Can personality predict foreign language classroom emotions? The devil's in the detail.

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Abstract

Personality has been identified as a possible antecedent to emotions experienced in the foreign language (FL) classroom. However, contrasting results and differing personality models have resulted in ambiguous findings. This study set out to delve deeper into the role of personality as a predictor of FL emotions through a series of increasingly restrictive statistical models on a sample of n=246 FL learners. The relationships between personality – operationalised as global and lower-order factors in the Five Factor Model – and the FL emotions of Foreign Language Enjoyment, Anxiety, and Boredom were examined. The global factors of Neuroticism, Extraversion, and Conscientiousness, and the lower-order factors of Trust, Dutifulness, and Cheerfulness were significant predictors of FL emotions. However, the complexity of personality as a predictor variable is demonstrated in the intricacy of the results and as such the inclusion of personality in explanatory models of FL emotions ought to be approached with caution.

Keywords: *Foreign Language Emotions, Personality, Foreign Language Enjoyment, Foreign Language Anxiety, Foreign Language Boredom*

Can personality predict foreign language classroom emotions? The devil's in the detail.

Classroom emotions have been found to affect the learning process and learning outcomes, with emotions linked to learning success in mathematics (Ahmed et al., 2013), science (Tobin & Llena, 2014), and foreign language (FL) learning (Dewaele & MacIntyre, 2014; Botes, Dewaele, et al. 2022a; Dewaele, Botes et al., 2022). Within the context of FL learning, three emotions in particular have been scrutinised - the well-established negative emotion of Foreign Language Anxiety (FLA; Horwitz et al., 1986), the more recent positive emotion addition of Foreign Language Enjoyment (FLE; Dewaele & MacIntyre, 2014), and the even more recently introduced negative emotion of Foreign Language Boredom (FLB; Li et al., 2020; Pawlak et al., 2020).

The majority of studies has examined these emotions in FL learning as a predictor variable in conjunction with utilitarian outcomes such as achievement in the FL classroom (Shao et al., 2020), the willingness to speak the target language (Dewaele & Pavelescu, 2021), and the perception of achievement (Botes et al., 2020a). The recent introduction of Positive Psychology into the FL research context (MacIntyre & Mercer, 2014; Wang et al., 2021) has led to an increased interest in the subjective experience of the FL learner in the FL classroom, including the FL learner's positive emotions and positive interactions (Dewaele et al., 2019). In this framework of considering the holistic well-being of the FL learner to be of equal import to the ultimate goal of acquiring the target language, emotions ought also to be considered as an outcome variable. Indeed, the maximising of enjoyment and limiting the experience of anxiety and boredom in the FL classroom should also be considered something worth striving for. However, if emotions in the FL classroom are placed centre-stage as outcome variables, the antecedents and predictors in the larger nomological network of these emotions ought also to be given their due.

A largely unexplored predictor of FL classroom emotions is that of personality. By and large, personality traits – which can be defined as the relatively stable traits of behaviours, thoughts, and feelings of an individual (DeYoung, 2015) – have been largely under-researched in applied linguistics. This is not surprising, given the relatively small amounts of variance often explained in foreign language (FL) proficiency by personality traits, especially in comparison to the meatier findings with regards to motivation and ability (Dewaele, 2012). Indeed, a recent meta-analysis focusing on correlational relations between personality traits and FL academic performance found relatively small effect sizes ($-.036 < r < .225$; $k = 137$; Chen et al., 2021). It is therefore no wonder that Dörnyei (2005) remarked that "the role and impact of personality factors are of less importance than those of some other individual differences variables such as aptitude and motivation" (p. 10).

However, if the outcome variable shifts from proficiency or achievement in the FL class towards FL emotions, the possibility of personality as a predictor of import ought to be revisited. Personality as a predictor of FL classroom emotions can be substantiated through the Control-Value Theory of academic emotions (Pekrun et al., 2007). The Control-Value Theory postulates that distal individual antecedents, such as temperament, may impact the emotional experiences of learners in an educational setting (Pekrun et al., 2007). Therefore, some learners are predisposed to form a judgement or appraisal regarding certain aspects of learning through for example, their personality, which in turn influences the formation and display of certain emotions (Śoric et al., 2013). Furthermore, research in domain-general and mathematics-specific education have found significant relationships between personality traits and classroom emotions (Sander & de la Fuente, 2020; Wang et al., 2020). The global personality traits of Conscientiousness and Neuroticism in particular have been found to have predictive ability with regards to classroom emotions (Sander & de la Fuente, 2020; Śoric et al., 2013).

Preliminary research findings thus far have not fully substantiated a link between personality and domain-specific FL classroom emotions. By and large, effect sizes have been small (Dewaele, 2013; Dewaele & MacIntyre, 2019) or inconsistent, with for example, some studies finding a significant link between FLA and Extraversion (MacIntyre & Charos, 1996), whilst others report no significant relationship (Šafranj & Zivlak, 2018). In addition, studies have also reported inconsistencies across groups or clusters within the same study, with Dewaele (2013) finding a significant relationship between FLA and Extraversion in some age and target language groups but not in others. Inconsistencies across findings may in part be due to the use of a myriad of different personality trait classifications in different studies, such as the Eysenck Personality Questionnaire (Dewaele, 2013), the Goldberg's Big Five International Personality Item Pool (Asmali, 2017; Šafranj & Zivlak, 2018), Big Five Index (Vural, 2019) and the Multicultural Personality Questionnaire (Dewaele & Al-Saraj, 2015). Furthermore, the majority of studies focused only on global personality traits such as the Big Five (e.g. Openness to Experience, Conscientiousness) as opposed to second-order traits (e.g. Self-Efficacy, Sympathy). In addition, the majority of studies have only included FLA as an outcome variable, which given the relative recency of the inclusion of FLE (Dewaele & MacIntyre, 2014) and FLB (Li et al., 2020; Pawlak et al., 2020) to the applied linguistics lexicon is perhaps not unexpected. A number of studies did report a positive relationship between the lower-order personality trait Trait Emotional Intelligence and FLE, and a negative relationship between Trait Emotional Intelligence and FLA (Li, 2020; Resnik & Dewaele, 2020).

The current study therefore aims to explore personality traits (on both a global and second-order level) as predictors of anxiety, enjoyment and boredom in the FL classroom in order to transparently explore the complexities associated with personality as a predictor variable. In doing so, we hope to provide a first initial in-depth exploration of personality as a

predictor of FL emotions, whilst critically examining not only statistical significance, but also relative effect size.

Personality Theories and FL Learning

Personality within the context of FL learning has been captured using a myriad of personality theories and accompanying measures (see Asmali, 2017; Dewaele, 2013, Dewaele & Al-Saraj, 2015). Within this study, we conceptualise personality within the arguably most prominent personality theory, the Five Factor Model (FFM). The FFM consists of five global personality traits (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). Openness to Experience was defined by McCrae (1987) as an "intellectual curiosity, aesthetic sensitivity, liberal values, and emotional differentiation" (p. 1259). Openness to Experience has also commonly been referred to as Intellect in some studies (DeYoung, 2015; DeYoung et al., 2005). In turn, Conscientiousness is associated with responsibility, purposefulness, and orderliness, and Extraversion as the tendency to be sociable, outgoing, and assertive (Conrad & Patry, 2012). In addition, Agreeableness attempts to capture the likelihood of an individual to be kind, sympathetic, and helpful towards others, whereas Neuroticism focuses on the frequency with which the individual experiences negative emotions and states such as anxiety, anger, and vulnerability (Maples-Keller et al., 2019). Neuroticism is also frequently captured in studies as its positive counterpart of Emotional Stability (Goldberg, 1992).

