakker, Van Doornen, & Schaufeli, 2006).

Extraversion reflects the extent to which individuals are active, enthusiastic, and have the tendency to experience positive emotions (Costa & McCrae, 1992). Extraversion is positively associated with engagement (e.g., Langelaan et al., 2006), because both concepts entail activeness and energy. Moreover, positive emotions build personal resources and lead to engagement (broaden-and-build theory; Fredrickson, 1998). Because extraverted persons tend to be energized and fun-loving (McCrae & Costa, 2003), they may be less prone to experience states of deactivation and displeasure, such as burnout and boredom (Bakker, Van der Zee, Lewig, & Dollard, 2006).

Conscientiousness is defined by features like responsibility and perseverance (Costa & McCrae, 1992). Conscientious persons tend to have high aspirations and focus on goals that they have set (McCrae & Costa, 2003). This also holds for engaged individuals, who are inclined to pursue goals that represent their wishes and aspirations (Van Beek, Taris, Schaufeli, & Brenninkmeijer, 2014). Therefore, it is no surprise that conscientiousness was positively related to work engagement (Inceoglu & Warr, 2012; Sulea, Virga, Maricutoiu, Dumitru, & Sava, 2012). Due to their characteristics, individuals high in conscientiousness feel more prepared to face demands and are less vulnerable to boredom and burnout (Alarcon et al., 2009; Hochwälder, 2006).

Agreeableness refers to the extent to which an individual is collaborative and sympathetic towards others (Costa & McCrae, 1992). Research on the relation between agreeableness and engagement is scarce and did not reveal significant associations (Kim, Shin, & Swanger, 2009). Still, agreeableness may foster supportive relationships

with peers, that may stimulate personal growth and help to cope with demands (Bakker & Demerouti, 2007), therefore, promoting well-being via developing interpersonal resources. Agreeableness was found to be negatively associated with burnout (Alarcon et al., 2009).

Lastly, openness to experience reflects the extent to which an individual is creative and intellectually curious (Costa & McCrae, 1992). Students with such characteristics may engage in active coping and craft their studies to their values and preferences (e.g., making their tasks more challenging) which, in turn, might foster well-being (e.g., Bakker, Tims, & Derks, 2012). Openness to experience is negatively related to depersonalization (Bakker et al., 2006) and positively related to personal accomplishment (Storm & Rothman, 2003), two dimensions of burnout.

Therefore, we expect that:

Hypothesis 1: Engagement will be positively associated with conscientiousness, agreeableness, extraversion, and openness to experience, and negatively associated with neuroticism.

Hypothesis 2: Boredom will be positively associated with neuroticism and negatively associated with conscientiousness, agreeableness, extraversion, and openness to experience.

Hypothesis 3: Burnout will be positively associated with neuroticism and negatively associated with conscientiousness, agreeableness, extraversion, and openness to experience.

4. Need satisfaction

In addition to personality traits, satisfaction of innate psychological needs is considered to be essential to students' development and well-being (Deci & Ryan, 2000). According to SDT (Deci & Ryan, 2000) individuals are active and growth-oriented by nature. They are inclined to fulfill their potential, meaning that they are oriented towards exploring the world, gathering knowledge, and actively pursuing challenges and interests (Van den Broeck, Vansteenkiste, & De Witte, 2008b). For this to happen, it is necessary that three innate psychological needs are fulfilled: the needs for autonomy, competence, and relatedness. Within the study context, the *need for autonomy* represents a student's desire to regulate himself and his behavior, and to experience psychological freedom and choice when studying. The *need for competence* refers to a student's desire to interact effectively with the environment by experiencing mastery and engaging in challenges. The *need for relatedness* represents a student's need to feel connected with fellow students and to experience amicable relationships.

Individuals with fulfilled needs are more strongly motivated (i.e., display a higher amount of motivation for an activity; Vansteenkiste, Lens, & Deci, 2006) and are also qualitatively better motivated (Van den Broeck et al., 2008a). They engage in activities which they value or find interesting and enjoyable; that is, they are autonomously motivated. Furthermore, fulfilled psychological needs generate a sense of energy (e.g., Lens & Vansteenkiste, 2006): they are accompanied by feeling vigorous (Van den Broeck et al., 2008a) and being engaged in the task (Deci et al., 2010). In contrast, unfulfilled needs inhibit a student's development and are associated with decreased well-being (Van den Broeck et al., 2008a), possibly because unfulfilled needs thwart optimal motivation (Lens & Vansteenkiste, 2006; Van den Broeck et al., 2008a). Individuals with unfulfilled needs engage in activities to avoid punishments (i.e., disapproval by others), to obtain rewards (i.e., appreciation by others), or to buttress themselves with feelings of self-worth. Moreover, unfulfilled needs thwart the generation of a sense of energy (Lens & Vansteenkiste, 2006; Van den Broeck et al., 2008a): they are associated with emotional exhaustion (Vansteenkiste et al., 2007).

