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Does Perceived Cohesion Mediate the Student Personality–Engagement Relationship in the University Setting?

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Student engagement has been established as a robust predictor of several positive outcomes related to academic development and success. Increasing our knowledge on what variables affect engagement can assist lecturers and other educational agents in maximizing student engagement within the university setting. The purpose of this study was to investigate the relationship between personality and student engagement via the mediational role of perceived cohesion in the university classroom. The model was tested using multilevel structural equation modeling and cross-sectional data from 1,500 students (72% female) belonging to 72 different university classrooms. The mediation model linking the personality dimensions with engagement via perceived cohesion, including task and social orientations, was partially supported by the data. Task cohesion mediated the positive relationship between three personality dimensions (i.e., Agreeableness, Extraversion, and Emotional Stability) and student engagement. No significant results were found with social cohesion as a mediator of the personality-engagement relationship. These findings suggest that building and developing a cohesive environment in the university setting, especially with regards to task cohesion, may be an effective strategy to promote student engagement. However, the specific characteristics of the university environment should be also considered (e.g., academic major or time spent in small work groups vs. time spent in large "traditional" lecture theaters). Recommendations for future research are discussed.

Educational Impact and Implications Statement
Task cohesion mediated the positive relationship between three personality dimensions (Agreeableness, Extraversion, and Emotional Stability) and student engagement. No significant relationship was found with social cohesion. Strategies aimed at developing a cohesive environment in the university setting (especially with regard to task cohesion) may promote student engagement.

Keywords: student engagement, FFM model, class functioning

Engagement is one of the most researched topics in the education field over the past several decades. The enthusiasm is grounded on evidence suggesting that engagement is both an alterable state and a strong predictor of students' well-being, learning, academic achievement, motivation, and retention (Fredricks, Blumenfeld, & Paris, 2004; Harper & Quaye, 2009; Klem & Connell, 2004; Sulea, Van Beek, Sarbescu, Virga, & Schaufeli, 2015). While differences exist when defining the construct (Sinatra, Heddy, & Lombardi, 2015), a commonly accepted definition understands engagement as a positive, fulfilling, and affective-cognitive state of mind characterized by the dimensions of vigor, dedication, and absorption (Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002).

Different antecedents of engagement have been investigated in the university setting (Kahu, 2013). These can be classified into contextual (e.g., teaching behavior, institutional practice) or individual factors (e.g., gender, personality). Personality—defined as "individual differences in the tendency to behave, think, and feel in certain consistent ways" (Caspi, 1998, p. 312)—is an individual antecedent that has been associated with student engagement (e.g., Linvill, 2014). Researchers have addressed important endeavors to identify and specify all individual differences and to develop a comprehensive model of personality. Based on the lexical hypothesis, which posits that personality characteristics that are most

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relevant to a group of people will eventually become encoded into their language, McCrae and Costa (1987) developed the five-factor model of personality (FFM). The FFM includes five orthogonal factors: Extraversion, Emotional Stability, Openness to Experience, Agreeableness, And Conscientiousness. The model has received some criticism due to its atheoretical nature and its limited scope to account for all dimensions of human personality (Block, 1995). However, a substantial body of evidence has supported the validity of the FFM (e.g., McCrae, 2001), its generalizability across cultures (Paunonen, Zeidner, Engvik, Oosterveld, & Maliphant, 2000), and even the heritability of the FFM traits (Jang, McCrae, Angleitner, Riemann, & Livesley, 1998).

Personality Dimensions and Engagement

A number of arguments can be advanced to link individual FFM traits with engagement. Conscientious individuals are characterized as being organized, self-disciplined, perseverant, and achievement-oriented (Costa & McCrae, 1992). These characteristics are closely connected to student engagement as well as to achievement-related behaviors (Heaven, Ciarrochi, & Vialle, 2007). Indeed, Conscientiousness has been positively linked to engagement among undergraduate students (Sulea et al., 2015). Emotional Stability refers to a disposition to experience less negative emotions, such as anxiety, nervousness, worry, or anger (Costa & McCrae, 1992). The prevalence of negative affect is related to burnout and behavioral withdrawal (Petrides, Chamorro-Premuzic, Frederickson, & Furnham, 2005), suggesting that students low on emotional stability may show poorer levels of engagement than their pairs with high emotional stability. Sulea et al. (2015) found that emotional stability was positively associated with engagement. Agreeableness describes a tendency to be cooperative, altruistic, and prosocial (Graziano, Jensen-Campbell, & Hair, 1996). Since agreeable students foster teamwork and a positive environment, they are more likely to be engaged than those low on agreeableness. This idea is compatible with previous research in the university setting linking agreeableness to varied engagement concomitants such as effort, concentration on learning tasks, and compliance with teacher instructions (Vermetten, Lodewijks, & Vermunt, 2001). Openness to Experience is associated with intellectual curiosity, creativity, and having a wide range of cultural interests (McCrae, 1996). Students high on Openness to Experience are expected to be constantly looking for new information and new experiences, being consequently more engaged with their education. For example, Linvill (2014) noted that need for cognition, a personality construct closely related to Openness to Experience (Woo, Harms, & Kuncel, 2007), acts as a significant predictor for engagement and interest among undergraduate students. Finally, Extraversion entails the inclination to seek stimulation, experience positive emotions, and being sociable and energetic (Costa & McCrae, 1992). Extravert students may be more engaged due to higher energy levels and positive attitude (Ongore, 2014).