The FFM was developed through a lexical approach, which theorised that the fundamental traits of personality are reflected in language, specifically in the adjectives utilised to describe individuals (Costa & McCrae, 1995) From a data driven approach, the five global personality traits emerged, as well as six underlying traits for each of the global personality traits (Costa & McCrae, 1995). The FFM is therefore a hierarchical representation of personality (Maples-Keller et al., 2019). Within this study, we will specifically use the

FFM as conceptualised in the IPIP-NEO-60 (Maples-Keller et al., 2019), which is an open-source version of the NEO PI-R (Costa & McCrae, 1992) and was developed using item response theory on personality items sourced from the International Personality Item Pool (IPIP). Both the IPIP-NEO-60 and the NEO PI-R have demonstrated strong validity and reliability evidence (Maples-Keller et al., 2019; McCrae & Costa, 1992).

Each of the five global factors of personality as detailed by Costa and McCrae (1992) have individually been associated with learning and success in academic pursuits, although Conscientiousness is commonly found to be the strongest predictor of domain-general academic success (see the following meta-analyses for review: Poropat, 2009; Stajkovic et al., 2018; Vedel, 2014). Interestingly, however, in a recent meta-analysis focusing on the domain of foreign language achievement, Openness to Experience and Conscientiousness were found to be the strongest predictors of foreign language learning success (Chen et al., 2021).

However, even though the global personality traits have been associated with academic success, it should also be noted that personality traits may not just predispose an individual to have better grades, but may also affect the learning process and learner experience (Boekaerts, 1996; De Raad & Schouwenburg, 1996). Personality factors have been associated with learning behaviours such as study engagement (Cilliers et al., 2018), the use of specific learning strategies (Chamorro-Premuzic & Furnham, 2008), and procrastination (Karatas, 2015). Personality has also been found to be linked to academic motivation (Komarraju et al., 2009), and self-beliefs such as self-efficacy (Sanchez-Cardona et al., 2012). Importantly, personality has also been linked to emotional experiences in learning (Śoric et al., 2013). As such, the possibility of personality specifically impacting emotions within the foreign language classroom, ought to be considered.

Foreign Language Classroom Emotions and Personality

Three emotion variables have thus far received considerable research attention in FL learning research: Foreign language anxiety (FLA), foreign language enjoyment (FLE), and foreign language boredom (FLB). FLA is perhaps the most well-established and oft researched affective variable in applied linguistics (MacIntyre, 2017). First introduced by Horwitz et al. (1986), the variable can be defined as "a distinct complex of self-perceptions, beliefs, feelings, and behaviours related to classroom learning arising from the uniqueness of the language learning process" (p. 128). Horwitz (2017) argued that FLA has characteristics of both trait and state anxieties: 'When individuals experience Language Anxiety, they have the trait of feeling state anxiety when participating in language learning and/or use. It is also likely that individuals who experience Language Anxiety would feel anxious simply thinking about language learning and/or use' (p. 33). Horwitz (2017) explained that using an imperfectly mastered FL is ego-threatening and hence anxiety-provoking. She described FL learners as suffering from "pink dress anxiety" (p. 45), namely turning up at party where everybody is dressed in black and squirming for standing out. FLA can therefore be seen as a situation-specific trait-like anxiety that has been found to be relatively stable across time (Pan & Zhang, 2021) and can be differentiated from state anxiety experienced within a specific moment and circumstance (Gregersen et al., 2014). Recent meta-analyses have found clear associations between the presence of FLA and reduced proficiency in the target language, as measured through the proxy variables of academic achievement (Botes et al., 2020b) and self-perceived proficiency (Teimouri et al., 2019). In addition, FLA has been negatively associated with the motivation to learn the target language (Liu & Huang, 2011), the willingness to communicate in the target language (MacIntyre & Charos, 1996), and the attitude towards the target language (Gocer, 2014).

Overall, an increased FLA is associated with negative outcomes regarding FL learning. As such, the question may be asked if some people may be more predisposed in terms of their personality traits to experience higher levels of FLA. Previous studies examining global personality factors have found support for the personality trait of Neuroticism/Emotional Stability relating to anxiety in the FL class (see Dewaele & Al-Saraj, 2015; Dewaele & MacIntyre, 2019; Asmali, 2017; Vural, 2019), with effect sizes in these studies ranging from small to large ($.273 < r < .528$). Still yet, some studies have found mixed results in different cohorts (Dewaele, 2013). It should be noted as well, that all studies listed above, utilised differing models of personality, with Dewaele and Al-Saraj (2015) using the Multicultural Personality Questionnaire, Dewaele (2013) using the Eysenck Personality Questionnaire, and Vural (2019) using Big Five Index. Furthermore, inconsistent results have been found with Extraversion as a predictor of FLA with some studies reporting a significant relationship (Asmali, 2017; MacIntyre & Charos, 1996), and others not (Dewaele, 2013; Šafranj & Zivlak, 2018). Similarly, both Agreeableness and Openness to Experience have similar inconsistent result patterns (see Asmali, 2017; Šafranj & Zivlak, 2018; Vural, 2019). Overall, personality as a predictor of FLA therefore seems to be inconclusive.

In turn, FLE is a broad positive emotion experienced by the FL learner when their psychological needs are met in the FL classroom (Dewaele & MacIntyre, 2014). FLE was introduced as the positive emotion counterpart of FLA, but has since been established as an emotion variable in its own right (Botes et al., 2021, Dewaele & MacIntyre, 2016), with a nomological network of variables unique from FLA (Dewaele & MacIntyre, 2019). In a recent meta-analysis (Botes, Dewaele et al., 2022b), FLE was found to be positively associated with academic achievement in the FL class ($r = .30$; $k = 28$), self-perceived achievement ($r = .28$; $k = 9$), and a willingness to communicate in the target language ($r = .48$; $k = 13$). Furthermore, higher levels of FLE have been linked to a greater motivation to

learn the target language (Zhang et al., 2020), a more positive attitude towards the target language (Dewaele, Saito et al., 2022), and more positive self-beliefs regarding aptitude (Botes et al., 2020a). In short, FLE is therefore generally associated with positive outcomes in FL learning. In terms of personality as a predictor variable of FLE, studies have been few and far in between. Dewaele and MacIntyre (2019) found significant positive associations between FLE and the personality traits of Cultural Empathy ($r = .344$; $p < .01$), Social Initiative ($r = .311$; $p < .01$), Openmindedness ($r = .316$; $p < .01$), and Emotional Stability ($r = .190$; $p < .01$). No other studies could be found that examined the Big Five personality traits or derivations thereof alongside FLE. Beyond the reaches of the FL classroom, enjoyment/joy in other educational settings have been linked to the personality traits. De la Fuente et al. (2020) found significant correlations between domain-general academic enjoyment and all five global personality traits, with positive associations between enjoyment and Agreeableness, Conscientiousness, Extraversion, and Openness to Experience ($.200 < r < .562$), and negative associations between enjoyment and Neuroticism ($-.152 < r < -.110$). However, on the whole, personality as a predictor of enjoyment specific to the FL classroom is yet to be fully explored.