Individuals' reactions to their study environment and their well-being may be explained, as argued previously, from a trait as well as a

motivational perspective. From a practical perspective, it is important to evaluate the incremental validity of need satisfaction over personality traits. By incremental validity we mean "the degree to which a measure explains or predicts a phenomenon of interest, relative to other measures" (Haynes & Lench, 2003, p. 457), that is, the ability of a measure to predict outcomes beyond other measures. Whereas traits are difficult to change, an incremental contribution of need satisfaction will reveal how students' well-being may be fostered: by arranging the environment in a way that it stimulates need satisfaction. Moreover, from a theoretical perspective, this perspective suggests the need to better ascertain the more proximal perspective of need satisfaction beyond the distal perspective of personality traits, and therefore better understand the potentially predictive role of need satisfaction for individual well-being.

Drawing on the arguments outlined above, we expect that:

Hypothesis 4: Need satisfaction will be positively associated with engagement and will show unique, incremental validity over personality traits in predicting engagement.

Hypothesis 5: Need satisfaction will be negatively associated with boredom and will show unique, incremental validity over personality traits in predicting boredom.

Hypothesis 6: Need satisfaction will be negatively associated with burnout and will show unique, incremental validity over personality traits in predicting burnout.

5. Method

5.1. Participants

The research sample (N = 255), based on a non-probabilistic convenience sampling procedure, consisted of 212 females (83.1%) and 43 males (16.9%) after respondents with missing values were excluded (approximately 6%). The age of the respondents ranged from 20 to 46 years (M = 21.74, SD = 2.42). The sample consisted of Romanian social and economic science college students in the third (94.6%) and fourth (4.6%) year of their studies (full time). The average number of hours per week spent on their studies ranged from 1 to 40 h(s) (M = 16.80, SD = 10.76).

5.2. Procedure

To collect data a questionnaire was distributed before a class started with the permission of the course lecturers. Before filling out the questionnaire, students were asked to read a cover letter that explained the general purpose of the study and that ensured confidentially of individual responses. Participation was voluntary and students received no reward.

5.3. Measures

Engagement was measured with the student version of the Utrecht Work Engagement Scale (UWES-S; Schaufeli et al., 2002), which includes three subscales: Vigor (6 items), Dedication (5 items), and Absorption (6 items). An example item is "I am immersed in my studies". Items were scored on a 7-point frequency scale (0 = "never"), (6 = "always"). In accordance with previous recommendations (Schaufeli et al., 2006), we used the overall score (α = .92).

Boredom was measured with the Utrecht Boredom Scale (UBORS; Reijseger et al., 2013), that contains 8 items that were reworded for students (e.g., "When I study, I feel bored"). All items employed a 5-point frequency scale (1 = "never", 5 = "always"). We used the overall score (α = .86).

Burnout was measured with two subscales from the Maslach Burnout Inventory for Students (MBI-SS; Schaufeli et al., 2002): Exhaustion (5 items) and Cynicism (5 items). An example item is: "I feel emotionally drained from my studies". All items were scored on a 7-point frequency scale (0 = "never" 6 = "always"). Following previous research (Van Beek et al., 2011), we used the overall score (α = .82) because exhaustion and cynicism constitute the core dimensions of burnout (Schaufeli & Taris, 2005).

Personality traits were measured with Mowen's Personality Scale (2000), which contains five subscales: conscientiousness (3 items), introversion (the opposite of extraversion; 3 items), neuroticism (3 items), openness to experience (3 items), and agreeableness (3 items). An example item is: "Emotions go way up and down". Participants were asked to score on a 7-point rating scale (1 = "strongly disagree" 7 = "strongly agree") to which extent a characteristic applies to them. For the analyses, the reversed scores of introversion were used. The internal consistency alphas ranged from .73 (for neuroticism) to .81 (for conscientiousness).