Perceived Cohesion as a Mediator of the Relationship Between Personality and Engagement

Cohesion is one of the central variables that configures the social environment (Dion, 2000). Within the group dynamics field, cohesion is commonly understood as "a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs" (Carron, Brawley, & Widmeyer, 1998, p. 213). As derived from this definition, cohesion is differentiated into task (i.e., the degree to which members of a group work together to achieve common goals) and social orientations (i.e., the degree to which members of a group like each other and interact accordingly). These, in turn, are further differentiated into group and individual components (i.e., how people perceive the cohesion levels of the group as a whole, as well as their particular attraction to the group). Perceived cohesion is seen as a critical contextual factor during the student engagement process (Anderman & Freeman, 2004). Engagement emerges from both individual and contextual factors and is sensitive to variations in the environment (Anderman, 2003; Fredricks, Blumenfeld, & Paris. 2004). Ulmanen, Soini, Pietarinen, and Pyhältö (2016) noted that social cohesion and peer support are important prerequisites of the student emotional engagement toward school. Moreover, Karp, Hughes, and O'Gara (2010) identified through in-depth interviews among first-year undergraduate students that social and academic peer networks are essential factors for the development of student engagement. As in Karp et al. (2010), some other studies stress that both positive social and academic experiences are needed to promote student engagement (Anderman, 2003; Freeman, Anderman, & Jensen, 2007). These findings suggest that both social and task cohesion might be related to student engagement.

Since personality traits influence perception of social interactions (McCrae, 1996), it follows that personality traits can potentially affect interpersonal dynamics such as leadership or cohesion perceptions. From the five dimensions included in the FFM, four dimensions have been related to cohesion perceptions (i.e., Extraversion, Emotional Stability, Conscientiousness, and Agreeableness). Agreeableness engenders socially oriented tendencies, such as being cooperative, sympathetic, friendly, and altruistic toward others (Graziano et al., 1996). Thus it seems plausible the prevalence of such traits positively influences both social and task cohesion perceptions. Empirical evidence has in fact supported this assumption among undergraduate student's teams (Van Vianen & De Dreu, 2001). Individuals low in Emotional Stability often report high levels of hostility, tension, bad mood, loneliness, and less satisfaction with interpersonal relationships (McAdams, 2001). Low levels of Emotional Stability in groups may be harmful in terms of both social and task cohesion perceptions. Van Vianen and De Dreu (2001) reported a significant positive relationship between the personality trait of Emotional Stability and both social and task cohesion perceptions using a sample of undergraduate student's teams. Extraversion refers to the tendency of being sociable and communicate and connect with others, hence contributing to create a more socially cohesive environment (Barrick, Stewart, Neubert, & Mount, 1998). Moreover, in group settings extraverts are more likely to be active participants in group discussion and exhibit leader behaviors (Littlepage, Schmidt, Whisler, & Frost, 1995), thus theoretically influencing task cohesion perceptions. Conscientious individuals are thorough, hardworking, and achievement-oriented (Heaven et al., 2007), all these characteristics being related to task cohesion, but not necessarily to social cohesion. Indeed, Van Vianen and De Dreu (2001) noted a significant positive relationship between conscientiousness and task

cohesion perceptions, while the relationship with social cohesion was nonsignificant. Last, Openness to Experience has not been theoretically or empirically related to either social or task cohesion (Barrick et al., 1998; Van Vianen & De Dreu, 2001).

In summary, past research has already noted the effect of both cohesion and personality in promoting student engagement. However, these factors have been analyzed separately, while relationships could be more complex than those described by previous studies. Rather than assuming that personality and engagement, or perceived cohesion and engagement, are linked in a simple one-to-one relationship, it is possible that both personality and cohesion work together to promote (or hinder) student engagement. Personality can influence the nature and perception of group functioning (e.g., cohesion), which results in individual and group consequences (e.g., engagement). For example, conscientious students could be more engaged with their education due to a stronger perception of task cohesion within their classroom. That is, perceived cohesion could act as an underlying mechanism or process by which personality influences engagement. This is consistent with the FFM, which postulates individuals are characterized by personality traits that influence their perceptions of social interactions, as well as their perceptions of the environment (McCrae & Costa, 2008). Increasing our knowledge on what variables affect engagement, and in which manner, is important as this information might help lecturers and other educational agents to maximize student engagement in the university setting.

The Present Study: Aim, Hypotheses, and Theoretical Framework

The purpose of the present study was to examine the role of task and social cohesion perceptions in mediating the relationship between student personality and student engagement. The model tested hypothesizes that: agreeableness, extraversion and emotional stability are indirectly associated with engagement via task and social cohesion (Hypothesis 1) and conscientiousness is indirectly associated with engagement via task cohesion (Hypothesis 2).

Hypotheses are based on theory and empirical evidence. This implies that not all dimensions of personality were included in the model, if previous literature failed to support specific relationships. In addition, a fine-grained approach was employed with cohesion, distinguishing between social and task orientations. Previous calls have been made to adopt a bidimensional conceptualization of cohesion in order to posit specific and theoretically supported relationship among personality traits, mediators, and outcomes (LePine, Buckman, Crawford, & Methot, 2011). The context-input-process-output (CIPO) model (Scheerens, 2015) was utilized as the theoretical framework. The CIPO model is an adaptation of the input-process-outcome (IPO) model (McGrath, 1964) to the education setting and features a production process through which inputs (e.g., personality) by means of processes (e.g., perceived cohesion) results in students' affective, cognitive, or behavioral outcomes (e.g., engagement), being all three under the influence of antecedents and contextual conditions (Scheerens, 2015). The CIPO model conceptualizes a multilevel production process, highlighting that both the individual- and classroom-level should be considered when conducting research in the education setting. This is consistent with the nature of data in the university, hierarchically structured. Therefore, while variables and their associations within the model were conceptualized only at the individual level, multilevel structural equation modeling (MSEM) was used to control for the nested nature of the data.

Method

Procedure

Approval was obtained from Grégoire Bosselut's institutional research ethics board to conduct the study. All participants gave written informed consent to volunteer for the study. American Psychological Association guidelines concerning confidentiality and anonymity were followed. Data collection took place 2 months after the start of the academic course (November and December). Paper-based questionnaires were administered in a classroom setting at the end of a lecture session under supervision of a lecturer and members of the research staff.