Lastly, boredom has been defined as "the aversive experience of wanting, but being unable, to engage in satisfying activity" (Eastwood et al., 2012, p. 482), with FLB specifically referring to a 'state of disengagement' in the FL classroom (Kruk & Zawodniak, 2020, p.16). FLB has been associated with numerous individual and contextual factors in the FL class. Antecedents identified include difficulty levels of tasks, teacher-related behaviours, poor FL learning skills, and attitudes towards the target language in both qualitative (Kruk et al., 2022; Kruk, 2021) and quantitative studies (Li, 2022; Nakamura et al., 2021). In addition, FLB has been linked to both perceived proficiency (Li & Dewaele, 2020) and academic achievement (Shao et al., 2020) in FL learning. However, no study could be found

specifically examining personality in connection to FLB. General education studies have linked learning boredom to personality factors, with Sulea et al. (2015), finding that learning boredom in university students was associated with Conscientiousness (r = -.18; p < .01), Agreeableness (r = -.21; p < .01), and Neuroticism (r = .22; p < .01). However, the link between boredom and personality traits extends beyond the context of learning, with Barnett and Klitzing (2006) finding that the experience of boredom during the free-time (non-academic activities related) of university students was predicted by the personality traits of Extraversion (β = -.14; p < .01) and Openness to Experience (β = .12; p < .01). Furthermore, boredom proneness has been significantly associated with the personality traits of Extraversion, Agreeableness, Conscientiousness, and Openness to Experience (Culp, 2006). Therefore, extrapolated from these findings, the experience of boredom and the expression of boredom in the FL class may be influenced by the presence of specific, or a combination of, personality traits who may be particularly salient in some contexts (extraverts becoming more easily bored in low-arousal activities for example).

Overall, the literature thus far resembles a murky pond. Some insights have been made regarding personality as a predictor of FL classroom emotions, some insights may be inferred from domain-general findings, but due to small effect sizes and contradictory findings, these insights may be described as hazy at best. This study therefore aims to examine the relationship between personality and FL classroom emotions, utilising increasingly restrictive methods and where personality is examined as global and second-order factors. As such the following research questions will be examined:

1. What is the relationship between the global personality traits of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, and the foreign language classroom emotions of anxiety, enjoyment, and boredom when

examined through bivariate correlations? (i.e. do personality traits significantly correlate with FL classroom emotions). Thus, with this research question we examine whether personality traits individually correlate with foreign language classroom emotions.

2. Do the global personality traits of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism predict the foreign language classroom emotions of anxiety, enjoyment, and boredom, when examined through multiple regression models? (i.e. three multiple regression models with the FFM as predictors and each of the emotions as outcome variable in turn). Thus, with this research question we aim to determine whether personality traits predict the foreign language classroom emotions separately.
3. Do global personality traits of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism predict the foreign language classroom emotions of anxiety, enjoyment, and boredom, when examined through a path model? (i.e. single path analysis model with multiple outcome variables). Thus, with this research question we refer to the question whether personality traits predict the foreign language classroom emotions jointly.
4. Do second-order personality traits, measured as one of 30 underlying traits in the FFM, predict the foreign language classroom emotions of anxiety, enjoyment, and boredom when examined through multiple regression models? (i.e. multiple regression models with the subfactors of the FFM as predictors and each of the emotions as an outcome variable in turn). Thus, with this research question we examine whether second-order personality traits predict the foreign language classroom emotions separately.

Methods

Participants

Adult foreign language (FL) learners in the United Kingdom were recruited to take part in the study in December 2021. Participants were recruited via Prolific and compensated for their participation. All participants were currently enrolled in FL classes. A total of *n* = 246 FL learners completed the online questionnaire. The average age of participants was 35.42 years (*SD* = 12.70). The majority of participants were female (*n* = 136) and British nationals (*n* = 207). The majority of the sample was university educated (*n* = 178), with English as an L1 (*n* = 205). Thirty participants indicated that they were monolingual, with 93 bilinguals, 75 trilinguals, 33 quadrilinguals, 9 pentalinguals, and 6 participants listing six or more languages in their repertoire. The most popular target language was Spanish (*n* = 72), followed by French (*n* = 54), German (*n* = 27), Italian (*n* = 17), and Japanese (*n* = 13). Detailed information regarding the linguistic repertoire of participants is provided in the Supplementary Materials.

Instruments

IPIP-NEO-60

The IPIP-NEO-60 is a 60-item, open-source personality measure developed through applying item response theory to the International Personality Item Pool (Maples-Keller et al., 2019). The questionnaire measures the five global personality factors of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Each global personality factor is captured through six subfactors, each measured with two items. All items were measured on a five-point Likert scale ranging from ‘strongly agree’ to ‘strongly disagree’. The five global factors are detailed below:

1. ***Openness to Experience*** (α = .66; ω = .62)

   Openness to Experience examined the general level of open-mindedness and curiosity in participants and consists of the subfactors of Imagination, Artistic

Interests, Emotionality, Adventurousness, Intellect, and Liberalism[1]. Items included were 'I have a vivid imagination' and 'I tend to experience my emotions intensely'.

2. ***Conscientiousness*** (α = .80; ω = .79)

   Conscientiousness captured the general tendency to be responsible, organised and hard-working. The subfactors measured were Self-Efficacy, Orderliness, Dutifulness, Achievement Striving, Self-Discipline, and Cautiousness. Example items were 'I set high standards for myself and others' and 'I know how to get things done'.

3. ***Extraversion*** (α = .84; ω = .84)

   The tendency to be social and outgoing was measured through the global factor of Extraversion. The subscales of the factor were Friendliness, Gregariousness, Assertiveness, Activity Level, Excitement Seeking, and Cheerfulness. Items such as 'I make friends easily' and 'I love life' were included.

4. ***Agreeableness*** (α = .78; ω = .78)

   The global factor of Agreeableness measured the tendency to get along with other people. The personality trait was captured through the subfactors of Trust, Morality, Altruism, Cooperation, Modesty, and Sympathy. Items included were 'I am concerned about others' and 'I trust others'.

5. ***Neuroticism*** (α = .85; ω = .86)

   Neuroticism measured the tendency toward emotional instability and negativity as captured through the subfactors of Anxiety, Anger, Depression, Self-Consciousness, Immoderation, and Vulnerability. Items such as 'I dislike myself' and 'I get stressed out easily' were included.

[1] Internal consistencies of subscales reported in the Supplementary Materials.

Short-form Foreign Language Enjoyment Scale (S-FLES): (α = .82; ω = .80)

The nine-item S-FLES developed by Botes et al. (2021) was used to measure a general enjoyment of FL learning. The scale is a validated short-form adapted from the 21-item Foreign Language Enjoyment Scale (Dewaele & MacIntyre, 2014)- items such a 'I enjoy the FL class' and 'I've learned interesting things in the FL class' were measured on a five-point Likert scale from 'strongly disagree' to 'strongly agree'.

Short-form Foreign Language Anxiety Scale (S-FLAS): (α = .88; ω = .88)

The eight-item S-FLAS developed by MacIntyre (1992) and validated by Botes, Dewaele et al. (2022b) was used to capture a situation-specific anxiety in the FL class. The scale was adapted from the original 33-item Foreign Language Classroom Scale designed by Horwitz et al. (1986). Items such as 'I feel other students speak the FL better than I do' and 'I get nervous and confused when I am speaking in my FL class' were measured on a five-point Likert ranging from 'strongly disagree' to strongly agree'.

Foreign Language Classroom Boredom Scale (FLCBS): (α = 92.; ω = 92.)

The eight-item FLCBS, which is a classroom specific subset of the larger Foreign Language Boredom Scale (Li et al., 2020) was used to capture a tendency to become bored in the FL class. Items included were 'The FL class bored me' and 'My mind begins to wander in the FL class'. Items were measured on a five-point Likert scale from 'strongly disagree' to 'strongly agree'.

Data Analysis

All data were analysed using JASP 0.16.1 (JASP Team, 2022). Descriptive statistics, skewness and kurtosis, and Pearson's correlation coefficients were calculated between all variables included in the study and were used to examine research question 1.