Need satisfaction was measured with the Need Satisfaction at Work Scale (NSWS; Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010) that consists of three subscales: Autonomy Satisfaction (6 items), Competence Satisfaction (6 items), and Relatedness Satisfaction (6 items). An example item is: ("I feel competent as a student"). Items were reworded for students. All items employed a 5-point rating scale (1 = "totally disagree" 5 = "totally agree"). The internal consistency alphas ranged from .73 (for Autonomy Satisfaction) to .88 (for Competence Satisfaction).

The Romanian versions of all instruments were evaluated using the standard back-translation technique (Brislin, 1970).

6. Results

6.1. Preliminary analysis

Table 1 presents the correlation matrix of all research variables and the internal consistencies (Cronbach's alpha) of all scales. In order to reduce the risk for type I error the Bonferroni correction was used. Therefore, only correlations significant at $p < .01$ were considered significant.

To examine whether engagement, boredom, and burnout can be differentiated from each other, two confirmatory factor analyses (CFA's) were carried out using AMOS (Arbuckle, 2007). The analyses were performed on item parcels constituted by the items measuring the three well-being types. This approach appears to be reliable when attempting to verify the factorial validity of theoretical constructs (Byrne, 2010). There were four parcels for engagement, three for burnout, and two for boredom. In line with the recommendations for this practice (Little, Cunningham, Shahar, & Widaman, 2002), each parcel contained between three and five items. The parcels for engagement and burnout were formed using the domain-representative approach (i.e., a parceling technique specific for multidimensional item sets), while the parcels for boredom were formed using the random assignment approach (i.e., a parceling technique specific for one-dimensional item sets; for more details about these parceling techniques, see Little et al., 2002). A three-factor model with parcels loading on three correlated latent factors corresponding to the three forms of well-being showed a significantly better fit to the data than a one-factor model, with all parcels loading on a single latent factor (after allowing only one error term between two parcels of the engagement dimension to correlate): $\Delta \chi^2(4) = 355.90$, $p < .01$ (GFI = .95, CFI = .98, RMSEA = .075). Hence, the three types of well-being can be distinguished from each other and do *not* constitute a single general factor. Notably, other studies that examined whether the three types of well-being can be differentiated from each other arrived at the same conclusion, after allowing a few errors to correlate in their CFA model (e.g., Schaufeli & Bakker, 2004; Schaufeli, Taris, & Van Rhenen, 2008). Probably, the main justification for allowing errors to correlate in such models is

Table 1
Correlation matrix.

Scale	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Extraversion	3.75	1.37	(.80)										
2. Openness	5.27	.97	.22**	(.78)									
3. Conscientiousness	5.36	1.22	.07	.04	(.81)								
4. Agreeableness	5.99	.70	−.07	.24**	.29**	(.75)							
5. Neuroticism	3.64	1.36	−.05	.02	−.16	−.16	(.73)						
6. Autonomy	3.22	.97	.19**	.05	.20**	.18**	−.26**	(.73)					
7. Competence	3.20	.80	.09	.15	.23**	.14	−.03	.31**	(.88)				
8. Relatedness	2.87	.90	.25**	.16	.09	.29**	−.26**	.38**	.32**	(.79)			
9. Boredom	1.58	.50	.00	.05	−.18**	−.21**	.22**	−.37**	−.31**	−.28**	(.86)		
10. Engagement	3.11	.90	.07	.07	.25**	.23**	−.26**	.43**	.43**	.37**	−.50**	(.93)	
11. Burnout	3.45	1.33	−.16	−.04	−.18**	−.18**	.27**	−.56**	−.43**	−.41**	.55**	−.46**	(.82)

Notes: Internal consistency alphas are displayed in the diagonal.
** $p < .01$

that, although the types of well-being can be discriminated empirically (there is not one common, undifferentiated employee well-being factor), some items share common variance (Schaufeli et al., 2008).

[Insert Table 1 about here].

6.2. Hypothesis testing

Three hierarchical multiple regression analyses were conducted using engagement, boredom, and burnout as criterion variables, and personality traits and need satisfaction as predictor variables, respectively. In the first step, age and gender were included as control variables, as they were found to be related to the dependent variables in previous research (e.g., Kinnunen, Feldt, & Mäkikangas, 2008; Purvanova & Muros, 2010). In the second step, the five personality traits were added. In the third and final step, the three forms of need satisfaction were added. The results of the three hierarchical multiple regression analyses are displayed in Table 2.

For engagement, the analyses revealed that both age ($\beta = -.10$) and gender ($\beta = -.12$) were significantly related to engagement. Younger and female students were somewhat more engaged. The model based on age and gender explained engagement at a rate of 2.5% ($R^2 = .025$).