Participants

Participants were 1,500 students (1,080 females; M_{age}= 20.04, SD = 3.05) in 72 university classrooms at three French universities from Tours (n = 1,012), Paris (n = 356), and Grenoble (n = 132). The average number of students per class was 20.83 (SD = 4.94). Students spent an average of 23.99 hr per week (SD = 8.29 hr) with their colleagues inside the classroom and an average of 8.22 hr per week (SD = 9.70 hr) with their colleagues outside the classroom. The sample consisted of undergraduate (n = 1,331; $n_{\text{first year}}$ = 838, $n_{\text{second year}}$ = 345, $n_{\text{third year}}$ = 148) and postgraduate (master's level) students (n = 169; $n_{\text{first year}}$ = 104, $n_{\text{second year}}$ = 65). The participants were students in marketing (n = 473), management and communication (n = 231), human kinetics (n = 197), and psychology (n = 599).

Measures

Personality. Student's personality traits were assessed using the French Big Five Inventory (BFI-Fr; Plaisant, Courtois, Réveillère, Mendelsohn, & John, 2010). The BFI-Fr is composed of 44 items distributed in five subscales: Emotional Stability (e.g., I see myself as someone who is emotionally stable, not easily upset), Extroversion (e.g., I see myself as someone who is talkative), Openness (e.g., I see myself as someone who is curious about many different things), Agreeableness (e.g., I see myself as someone who is helpful and unselfish with others), and Conscientiousness (e.g., I see myself as someone who perseveres until the task is finished). Each item is answered on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Emotional Stability's subscale was reversed such as higher score represented higher emotional instability (i.e., Neuroticism). Previous research has supported the internal consistency and convergent and discriminant validity of the BFI-Fr (Plaisant et al., 2010). The α coefficients were satisfactory (.82, .84, .69, .78, and .81 for the Emotional Stability, Extraversion, Openness, Agreeableness, and Conscientiousness subscales, respectively).

Cohesion. Students' perceptions of group cohesion were assessed through the University Group Environment Questionnaire (UGEQ; Bosselut, Heuzé, Castro, Fouquereau, & Chevalier, 2018). The UGEQ is originally developed in French and contains

16 items divided equally into four subscales. Two subscales assess task cohesion, named Attractions to the Group-Task (e.g., I like the working atmosphere of my group) and Group Integration Task (e.g., Members of my group prefer to work together rather than on their own). Two subscales assess social cohesion, named Attractions to the Group-Social (e.g., I will miss the members of my group at the end of the academic year) and Group Integration Social (e.g., Members of my group participate in joint activities outside of classes). The questionnaire is scored on a 9-point scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). The scale has demonstrated good factorial validity and internal consistency, as well as measurement invariance across gender, format of administration, and study level (Bosselut et al., 2018). Consistent with Carron, Widmeyer, and Brawley's (1985) recommendations, the subscales were combined to create a total social and task cohesion score. The α coefficients were satisfactory (.85 and .78 for Task and Social Cohesion subscales, respectively).

Student engagement. The shortened student version of the Utrecht Work Engagement Scale (UWES-S; Schaufeli & Bakker, 2003) was employed to measure student's engagement. The back-translation method was used to translate the original scale into French. This questionnaire includes nine items grouped into three subscales: Vigor (e.g., When I get up in the morning I feel like going to class), Absorption (e.g., Time flies when I am studying), and Dedication (e.g., I am proud of my studies). Participants responded to each item on a 7-point Likert scale ranging from 0 (*never*) to 6 (*always*). In previous studies (Schaufeli & Bakker, 2003), the UWES-s has demonstrated good factorial validity, internal consistency, and discriminant validity. The subscales were combined to create a total engagement score, and the alpha coefficient was satisfactory (.87).

Data Analysis Strategy

MSEM (Preacher, Zyphur, & Zhang, 2010) allows researchers to investigate the partitioned variance of the between groups and within group for each variable in the same time. Given that all variables were measured at level 1 in the present study (i.e., each student answered individually to the different questionnaires), the model is referred as a 1–1–1 MSEM (Preacher et al., 2010). While variables and their associations within the model were investigated only at the within-classroom level, MSEM was used to control for the nested nature of the data (between-classroom variance). Mplus (Version 7; Muthén & Muthén, 1998–2012) was used for fitting the MSEM model, using the two level option with random intercept (i.e., TYPE = TWOLEVEL) with CLUSTER and BAYES estimator. The Bayes estimator is considered especially relevant in multilevel mediation models (Yuan & MacKinnon, 2009). Moreover, Bayesian inferences for direct and indirect effects are exact; they do not rely on normality assumptions or large sample approximations and they produce credible intervals (CI) for indirect effects in a straightforward manner (Yuan & MacKinnon, 2009). The MODEL CONSTRAINT command was used to estimate the direct and indirect effects. As a Sobel test indirect effects are the product between *a* path (predictor-mediator) and *b* path (mediator-outcome). Indirect effects are considered statistically significant when the *p* values are smaller than .05 and the credible interval of the Bayes estimator excludes 0 (Preacher & Hayes, 2008). For example, if the CIs are −0.214 and 0.214 the indirect effect is not significant, whereas if the CIs are 0.214 and 0.425 the indirect effect is significant. Intraclass correlations (ICC) were calculated to ensure that enough between-groups variance was available to warrant decomposing the Level 1 and Level 2 variances (Preacher et al., 2010). ICCs greater than .05 suggest that multilevel analysis should be used (Julian, 2001). Finally, the influence of gender, university, academic major, and study level were controlled using the multiple indicators multiple causes (MIMIC) procedure in Mplus, as these factors have been shown to influence the variables within the mediational model (e.g., Carron, Bray, & Eys, 2002; Damian, Su, Shanahan, Trautwein, & Roberts, 2015; Lievens, Coetsier, De Fruyt, & De Maeseneer, 2002; Schmitt, Realo, Voracek, & Allik, 2008).

Results

Descriptive Statistics

Means, standard deviations, and correlations are presented in Table 1. Multivariate (Mahalanobis distance higher than $\chi^2(8) = 26.12$, $p < .001$) and univariate outliers were identified (i.e., $z > 3.29$ for $p < .001$) and excluded from further analyses. Consequently, further analyzes were based on 1,468 students.