Three multiple regression models were used to explore research question 2, with the five global personality factors as predictor variables and the three classroom emotion variables as outcome variables. Multiple regressions with forced entry was conducted as no particular predictor variable was theoretically assumed to take precedence (Field, 2013). The regression models were interpreted based on the adjusted R^2 value and labelled as small, moderate or large based on the recent synthesis of regression results in applied linguistics by Plonsky and Ghanbar (2018). R^2 values < .20 labelled as small effect sizes, moderate effects were .20 < R^2 < .50, and large effect sizes exceeded .50. The individual predictive power of personality traits on classroom emotions were assessed via standardised beta coefficients (β), which enabled the comparison of individual predictors across multiple models. Standardised beta coefficients were interpreted in line with the recommendation of Alcock et al. (2014), who advocates for the interpretation of standardised regressions to follow the interpretation of correlation coefficients (and coincidentally the recommendation of R^2 interpretations by Plonsky and Ghanbar (2018)), with small effect sizes (β < .20), moderate effect sizes (.20 < β < .50), and large effect sizes (β > .50). Lastly, in order to reduce the possibility of Type 1 error risk and given the multiple predictor variables utilised in the regression study, the alpha value of the models was set to p < .01 (Field, 2013). This allowed for more stringent analysis and for only predictors of greater magnitude to be included in the fine-depth discussion regarding personality as a possible predictor of FL classroom emotions.

The results of the multiple regression models of the global personality factors were used to inform the construction of a path model and addressed research question 3. The path model is a specific form of structural equation modelling (SEM) that utilises observed variables as opposed to latent variables. Due to the complexity of the model and the relatively modest sample size (n = 246), path analysis was selected as the method of choice. The path analysis was tested in R Studio utilising the Lavaan package (Rosseel, 2012). The path model allowed

for the inclusion of all three classroom emotion variables as outcome variables in a single model. The model was estimated through weighted least squares with standard error, as all variables measured in the study were ordinal (Li, 2016). Close model fit was analysed through the Root Mean Square Error of Approximation (RMSEA ≤ .05), Standard Root Mean Square Residual (SRMR ≤ .08), Comparative Fit Index (CFI ≥ .95), Tucker-Lewis Index (TLI ≥ .95), and the chi-square (χ^2; $p > .05$; Byrne, 1998; Kenny, 2020). Moderate fit was also considered (RMSEA ≤ .08; SRMR ≤ .12; CFI ≥ .90; TLI ≥ .90; Kenny, 2020).

Lastly, in order to have a fine-grained understanding of the effect of the subfactors of personality on the classroom emotions and address research question 4, a series of multiple regression models were analysed with the subfactors of each global factors in turn modelled to predict a classroom emotion.

Results

Descriptive Statistics

The descriptive statistics for the global personality factors and classroom emotions can be found in Table 1. Additional descriptive statistics of the subfactors of personality are available in the supplementary materials.

Table 1.

Descriptive statistics and t-test results.

Variable	Min	Max	Mean	SD	Skewness	Kurtosis
FL Enjoyment	1.78	5	3.68	0.53	-.22	0.17
FL Anxiety	1	4.75	3.05	.85	-.19	-.54
FL Boredom	1	4.5	2.10	.77	.45	-.25
Openness to Experience	2.17	4.83	3.56	.51	.03	-.18
Conscientiousness	1.92	5	3.74	.53	-.39	.90

Extraversion	1.25	4.83	3.23	.63	-.26	-.13
Agreeableness	1.5	4.92	3.81	.52	-.79	1.52
Neuroticism	1.33	4.83	2.93	.69	-.07	-.28

Research Question 1: Global Personality Trait Correlations

The Pearson correlation matrix of the classroom emotions and global personality factors can be found in Table 2. No correlation coefficients were large enough to create multicollinearity concerns ($r > .80$; Field, 2013).

Table 2.

Pearson Correlation Matrix

Variable	1	2	3	4	5	6	7	8
1. FL Enjoyment	-	-.258**	-.401**	.198*	.353**	.334**	.338**	-.218**
2. FL Anxiety		-	.397**	-.001	-.320**	-.385**	-.026	.595**
3. FL Boredom			-	-.252**	-.452**	-.143	-.333**	.360**
4. Openness to Experience				-	.049	-115	.272**	.011
5. Conscientiousness					-	.368**	.275**	-.546**
6. Extraversion						-	.100	-.479**
7. Agreeableness							-	-.179*
8. Neuroticism								-

Note: $^{**}p < .001$; $^{*}p < .01$

Interestingly, both Conscientiousness and Neuroticism had statistically significant correlation coefficients with all three emotion variables, namely FLE ($r = .334$; $p < .001$; $r = -.218$; $p < .001$), FLA ($r = -.320$; $p < .001$; $r = .595$; $p < .001$), and FLB ($r = -.452$; $p < .001$; $r = .360$; $p < .001$). In turn, Openness to Experience and Agreeableness were not associated with anxiety in the FL classroom and only correlated with FLE ($r = .198$; $p < .01$; $r = .338$; $p < .001$)

and FLB (r = -.252**; p < .001; r = -.333; p < .001). Lastly, Extraversion was associated with FLE (r = .334; p < .001) and FLA (r = -.385; p < .001). The correlation coefficient matrix therefore provides a first hint at possible significant relationships between personality factors and FL classroom emotions, however, as the matrix only includes the global personality factors it should be noted that the possibility remains for subfactors of personality traits to be statistically significant predictors of FL emotions, even if the global factors do not show significance. Additional correlation matrices of the subfactors of personality traits can be found in the supplementary materials.

Research Question 2: Global Personality Traits as Predictors

Three multiple regressions were analysed with each FL emotion variable as an outcome variable and all five global personality factors as predictor variables (see Table 3).

A significant regression equation was found for FLE (F (5, 240) = 15.727; p < .001), with an R^2 of .231. Thus, the five global personality factors explained 24.7% of variance in FLE and the effect size can be interpreted as moderate. In addition, Conscientiousness (β = .227; p < .01), Extraversion (β = .246; p < .001), and Agreeableness (β = .235; p < .001) were found to be moderate statistically significant predictors of FLE. Interestingly, even though Openness to Experience and Neuroticism were both found to be statistically significantly correlated with FLE, these significant bivariate correlations did not translate into significant predictors when all five personality factors were taken into account in one multiple regression model.

Similarly, a significant regression equation was found with the global personality factors predicting FLA (F (5, 240) = 28.646; p < .001). The big five personality factors explained 36.1% of variance in FLA. However, only Neuroticism was found to be a statistically significant predictor of FLA (β = .551; p < .001) when all predictor variables where considered

in one model. Neuroticism was found to have a large effect on FLA, which is not surprising given that Anxiety is an underlying factor of the global Neuroticism score and general anxiety has been shown to be moderately associated with language anxiety (Botes, van der Westhuizen et al., 2022).

Lastly, a statistically significant regression equation was also found for FLB (F (5, 240) = 21.928, $p < .001$), with moderate amount of variance explained ($R^2 = .299$). Four of the global personality factors had a statistically significant effect on FLB. Openness to Experience and Conscientiousness both had a moderate negative effect on boredom in the FL classroom (β = -.208; p < .001, β = -.324; p < .001). In addition, Agreeableness had a small negative effect on FLB (β = -.162; p < .01). Thus, individuals with higher levels of Openness to Experience, Conscientiousness, and Agreeableness, where less likely to report boredom in the FL classroom. In contrast, Neuroticism had a moderate positive effect on FLB (β = .216; p < .01).