In the second step, conscientiousness ($\beta = .17$), agreeableness ($\beta = .11$), and neuroticism ($\beta = -.21$) were significantly associated with engagement. Students who scored high on conscientiousness and agreeableness, and low on neuroticism reported higher levels of engagement (Hypothesis 1 partially confirmed). The personality traits raised the model's explanatory potential to 15.4% ($R^2 = .154$).

In the third and final step, satisfaction of the need for competence showed the strongest relation with engagement ($\beta = .28$), followed by satisfaction of the need for autonomy ($\beta = .24$) and the need for relatedness ($\beta = .14$), respectively. Students with fulfilled needs for competence, autonomy and relatedness reported higher levels of engagement, after controlling for personality traits (Hypothesis 4 confirmed). Taken together, engagement can be explained by age, gender, personality traits and need satisfaction at a rate of 35.1% ($R^2 = .351$), where need satisfaction was the strongest contributory variable in the model. Hence, these results demonstrate the incremental validity of need satisfaction over and above personality traits in explaining engagement.

For boredom, the analyses revealed a significant relation for gender ($\beta = .19$), indicating that men were somewhat more bored than women. The model based on age and gender explained boredom at a rate of 3.6% ($R^2 = .036$).

Table 2
Hierarchical multiple regression results.[1]

Variables	Engagement		Boredom		Burnout	
	$R^2/\Delta R^2$	β	$R^2/\Delta R^2$	β	$R^2/\Delta R^2$	β
Step 1	.025*		.036*		.001	
Age		−.10*		.02		.03
Gender		−.12*		.19**		.01
Step 2	.154/.129**		.118/.082**		.129/.128**	
Age		−.11*		.01		.05
Gender		−.09		.15*		−.01
Extraversion		.07		.04		−.16**
Openness		.03		.08		.02
Conscientiousness		.17**		−.11*		−.09
Agreeableness		.11*		−.13*		−.13*
Neuroticism		−.21**		.18**		.23**
Step 3	.351/.197**		.254/.136**		.433/.304**	
Age		−.04		−.05		−.04
Gender		−.07		.14*		−.02
Extraversion		.03		.05		−.03
Openness		.00		.11*		.05
Conscientiousness		.09		−.04		.00
Agreeableness		.04		−/07		−.03
Neuroticism		−.13*		.11*		.12*
Autonomy		.24**		−.24**		−.39**
Competence		.28**		−.20**		−.27**
Relatedness		.14*		−.09		−.13*

Notes:
* $p < .05$.
** $p < .01$.
[1] The mean scores of extraversion are the reversed mean scores of introversion, which was measured with the personality scale used in this study.

In the second step, conscientiousness ($\beta = -.11$), agreeableness ($\beta = -.13$), and neuroticism ($\beta = .18$) were found to be significant predictors of boredom. Students who scored low on conscientiousness and agreeableness, and high on neuroticism reported higher levels of boredom (Hypothesis 2 partially confirmed). The personality traits raised the model's explanatory potential to 11.8% ($R^2 = .118$).

In the third step, the needs for autonomy ($\beta = -.24$) and competence ($\beta = -.20$) were found to be significant predictors of boredom. Students with unfulfilled needs for autonomy and competence reported higher levels of boredom, after controlling for personality traits (Hypothesis 5 confirmed). Hence, boredom can be explained by gender, personality traits and need satisfaction at a rate of 25.4% ($R^2 = .254$). Need satisfaction was the strongest contributory variable in the model. In other words, these results demonstrate the incremental validity of need satisfaction (i.e., for autonomy and competence) over and above personality traits in explaining boredom.

For burnout, the analyses revealed that age and gender were *not* significantly related. In the second step, extraversion ($\beta = -.16$), agreeableness ($\beta = -.13$) and neuroticism ($\beta = .23$) were found to be significantly associated with burnout. Students who scored high on neuroticism, and low on extraversion and agreeableness experienced higher levels of burnout (Hypothesis 3 partially confirmed). The model based on age, gender, and personality traits explained burnout at a rate of 12.9% ($R^2 = .129$).

In the third step, the needs for autonomy ($\beta = -.39$), competence ($\beta = -.27$), and relatedness ($\beta = -.13$) were found to be significant predictors of burnout, after controlling for personality traits. Students with unfulfilled needs reported higher levels of burnout (Hypothesis 6 confirmed). The three forms of need satisfaction added an extra 30.4% ($\Delta R^2 = .304$) to the model's explanatory potential. Thus, burnout can be explained by personality traits and need satisfaction at a rate of 43.3% ($R^2 = .433$), and need satisfaction was the strongest contributory variable in the model. Hence, these results demonstrate the incremental validity of need satisfaction over and above personality traits in explaining burnout.