Main Analysis

Of the five FFM traits, four corresponding ICCs values were below .05 (i.e., .04 for Extraversion; .02 for Agreeableness; .03 for Emotional Stability; .05 for Conscientiousness; .07 for Openness).

Table 1
Descriptive Statistics

Variables	*M*	SD_{within}	$SD_{between}$	1	2	3	4	5	6	7	8
1. Extraversion	3.336	.793	.154		−.075*	.108**	−.216**	.188**	.108**	.193**	.244**
2. Agreeableness	3.929	.544	.007	−.530**		.092**	−.157**	.035	.210**	.131**	.110**
3. Conscientiousness	3.421	.695	.155	−.287**	.215		−.059	.105**	.024	−.015	.440**
4. Emotional stability	2.954	.833	.177	−.457**	.315*	.038		−.092**	−.141**	−.050	−.086**
5. Openness	3.428	.632	.161	.235	.204	−.271*	.372**		.049	.112**	.239**
6. Cohesion_Task	6.241	1.087	.513	.149	−.082	−.051	−.159	−.351*		.557**	.179**
7. Cohesion_Social	5.373	1.250	.893	.553**	−.332**	−.140	−.247*	−.275*	.633**		.152**
8. Engagement	3.925	.862	.238	−.095	.708**	.441**	.397**	.360**	−.320**	−.147	

Note. Within values are reported above the diagonal; between values are reported bellow the diagonal.
* $p < .05$. ** $p < .01$.

Both ICC values for cohesion were above .05 (i.e., .18 for task cohesion and .36 for social cohesion). Finally, engagement's ICC value was above .05 (i.e., .07). While the ICC values for cohesion and engagement warranted the use of a multilevel approach, the low values for the FFM traits prevented us to analyze the mediational model at the group level. Thus, we examine the relationships only at the individual level, controlling for the nesting of students in classes. (Julian, 2001). The 1–1–1 MSEM model was estimated with the FFM traits as independent variables, task and social cohesion as mediators, and engagement as the dependent variable. Standardized estimates, posterior standard deviation, p values, and 95% credibility intervals are presented in Table 2. All further results are presented controlling for classroom, gender, university, academic major, and study level.

Direct effects. Whereas no relationship was found between emotional stability and engagement, significant and positive relationships were observed between three personality dimensions (Extraversion, Agreeableness, and Conscientiousness) and engagement (X→Y, path c'). Only task cohesion was significantly and positively related to engagement (M→Y, path b). Both extraversion and agreeableness were significantly and positively related to both task and social cohesion (X→M, path a). Emotional stability was significantly and negatively related to task cohesion (X→M, path a).

Indirect effects. Task cohesion mediated the positive relationship between Extraversion and engagement (estimate = 0.011, $p < .0001$). In addition, task cohesion mediated the positive relationship between Agreeableness and engagement (estimate = 0.022, $p < .0001$). Task cohesion also mediated the negative relationship between Emotional Stability and engagement (estimate = −0.010, $p = .001$). No significant indirect effects were found with social cohesion as a mediator. Therefore, we partially find support for H_1. With Conscientiousness as an independent variable, no indirect relationship was found. Therefore, we did not find support for H_2.

Discussion

The aim of this study was to investigate the potential role of perceived cohesion as an underlying mechanism by which personality influences engagement in the university setting. More specifically, we tested a CIPO-inspired mediation model linking the FFM dimensions with student engagement via perceived social and task cohesion. Overall, the hypotheses advanced were partially supported by the data.

Our first hypothesis was that higher Agreeableness, Extraversion, and Emotional Stability would be indirectly associated with greater engagement via higher task and social cohesion. Our research yielded evidence supporting the postulated indirect links between Agreeableness, Extraversion, and Emotional Stability and engagement via task cohesion. Contrary to our expectations, social cohesion did not mediate these relationships. While some personality dimensions (i.e., Agreeableness and Extraversion) correlated positively with social cohesion, no significant link was found between social cohesion and engagement. We hypothesized that social cohesion could be related to engagement and act as a mediator based on previous research highlighting the relevant role of both academic and social experiences in the development of student engagement (Anderman, 2003; Freeman et al., 2007; Karp et al., 2010; Ulmanen et al., 2016). However, most of these studies were conducted in schools (e.g., Ulmanen et al., 2016), while universities present distinctive characteristics that may explain our result (or lack thereof). In particular, university students could give more importance to pursuing instrumental goals (task-orientation) than satisfying affective needs (social orientation). Consequently, in the university setting, task cohesion may play a more prominent role in the engagement process, as opposed to school, high school, or other educational settings where the demands and the students' age are different. For example, a meta-analysis investigating the relationship between cohesion and performance highlighted a moderated effect of the setting (Castaño, Watts, & Tekleab, 2013), although the authors did not report the effects separately for each educational setting. Further research is needed specifically addressing the role of task and social cohesion across different educational settings.

Similarly, we believe our results may differ also across different university settings, depending on contextual factors (e.g., education curriculum). This is consistent with the CIPO model, which recognizes the importance of the environment, being inputs, processes, and outcomes under the influence of antecedents and contextual conditions (Scheerens, 2015). For example, the French education system (and several other countries within the European Higher Education Area) emphasizes courses delivered through small collaborative group work, rather than impersonal lectures in large halls. According to the current academic curriculum, more than two thirds of the total course workload is spent working in small groups, this providing more opportunities for social interaction and student interdependence. By contrast, cohesion may not play a relevant role in other academic environments focused on "traditional" lectures, where students do not typically interact with each other and work on their own individual assignments. Apart from the educational curriculum, our results highlight that other contextual factors (e.g., university or academic major) might also influence cohesion and engagement. For example, post hoc analyses showed that human kinetics and marketing students had significantly higher perceptions of social and task cohesion than students from other majors. In addition, human kinetics students had significantly higher perceptions of engagement compared to other students. Taken together, these findings suggest that future research should carefully consider contextual factors when investigating cohesion or engagement in the university setting.

