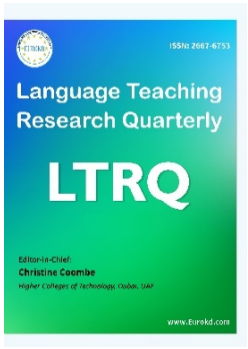

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A Longitudinal Examination of Changes in Language Teachers' Anxiety and Enjoyment Using Growth Curve Modeling

Julia Goetze

University of Wisconsin-Madison, United States

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Abstract

For over 30 years, Peter MacIntyre shaped and innovated the way(s) in which second language acquisition (SLA) researchers investigate individual differences (IDs) of language learners. His work significantly contributed to the sophistication of conceptual models for learner ID variables such as willingness-to-communicate, anxiety, and enjoyment, advanced theoretical perspectives and approaches, and pioneered methodological innovations, such as the idiodynamic method. The purpose of the present study is to take Peter's pioneering vision and innovative spirit as starting points and to apply multiple aspects of his work to the empirical investigation of language teacher IDs. Specifically, the study takes a longitudinal approach and examines the (dynamic) change trajectories in language teachers' anxiety and enjoyment in two different classroom scenarios over a period of nine weeks. Quantitative online survey data was collected from 93 language teachers and analyzed via individual growth curve modeling, using gender and experience level as time-invariant, and coping potential as time-varying covariates. Results indicate unique change trajectories and inter-individual differences for both emotions across both classroom scenarios. Findings also suggest that time-varying, rather than time-invariant variables, consistently explained substantive amounts of variance and variability in language teachers' emotion trajectories. Directions for future research and practical implications are discussed.

Keywords: *Language Teacher Emotions, Anxiety, Enjoyment, Growth Curve Modeling, Coping Appraisal*

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* Corresponding author.
E-mail address: julia.goetze@wisc.edu
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[1]Introduction

Individual difference (ID) research is a thriving subdomain of second language acquisition (SLA) research. While IDs have historically been conceptualized and investigated as more stable traits with little change over time, a plethora of recent ID studies has adopted and supported a dynamic view of IDs (Li et al., 2022), which assumes that variables continuously and dynamically change, albeit along different timescales (e.g., MacIntyre, 2020). Research on learner (achievement) emotions are no exception to this trend (e.g., Chen, 2023; Gregersen, 2020). Numerous recent studies on language learner anxiety have adopted complex and/or dynamic systems perspectives and utilized novel methods (e.g., the idiodynamic method, retrodictive qualitative modeling) to show that language learners' anxiety continuously interacts with numerous person, context, and situation factors that cause fluctuations over time, whereby timescales of change range from seconds to days to months or even years (MacIntyre, 2017). Similarly, recent investigations of language learner enjoyment have embraced complexity frameworks and their associated methods to capture empirical evidence for its dynamic fluctuation over time (e.g., Boudreau et al., 2018; Elahi Shirvan et al., 2020; Kruk et al., 2022).

While a lot is known about the dynamics of language learner emotions, research on language teachers' emotions, such as anxiety and enjoyment, as well as their dynamic change over time, is still comparatively scarce. Some of the existing research provides evidence that language teacher emotions are equally as dynamic as learner emotions and fluctuate in response to person, context, and situation factors as well. For example, Ikeda et al. (2020) investigated EFL teachers' anxiety longitudinally using a questionnaire, retrospective "anxiety timeline graphs" (p. 179), and stimulated recall interviews and found that each teacher had a unique anxiety trajectory, which was affected by person factors, such as teaching experience, or context factors, such as teacher training, administrative tasks, or classroom observations. However, existing studies of language teacher enjoyment have primarily focused on sources of foreign language teaching enjoyment (Mierzwa, 2019) or factors contributing to "enjoyment as a teacher" (Thumvichit, 2022, p. 8). To my knowledge, no longitudinal studies and, consequently, empirical evidence for language teacher enjoyment's dynamicity or how sources of enjoyment contribute to its stability or fluctuations over time exist. Accordingly, novel analytical methods such as growth curve modeling (GCM; Zhang, 2022; Zhou et al., 2023) that are suitable to capture dynamic changes in emotions longitudinally and to examine individual differences between them have not been employed in SLA studies of teachers' emotions yet.