Table 3

Standardised Regression Path Results (β) of Global Personality Scores

	FLE	FLA	FLB
Intercept H_0	B = 3.681; $p < .001$	B = 3.047; $p < .001$	B = 2.098; $p < .001$
Openness to Experience	β = .094; p = .113	β = -.015; p = .775	**β = -.208; $p < .001$**
Conscientiousness	**β = .227; $p < .01$**	β = .007; p = .915	**β = -.324; $p < .001$**
Extraversion	**β = .246; $p < .001$**	β = -.131; p = .029	β = .120; p = .054
Agreeableness	**β = .235; $p < .001$**	β = .083; p = .132	**β = -.162; $p < .01$**
Neuroticism	β = .062; p = .387	**β = .551; $p < .001$**	**β = .216; $p < .01$**
R^2	.231	.361	.299

The multiple regression models therefore indicated that all three FL classroom emotions where predicted by at least one global personality factor, with no single personality factor predicting all FL classroom emotions. The variance explained by the personality factors can be

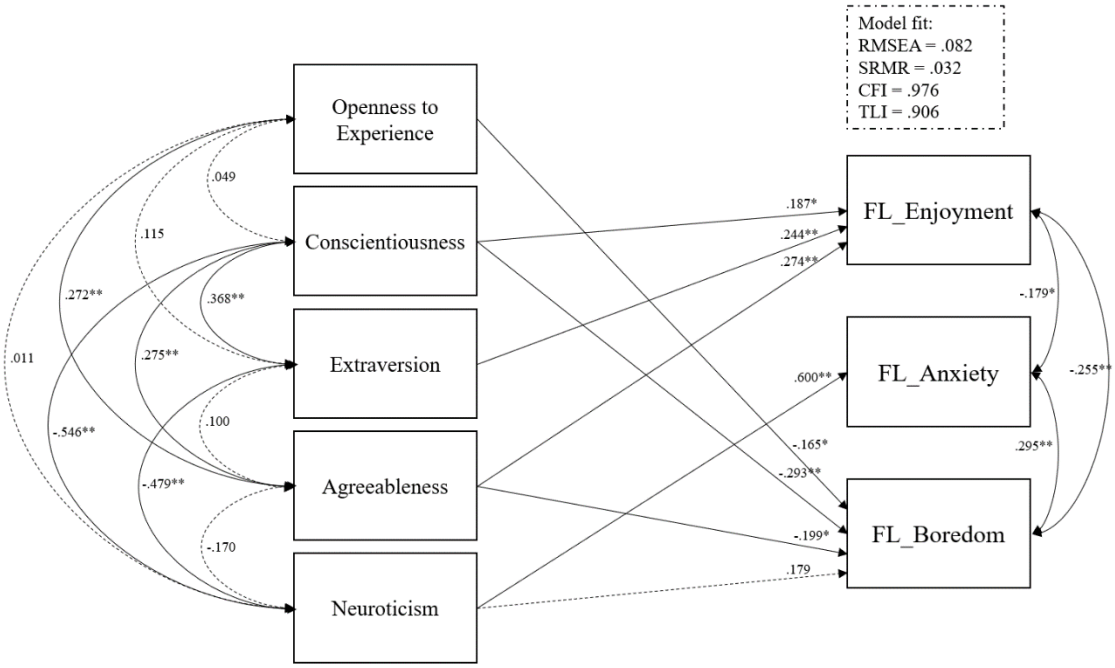
considered modest, however given that a previous synthesis of the use of multiple regression in applied linguistics studies reported that non-linguistic predictors commonly have rather small effect sizes (Plonsky & Ghanbar, 2018), the modest R^2 values can indeed be optimistically interpreted. In addition, given the more stringent alpha cut-offs utilised in this study, we have some considerable confidence in the findings of the first research question.

Research Question 3: Path Analysis of Personality and Classroom Emotions

The statistically significant effects found in multiple regression models were used to develop the path model (see Figure 1). The model allowed for the inclusion of all three FL emotions as outcome variables in a single analysis.

Figure 1

Path Analysis Model



Note. $**p < .001$; $*p < .01$

The path model indicated close fit (χ^2 (7) = 18.683; p = .010), with the SRMR and CFI both confirming a close fit (*SRMR* = .032; *CFI* = .976). In turn, the TLI indicated reasonable

fit (*TLI* = .949). However, the RMSEA indicated mediocre fit as it was slightly higher than the aimed <.08 to indicate reasonable fit (*RMSEA* = .082). Given that the RMSEA is particularly prone to Type II error in smaller degrees of freedom models, as well as models with smaller sample sizes (Kenny, 2020; Kenny et al., 2014), the RMSEA of the model was deemed mediocre, but acceptable.

The path coefficients largely reflected the results of the multiple regression, with the exception of the effect of Neuroticism on FLB, which was not found to be statistically significant. Overall, the path model demonstrated the effects of global personality traits on FL classroom emotions, although some effect sizes found could be classified as small (< .20). Indeed, the only effect size found of substantial size, was the effect of Neuroticism on FLA (β = .600; p < .001).

Research Question 4: Subfactors of Personality Traits as Predictors

In order to examine the effect of personality on a more fine-grained level, the specific subfactors of personality was modelled to effect FL classroom emotions in a series of multiple regression models.

Openness to Experience

A significant regression equation was found for both the multiple regression model predicting FLA and FLB (see Table 4), however the complexity inherent with examining personality and FL classroom emotions is apparent in both regression equation results. Given the more stringent alpha cut-off used in the study, the multiple regression of FLE was found to be insignificant (F (6, 239) = 2.760; p = .013; R^2 = .041).

The second-order personality factors underlying Openness to Experience significantly predicted FLA (F (6, 239) = 6.946; p < .001; R^2 = .127), with Emotionality (β = .244, p < .001) and Adventurousness (β = -.268, p < .001) specifically predicting FLA. Interestingly, the two

second-order personality factors had opposite effects, with Emotionality being a positive predictor of FLA and Adventurousness being a negative predictor. The two second-order personality traits, theoretically assumed to be tapping into the same higher-order personality factor, therefore does not share similar nomological associations. This finding raises significant questions regarding the use and usability of the global factor of Openness to Experience as a predictor of FLA, as both Emotionality and Adventurousness items are used to measure the higher-order factor.

A similar result was found with FLB, with a significant overall regression equation (F (6, 239) = 7.307; $p < .001$; $R^2 = .134$), and Artistic Interest negatively predicting FLB ($\beta = -.196$, $p < .01$), whilst Emotionality positively predicted FLB ($\beta = .178$, $p < .01$). The differing slopes of the individual predictors of FLA and FLB may go some way to explain the inconsistent results in literature regarding Openness of Experience as a predictor of FL classroom emotions (see Asmali, 2017; Šafranj & Zivlak, 2018; Vural, 2019).

Table 4

Standardised Regression Path Results (β) of Openness to Experience Subscales

	FLE	FLA	FLB
Intercept H_0	$B = 3.681$; $p < .001$	$B = 3.047$; $p < .001$	$B = 2.098$; $p < .001$
Imagination	$\beta = .129$; $p = .057$	$\beta = -.013$; $p = .845$	$\beta = -.089$; $p = .164$
Artistic Interest	$\beta = .078$; $p = .259$	$\beta = -.031$; $p = .638$	**$\beta = -.196$; $p < .01$**
Emotionality	$\beta = -.043$; $p = .525$	**$\beta = .244$; $p < .001$**	**$\beta = .178$; $p < .01$**
Adventurousness	$\beta = .105$; $p = .121$	**$\beta = -.268$; $p < .001$**	$\beta = -.167$; $p = .010$
Intellect	$\beta = .097$; $p = .162$	$\beta = .034$; $p = .611$	$\beta = -.127$; $p = .055$
Liberalism	$\beta = -.016$; $p = .183$	$\beta = .009$; $p = .880$	$\beta = -.023$; $p = .709$
R^2	.041	.127	.134

Conscientiousness

A significant regression equation was found for the multiple regression models of all three emotion variables (see Table 5). The subscales of Conscientiousness significantly predicted FLE (F (6, 239) = 6.824; $p < .001$; $R^2 = .125$), with Dutifulness in particular positively predicting FLE ($\beta = .185$, $p < .01$). Similarly, the second-order factors of Conscientiousness significantly predicted FLB (F (6, 239) = 12.677; $p < .001$; $R^2 = .222$), with Dutifulness, Self-Discipline, and Cautiousness all negatively associated with FLB ($-.253 < \beta < -.182$, $p < .01$). The findings regarding the subscales of Conscientiousness therefore reflects and further substantiates the significant associations found between FLE, FLB, and the global factor of Conscientiousness (see Table 3, Figure 1).

