By the Old Gods and the New: The Effect of the Congruence and Incongruence of Foreign Language Classroom Anxiety and Enjoyment on Self-Perceived Proficiency

ELOUISE BOTES,[1] JEAN–MARC DEWAELE,[2] AND SAMUEL GREIFF[3]

[1] *University of Vienna, Department of Developmental and Educational Psychology, University Street 7 1010, Vienna, Austria E-mail: elouise.botes@univie.ac.at*

[2] *Birkbeck, University of London, Department of Languages,Cultures, and Applied Linguistics, 43 Gordon Square, London, United Kingdom, WC1H 0PD E-mail: j.dewaele@bbk.ac.uk*

[3] *University of Luxembourg, Department of Behavioural and Cognitive Sciences, 11, Porte des Sciences L-4366, Esch-sur-Alzette, Luxembourg E-mail: Samuel.greiff@uni.lu*

Emotions in foreign language (FL) learning have become an increasingly popular research avenue in applied linguistics. Such research is often carried out using linear correlational or regression methods, which are limited in the extent to which they can depict interrelations. In this study, we aimed to reexamine the relationships between the emotion variables of foreign language classroom anxiety (FLCA) and foreign language enjoyment (FLE) and the outcome variable of self-perceived proficiency (SPP) through nonlinear methods. Specifically, we examined how different levels of FLCA and FLE influenced SPP in concert in a sample of $N = 1{,}039$ FL learners by utilizing polynomial regression with response surface analysis. The nonlinear method generated a response model that visually depicted a complex SPP pattern as a result of differing levels of FLCA and FLE. This three-dimensional model provides considerable insight into the interaction of positive and negative emotions above and beyond what could be derived from "classical" methods of correlation and linear regression.

Keywords: foreign language classroom anxiety; foreign language enjoyment; self-perceived proficiency; polynomial regression; response surface analysis

THE ROLE OF EMOTIONS IN FOREIGN language (FL) learning has recently received considerable research attention (Dewaele, 2021; Dewaele et al., 2019). The two variables at the forefront of emotion research in applied linguistics are the negative emotion of foreign language classroom anxiety (FLCA) and the positive emotion of foreign language enjoyment (FLE; Dewaele & MacIntyre, 2014, 2016). Numerous previous studies have examined the individual associations of FLCA and FLE, respectively, with the proficiency of language learners (Dewaele & Dewaele, 2017; Li et al., 2020; Wei et al., 2019), and some have also examined the interaction between FLCA and FLE (Jiang & Dewaele, 2019).

Previous studies have all utilized linear methods such as group averages, correlations, and linear regressions to examine these associations. However, these "classical" methods, though

The Modern Language Journal, 0, 0, (2022)
DOI: 10.1111/modl.12807
0026-7902/22/1–14 $1.50/0

methodologically sound, are limited in that they simplify the relations between variables to such an extent that it might not do justice to the complexities of the realities of the foreign language classroom (Gkonou, 2017). A nonlinear method that allows users to establish associations that go beyond mere linear trends is therefore needed to accurately reflect the full range of emotions experienced by FL learners. Such a method can be found in polynomial regression with response surface analysis. Specifically, polynomial regression with response surface analysis is a powerful methodology that can be used to examine the nonlinear effects of two psychological constructs on a third variable (Edwards, 1994; Humberg et al., 2019). The plotting of a congruence effect between the two independent variables in a three-dimensional space offers a unique opportunity to examine the interaction of complex psychological variables beyond what linear regression models can do (Shanock et al., 2010). Of note, polynomial regression has often been used in the fields of personality psychology and occupational psychology (Dörendahl et al., 2020; Edwards, 2007) but to our knowledge, it has yet to be used in the field of applied linguistics. In addition, to our knowledge, the method has not been used to examine the interaction of emotions in education.

Therefore, in order to explore the complexities of the relationships between emotion and self-perceived proficiency (SPP) and to simultaneously introduce a lesser known method to the field of applied linguistics, the following study has two main aims—namely, (a) to examine how FLCA and FLE in concert influence SPP through a three-dimensional response surface model and (b) to introduce the method of polynomial regression with response surface analysis to the field of applied linguistics by applying this method to the aforementioned examination.

LITERATURE REVIEW

Emotions in Language Learning

FLCA remains the most commonly studied emotion in FL learning (Dewaele & MacIntyre, 2014) and was originally defined as "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to classroom language learning, arising from a uniqueness in the language learning process" (Horwitz et al., 1986, p. 128). FLCA has since become a cornerstone of individual differences in FL learning research. Three decades of continual research on the topic have led to a complex understanding in the prevailing literature of the debilitating effects of language anxiety during the process of FL learning (Horwitz, 2010, 2017; MacIntyre, 2017).

More recently, the emergence of positive psychology principles in applied linguistics research (Dewaele et al., 2019; MacIntyre et al., 2019) has led to the development of FLE as a construct. Positive psychology emphasizes the enabling power of positive characteristics and behaviors in creating positive outcomes, breaking away from the traditional overt interest in negative diagnostics prevalent in psychological research (Seligman & Csikszentmihalyi, 2014). In this framework, FLCA can be seen as an embodiment of traditional, diagnostic-based emotion research, with extensive research attention provided in the past 30-odd years to examining the antecedents, malleability, and consequences of FLCA. In opposition, FLE encompasses the concept of the broadening ability of positive emotions (Fredrickson, 2001).

In recent years, a great deal of research attention has been given to the relationship between the established construct of FLCA and the newly introduced construct of FLE. In the seminal study that introduced "FLE" to the research lexicon, Dewaele and MacIntyre (2014) questioned whether positive and negative emotions in FL learning resembled the two-faced Roman god Janus in that FLCA and FLE presented two sides of a single continuum. However, the study concluded that due to a moderate negative correlation, $r = -.36$, $p < .001$, FLCA and FLE can be viewed as largely independent but related variables. Indeed, subsequent research has confirmed that FLCA and FLE manifest differently not only in terms of their bivariate relation but also in terms of their antecedents (Dewaele & Dewaele, 2017; Jiang & Dewaele, 2019), inherent design, and factor structure (Li et al., 2018).

FLCA and FLE have been established as related variables within a largely shared nomological network, as both emotion constructs have been found to interact with established variables in FL learning motivation research. For instance, FLCA has been associated with numerous affective, personality, and cognitive variables in the decades-long research into the nature of language anxiety (MacIntyre, 2017). By contrast, the nomological network of FLE is as yet underdeveloped.

Essentially, both FLCA and FLE have been linked to real and perceived competence in the target language through correlations and linear regressions. As the authors of this study, we have also previously examined the correlational relationships between FLCA, FLE, and proficiency (Botes et al., 2020a). Specifically, we utilized an

existing dataset comprising $N = 1{,}039$ adult FL learners to examine the interaction between multilingualism and SPP on FLCA and FLE (Botes et al., 2020a). In this previously published study, FLCA was found to be negatively correlated with SPP, $r = -.340$, $p < .001$, whereas FLE was positively correlated with SPP, $r = .245$, $p < .001$. In addition, other studies have confirmed an existing linear and correlational relationship between emotion variables and perceived proficiency in the FL classroom (Li et al., 2018; Mierzwa, 2018; Teimouri et al., 2019; Zhang et al., 2020).