To address these gaps, the objective of the current study is twofold. First, the study contributes to the existing body of knowledge by examining the change trajectories in language teachers' enjoyment and anxiety across two language classroom scenarios over a period of nine weeks both at the individual and at the group level. Second, it investigates the role of two time-invariant variables (gender, teaching experience) and two time-varying variables (emotion-focused coping, problem-focused coping) in explaining the inter- and intra-individual variance in language teachers' enjoyment and anxiety over time. The aim is to examine the utility of GCM as an innovative methodology to describe and explain dynamic changes in individual

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language teachers' anxiety and enjoyment trajectories over time, while also capturing inter-individual differences in teachers' emotion trajectories.

Literature Review

Language Teacher Emotions

The language teacher has long been an afterthought in instructed SLA inquiry (Mercer & Kostoulas, 2018). However, following Mercer's (2018) call to consider teachers as significant language classroom participants, whose experiences, perceptions, and psychologies shape classroom interactions and student learning, and the advent of the positive psychology movement in SLA (MacIntyre, 2016), this imbalance between investigations of language learners and teachers is slowly beginning to be redressed. Consequently, studies of teachers' psychologies, including their motivations, identities, and beliefs, have gained momentum in recent years. One variable that has received increased attention, especially in light of the Covid pandemic, is language teacher well-being (Resnik & Mercer, 2024), which is frequently connected to teachers' (positive) emotional experiences in the classroom and beyond (e.g., MacIntyre et al., 2019). While language teachers' emotions have been considered outcomes of well-being (e.g., Ergün & Dewaele, 2021), they have not yet received much research attention in their own right. This is somewhat surprising since language teacher emotions have not only been linked to well-being but also student classroom emotions and attitudes (Moskowitz & Dewaele, 2021), making them a meaningful variable in the context of instructed SLA research.

In contrast, teacher emotion research in general education is an established domain of inquiry, where they are defined as emotions related to professional duties (Frenzel et al., 2020) and linked to person factors (e.g., motivation, self-efficacy), student factors (e.g., emotions, engagement), and institution factors (e.g., collegial relationships) (Wu & Chen, 2018). Notably, this body of research is almost exclusively grounded in appraisal theory (e.g., Lazarus, 1991), which posits that emotional experiences result from an individual's appraisal of a situation. According to the theory, appraisals activate other components of an emotional episode, such as facial expressions, motivational tendencies, or physiological changes, which are comprehensively experienced as an emotional state. Due to the situatedness of appraisals in concrete events, existing research has frequently utilized situation-based methods, such as vignette methodology (Goetze, 2023a), to elicit emotion ratings from large samples of teachers. Vignettes are text or video-based stimuli that serve as basis for participants to create mental images (e.g., Kosslyn et al., 2006) that are vivid enough to evoke emotional reactions (e.g., Smith & Ellsworth, 1985). They are considered a hybrid method of retrospective and in-situ data collection that produces valid data (Schorr, 2001). Vignettes are deemed especially suitable for quantitative data collection from teachers, whose work contexts make it all but impossible to replicate classroom situations at a large scale. Using this combination of appraisal and vignettes, general education research has investigated teachers' joy, pride, love, anger, anxiety and boredom (Chen, 2019; Frenzel et al., 2016; Sutton & Wheatley, 2003), linking them to student performance and teacher well-being.