Our second hypothesis was that higher Conscientiousness would be indirectly associated with greater engagement via higher task cohesion. According to our data, perception of task cohesion did not act as a mediator in this relationship. A possible explanation is that, in comparison with agreeableness, extraversion, and emotional stability, conscientiousness is a less socially oriented dimension and, therefore, less capable of influencing interpersonal relationships within the educational environment. This may explain why task cohesion mediated the relationship between such three socially oriented personality dimensions and engagement, while no significant mediation was found between Conscientiousness and engagement. Previous research has underlined how Emotional Stability and Agreeableness are stronger predictors of performance than conscientiousness in jobs involving teamwork and personal interaction (Mount, Barrick, & Stewart, 1998), which highlights the greater social orientation of such dimensions. In addition, previous underlying mechanisms described in the conscientiousness-

Table 2
Standardized Estimates, Posterior Standard Deviation, and Credibility for the Multilevel Structural Equation Modeling Models

Models	Estimate	Post *SD*	*p*	95% CI Lower	95% CI Upper
Control variables					
Sex → Eng	−.009	.027	.370	−.062	.042
Sex → C-Task	−.028	.030	.178	−.085	.030
Sex → C-Social	.066	.029	.012	.008	.122
Sex → C	−.254	.026	<.0001	−.304	−.204
Sex → E	−.030	.028	.137	−.085	.023
Sex → A	−.042	.027	.063	−.093	.011
Sex → ES	−.319	.023	<.0001	−.364	−.273
Sex → O					
Univ → Eng	−.030	.034	.190	−.096	.038
Univ → C-Task	.017	.035	.309	−.051	.087
Univ → C-Social	−.424	.031	<.0001	−.483	−.361
Univ → C	−.141	.035	<.0001	−.209	−.072
Univ → E	−.139	.36	<.0001	−.210	−.069
Univ → A	.044	.036	.114	−.028	.115
Univ → ES	.007	.034	.426	−.060	.072
Univ → O	.015	.037	.339	−.056	.086
Level → Eng	.023	.023	.157	−.022	.067
Level → C-Task	.007	.026	.394	−.044	.058
Level → C-Social	.023	.024	.183	−.026	.069
Level → C	.127	.025	<.0001	.078	.176
Level → E	.005	.027	.425	−.046	.057
Level → A	.071	.026	.003	.019	.123
Level → ES	−.061	.025	.009	−.110	−.011
Level → O	.035	.027	.094	−.018	.088
Prog → Eng	−.087	.034	.005	−.153	−.021
Prog → C-Task	.095	.036	.004	.024	.165
Prog → C-Social	.376	.033	<.0001	.311	.440
Prog → C	.031	.036	.196	−.038	.101
Prog → E	.189	.036	<.0001	.116	.258
Prog → A	−.068	.037	.035	−.142	.006
Prog → ES	−.053	.035	.067	−.122	.016
Prog → O	−.034	.037	.181	−.107	.041
Direct effects					
C-Social → Eng (*b*)	.042	.028	.069	−.014	.097
C-Task → Eng (*b*)	.111	.028	<.0001	.056	.167
C → Eng (*c′*)	.400	.022	<.0001	.355	.443
C → C-Task (*a*)	.002	.023	.469	−.044	.047
C → C-Social (*a*)	.000	.000	1.000	.000	.000
E → Eng (*c′*)	.154	.024	<.0001	.105	.201
E → C-Task (*a*)	.100	.027	<.0001	.047	.154
E → C-Social (*a*)	.216	.027	<.0001	.163	.228
A → Eng (*c′*)	.055	.024	.010	.009	.010
A → C-Task (*a*)	.203	.026	<.0001	.152	.253
A → C-Social (*a*)	.154	.027	<.0001	.101	.205
ES → Eng (*c′*)	.012	.026	.323	−.038	.062
ES → C-Task (*a*)	−.097	.029	.001	−.153	−.039
ES → C-Social (*a*)	.036	.029	.108	−.021	.094
O → Eng (*c′*)	.086	.029	.001	.135	.223
O → C-Task (*a*)	.000	.000	1.000	.000	.000
O → C-Social (*a*)	.000	.000	1.000	.000	.000
Indirect effects					
Indirect C → C-Social → Eng	.000	.000	1.000	.000	.000
Indirect C → C-Task → Eng	.000	.003	.469	−.005	.006
Indirect E → C-Social → Eng	.009	.006	.069	−.003	.021
Indirect E → C-Task → Eng	.011	.004	<.0001	.004	.020
Indirect A → C-Social → Eng	.006	.004	.069	−.002	.015
Indirect A → C-Task → Eng	.022	.006	<.0001	.010	.035
Indirect ES → C-Social → Eng	.001	.002	.159	−.001	.006
Indirect ES → C-Task → Eng	−.010	.004	.001	−.020	−.003
Indirect O → C-Social → Eng	.000	.000	1.000	.000	.000
Indirect O → C-Task → Eng	.000	.000	1.000	.000	.000

Note. Post *SD* = posterior standard deviation; CI = credible intervals; Eng = student engagement; C-Task = cohesion-task; C-Social = cohesion-social; C = Conscientiousness; E = Extraversion; A = Agreeableness; ES = Emotional Stability (reverse score); O = Openness to Experience; Univ = university; Level = study level; Prog = program (academic major); *a* = direct path from independent variable to mediator; *b* = direct path from mediator to dependent variable; *c′* = direct path from independent variable to dependent variable.

engagement literature are fundamentally individual. For example, Wildermuth, Vaughan, and Christo-Baker (2013) identified several factors mediating the link between personality and emotional engagement, being all of them psychological-individual factors (e.g., meaningfulness). Our finding, together with previous literature, suggests that future research investigating the pathways by which Conscientiousness relates to engagement should carefully consider individual factors, as these may be better candidates than contextual ones in terms of mediation effects.