In turn, a significant regression equation was found for the subscales of Conscientiousness as a predictor of FLA (F (6, 239) = 5.304; $p < .001$; $R^2 = .095$). However, no single coefficient was statistically significant ($\beta > .01$). It is therefore likely that the significant F-statistic may be a statistical artefact due to the moderately large correlations between the predictor variables ($.187 < r < .527$; see Supplementary Materials; Kalnins, 2018).

Table 5

Standardised Regression Path Results (β) of Conscientiousness Subscales

	FLE	FLA	FLB
Intercept H_0	$B = 3.681$; $p < .001$	$B = 3.047$; $p < .001$	$B = 2.098$; $p < .001$
Self-Efficacy	$\beta = .053$; $p = .512$	$\beta = -.127$; $p = .121$	$\beta = .008$; $p = .919$
Orderliness	$\beta = .043$; $p = .512$	$\beta = -.114$; $p = .092$	$\beta = -.065$; $p = .297$
Dutifulness	**$\beta = .185$; $p < .01$**	$\beta = -.041$; $p = .555$	**$\beta = -.253$; $p < .001$**
Achievement Striving	$\beta = .072$; $p = .316$	$\beta = .044$; $p = .545$	$\beta = -.014$; $p = .835$
Self-Discipline	$\beta = .175$; $p = .017$	$\beta = -.173$; $p = .021$	**$\beta = -.199$; $p < .01$**
Cautiousness	$\beta = .013$; $p = .849$	$\beta = -.053$; $p = .428$	**$\beta = -.182$; $p < .01$**
R^2	.125	.095	.222

Extraversion

All three multiple regression equations were statistically significant (see Table 6). The subscales of Extraversion significantly predicted FLE (F (6, 239) = 12.607; $p < .001$; R^2 = .240), with Excitement Seeking (β = .224, $p < .01$) and Cheerfulness (β = .353, $p < .001$) both positively predicting FLE. In turn, FLA (F (6, 239) = 9.504; $p < .001$; R^2 = .172) was negatively predicted by both Friendliness (β = -.225, $p < .01$) and Cheerfulness (β = -.205, $p < .01$). Lastly, FLB (F (6, 239) = 5.202; $p < .001$; R^2 = .093) was also significantly negatively predicted by Cheerfulness (β = -.339, $p < .001$).

Table 6

Standardised Regression Path Results (β) of Extraversion Subscales

	FLE	FLA	FLB
Intercept H_0	B = 3.681; $p < .001$	B = 3.047; $p < .001$	B = 2.098; $p < .001$
Friendliness	β = .083; p = .283	**β = -.225; p < .01**	β = -.052; p = .531
Gregariousness	β = -.104; p = .128	β = -.109; p = .121	β = .125; p = .092
Assertiveness	β = -.070; p = .268	β = -.042; p = .519	β = .090; p = .189
Activity Level	β = -.019; p = .761	β = -.001; p = .994	β = .003; p = .968
Excitement Seeking	**β = .224; p < .01**	β = .049; p = .477	β = -.015; p = .842
Cheerfulness	**β = .353; p < .001**	**β = -.205; p < .01**	**β = -.339; p < .001**
R^2	.240	.172	.093

Agreeableness

The multiple regression equations of the subscales of Agreeableness were statistically significant for FLE (F (6, 239) = 8.766; $p < .001$; R^2 = .160), FLA (F (6, 239) = 4.597; $p <$ .001; R^2 = .081), and FLB (F (6, 239) = 12.502; $p < .001$; R^2 = .220). Each FL classroom emotion had one statistically significant predictor coefficient, with Trust positively predicting FLE (β = .230, $p < .001$), Modesty positively predicting FLA (β = .262, $p < .001$), and Morality negatively predicting FLB (β = -.379, $p < .001$).

Table 7

Standardised Regression Path Results (β) of Agreeableness Subscales

	FLE	FLA	FLB
Intercept H_0	B = 3.681; p < .001	B = 3.047; p < .001	B = 2.098; p < .001
Trust	***β* = .230; *p* <.001**	β = -.116; p = .093	β = -.019; p = .764
Morality	β = .072; p = .342	β = -.080; p = .313	***β* = -.379; *p* < .001**
Altruism	β = .159; p = .030	β = -.034; p = .652	β = -.013; p = .854
Cooperation	β = .145; p = .060	β = -.134; p = .095	β = -.175; p = .019
Modesty	β = -.101; p = .109	***β* = .262; *p* < .001**	β = .061; p = .311
Sympathy	β = .006; p = .934	β = .121; p = .116	β = .054; p = .446
R^2	.160	.081	.220

Neuroticism

The subscales of Neuroticism significantly predicted all three FL classroom emotions. FLE (F (6, 239) = 3 .807; p < .01; R^2 = .064) was negatively predicted by Depression (β = -.212, p < .01). In turn, FLCA (F (6, 239) = 22.932; p < .001) was positively predicted by both Anxiety (β = .185, p < .01) and Self-Consciousness (β = .183, p < .01). It should also be noted that a considerable amount of the variance of FLA was explained by the subscales of Neuroticism (R^2 = .349), which given that FLA is associated with both a general level of anxiety as well as social anxiety (Botes, van der Westhuizen et al., 2022), is perhaps not a surprising result. Lastly, FLB was significantly predicted by the subscales of Neuroticism (F (6, 239) = 9.291; p < .001; R^2 = .189), however the standardised coefficient results were inconsistent in terms of slope. Anxiety negatively predicted FLB (β = -.196, p < .01), whereas both Anger (β = .186, p < .01) and Depression (β = .278, p < .001) positively predicted FLB.

Table 8

Standardised Regression Path Results (β) of Neuroticism Subscales

	FLE	FLA	FLB
Intercept H_0	B = 3.681; p < .001	B = 3.047; p < .001	B = 2.098; p < .001
Anxiety	β = .175; p = .040	**β = .185; p < .01**	**β = -.196; p < .01**
Anger	β = -.107; p = .125	β = .045; p = .444	**β = .186; p < .01**
Depression	**β = -.212; p < .01**	β = .171; p = .012	**β = .278; p < .001**
Self-Consciousness	β = -.061; p = .420	**β = .183; p < .01**	β = .138; p = .053
Immoderation	β = .001; p = .988	β = .106; p = .065	β = .145; p = .025
Vulnerability	β = -.123; p = .100	β = .141; p = .025	β = .013; p = .885
R^2	.064	.349	.189

Discussion

The study set out to examine personality as a predictor of FL classroom emotions. Specifically, to examine the most widely recognised theory of personality – the FFM – and three FL classroom emotions. Results, to some extent, supported the hypothesis that certain character traits may predispose a FL learner to experience and express certain emotions in the FL language classroom. In particular, the negative emotion of FLA was strongly associated with Neuroticism (β = .551; p < .001), and it's second-order traits of general Anxiety (β = .185; p < .01) and Self-Consciousness (β = .183; p < .01). This finding is in line with previous research, as FLA has been found to be moderately positively associated with general anxiety as well as fear of negative evaluation (Botes, van der Westhuizen et al., 2022). Indeed, Horwitz et al. (1986) conceptualised FLA from the 'buildings blocks' of communication apprehension, test anxiety, and fear of negative evaluation. As such, FL learners with higher levels of Neuroticism are therefore likely to experience higher levels of FLA.