Furthermore, only a few studies have examined the interplay between FLCA and FLE in contrast to vast amounts of research detailing the individual correlations and regressions. We could find only a single study that explicitly examined the effect of both FLCA and FLE on real and perceived achievement in the FL classroom: Li et al. (2020) reported a statistically significant effect of FLCA and FLE on real proficiency in a multiple regression model, $R^2 = .115$, $p < .001$, and SPP, $R^2 = .293$, $p < .001$. Aside from the statistically significant regression equation, both FLCA, $\beta = -.426$, $p < .001$, and FLE, $\beta = .201$, $p < .001$, predicted SPP, with FLCA having the larger effect size. The conclusions of our own and other studies have therefore been that, to optimize the SPP of the FL learner, FLE should be maximized and FLCA should be minimized. However, this simple maxim might not reflect the reality of the FL classroom, where learners can experience equally high or low levels of FLCA and FLE with nonadditive effects on the outcome variable (e.g., SPP).

Quantitative studies based on correlations, including our own, have found a prevailing moderate negative correlation between FLCA and FLE (Botes et al., 2020a; Dewaele & MacIntyre, 2014, 2016; Khajavy et al., 2018), yet qualitative and quantitative research studies are rife with reports of students experiencing high levels of FLCA and FLE simultaneously (Dewaele et al., 2016, 2022). The varying combinations of FLCA and FLE that FL students can experience might therefore be overly simplified when only correlational results are examined.

In addition, the range of combinations of FLCA and FLE that can be present in FL learners are not necessarily reflected in hypotheses that propose linear relationships with a third variable. Numerous mixed-methods research studies have presented cases of language learners who display high levels of language anxiety in conjunction with high levels of proficiency or achievement (Dewaele & Alfawzan, 2018; Gkonou, 2017; MacIntyre, 1995), despite the prevailing moderate negative correlation between language anxiety and academic achievement ($r = -.39$; see the recent meta-analysis of 59 studies by Botes et al., 2020b). Furthermore, FL learners have also displayed low levels of enjoyment in combination with high levels of perceived proficiency (Li et al., 2020). Therefore, many combinations are possible with regard to FL learners' emotions, with learners displaying equally high, equally low, or opposing levels of FLCA and FLE.

Greater nuance is therefore needed in examining the interplay of FLCA and FLE and its effects on third variables. Such nuance may be achieved by examining the variables through polynomial regression and response surface analysis, as the response surface model will provide a three-dimensional depiction of how the level of agreement between FLCA and FLE affects the SPP of the FL learner. More specifically, this three-dimensional model will depict the SPP of FL learners as influenced by different possible combinations of FLCA and FLE. Specifically, the model will depict the resultant SPP when FLCA and FLE are experienced in equally high or equally low amounts (congruence) or at complete opposite levels (incongruence). In this study, we therefore reexamined the dataset used by Botes et al. (2020a) in an attempt to understand the nuances that exist in the emotions of FL learners, moving beyond the classical linear interpretation of the data.

Polynomial Regression and Response Surface Models

As far as we are aware, no attempt has been made in the literature to investigate individual difference variables in FL learning by applying polynomial regression with response surface analysis. Therefore, this study will attempt to provide a brief introduction to polynomial regression with response surface analysis and provide information about the methodological steps involved in the hope of inspiring additional research that might employ this method. Please note that other fields of social science have readily employed polynomial regression with response surface analysis, and the interested reader will find methodological introductions to the topic elsewhere (Edwards, 1994; Edwards & Parry, 1993; Schönbrodt & Humberg, 2018; Shanock et al., 2010).

Polynomial regression and response surface analysis can be used to investigate "the extent to which combinations of two predictor variables relate to an outcome variable, particularly when the discrepancy between the two variables is a central consideration" (Shanock et al., 2010,

p. 543). First introduced as a means for examining person–environment fit in organizational settings (Edwards, 2007; Edwards & Cable, 2009), response surface analysis has since become popular in personality and educational psychology settings (Chopik & Motyl, 2016; Ilmarinen et al., 2016; Milatz et al., 2015). This methodology might hold great promise in providing further insights into the relationships between applied linguistics variables that cannot be gained through direct linear methods.

On a more specific level, polynomial regression is concerned with examining how the congruence between two predictor variables affects the standing on a third variable, where congruence refers to the "fit, similarity, or agreement between two constructs" (Edwards, 2009, p. 34). In this study, the fit between FLCA and FLE is therefore proposed to affect the outcome variable of SPP. However, a key factor of polynomial regression that sets it apart from the use of linear methods is the importance given to both congruence and incongruence in the relation between the two predictor variables. Congruence between the predictor variables can therefore be defined as the agreement or similarity between the levels of the two predictors, such as when an FL learner experiences equally high or low levels of FLCA and FLE [++; −]. Incongruence, in turn, is seen as quantitatively distinct from congruence and can be defined as the misfit or dissimilarity between the predictors, such as an FL learner reporting a very high FLCA and a very low FLE or vice versa [+−; −+]. The relationship between the congruence of the predictor variables and the outcome variable is therefore not the direct opposite of the relationship between the incongruence of the predictor variables and the outcome variable (Edwards, 1994). In the present study, we therefore expected that different combinations of FLCA and FLE scores would result in a nonlinear relationship with SPP, both when FLCA and FLE were roughly at equal levels (equally high or equally low levels of enjoyment and anxiety) and when they were at exact opposite levels (e.g., high anxiety and low enjoyment).

On a statistical level, polynomial regression examines two predictor variables separately and jointly in that the calculated model rests on the centered predictors as well as on the interaction of the joint predictors with a third outcome variable (Edwards, 2007). Thus, the outcome variable (in this study, SPP) is regressed on each of the predictor variables (in this study, FLCA and FLE), on the interaction between the two predictor variables, and on the squared values of each of the predictors. The quadratic polynomial regression equation is calculated as follows:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + \varepsilon \quad (1)$$

where:

Z = outcome variable (SPP)
X = first predictor (FLCA)
Y = second predictor (FLE)
Y^2 and X^2 = quadratic terms for the predictors
XY = interaction between the predictors
b_1–b_5 = estimated coefficients