7. Discussion

7.1. Personality

The present study revealed that four out of five personality traits (i.e., neuroticism, extraversion, agreeableness, conscientiousness) are related to students' well-being. Openness to experience is not related to any well-being facet, possibly due to a selecting out process and a restriction in range of scores. It is plausible that students have high levels of openness to experience by the very nature of their intellectual pursuits. Attributes such as being curious and broad-minded might mirror an individual's readiness to engage in learning experiences (Barrick & Mount, 1991). This reasoning is supported by the relatively high mean score and relative low standard deviation of openness to experience (see Table 1). Future research should look more closely to subfacets like innovation, because previous research has shown that subfacets of openness to experience do relate to engagement (Inceoglu & Warr, 2012).

Engagement is positively associated with conscientiousness and agreeableness, and negatively associated with neuroticism. Having high aspirations, being focused on goals (i.e., high on conscientiousness), being collaborative and good-natured (i.e., high on agreeableness), having a positive self-perception, and feeling self-confident (i.e., low on neuroticism) (McCrae & Costa, 2003) obviously play a relevant role in experiencing engagement. These findings are in line with previous research (e.g., Mostert & Rothman, 2006). Unexpectedly, however, engagement is *not* related to extraversion in the present study. This might have to do with the introversion-scale that we used and with reversing the items, perhaps not yielding a good indication of extraversion. Also, it has been argued that the active subfacets of extraversion, rather than the global dimension, are significantly related to engagement (Inceoglu & Warr, 2012).

Boredom is positively related to neuroticism, and negatively related to conscientiousness and agreeableness, which is in line with previous research (e.g., Hill & Perkins, 1985). Neuroticism reflects a high stress sensitivity (Suls, 2001) and a predisposition to experience negative affect (Costa & McCrae, 1992) that may narrow students' thought-action repertoire (Fredrickson, 1998) and, in turn, provoke boredom. In contrast, being competent and focusing on self-set goals (i.e., high on conscientiousness, McCrae & Costa, 2003), may protect students from boredom. This may hold for agreeableness too; it can be speculated that kindness towards others may foster supportive relationships and protect students from boredom. Like engagement, boredom is not related to extraversion. Prior research showed that extraverted individuals experience fewer symptoms of boredom (Fisher, 1993), therefore this null-finding might also be explained by our approach of assessing extraversion.

Burnout is positively related to neuroticism, and negatively related to extraversion and agreeableness. This finding is in line with previous research (e.g., Alarcon et al., 2009; Kim et al., 2009). Due to their vulnerability to stress and difficulties in dealing with stress, students high in neuroticism seem to have an increased probability to experience burnout. Furthermore, disagreeable students may experience more burnout because they are critical and tough-minded. These attributes might impede them in building supportive relationships with others, making them more vulnerable to exhaustion and depersonalization. This may also hold for introverted (i.e., low on extraversion) individuals who are rather reserved and shy (McCrae & Costa, 2003). Because conscientiousness covers attributes that are important for educational achievement, we might have found no relation between burnout and conscientiousness due to a selecting out process as well. For instance, students who have a strong sense of purpose and who are perseverant perform well (Barrick & Mount, 1991). Moreover, previous studies also failed to find a relation between these concepts (Lopez, Bolano, Marino, & Pol, 2010). The subfacets might be better suited for such analyses.

7.2. Need satisfaction

The present study revealed that fulfillment of psychological needs is positively related to engagement, and negatively related to boredom and burnout, after controlling for personality traits. In line with previous research (Van den Broeck et al., 2008a), engagement is associated with fulfilled innate psychological needs. Basically, when students are involved in activities that satisfy their psychological needs, their energy is likely to be fostered (Ryan & Deci, 2008). They are optimally motivated and persistent in study activities.

In contrast and as expected, boredom and burnout are associated with unfulfilled psychological needs, expanding previous research in this direction (Van den Broeck et al., 2008a). When students experience low levels of choice and psychological freedom, do not feel competent, and do not feel connected with others, they are likely to experience dissatisfaction, low energy, and feelings of exhaustion, and they tend to show callous attitudes towards others (Lens & Vansteenkiste, 2006; Vansteenkiste et al., 2007). However, the need for relatedness does not seem to account for boredom, probably because the tendency of feeling connected with others is not necessarily required for engaging in intrinsically motivating activities (Deci & Ryan, 2000).