In turn, FLE was moderately associated with Conscientiousness (β = .227; p < .01), Extraversion (β = .246; p < .001), and Agreeableness (β = .235; p < .001). In particular, the second order-factors of Dutifulness (β = .185; p < .01), Cheerfulness (β = .353; p < .001) and Trust (β = .230; p < .001) were significant predictors of FLE. The result that FL learners with

higher levels of Cheerfulness may experience greater levels of FLE is supported by previous research that found that humour in the FL classroom was a reliable predictor of FLE (Neff & Dewaele, 2022, Dewaele, Saito et al., 2022). An additional novel finding is that the personality trait of Trust in particular predicted FLE. As FLE is closely linked to the learner's attitude towards the teacher (Dewaele & Dewaele, 2017) and has been found to be impacted by the teacher-student relationship as well as teacher behaviour (Dewaele, Botes et al., 2022), it is possible that FL learners who place greater levels of trust in others, in particular the FL teacher, may benefit from resultant FLE. The examination of the impact of trust in the FL classroom may be fruitful to explore in future research.

Lastly, four global personality traits were significantly associated with FLB, namely Openness to Experience (β = -.208; p < .001), Conscientiousness (β = -.324; p < .001), Agreeableness (β = -.162; p < .01), and Neuroticism (β = .216; p < .01). Specific lower-order traits that were the most strongly linked to FLB were Dutifulness (β = -.253; p < .001), Cheerfulness (β = -.379; p < .001), and Morality (β = -.379; p < .001). Boredom has been examined through the lens of morality in previous empirical and philosophical research (Elpidorou, 2022; Igou & van Tilburg, 2022), with Bertrand Russell (1930, as cited in Elpidorou, 2022, p. 2) remarking that 'boredom is a vital problem for the moralist since half the sins of mankind are caused by it' (p. 38). Boredom may perhaps be seen as wrongful to experience or express by learners in the FL classroom, with FL learners with higher levels of Morality, as well as Dutifulness, therefore being hesitant to express or indicate that they experience FLB.

There is, however, a cautionary tale to be told in the results, demonstrated by the progressively more stringent statistical methods and narrowing focus of traits. In the initial correlation matrix, for example, all global personality factors correlated significantly with FLE, however in the multiple regression and path models, the number of significant

predictors were reduced to only three (Conscientiousness, Extraversion, and Agreeableness). Furthermore, when examining the lower-order personality traits underlying these three global factors of a possible 18 predictors, only four were statistically significant ($p < .001$). This finding may go some way to explaining previous contradictory results in the literature, as researchers who utilise the single data point of a correlation may have varying results from those who use observed regression equations or even latent models. This is further complicated by the inherent complexity of personality, where global personality traits are notoriously broad and lower-order traits may provide contradicting results. This was demonstrated by the significant findings of Emotionality ($\beta = .244$; $p < .001$) as a positive predictor and Adventurousness ($\beta = -.268$; $p < .001$) as a negative predictor of FLA – where both Emotionality and Adventurousness were lower-order traits underlying the global factor of Openness to Experience.

Overall, the exploratory study indicated numerous personality traits that show promise as predictors of FL classroom emotions, with Neuroticism linked to FLA, Extraversion linked to FLE, and Conscientiousness in particular linked to FLB. In addition, the lower-order personality factors of Cheerfulness and Dutifulness show promise as possible predictors. Personality, on a global or lower-order level, can therefore be used as a predictor in FL classroom emotions, but ought to be approached with caution.

Limitations and Pedagogical Implications

The methods utilised in the study were limited to the modest sample size ($n = 246$). Latent modelling of the factors was for example not possible due to power constraints (Preacher & Coffman, 2006). Furthermore, the IPIP-NEO-60 can be considered a short-form measure with only two items per subfactor, limiting the reliability of the second-order personality traits. In addition, previous research has demonstrated that demographic factors such as average age

(Dewaele & Dewaele, 2017), gender (Park & French, 2013), and level of multilingualism (Dewaele, 2013) may play a role in the relationships between personality and FL classroom emotions. The impact of sample characteristics on the relationships between personality and FL classroom emotions was not taken into account in this study. Lastly, as a cross-sectional study the causal implications of the regression equations are limited.

Examining the significant predictors of the FL classroom emotions, especially on lower-order level, provides several pedagogical implications. Firstly, Modesty, Self-Consciousness, and lower Adventurousness were all statistically significant predictors of FLA. This would imply that students with high levels of FLA may be more likely to remain 'hidden' in the FL classroom as these individuals would be less likely to want to draw attention to their "pink dress" (cf. Horwitz, 2017), leading FL teachers not to notice the debilitating anxiety experienced by these students. FL teachers therefore need to be aware that students with higher levels of FLA may be difficult to identify, hindering possible assistance. Teachers could think about ways to strengthen group solidarity, creating safe spaces -or quiet moments during the class- during which the very anxious students could express themselves, and where their contribution would be welcomed by the group. Secondly, the subfactor of Cheerfulness was a significant predictor of all three emotions (FLE: β = .353; p < .001; FLA: β = -.205; p < .01; FLB: β = -.339; p < .001). Individuals who are predisposed to be more cheerful are therefore more likely to enjoy their FL classes, feel less anxious, and less bored during lessons. Even though the extent to which personality is malleable is debated (Damian et al., 2019; Rantanen et al., 2007), teachers may draw upon this finding and emphasise a good social atmosphere in the classroom. Previous studies have found humour in particular to be an important element in creating a sense of camaraderie in the FL classroom resulting in positive FL classroom emotions (Neff & Dewaele, 2022). FL teachers with high levels of perceived Trait Emotional Intelligence have been found to have

more motivated students (Moskowitz & Dewaele, 2020). It is likely that these teachers will also show more optimism about their students' ability to do well which could further contribute to a positive and cheerful classroom atmosphere.

Conclusion

This study set out to uncover whether personality could be used to predict FL classroom emotions. Some personality traits were found to show particular promise, such as the global traits of Neuroticism, Extraversion, and Conscientiousness, or the lower-order traits of Trust, Dutifulness, and Cheerfulness. However, given the complexity of the results, such as contradictory slopes of underlying subscales and relatively small effect sizes, the inclusion of personality in the nomological network of FL classroom emotions needs to be approached with caution. Researchers setting out to include personality traits in larger explanatory models of FL classroom emotions may just find that the devil lurks in the details.

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Can personality predict foreign language classroom emotions? The devil's in the detail.

Supplementary Materials

Table S1.

Linguistic Repertoires of Participants

Language	Frequency	Percentage
Arabic	1	.38
Bengali	2	.76
Bulgarian	3	1.15
Cantonese	1	.38
Dutch	2	.76
English	210	80.15
French	4	1.53
German	5	1.91
Greek	3	1.15
Hungarian	1	.38
Italian	3	1.15
Japanese	1	.38
Korean	1	.38
Latvian	1	.38
Malay	1	.38
Mandarin	1	.38
Polish	4	1.53
Portuguese	3	1.15
Punjabi	2	.76
Romanian	1	.38
Russian	1	.38
Spanish	5	1.91
Swedish	1	.38
Turkish	1	.38
Urdu	2	.76
Welsh	1	.38
Yoruba	1	.38
Total	262*	100.0

Note. *16 participants listed two languages as an L1.

Table S2.