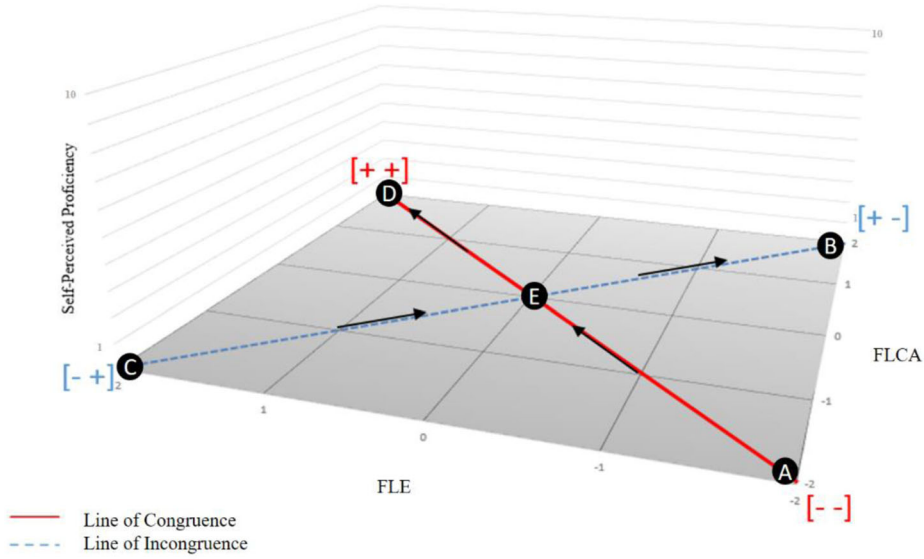
Equation (1) can be depicted in a three-dimensional space using response surface analysis for ease of interpretation. The surface estimates of the two predictor variables are mapped onto this three-dimensional space, and the lines of congruence and incongruence are of interest (see Figure 1; Edwards, 1994). Most notably, the characteristics of interest on the response surface are the slopes and curves of the lines of congruence and incongruence, which are depicted by calculating the four surface test parameters:

1. $a_1 = b_1 + b_2$: slope along the line of congruence, where FLCA and FLE are in perfect agreement (Line A–D in Figure 1)
2. $a_2 = b_3 + b_4 + b_5$: curvature along the line of congruence (Line A–D in Figure 1)
3. $a_3 = b_1 - b_2$: slope along the line of incongruence, where FLCA and FLE are at opposite levels (Line B–C in Figure 1)
4. $a_4 = b_3 - b_4 + b_5$: curvature along the line of incongruence (Line B–C in Figure 1)

These slopes and curves describe the nonlinear relationships between the variables when they are statistically significant (Shanock et al., 2010). Test parameters a_2 and a_4 additionally provide information about the direction of the curvature, such that a positive and statistically significant outcome yields a convex curve, and in turn, a negative and statistically significant outcome indicates a concave curve. The response surface may also present a pattern where both a convex and concave line is present on either the line of congruence and incongruence and is aptly termed a "saddle" curve (Edwards, 2007). In terms of the specific variables at play in this study, a concave model implies that greater SPP was observed in instances where FLCA and FLE were at either extreme (very high or very low). In turn, a convex curvature implies that a higher SPP was observed when both FLCA and FLE were experienced at moderate levels (at Point E in Figure 1).

The added value of polynomial regression with response surface analysis can be seen when

FIGURE 1
Three-Dimensional Space of the Response Surface Pattern [Color figure can be viewed at wileyonlinelibrary.com]



Three-Dimensional Space of the Response Surface Pattern

Note. FLCA = foreign language classroom anxiety; FLE = foreign language enjoyment.

comparing it directly with correlations and linear regressions, the oft-used method in applied linguistics. Correlational analyses such as the Pearson correlation coefficient aim at measuring the bivariate correlational relationship between two sets of data (Field, 2005). As such, only a linear nondirectional fit between two variables can be examined. In turn, linear regression models a directional relationship between one or more predictor variables and an outcome variable (Field, 2005). However, as with correlational analyses, linear regression aims to find a single line of best fit between the variables and cannot take curvature in the data into account (Field, 2005). In contrast, polynomial regression with response surface analysis examines all combinations of predictor variables and not just a single linear equation. As such, the nonlinear method can therefore provide a better approximation of the nuance in the data by modeling slope and curvature.

It should also be noted that the use of polynomial regression with response surface analysis is not without criticism. The methodology relies on the assumption that the variables are measured without error, as measurement error is not taken into account (Edwards, 2009). In addition, there is a risk of extrapolating results from the sample to the general population by applying oversimplistic interpretations. Therefore, results garnered from polynomial regression and response surface analysis should be cross-validated (Edwards, 1994). The most often cited criticism against the use of the methodology lies in its apparent complexity, as it may lead to misinterpretations and misconceptions (Cohen et al., 2010). However, the introduction of numerous Microsoft Excel macros (Edwards, 2007; Shanock et al., 2010) as well as RStudio packages such as RSA (Schönbrodt & Humberg, 2018) have simplified the analysis and interpretation of congruence results in recent years.

Therefore, with the current article, we hope to spark interest in the use of the methodology in the field of motivational studies in language learning. As such, we explored the ranges of emotions that language learners can have in the language classroom as well as how the fit and misfit between their emotions influence SPP as the outcome variable. The use of this methodology will expand the understanding of the role that emotions play in the FL classroom. Specifically, we give due attention to cases that are generally not depicted in linear methods (e.g., when FL learners experience equally high levels of FLCA and FLE).

METHOD

Participants

The sample consisted of $N = 1{,}039$ FL learners who completed an online questionnaire in 2012.[1] The average age of the sample was 24.04 years ($SD = 8.01$), with 71.66% of the sample identifying as female. The data were gathered via snowball sampling and were originally used in the study that introduced FLE (Dewaele & MacIntyre, 2014).

Materials

Self-Perceived Proficiency. A single item was used to measure SPP. Participants were asked to indicate their level of proficiency regarding the FL they were learning at the time on a scale ranging from 1 (beginner) to 5 (advanced).

Short-Form Foreign Language Classroom Anxiety Scale ($\alpha = .89$). We used an 8-item measure developed by MacIntyre (S-FLCAS; 1992) that is a shortened version of the original 33-item scale developed by Horwitz et al. (1986), and recently validated in Botes et al. (2022). The scale has been frequently used in emotions in FL learning research, most notably in the first study to introduce FLE to the research lexicon (Dewaele & MacIntyre, 2014). Items are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Short-Form Foreign Language Enjoyment Scale ($\alpha = .82$). We used a 9-item short-form scale (S-FLES) that was developed and validated utilizing exploratory factor analysis, confirmatory factor analysis, and ant colony optimization algorithms (Botes et al., 2021). The 9 items were selected from the original 21-item foreign language enjoyment scale by Dewaele and MacIntyre (2014). The short-form scale has been found to be a valid and reliable measure of FLE (Botes et al., 2021). The items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data Analysis

Data were analyzed using SPSS 25, the Excel macro for response surface analysis developed by Edwards (2007), and the RSA package in R (Schönbrodt & Humberg, 2018). Descriptive statistics were calculated for all three variables. Correlational and linear regression analyses were conducted between the predictor variables of FLE and FLCA and the outcome variable of SPP. These results were utilized to further demonstrate the added value of the nonlinear method of polynomial regression with response surface analysis. Furthermore, all assumptions for running response surface analysis were examined, as specified by Humberg et al. (2019).