Lastly, post hoc analyses revealed that the distribution of the study variables varies according to gender. For example, female students reported higher levels of Conscientiousness and lower levels of Emotional Stability than males. This has been found in past research, which highlights that these two personality dimensions are the most relevant to explain gender differences in personality across Western countries (Costa, Terracciano, & McCrae, 2001; Schmitt et al., 2008; Weisberg, DeYoung, & Hirsh, 2011). Females also reported higher levels of engagement than males, which is consistent with previous literature in the school setting (Lam et al., 2016) and could respond to the differences in personality between males and females (considering that Conscientiousness is strongly related to engagement). In relation to cohesion, while females in our sample reported lower levels of cohesion than males, previous research suggests the opposite: females tend to exhibit higher levels of cohesion (Martin & Good, 2015). This discrepancy might be explained by the time of the year in which our study took place. Evidence with sport teams suggests that the temporal pattern of cohesion follows a different trend based on gender, with females taking more time to develop cohesion perceptions than males (Eys et al., 2015).

Study Limitations and Recommendations for Future Research

Some limitations must be acknowledged for our study. First, the cross-sectional design used in our study does not allow us to draw conclusions about personality and cohesion as causal mechanisms of student engagement. Longitudinal or experimental studies would be necessary to examine whether personality and cohesion are causally related to engagement. Similarly, while cohesion is understood as a dynamic process, our study design (cross-sectional) only allowed us to capture a fixed picture of the construct. Data collection took place in the middle of the first academic semester, this allowing the possibility for the students to work and spend time together. However, changes in cohesion can occur throughout the academic year, potentially affecting the mediating role of cohesion in the personality-engagement relationship. Studies with repeated measures would be better suited to assess potential temporal variance in cohesion levels. Second, self-reports are not exempts of bias (e.g., social desirability response). The risk of biases associated with self-reports may be reduced in future research by using data and method triangulation (e.g., lecturer's self-report, observation). Third, despite the large number of participants, our sample was a convenience sample. Employing probability sampling will help produce more representative results and strengthen the available evidence. Last, we only considered an emergent state (i.e., cohesion) in order to explain the relationship between personality and engagement. Based on the IPO model, we can posit that personality could influence processes that, in turn, have an impact on cohesion (Forsyth, 2014). For example, cooperative learning is based on group work that is structured by teachers in order to maximize students' motivational, cognitive and social outcomes (Johnson & Johnson, 2009). Given that cooperative learning allows the development of social relationships (Tolmie et al., 2010), future research could examine its potential mediating effect within our personality-cohesion-engagement model.

Practical Implications

Besides those limits, we consider that the findings present practical implications and promising avenues for future intervention. To the best of our knowledge, the role of cohesion as a mechanism whereby personality influences engagement has not been previously examined in the literature. Knowing how personality affects engagement will help teachers and other educational agents to maximize engagement within the academic setting. This is important as engagement influences student's outcomes, such as well-being, learning, academic achievement, motivation, and retention (Fredricks et al., 2004; Harper & Quaye, 2009; Klem & Connell, 2004; Sulea et al., 2015). Findings suggest that building and developing a cohesive environment in the university setting (especially with regard to task cohesion) may be a good strategy to promote student engagement. This can be done through different ways. For example, exhibiting a transformational or democratic leadership style has been shown to positively influence cohesion perceptions (e.g., Callow, Smith, Hardy, Arthur, & Hardy, 2009; Kim & Cruz, 2016). Moreover, team building strategies such as goal setting or role clarification have also proven to be effective to enhance group cohesion and could be used within the classroom setting (for a review, see Martin, Carron, & Burke, 2009). As discussed above in relation to contextual factors, these strategies should be more effective in university environments with a special focus on group work and frequent interaction/collaboration between students.

References

Anderman, L. H. (2003). Academic and social perceptions as predictors of change in middle school students' sense of school belonging. *Journal of Experimental Education, 72,* 5–22. http://dx.doi.org/10.1080/00220970309600877

Anderman, L. H., & Freeman, T. M. (2004). Students' sense of belonging in school. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement: Vol. 13. Motivating students, improving schools: The legacy of Carol Midgley* (pp. 27–63). Greenwich, CT: JAI Press.

Barrick, M. B., Stewart, G. L., Neubert, M. J., & Mount, M. K. (1998). Relating member ability and personality to work-team processes and team effectiveness. *Journal of Applied Psychology, 83,* 377–391. http://dx.doi.org/10.1037/0021-9010.83.3.377

Block, J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin, 117,* 187–215. http://dx.doi.org/10.1037/0033-2909.117.2.187

Bosselut, G., Heuzé, J.-P., Castro, O., Fouquereau, E., & Chevalier, S. (2018). Using exploratory structure equation modeling to validate a measure of cohesion in the university classroom: The University Group Environment Questionnaire (UGEQ). *International Journal of Educational Research, 89,* 1–9. http://dx.doi.org/10.1016/j.ijer.2018.03.003

Callow, N., Smith, M. J., Hardy, L., Arthur, C. A., & Hardy, J. (2009). Measurement of transformational leadership and its relationship with

team cohesion and performance level. *Journal of Applied Sport Psychology, 21,* 395–412. http://dx.doi.org/10.1080/10413200903204754

Carron, A. V., Brawley, L. R., & Widmeyer, W. N. (1998). The measurement of cohesiveness in sport groups. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 213–226). Morgantown, WV: Fitness Information Technology.

Carron, A. V., Bray, S. R., & Eys, M. A. (2002). Team cohesion and team success in sport. *Journal of Sports Sciences, 20,* 119–126. http://dx.doi.org/10.1080/026404102317200828

Carron, A. V., Widmeyer, W. N., & Brawley, L. R. (1985). The development of an instrument to assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport Psychology, 7,* 244–266. http://dx.doi.org/10.1123/jsp.7.3.244

Caspi, A. (1998). Personality development across the life course. In W. Damon (Series Ed.) & N. Eisenberg (Vol. ED.), *Handbook of child psychology: Vol. 3. Social emotional, and personality development* (pp. 311–388). New York, NY: Wiley.