Descriptive Statistics of Personality Subfactors

	Min	Max	Mean	SD	Skewness	Kurtosis
Neuroticism Subscales						
Anxiety	1.00	5.00	3.6159	1.02409	-.417	-.814
Anger	1.00	5.00	2.5244	1.03580	.440	-.511
Depression	1.00	5.00	2.8760	1.08321	.097	-.853
Self-Consciousness	1.00	5.00	2.8760	.94754	.100	-.752
Immoderation	1.00	5.00	3.1016	.90342	-.026	-.388
Vulnerability	1.00	5.00	2.5671	.93709	.524	-.210
Extraversion Subscales						
Friendliness	1.00	5.00	3.3008	.92304	-.504	-.389
Gregariousness	1.00	5.00	2.4878	1.05359	.341	-.808
Assertiveness	1.00	5.00	3.1240	.97931	-.164	-.696
Activity Level	1.00	5.00	3.3272	.94848	-.398	-.537
Excitement	1.00	5.00	3.6057	.85057	-.660	.384
Cheerfulness	1.00	5.00	3.5447	.86191	-.583	-.232
Openness to Experience Subscales						
Imagination	1.00	5.00	3.7724	.92748	-.588	-.210
Artistic Interest	1.00	5.00	3.9126	.94948	-.886	.263
Emotionality	1.00	5.00	3.5610	.89119	-.316	-.197
Adventurousness	1.00	5.00	2.8028	.91068	.149	-.391
Intellect	1.00	5.00	3.7215	.98183	-.563	-.113
Liberalism	1.00	5.00	3.6057	.97886	-.493	-.349
Agreeableness Subscales						
Trust	1.00	5.00	3.3720	.85647	-.741	.469
Morality	1.00	5.00	4.2195	.83945	-1.221	1.289
Altruism	1.50	5.00	3.9492	.70888	-.659	.718
Cooperation	1.00	5.00	3.9309	.86148	-.812	.361
Modesty	1.00	5.00	3.4675	.88350	-.245	-.297
Sympathy	1.00	5.00	3.9207	.86592	-.937	.986
Conscientiousness Subscales						

Self-Efficacy	1.00	5.00	3.7764	.66610	-.725	1.328
Orderliness	1.00	5.00	3.5081	1.06519	-.402	-.735
Dutifulness	2.00	5.00	4.1220	.66958	-.732	.309
Achievement Striving	1.50	5.00	4.0122	.68501	-.688	.563
Self-Discipline	1.00	5.00	3.4573	.80000	-.257	-.120
Cautiousness	1.00	5.00	3.5732	.94908	-.645	-.087

Correlation Matrices of Personality Subfactors

Table S3

Openness to Experience Correlation Matrix

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. FLE	-	-.258**	-.401**	.170**	.137*	-.017	.151*	.168**	.030
2. FLCA		-	.397**	.016	.013	.284**	-.302**	-.038	.029
3. FLB			-	-.158*	-.224**	.129*	-.257**	-.235**	-.061
4. Imagination				-	.316**	.170**	.043	.221**	.103
5. Artistic Interest					-	.251**	.081	.229**	.074
6. Emotionality						-	-.171**	.063	.198**
7. Adventurousness							-	.296**	.124
8. Intellect								-	.225**
9. Liberalism									-

*$p < .05$ **$p < .01$

Table S4

Conscientiousness Correlation Matrix

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. FLE	-	-.258**	-.401**	.275**	.182**	.287**	.237**	.295**	.166**
2. FLCA		-	.397**	-.251**	-.227**	-.165**	-.140*	-.288**	-.181**
3. FLB			-	-.281**	-.238**	-.366**	-.220**	-.353**	-.340**
4. Self-Efficacy				-	.290**	.464**	.527**	.470**	.279**
5. Orderliness					-	.187**	.252**	.382**	.263**
6. Dutifulness						-	.313**	.252**	.273**
7. Achievement Striving							-	.377**	.215**
8. Self-Discipline								-	.352**
9. Cautiousness									-

*$p < .05$ **$p < .01$

Table S5

Extraversion Correlation Matrix

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. FLE	-	-.258**	-.401**	.285**	.135*	.049	.136*	.359**	.443**
2. FLCA		-	.397**	-.392**	-.299**	-.184**	-.146*	-.188**	-.357**
3. FLB			-	-.147*	-.012	.034	-.058	-.123	-.309**
4. Friendliness				-	.527**	.367**	.279**	.409**	.555**
5. Gregariousness					-	.271**	.215**	.374**	.380**
6. Assertiveness						-	.352**	.235**	.201**
7. Activity Level							-	.334**	.295**
8. Excitement								-	.460**
9. Cheerfulness									-

*$p < .05$ **$p < .01$

Table S6

Agreeableness Correlation Matrix

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. FLE	-	-.258**	-.401**	.339**	.220**	.292**	.251**	-.024	.210**
2. FLCA		-	.397**	-.125	-.098	-.047	-.117	.217**	.058
3. FLB			-	-.122	-.466**	-.112	-.388**	-.086	-.068
4. Trust				-	.208**	.376**	.240**	.030	.377**
5. Morality					-	.230**	.621**	.275**	.215**
6. Altruism						-	.213**	.041	.557**
7. Cooperation							-	.295**	.209**
8. Modesty								-	.171**
9. Sympathy									-

*$p < .05$ **$p < .01$

Table S7

Neuroticism Correlation Matrix

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. FLE	-	-.258**	-.401**	-.077	-.174**	-.233**	-.138*	-.079	-.198**
2. FLCA		-	.397**	.498**	.281**	.476**	.455**	.337**	.426**
3. FLB			-	.165**	.266**	.354**	.252**	.247**	.207**
4. Anxiety				-	.391**	.575**	.507**	.356**	.470**
5. Anger					-	.377**	.206**	.124	.343**
6. Depression						-	.438**	.355**	.447**
7. Self-Consciousness							-	.327**	.419**
8. Immoderation								-	.275**
9. Vulnerability									-

*$p < .05$ **$p < .01$

Spearman-Brown Reliabilities of Subfactors

Given that each subscale of personality only contained two items per scale, split-half reliability and the Spearman-Brown coefficient were used to examine the reliability of the scales (Eisinga et al., 2013). In addition, the correlation between the two items in each subscale was also presented. It should be noted that the subscales of Liberalism, Achievement Striving, and Self-Discipline had lower internal consistencies (< .500). However, given that only two item subscales were used, the extent to which internal consistency results can be interpreted was limited (Eisinga et al., 2013).

	Spearman-Brown Coefficient	*r*	*p*-value
Neuroticism Subscales			
Anxiety	.787	.649	<.001
Anger	.803	.671	<.001
Depression	.767	.622	<.001
Self-Consciousness	.643	.474	<.001
Immoderation	.571	.399	<.001
Vulnerability	.686	.686	<.001
Extraversion Subscales			
Friendliness	.673	.508	<.001
Gregariousness	.720	.563	<.001
Assertiveness	.783	.644	<.001
Activity Level	.749	.598	<.001
Excitement	.688	.524	<.001
Cheerfulness	.727	.571	<.001
Openness to Experience Subscales			
Imagination	.655	.487	<.001
Artistic Interest	.768	.623	<.001

Emotionality	.612	.440	<.001
Adventurousness	.638	.469	<.001
Intellect	.710	.551	<.001
Liberalism	.393	.273	<.01
Agreeableness Subscales			
Trust	.693	.530	<.001
Morality	.778	.636	<.001
Altruism	.600	.428	<.001
Cooperation	.617	.446	<.001
Modesty	.590	.418	<.001
Sympathy	.743	.592	<.001
Conscientiousness Subscales			
Self-Efficacy	.667	.499	<.001
Orderliness	.733	.578	<.001
Dutifulness	.616	.445	<.001
Achievement Striving	.455	.296	<.001
Self-Discipline	.486	.321	<.001
Cautiousness	.785	.647	<.001