Polynomial regression and response surface analysis were used to examine the effect of the possible congruence and incongruence between FLE and FLCA on SPP through the following detailed steps:

1. As recommended by Edwards (1994), the predictors of FLE and FLCA were centered on the midpoint of their respective scales. Both FLE and FLCA were measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). As such, the midpoint of both scales was 3; therefore, 3 was subtracted from the average score of FLE and FLCA for each participant in the sample. By doing so, two new variables were calculated: a centered FLE (b_1) and a centered FLCA (b_2).
2. Three additional variables required for the quadratic polynomial regression equation were calculated: the square of the centered FLE scores (b_3), the product of the centered FLE scores multiplied by the centered FLCA scores (b_4), and the square of the centered FLCA scores (b_5).
3. The outcome variable (i.e., SPP) was regressed on each of the five calculated variables (b_1–b_5) in order to derive each of the surface test values (a_1–a_4). As previously described, the surface test values represent the slope and curvature of the response surface along the lines of congruence and incongruence.
4. The unstandardized betas and standard errors of the regression coefficients calculated in Step 3 were entered into the Edwards (2007) Excel macro, which, in turn, generated a response surface model for each of the dependent variables.

RESULTS

Descriptive Statistics

The descriptive statistics for all three variables can be found in Table 1.

Preanalysis Requirement Checks

The data requirements were confirmed as specified by Humberg et al. (2019): (a) the

TABLE 1
Descriptive Statistics

Variable	*M*	*SD*	Max	Min
Foreign language classroom anxiety	2.70	.83	5.00	1.00
Foreign language enjoyment	3.84	.57	5.00	1.11
Self-perceived proficiency	3.73	1.12	5.00	1.00

TABLE 2
Discrepancy Pairs of Independent Variables Within Half a Standard Deviation

Pair	*n*	%
FLCA higher than FLE	371	35.71
FLCA equal to FLE	261	25.12
FLCA lower than FLE	407	39.17

Note. FLCA = foreign language classroom anxiety; FLE = foreign language enjoyment.

distribution of discrepant predictor pairs in the data (i.e., FL learners whose FLCA is higher, lower, and equal to their FLE), (b) the multicollinearity between FLCA and FLE, (c) the reliability of the measurements, and (d) the statistical power of the data.

A suitable amount of discrepancy was found in the dataset with regard to the pairs of predictors so that a polynomial regression analysis could be justified (see Table 2). In order to examine the discrepancies between the independent variables, the scores were standardized for both FLCA and FLE. The differences between the two scores were coded to identify participants whose standardized score on FLCA was half a standard deviation above or below FLE (Shanock et al., 2010). Thus, discrepancy pairs were coded as follows: FLCA higher than FLE, FLCA equal to FLE, and FLCA lower than FLE, within half a standard deviation.

As we found in our previous study, statistically significant correlations were observed between all variables (Botes et al., 2020a; see Table 3). FLCA had a statistically significant moderate negative correlation with the outcome variable of SPP, $r = -.35$, $p < .001$. In turn, FLE had a moderate positive correlation with SPP, $r = .37$, $p < .001$. The moderate negative correlation between FLCA and FLE indicated low multicollinearity between the two predictor variables, $r = -.26$, $p < .001$. Furthermore, a variance inflation factor of 1.074 was found between FLCA and FLE, thus meeting the collinearity requirements for further analysis (Humberg et al. 2019).

The last two requirements specified by Humberg et al. (2019)—namely, the reliability of the measures and the power of the data—were also met. The FLCAS and S-FLES, which were used to measure FLCA and FLE, respectively, both indicated an acceptable level of internal reliability with $\alpha = .89$ and $\alpha = .82$. Unfortunately, a reliability analysis could not be conducted on SPP, as a single item was used to measure the dependent variable. Last, the sample size of $N = 1{,}039$ was more than sufficient to examine the hypothesis in question (Humberg et al., 2019). As all requirements were met, the polynomial regression with response surface analysis proceeded.

Multiple Linear Regression

The overall multiple regression equation was statistically significant, $F(2,193) = .089$, $p < .001$, as was the direct predictive relationship between FLCA and SPP, $\beta = -.285$, $p < .001$. However, FLE did not have an individual direct predictive relationship with SPP, $\beta = .025$, $p = .730$. The results of the multiple linear regression therefore seem to indicate some complexity, as there is a mixture of significant and nonsignificant regression equations. However, due to the limitations of the method, further complexities such as curvatures in the data cannot be explored using multiple linear regression. As such, the nonlinear method of polynomial regression with response surface analysis was used to further examine the variables.

Polynomial Regression and Response Surface Model

The relations of FLCA and FLE with SPP were examined via polynomial regression and response surface analysis. The variables required for the quadratic polynomial regression were calculated as described in the data analysis section, where b_1 through b_5 were the estimated coefficients of FLCA and FLE. The outcome variable of SPP was regressed onto each of the calculated variables

TABLE 3
Correlation Matrix

Variable	1	2	3
1. Foreign language classroom anxiety	—	−.26**	−.35**
2. Foreign language enjoyment		—	.37**
3. Self-perceived proficiency			—

**$p < .01$.

TABLE 4
Polynomial Regression Results of FLCA and FLE on SPP

Variable	Description	Estimate	*SE*	*β*	*p*
b_1	FLCA centered	−.388	.039	−.385	<.001***
b_2	FLE centered	−.020	.063	−.013	.751
b_3	FLCA squared	.026	.024	.027	.279
b_4	FLCA × FLE	.088	.040	.093	.027*
b_5	FLE squared	.118	.040	.129	.004**
a_1	$(b_1 + b_2)$	−.410	.090		<.001***
a_2	$(b_3 + b_4 + b_5)$	.230	.070		.002**
a_3	$(b_1 - b_2)$	−.370	.060		<.001***
a_4	$(b_3 - b_4 + b_5)$	.060	.080		.467

Note. FLCA = foreign language classroom anxiety; FLE = foreign language enjoyment.
*$p < .05$.
**$p < .01$.
***$p < .001$.

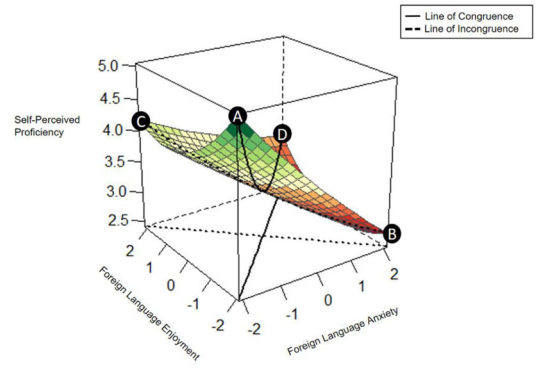
$(b_1–b_5)$, with the surface test values $(a_1–a_4)$ calculated from the regression model results (Edwards, 2002; Table 4).

The overall polynomial regression model of SPP as the outcome variable was statistically significant, $F(5,1033) = 52.47$, $p < .001$. As the regression model was significant, the interpretation of the response surface model could proceed (see angles A and B of the model in Figures 2 and 3). Please note that Figures 2 and 3 depict different angles of the same analysis.