Castaño, N., Watts, T., & Tekleab, A. G. (2013). A reexamination of the cohesion-performance relationship meta-analyses: A comprehensive approach. *Group Dynamics: Theory, Research, and Practice, 17,* 207–231. http://dx.doi.org/10.1037/a0034142

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO FFI): professional manual*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., Jr., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology, 81,* 322–331. http://dx.doi.org/10.1037/0022-3514.81.2.322

Damian, R. I., Su, R., Shanahan, M., Trautwein, U., & Roberts, B. W. (2015). Can personality traits and intelligence compensate for background disadvantage? Predicting status attainment in adulthood. *Journal of Personality and Social Psychology, 109,* 473–489. http://dx.doi.org/10.1037/pspp0000024

Dion, K. L. (2000). Group cohesion: From "field of forces" to multidimensional construct. *Group Dynamics: Theory, Research, and Practice, 4,* 7–26. http://dx.doi.org/10.1037/1089-2699.4.1.7

Eys, M., Evans, M. B., Martin, L. J., Ohlert, J., Wolf, S. A., Van Bussel, M., & Steins, C. (2015). Cohesion and performance for female and male sport teams. *The Sport Psychologist, 29,* 97–109. http://dx.doi.org/10.1123/tsp.2014-0027

Forsyth, D. R. (2014). *Group dynamics* (6th ed.). Belmont, CA: Wadsworth.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74,* 59–109. http://dx.doi.org/10.3102/00346543074001059

Freeman, T. M., Anderman, L. H., & Jensen, J. M. (2007). Sense of belonging in college freshmen at the classroom and campus levels. *Journal of Experimental Education, 75,* 203–220. http://dx.doi.org/10.3200/JEXE.75.3.203-220

Graziano, W. G., Jensen-Campbell, L. A., & Hair, E. C. (1996). Perceiving interpersonal conflict and reacting to it: The case for agreeableness. *Journal of Personality and Social Psychology, 70,* 820–835. http://dx.doi.org/10.1037/0022-3514.70.4.820

Harper, S. R., & Quaye, S. J. (2009). Beyond sameness, with engagement and outcomes for all. In S. R. Harper & S. J. Quaye (Eds.), *Student engagement in higher education* (pp. 1–15). New York, NY: Routledge.

Heaven, P., Ciarrochi, J., & Vialle, W. (2007). Conscientiousness and Eysenckian psychoticism as predictors of school grades. *Personality and Individual Differences, 42,* 535–546. http://dx.doi.org/10.1016/j.paid.2006.07.028

Jang, K. L., McCrae, R. R., Angleitner, A., Riemann, R., & Livesley, W. J. (1998). Heritability of facet-level traits in a cross-cultural twin sample: Support for a hierarchical model of personality. *Journal of Personality and Social Psychology, 74,* 1556–1565. http://dx.doi.org/10.1037/0022-3514.74.6.1556

Johnson, D. W., & Johnson, F. P. (2009). *Joining together: Group theory and group skills* (10th ed.). Upper Saddle River, NJ: Pearson Education.

Julian, M. W. (2001). The consequences of ignoring multilevel data structures in non-hierarchical covariance modeling. *Structural Equation Modeling, 8,* 325–352. http://dx.doi.org/10.1207/S15328007SEM0803_1

Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education, 38,* 758–773. http://dx.doi.org/10.1080/03075079.2011.598505

Karp, M. M., Hughes, K. L., & O'Gara, L. (2010). An exploration of Tinto's integration framework for community college students. *Journal of College Student Retention: Research, Theory and Practice, 12,* 69–86. http://dx.doi.org/10.2190/CS.12.1.e

Kim, H. D., & Cruz, A. B. (2016). The influence of coaches' leadership styles on athletes' satisfaction and team cohesion: A meta-analytic approach. *International Journal of Sports Science & Coaching, 11,* 900–909. http://dx.doi.org/10.1177/1747954116676117

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *The Journal of School Health, 74,* 262–273. http://dx.doi.org/10.1111/j.1746-1561.2004.tb08283.x

Lam, S. F., Jimerson, S., Shin, H., Cefai, C., Veiga, F. H., Hatzichristou, C., . . . Zollneritsch, J. (2016). Cultural universality and specificity of student engagement in school: The results of an international study from 12 countries. *British Journal of Educational Psychology, 86,* 137–153. http://dx.doi.org/10.1111/bjep.12079

LePine, J., Buckman, B. R., Crawford, E. R., & Methot, J. R. (2011). A review of research on personality in teams: Accounting for pathways spanning levels of theory and analysis. *Human Resource Management Review, 21,* 311–330. http://dx.doi.org/10.1016/j.hrmr.2010.10.004

Lievens, F., Coetsier, P., De Fruyt, F., & De Maeseneer, J. (2002). Medical students' personality characteristics and academic performance: A five-factor model perspective. *Medical Education, 36,* 1050–1056. http://dx.doi.org/10.1046/j.1365-2923.2002.01328.x

Linvill, D. (2014). Student interest and engagement in the classroom: Relationships with student personality and developmental variables. *Southern Communication Journal, 79,* 201–214. http://dx.doi.org/10.1080/1041794X.2014.884156

Littlepage, G. E., Schmidt, G. W., Whisler, E. W., & Frost, A. G. (1995). An input-process-output analysis of influence and performance in problem-solving groups. *Journal of Personality and Social Psychology, 69,* 877–889. http://dx.doi.org/10.1037/0022-3514.69.5.877

Martin, E., & Good, J. (2015). Strategy, team cohesion and team member satisfaction: The effects of gender and group composition. *Computers in Human Behavior, 53,* 536–543. http://dx.doi.org/10.1016/j.chb.2014.06.013

Martin, L. J., Carron, A. V., & Burke, S. M. (2009). Team building interventions in sport: A meta-analysis. *Sport and Exercise Psychology Review, 5,* 3–18.