Interestingly, and as hypothesized, the present study revealed that need satisfaction might play a role in well-being beyond personality traits.

7.3. Theoretical and practical implications

The present study has several strengths and implications. First, it shows that three different types of study-related well-being can be

differentiated from each other: engagement, boredom, and burnout differ in terms of their relations with personality traits and the extent to which psychological needs are satisfied.

Second, the present study indicates that need satisfaction is an important correlate of well-being, which goes beyond the impact of personality traits. This finding supports the usefulness of SDT for the educational context. As Ryan and Niemiec (2009) argued, fostering freedom, one's capabilities, and healthy interpersonal relations is an important mission of education. Besides our findings, students' satisfaction of basic needs is associated with better learning outcomes and more investment of time and energy in their academic activities (Niemiec & Ryan, 2009).

Third, our results support to some extent earlier findings regarding personality traits and need satisfaction, and engagement and burnout (e.g., Alarcon et al., 2009; Simsek & Koydemir, 2012). Tellingly, the present study seems to be the first one that examined need satisfaction in relation to boredom. Since study activities can be considered as work activities, it is likely that our findings might also apply to employees. However, this needs to be confirmed in future research.

From a practical perspective, it is relevant to take into account the social environment. For example, teachers may craft a supporting and challenging study environment for their students to stimulate students' need satisfaction. This can be done by clarifying to the students the aim and the importance of their study tasks, encouraging them to choose the right academic activities, engaging them in projects that encourage skills development, and by providing them with adequate resources (Deci & Ryan, 2000; Mann & Robinson, 2009; Niemiec & Ryan, 2009). Additionally, students' satisfaction can be supported by teacher and class characteristics, such encouragement and group interaction (Filak & Sheldon, 2003). Developing these ideas further, we believe that students' need for autonomy can be fulfilled by providing opportunities to craft their study projects (i.e., to modify aspects of their study activities to improve the fit between their studies and their own needs, abilities, and preferences; Tims, Bakker, & Derks, 2013). Teachers can support students' need for competence by presenting challenging and attainable goals (Locke, 2003), providing positive feedback (i.e., that is showing progress in relation to goals; Van den Broeck, Vansteenkiste, De Witte, Lens, & Andriessen, 2009), and support. Students' need for relatedness can be fulfilled by showing acceptance, understanding and consideration. Teachers should encourage these qualities among students as well, for example by giving them opportunities to work in groups.

7.4. Limitations

The present study has some limitations. First, it is based on a cross-sectional convenience sample, meaning that causal inferences are not warranted. Although it is tempting to conclude that personality traits and need satisfaction determine well-being, the present study only demonstrates that personality traits and need satisfaction are related to student well-being.

Second, it is conceivable that the Big Five personality traits affect need satisfaction (Taris, Van Beek, & Schaufeli, 2014) and that the associations between the personality traits and students' well-being are mediated by need satisfaction. For instance, students high in conscientiousness tend to be disciplined and achievement-oriented, and therefore, their need for competence might be easily satisfied (Ingledew, Markland, & Sheppard, 2004). Students high in extraversion tend to be warm and sociable, and therefore, it might be relatively easy for them to satisfy their need for relatedness. Our results do suggest that mediation is likely to occur since the regression coefficients of personality traits drop when need satisfaction was added. However, a longitudinal design is indispensable to study causality and mediation processes (Taris & Kompier, 2006). Therefore, further longitudinal research is necessary to disentangle the causality of the relationship.

Third, the present study is based on self-reports, which may have inflated the associations among the study variables due to common method variance or the wish to answer consistently (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Nevertheless, Spector (2006) argued convincingly that self-reports do not automatically and inevitably inflate associations between variables and do not necessarily lead to significant results.

Lastly, the current study focused on the incremental value of need satisfaction over and above personality traits in explaining engagement, boredom, and burnout among students. However, we do not take into account the context, while engagement, boredom, and burnout are – by definition – work or study related. In a next step, specific job - or study related demands and resources could be included, for instance by using the conceptual framework of the Job Demands-Resources model (Bakker & Demerouti, 2007). By doing so, we could control for the additional effects of job – or study characteristics.

7.5. Final note

The present study showed that satisfaction of students' basic needs for autonomy, competence, and relatedness has an incremental value over and above their personality traits in explaining engagement, boredom, and burnout. Hence, students' well-being might be enhanced by changing the educational environment so that their needs are met.

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