The line of congruence in the response surface model was interpreted via the slope and curvature of the line (a_1 and a_2). The slope of the line of congruence was significantly negative, $a_1 = -.41$, $p < .001$, and therefore, SPP decreased as FLCA and FLE increased. In turn, the curvature of the line of congruence was significantly positive, $a_2 = .23$, $p < .01$. The significant a_2 variable indicated a nonlinear relationship on the line of congruence, which resulted in a convex curvature (see angle A of the response surface model in Figure 2). Therefore, more extreme levels of FLCA and FLE led to a greater SPP. Where very high FLCA and FLE were present, a moderate level of SPP was expected. In addition, where very low FLCA and FLE were present, an even greater level of SPP was found.

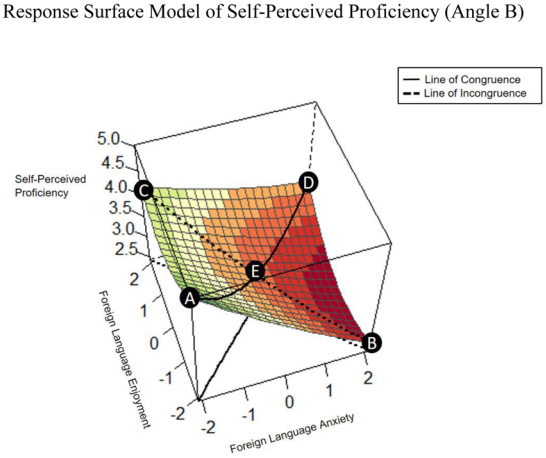
The line of incongruence, in turn, resulted in a significant negative slope, $a_3 = -.37$, $p < .001$. Therefore, a very low SPP was present at the point

FIGURE 2
Response Surface Model of Self-Perceived Proficiency (Angle A) [Color figure can be viewed at wileyonlinelibrary.com]



Response Surface Model of Self-Perceived Proficiency (Angle A)

FIGURE 3
Response Surface Model of Self-Perceived Proficiency (Angle B) [Color figure can be viewed at wileyonlinelibrary.com]



where low FLE and high FLCA occurred (see Point B in angle B of the model in Figure 3). As FLE increased and FLCA decreased along the line of incongruence, a resultant rise in SPP occurred. This result was not unexpected, as it duplicated the linear findings of our previous studies, with low FLCA and high FLE resulting in high SPP (Botes et al., 2020a). In addition, the curvature of the line of incongruence was found to be non-significant ($p = .467$). Therefore, no significant curvature was found on the line of incongruence, with a steady linear increase in SPP present between Points B and C where FLE rose and FLCA fell.

DISCUSSION

The aims of this study were to examine an existing dataset through the lens of polynomial regression with response surface analysis and, thereby, to reveal the complexity of the interaction between FLCA and FLE and its subsequent effect on SPP. This study provides the first example of the use of polynomial regression with response surface analysis in examining individual differences in applied linguistics.

As the core result of this study, a statistically significant polynomial regression model between FLCA and FLE as independent variables and SPP as the dependent variable was reported. A significant slope was found on the line of incongruence, where FLCA and FLE were experienced at opposite levels (e.g., high FLCA and low FLE). The curvature of the line of incongruence was insignificant. Therefore, as the FLCA of the FL learner decreased and the FLE increased, a linear increase in SPP was predicted. The results of this line of incongruence clearly replicated findings of previous studies utilizing correlational and linear methods—namely, that FLCA was a hindrance to SPP, and FLE was a facilitating factor (Li et al., 2020; Teimouri et al., 2019). However, this simplistic interpretation of the interaction between FLCA and FLE is only applicable to FL learners whose positive and negative emotions are at opposite ends, such as a high level of FLE and a low level of FLCA. As FL learners' emotions come in all shapes and sizes, it is also necessary to understand the interaction between FLCA and FLE when each emotion is experienced with equal intensity (e.g., equally low FLCA and FLE).

In fact, the added value of using polynomial regression with response surface analysis is revealed in the results garnered from the line of congruence—where FLCA and FLE were experienced at equal levels. Methodologically speaking, a statistically significant slope and curvature were found for the line of congruence. The negative slope indicated that as FLCA and FLE increased, a decrease in SPP was visible. However, this decrease did not occur linearly but rather took a convex shape where equally low levels of FLCA and FLE resulted in the highest level of SPP. This specific finding of high SPP as the result of low FLCA and low FLE ought to be emphasized. Previous linear studies, including our own, have found an individual negative relationship between FLCA and real or perceived proficiency (Botes et al., 2020a, 2020b; Teimouri et al., 2019), as well as an individual positive relationship between FLE and real

or perceived proficiency (Botes et al., 2020b; Li et al., 2020). Indeed, the correlational and linear regression results reported in this study found a negative relationship between FLCA and SPP, $r = -.35$, $\beta = -.285$, $p < .001$. In addition, a statistically significant positive correlation, $r = .37$, $p < .001$, and a nonsignificant regression ($p > .05$) was found between FLE and SPP. Yet, the line of congruence provides considerably more nuance than the correlational or regression results, as it modeled that in the instance where the FL learner experienced low FLCA and low FLE, a resultant high SPP was observed. This high SPP can probably be attributed to a lack of anxiety in the FL learner; however, the lack of enjoyment seemed to have no discernible negative impact. This lack of anxiety seems to compensate for the lack of enjoyment in the FL learner and still result in a high SPP. This compensatory effect is visible further along the line of congruence as well, where a high FLE (and equally high FLCA) resulted in a moderate SPP. Thus, the positive impact of a high level of FLE compensated for the negative impact of the high level of FLCA experienced by the FL learner to yield a positive outcome of an overall moderate SPP. This intricate pattern of compensatory effects could not have been revealed through linear methods and practically demonstrates the use of polynomial regression with response surface analysis in examining individual differences data.

It should also be noted that the line of congruence provides additional insight into the individual sway both FLCA and FLE hold in the interaction effect. The level of SPP was considerably greater as a result of extremely low FLCA and FLE, as opposed to the moderate SPP garnered from an extremely high FLCA and FLE. Therefore, in the interaction between FLCA and FLE and its resultant effect on SPP, a lower level of FLCA will be more beneficial to creating a greater SPP in the FL learner than a higher level of FLE. This greater impact of FLCA on SPP in comparison to FLE in the interaction effect has some basis in the literature. Research on the impact of positive and negative emotions has indicated that the impact of negative emotions can at times outweigh the impact of positive emotions in test performance (Chin et al., 2017), achievement motivation (Bartels, 2007), and memory recall (Brainerd et al., 2008). The impact of negative emotions in the FL classroom should therefore not be underestimated, especially as the response surface model shows that even high amounts of positive emotions will not fully compensate for the presence of negative emotions.

THEORETICAL AND PRACTICAL IMPLICATIONS

The findings of this study have both theoretical and practical implications. The current study provided a demonstration of the use and value that polynomial regression with response surface analysis can offer applied linguistics research. The three-dimensional modeling of an outcome variable as influenced by two independent variables provides a unique opportunity to capture the complexity of a dataset. Further endeavors that may benefit from the use of this methodology include examining the interaction between real and perceived proficiency in the target language and an outcome variable, such as willingness to communicate, or examining the interaction between willingness to communicate in the FL class of the teacher and the student and an outcome variable, such as student proficiency.