McAdams, D. P. (2001). *The person: An integrated introduction to personality psychology*. San Diego, CA: Harcourt.

McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological Bulletin, 120,* 323–337. http://dx.doi.org/10.1037/0033-2909.120.3.323

McCrae, R. R. (2001). 5 years of progress: A reply to Block. *Journal of Research in Personality, 35,* 108–113. http://dx.doi.org/10.1006/jrpe.2000.2294

McCrae, R. R., & Costa, P. (2008). Empirical and theoretical status of the five-factor model of personality traits. In *The Sage handbook of personality theory and assessment: Vol. 1—Personality theories and models* (pp. 273–294). Thousand Oaks, CA: Sage. http://dx.doi.org/10.4135/9781849200462.n13

McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology, 52,* 81–90. http://dx.doi.org/10.1037/0022-3514.52.1.81

McGrath, J. E. (1964). *Social psychology: A brief introduction*. New York, NY: Holt, Rinehart and Winston.

Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-factor model of personality and performance in jobs involving interpersonal interactions. *Human Performance, 11,* 145–165. http://dx.doi.org/10.1080/08959285.1998.9668029

Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide* (Version 7). Los Angeles: Author.

Ongore, O. (2014). A study of relationship between personality traits and job engagement. *Procedia: Social and Behavioral Sciences, 141,* 1315–1319. http://dx.doi.org/10.1016/j.sbspro.2014.05.226

Paunonen, S. V., Zeidner, M., Engvik, H. A., Oosterveld, P., & Maliphant, R. (2000). The nonverbal assessment of personality in five cultures. *Journal of Cross-Cultural Psychology, 31,* 220–239. http://dx.doi.org/10.1177/0022022100031002005

Petrides, K. V., Chamorro-Premuzic, T., Frederickson, N., & Furnham, A. (2005). Explaining individual differences in scholastic behaviour and achievement. *British Journal of Educational Psychology, 75,* 239–255. http://dx.doi.org/10.1348/000709904X24735

Plaisant, O., Courtois, R., Réveillère, C., Mendelsohn, G. A., & John, O. P. (2010). Validation par analyse factorielle du Big Five Inventory français (BFI-Fr). Analyse convergente avec le NEO-PI-R. *Annales Médico-psychologiques, revue psychiatrique, 168,* 97–106.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40,* 879–891. http://dx.doi.org/10.3758/BRM.40.3.879

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods, 15,* 209–233. http://dx.doi.org/10.1037/a0020141

Schaufeli, W. B., & Bakker, A. B. (2003). *Utrecht Work Engagement Scale: Preliminary manual*. Utrecht, the Netherlands: Utrecht University.

Schaufeli, W. B., Martínez, I., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students: A cross national study. *Journal of Cross-Cultural Psychology, 33,* 464–481. http://dx.doi.org/10.1177/0022022102033005003

Scheerens, J. (2015). Theories on educational effectiveness and ineffectiveness. *School Effectiveness and School Improvement, 26,* 10–31. http://dx.doi.org/10.1080/09243453.2013.858754

Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology, 94,* 168–182. http://dx.doi.org/10.1037/0022-3514.94.1.168

Sinatra, G. M., Heddy, B. C., & Lombardi, D. (2015). The challenges of defining and measuring student engagement in science. *Educational Psychologist, 50,* 1–13. http://dx.doi.org/10.1080/00461520.2014.1002924

Sulea, C., Van Beek, I., Sarbescu, P., Virga, D., & Schaufeli, W. B. (2015). Engagement, boredom, and burnout among students: Basic need satisfaction matters more than personality traits. *Learning and Individual Differences, 42,* 132–138. http://dx.doi.org/10.1016/j.lindif.2015.08.018

Tolmie, A., Topping, K. J., Christie, D., Donaldson, C., Howe, C., Jessiman, E., . . . Thurston, A. (2010). Social effects of collaborative learning in primary schools. *Learning and Instruction, 20,* 177–191. http://dx.doi.org/10.1016/j.learninstruc.2009.01.005

Ulmanen, S., Soini, T., Pietarinen, J., & Pyhältö, K. (2016). The anatomy of adolescents' emotional engagement in schoolwork. *Social Psychology of Education: An International Journal, 19,* 1–20. http://dx.doi.org/10.1007/s11218-016-9343-0

van Vianen, A. E., & De Dreu, C. K. (2001). Personality in teams: Its relationship to social cohesion, task cohesion, and team performance. *European Journal of Work and Organizational Psychology, 10,* 97–120. http://dx.doi.org/10.1080/13594320143000573

Vermetten, Y. J., Lodewijks, H. G., & Vermunt, J. D. (2001). The role of personality traits and goal orientations in strategy use. *Contemporary Educational Psychology, 26,* 149–170. http://dx.doi.org/10.1006/ceps.1999.1042

Wildermuth, C. M. S., Vaughan, A. G., & Christo-Baker, E. A. (2013). A path to passion: Connecting personality, psychological conditions, and emotional engagement. *Journal of Psychological Issues in Organizational Culture, 3,* 18–45. http://dx.doi.org/10.1002/jpoc.21082

Weisberg, Y. J., Deyoung, C. G., & Hirsh, J. B. (2011). Gender differences in personality across the ten aspects of the big five. *Frontiers in Psychology, 2,* 178. http://dx.doi.org/10.3389/fpsyg.2011.00178

Woo, S. E., Harms, P. D., & Kuncel, N. R. (2007). Integrating personality and intelligence: Typical intellectual engagement and need for cognition. *Personality and Individual Differences, 43,* 1635–1639. http://dx.doi.org/10.1016/j.paid.2007.04.022

Yuan, Y., & MacKinnon, D. P. (2009). Bayesian mediation analysis. *Psychological Methods, 14,* 301–322. http://dx.doi.org/10.1037/a0016972

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