Additional theoretical implications that ought to be considered include the framing of and formulation of future hypotheses regarding emotions in FL learning. As demonstrated by the significant slopes and curvatures in the response surface model, a nonlinear relationship underlies the emotion variables in this study. As such, future research ought to consider and statistically examine the possibility of nonlinear solutions when testing hypotheses regarding FLE and FLCA.

The practical implications of the findings of this study specifically concern FL teachers, as the results indicate that high levels of anxiety in the FL classroom cannot be fully offset by high levels of enjoyment. Therefore, FL teachers need to prioritize the lowering of FLCA in their classrooms. Fully eliminating FLCA from the FL classroom would be nearly impossible from a practical standpoint; however, the FL teacher should attempt to create a positive classroom environment where students are allowed to make errors without fearing harsh words or ridicule. Teachers can also empathize with students and train them to handle their FLCA in a constructive manner. This may include less prescriptive approaches with a strong focus on grammar and pronunciation, which have been found to contribute to the level of anxiety in FL learners (Young, 1991) or by implementing learning strategies such as self-driven learning (Dupuy, 1997), learning through song (Dolean, 2016), and multimedia technologies (Golonka et al., 2014; Oxford, 2017). In addition, Kondo and Ying–Ling (2004) found that emphasizing and actively encouraging students to prepare for FL classes, to take time to relax when FL learning, and to practice positive thinking

increases students' abilities to cope with language anxiety. Furthermore, the FL teacher can implement other strategies to increase FLE in the classroom, such as the interactive games used by Allen et al. (2014) in order to improve L2 writing engagement, perceived writing skills, and enjoyment of writing. The Web-based software Writing Pal developed by Allen et al. (2014) utilizes a series of mini-games aimed at improving writing skills such as planning, cohesion building, and paraphrasing through an intelligent tutoring system with automatic feedback (for an overview of the exact games used, please see Allen et al., 2014). In addition, utilizing humor and empathetic teaching may be helpful in order to decrease anxiety in FL learning. For example, Ariza (2002) successfully utilized the community language learning (CLL) approach for a particularly vulnerable group of Spanish language learners. The CLL approach involved the FL teacher emulating the role of empathetic counsellor through active listening, attempting to understand and show empathy for the root causes of the anxiety of the FL learners (Ariza, 2002). Furthermore, drawing upon positive psychology, Oxford (2017) suggested a number of interventions that teachers can use to lower learners' FLCA by boosting their sense of agency, hope, and optimism. In cases in which classroom activity may elicit both anxiety and enjoyment (e.g., public speaking in the target language), FL teachers must keep in mind that, should the FL learners experience both emotions at equally high intensities, the negative effect of FLCA may to some extent "overpower" any positive effects of FLE.

LIMITATIONS

The present study has several limitations that ought to be considered. First, the sample of FL learners was broad; and no specific target language, country, or age group were investigated. In fact, future response surface models generated from specific target languages or geographical samples may show different slopes and curvatures. Therefore, the extent to which the response surface model generated in this study can be generalized to other contexts is uncertain. Second, SPP was measured with a single item. Future studies utilizing different measures such as a multi-item scale or a true measure of proficiency might not find the same interaction effect and outcome as presented here. Third, the dataset utilized in this study has been used before by the authors (Botes et al., 2020b; see Note 1 regarding the previous use of the data). Last, it should also be noted that using the methodology of polynomial regression and response surface modeling can be a complicated and rather statistical endeavor to undertake. This study attempted to provide a simple overview of the method; however, it did not address the myriad intricacies in the calculation and interpretation of the response surface model that can be found elsewhere (Edwards, 2009; Humberg et al., 2019; Shanock et al., 2010).

CONCLUSION

In their study, Dewaele and MacIntyre (2014) likened the established negative emotion variable of FLCA and the emerging positive emotion variable of FLE to the Roman gods Phobos and Laetitia. In this study, we reexamined these old gods of the Dewaele & MacIntyre (2014) dataset through the new lens of polynomial regression with response surface analysis. Results indicated that FL students with a lower FLCA and higher FLE had a higher level of SPP—echoing the findings of previous studies that used linear and correlational methods (Dewaele & MacIntyre, 2014). However, FL learners who experienced FLCA and FLE at equal intensities yielded a complex pattern of SPP, where the presence of one emotion at times compensated for the lack of another. In addition, the greater impact of anxiety in determining the perceived proficiency of the FL learner was observed. Although tried-and-tested methods of correlational and linear hypotheses regarding positive and negative emotions are not without value, polynomial regression and response surface analysis can reflect complexities in FL emotion data on a more fine-grained level.

NOTE

[1] As mentioned , the dataset was previously used to examine the linear and correlational relationships among FLCA, FLE, and SPP (Botes et al., 2020a). In our previous study (Botes et al., 2020a), we examined the interaction effect of multilingualism and SPP as predictors on the emotions of FLCA and FLE as criteria as a direct consequence of previous research findings indicating significant differences in FLCA and FLE across levels of SPP and multilingualism (Dewaele, 2010; Thompson & Khawaja, 2016). In this study, we deploy the method of polynomial regression with response surface analysis to reexamine this same dataset in order to determine whether FLCA and FLE in congruence predict SPP. There are, therefore, differences in the directionality assumed across our previous study (multilingualism with SPP → FLCA and FLE; Botes et al., 2020a) and our

current study (FLCA and FLE → SPP). Neither study should be taken as a definitive stance on the directionality of the relations between the variables in the nomological network. Instead, we assume a circular relationship between the emotion variables and SPP, where, for example, low FLCA can predict low SPP but, in turn, low SPP can predict anxiety. This "spiral" prediction is not uncommon in studies of emotion, where anxiety has been theorized to have a spiralling effect on the performance of musicians (Spahn et al., 2010), drivers (Fairclough et al., 2006), sales agents (Mughal et al., 1996), mathematics learners (Jameson, 2014), and language learners (Saito & Samimy, 1996). Ideally, future experimental research would examine the negative spiral between SPP and FLCA as well as the positive spiral between SPP and FLE that we put forth in theory; however, such a study is beyond the scope of this article.

REFERENCES

Allen, L. K., Crossley, S. A., Snow, E. L., & McNamara, D. S. (2014). L2 writing practice: Game enjoyment as a key to engagement. *Language Learning & Technology*, *18*, 124–150.

Ariza, E. N. (2002). Resurrecting "old" language learning methods to reduce anxiety for new language learners: Community language learning to the rescue. *Bilingual Research Journal*, *26*, 717–728. https://doi.org/10.1080/15235882.2002.10162586

Bartels, J. M. (2007). Dispositional positive and negative affect and approach–avoidance achievement motivation. *Individual Differences Research*, *5*, 246–259.

Botes, E., Dewaele, J.-M., & Greiff, S. (2020a). The power to improve: Effects of multilingualism and perceived proficiency on enjoyment and anxiety in foreign language learning. *European Journal of Applied Linguistics*. *8*, 279–306. https://doi.org/10.1515/eujal-2020-0003

Botes, E., Dewaele, J.–M., & Greiff, S. (2020b). The foreign language classroom anxiety scale and academic achievement: An overview of the prevailing literature and a meta-analysis. *Journal for the Psychology of Language Learning*, *2*, 26–56. https://www.iapll.com/jpll2-botes-dewaele-greiff

Botes, E., Dewaele, J.–M., & Greiff, S. (2021). The development and validation of the Short-Form Foreign Language Enjoyment Scale. *Modern Language Journal*, *105*, 858–876. https://doi.org/10.1111/modl.12741

Botes, E., van der Westhuizen, L., Dewaele, J.–M., MacIntyre, P., & Greiff, S. (2022). Validating the short-form foreign language classroom anxiety scale. *Applied Linguistics*. https://doi.org/10.1093/applin/amac018

Brainerd, C. J., Stein, L. M., Silveira, R. A., Rohenkohl, G., & Reyna, V. F. (2008). How does negative emotion cause false memories? *Psychological Science*, *19*, 919–925. https://doi.org/10.1111/2Fj.1467-9280.2008.02177.x

Chin, E. C. H., Williams, M. W., Taylor, J. E., & Harvey, S. T. (2017). The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions. *Learning and Individual Differences*, *54*, 1–8. https://doi.org/10.1016/j.lindif.2017.01.002

Chopik, W. J., & Motyl, M. (2016). Ideological fit enhances interpersonal orientations. *Social Psychological and Personality Science*, *7*, 759–768. https://doi.org/10.1177/1948550616658096

Cohen, A., Nahum-Shani, I., & Doveh, E. (2010). Further insight and additional inference methods for polynomial regression applied to the analysis of congruence. *Multivariate Behavioral Research*, *45*, 828–852. https://doi.org/10.1080/00273171.2010.519272

Dewaele, J.-M. (2010). Multilingualism and affordances: Variation in self-perceived communicative competence and communicative anxiety in French L1, L2, L3 and L4. *International Review of Applied Linguistics in Language Teaching*, *48*, 105–129. https://doi.org/10.1515/iral.2010.006

Dewaele, J.–M. (2021). Research on emotions in second language acquisition: Reflections on its birth and unexpected growth. In A. Al–Hoorie & F. Szabo (Eds.), *Researching language learning motivation: A concise guide* (pp. 125–134). Bloomsbury.

Dewaele, J.–M., & Alfawzan, M. (2018). Does the effect of enjoyment outweigh that of anxiety in foreign language performance? *Studies in Second Language Learning and Teaching*, *8*, 21–45. https://doi.org/10.14746/ssllt.2018.8.1.2

Dewaele, J.–M., Chen, X., Padilla, A. M., & Lake, J. (2019). The flowering of positive psychology in foreign/second language teaching and acquisition research. *Frontiers in Psychology*, *10*, 2128. https://doi.org/10.3389/fpsyg.2019.02128

Dewaele, J.–M., & Dewaele, L. (2017). The dynamic interactions in foreign language classroom anxiety and foreign language enjoyment of pupils aged 12 to 18: A pseudo-longitudinal investigation. *Journal of the European Second Language Association*, *1*, 12–22. https://doi.org/10.22599/jesla.6

Dewaele, J.–M., & MacIntyre, P. D. (2014). The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Studies in Second Language Learning and Teaching*, *4*, 237–274. https://doi.org/10.14746/ssllt.2014.4.2.5

Dewaele, J.–M., & MacIntyre, P. D. (2016). Foreign language enjoyment and foreign language classroom anxiety. The right and left feet of FL learning? In P. D. MacIntyre, T. Gregersen, & S. Mercer (Eds.), *Positive psychology in SLA* (pp. 215–236). Multilingual Matters.

Dewaele, J.–M., MacIntyre, P. D., Boudreau, C., & Dewaele, L. (2016). Do girls have all the fun? Anxiety and enjoyment in the foreign language classroom. *Theory and Practice of Second Language Acquisition*, *2*, 41–63. http://www.journals.us.edu.pl/index.php/TAPSLA/article/view/3941

Dewaele, J.–M., Özdemir, C., Karci, D., Uysal, S., Özdemir, E. D., & Balta, N. (2022). How distinctive is the foreign language enjoyment and foreign language classroom anxiety of Kazakh learners of Turkish? *Applied Linguistics Review*, *13*, 243–265. https://doi.org/10.1515/applirev-2019-0021

Dolean, D. D. (2016). The effects of teaching songs during foreign language classes on students' foreign language anxiety. *Language Teaching Research*, *20*, 638–653. https://doi.org/10.1177/1362168815606151

Dörendahl, J., Niepel, C., & Greiff, S. (2020). Actually getting some satisfaction on the job: Need–supply fit of fundamental motives at work. *Frontiers in Psychology*, *11*, 1740. https://doi.org/10.3389/fpsyg.2020.01740

Dupuy, B. C. (1997). Literature circles: An alternative framework for increasing intermediate FL students' comprehension and enjoyment of texts in the target language. *Mosaic: A Journal for Language Teachers*, *5*, 13–16.

Edwards, J. R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, *58*, 51–100. https://doi.org/10.1006/obhd.1994.1029

Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis and response surface methodology. In F. Drasgow & N. Schmitt (Eds.), *Measuring and analyzing behavior in organizations: Advances in measurement and data analysis* (pp. 350–400). Jossey-Bass.

Edwards, J. R. (2007). Polynomial regression and response surface methodology. In C. Ostroff & T. A. Judge (Eds.), *Perspectives on organisational fit* (pp. 361–372). Jossey-Bass.

Edwards, J. R. (2009). Latent variable modeling in congruence research: Current problems and future directions. *Organizational Research Methods*, *12*, 34–62. https://doi.org/10.1177/1094428107308920

Edwards, J. R., & Cable, D. M. (2009). The value of value congruence. *Journal of Applied Psychology*, *94*, 654–677. https://doi.org/10.1037/a0014891

Edwards, J. R., & Parry, M. E. (1993). On the use of polynomial regression equations as an alternative to difference scores in organizational research. *Academy of Management Journal*, *36*, 1577–1613. https://doi.org/10.5465/256822

Fairclough, S. H., Tattersall, A. J., & Houston, K. (2006). Anxiety and performance in the British driving test. *Transportation Research Part F: Traffic Psychology and Behaviour*, *9*, 43–52. https://doi.org/10.1016/j.trf.2005.08.004

Field, A. (2005). *Discovering statistics using SPSS*. SAGE.

Fredrickson, B. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*, 218–226. https://psycnet.apa.org/doi/10.1037/0003-066X.56.3.218

Gkonou, C. (2017). Towards an ecological understanding of language anxiety. In C. Gkonou, M. Daubney, & J.–M. Dewaele (Eds.), *New insights into language anxiety* (pp. 136–156). Multilingual Matters.

Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: A review of technology types and their effectiveness. *Computer Assisted Language Learning*, *27*, 70–105. https://doi.org/10.1080/09588221.2012.700315

Horwitz, E. K. (2010). Foreign and second language anxiety. *Language Teaching*, *43*, 154–167. https://doi.org/10.1017/S026144480999036X

Horwitz, E. K. (2017). On the misreading of Horwitz, Horwitz and Cope (1986) and the need to balance anxiety research and the experiences of anxious language learners. In C. Gkonou, M. Daubney, & J.–M. Dewaele (Eds.), *New insights into language anxiety* (pp. 31–48). Multilingual Matters.

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *Modern Language Journal*, *70*, 125–132. https://doi.org/10.1111/j.1540-4781.1986.tb05256.x

Humberg, S., Nestler, S., & Back, M. D. (2019). Response surface analysis in personality and social psychology: Checklist and clarifications for the case of congruence hypotheses. *Social Psychological and Personality Science*, *10*, 409–419. https://doi.org/10.1177/1948550618757600

Ilmarinen, V.–J., Lönnqvist, J.–E., & Paunonen, S. (2016). Similarity-attraction effects in friendship formation: Honest platoon-mates prefer each other but dishonest do not. *Personality and Individual Differences*, *92*, 153–158. https://doi.org/10.1016/j.paid.2015.12.040

Jameson, M. M. (2014). Contextual factors related to math anxiety in second-grade children. *The Journal of Experimental Education*, *82*, 518–536. https://doi.org/10.1080/00220973.2013.813367

Jiang, Y., & Dewaele, J.–M. (2019). How unique is the foreign language classroom enjoyment and anxiety of Chinese EFL learners? *System*, *82*, 13–25. https://doi.org/10.1016/j.system.2019.02.017

Khajavy, G. H., MacIntyre, P. D., & Barabadi, E. (2018). Role of the emotions and classroom environment in willingness to communicate. *Studies in Second Language Acquisition*, *40*, 605–624. https://doi.org/10.1017/S0272263117000304

Kondo, D. S., & Ying–Ling, Y. (2004). Strategies for coping with language anxiety: The case of students of English in Japan. *ELT Journal*, *58*, 258–265. https://doi.org/10.1093/elt/58.3.258

Li, C., Dewaele, J.–M., & Jiang, G. (2020). The complex relationship between classroom emotions and EFL achievement in China. *Applied Linguistics Review*, *11*, 485–510. https://doi.org/10.1515/applirev-2018-0043

Li, C., Jiang, G., & Dewaele, J.–M. (2018). Understanding Chinese high school students' foreign language enjoyment: Validation of the Chinese version of the Foreign Language Enjoyment scale. *System*, *76*, 183–196. https://doi.org/10.1016/j.system.2018.06.004

MacIntyre, P. D. (1992). *Anxiety and language learning from a stages of processing perspective*. (Unpublished doctoral dissertation). The University of Western Ontario, London, ON, Canada. https://ir.lib.uwo.ca/digitizedtheses/2155

MacIntyre, P. D. (1995). How does anxiety affect second language learning? A reply to Sparks and Ganschow. *Modern Language Journal*, *79*, 90–99. https://doi.org/10.1111/j.1540-4781.1995.tb05418.x

MacIntyre, P. D. (2017). An overview of language anxiety research and trends in its development. In C. Gkonou, M. Daubney, & J.–M. Dewaele (Eds.), *New insights into language anxiety: Theory, research and educational implications* (pp. 11–30). Multilingual Matters.

MacIntyre, P. D., Gregersen, T., & Mercer, S. (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *Modern Language Journal*, *103*, 262–274. https://doi.org/10.1111/modl.12544

Mierzwa, E. (2018). The relationship between foreign language enjoyment and gender among secondary grammar school students. *The Journal of Education, Culture, and Society*, *1*, 117–135. https://doi.org/10.15503/jecs20182.117.135

Milatz, A., Lüftenegger, M., & Schober, B. (2015). Teachers' relationship closeness with students as a resource for teacher wellbeing: A response surface analytical approach. *Frontiers in Psychology*, *6*, 1949. https://doi.org/10.3389/fpsyg.2015.01949

Mughal, S., Walsh, J., & Wilding, J. (1996). Stress and work performance: The role of trait anxiety. *Personality and Individual Differences*, *20*, 685–691. https://doi.org/10.1016/0191-8869(96)00025-6

Oxford, R. (2017). *Teaching and researching language learning strategies: Self-regulation in context*. Routledge.

Saito, Y., & Samimy, K. K. (1996). Foreign language anxiety and language performance: A study of learner anxiety in beginning, intermediate, and advanced-level college students of Japanese. *Foreign Language Annals*, *29*, 239–249. https://doi.org/10.1111/j.1944-9720.1996.tb02330.x

Schönbrodt, F. D., & Humberg, S. (2018). *RSA: An R package for response surface analysis (version 0.9.12)*. https://cran.r-project.org/package=RSA

Seligman, M. E. P., & Csikszentmihalyi, M. (2014). Positive psychology: An introduction. In M. Csikszentmihalyi (Ed.), *Flow and the foundations of positive psychology: The collected works of Mihaly Csikszentmihalyi* (pp. 279–298). Springer. https://doi.org/10.1007/978-94-017-9088-8_18

Shanock, L. R., Baran, B. E., Gentry, W. A., Pattison, S. C., & Heggestad, E. D. (2010). Polynomial regression with response surface analysis: A powerful approach for examining moderation and overcoming limitations of difference scores. *Journal of Business and Psychology*, *25*, 543–554. https://doi.org/10.1007/s10869-010-9183-4

Spahn, C., Echternach, M., Zander, M. F., Voltmer, E., & Richter, B. (2010). Music performance anxiety in opera singers. *Logopedics Phoniatrics Vocology*, *35*, 175–182. https://doi.org/10.3109/14015431003720600

Teimouri, Y., Goetze, J., & Plonsky, L. (2019). Second language anxiety and achievement: A meta-analysis. *Studies in Second Language Acquisition*, *41*, 363–387. https://doi.org/10.1017/S0272263118000311

Thompson, A. S., & Khawaja, A. J. (2016). Foreign language anxiety in Turkey: The role of multilingualism. *Journal of Multilingual and Multicultural Development*, *37*, 115–130. https://doi.org/10.1080/01434632.2015.1031136

Wei, H., Gao, K., & Wang, W. (2019). Understanding the relationship between grit and foreign language performance among middle school students: The roles of foreign language enjoyment and classroom environment. *Frontiers in Psychology*, *10*, 1508. https://doi.org/10.3389/fpsyg.2019.01508

Young, D. J. (1991). Creating a low-anxiety classroom environment: What does language anxiety research suggest? *Modern Language Journal*, *75*, 426–439. https://doi.org/10.2307/329492

Zhang, H., Dai, Y., & Wang, Y. (2020). Motivation and second foreign language proficiency: The mediating role of foreign language enjoyment. *Sustainability*, *12*, 1302. https://doi.org/10.3390/su12041302

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.