In SLA, recent teacher emotion research has adopted similar approaches to produce initial insights into language teachers' complex emotional realities. Fraschini and Park (2021) used appraisal theory in combination with Q methodology to examine the link between language teachers' appraisals of professional stressors and their emotional experiences. Findings

provided initial empirical evidence for the causal link between language teachers' appraisals and subsequent emotional responses to the same stressors, as well as the inter-individual variability in appraisals and emotions. Similarly, Dumančić et al. (2022) combined appraisal theory with a qualitative approach to explore the link between language teachers' appraisals and emotions across various classroom situations. Their findings show a complex reality of positive and negative emotions which were systematically linked to teachers' varying appraisals of the same classroom aspect, such as student behavior. Lastly, Goetze (2023b) used appraisal theory and vignettes to examine the complexity of language teachers' classroom emotions and found that appraisals of teachers' coping potential play a significant role in determining the quality of an emotional response. Her findings lend support to the hypothesis that appraisals of high and low coping potential can differentiate emotional responses into unpleasant (e.g., fear, anxiety) or pleasant (e.g., joy, happiness) (Ellsworth & Scherer, 2003). While these studies support the usefulness of appraisal theory and situation-based methodologies in the investigation of language teachers' classroom emotions, they primarily provide snapshots into the emotional complexity of teachers' classroom realities without tracing emotional complexity or the dynamicity of focal emotions over time.

(Language) Teacher Enjoyment and Anxiety

In general education, two perspectives on teacher enjoyment exist. The first one suggests that enjoyment is one of the most frequent and salient positive emotions that teachers experience and links it to appraisals of goal attainment in relation to student classroom behavior (Frenzel, 2014). The second one defines enjoyment as an achievement emotion that results from positive value appraisals of a task, over which an individual has a significant amount of control (Pekrun, 2006). Both research traditions are rooted in appraisal theory and tend to use cross-sectional designs that rely mainly on self-reports and Q methodology. Studies have produced empirical findings that link teacher enjoyment to positive teacher-centered outcomes, such as reduced burnout (Frenzel et al., 2016), and positive student-centered outcomes, such as increased student enjoyment (Frenzel et al., 2018).

In SLA, studies on language teacher enjoyment only recently emerged in response to calls for more research into language teacher psychologies (Mercer & Kostoulas, 2018), both as a result of positive psychology as a burgeoning research paradigm (MacIntyre, 2016), and in response to growing concerns about language teacher well-being during and post-pandemic (e.g., Sulis et al., 2021). In 2021, Ergün and Dewaele were the first to consider enjoyment as an outcome variable in their study of language teacher well-being and since then, to my knowledge, only one other study has focused on the variable. Thumvichit (2022) adopted a theoretical approach from general education and defined language teacher enjoyment as "FL teachers' subjective satisfaction, motivational tendencies, expression, and caused by appraisals involving goal alignment and goal conduciveness, as well as appraisals of controllability and personal agency" (p. 2). Using Q methodology, he found that language teachers shared common experiences but varied in their perspectives of them, which impacted their levels of enjoyment. Notably, he found gender differences in the perception of some workplace scenarios, which raises questions about the role of gender in the systematic variance of appraisals and resulting emotions among language teachers.

SLA studies focusing on language teacher anxiety have a longer history than enjoyment research. Almost 30 years ago, Horwitz (1996) introduced the teacher-centered variable of foreign language anxiety and conceptualized it as closely related to advanced language students' language use anxiety, meaning that (nonnative) teachers' low confidence in their target language use abilities were linked to higher levels of anxiety, which could negatively impact instructional practices. However, she added that situated and contextualized language use-unrelated factors, such as disruptive and disrespectful student behavior and institutional performance standards, also contribute to language teachers' anxious classroom experiences, though this type of anxiety was closer related to the task of teaching more generally.

Despite her dyadic definition, most studies of language teacher anxiety have focused on the language use-related aspect of the construct. Most of these studies use a cross-sectional design and self-reports to capture sources or levels of language use-related teacher anxiety (e.g., Kim & Kim, 2004) or to validate instruments like the Teacher Foreign Language Anxiety Scale (TFLAS; Horwitz, 2008) across different contexts (e.g., Machida, 2016). More recently, SLA scholars have broadened the scope of inquiry, adopted appraisal theory, and used Q sorts and qualitative methods (e.g., journal entries) to investigate situation and context factors of language teacher anxiety. For example, Fraschini and Park (2021) explored how language teachers' subjective perceptions of their work environment affect their anxiety levels, while Dumančić et al. (2022) shed light on specific classroom situations that could be perceived as anxiety-provoking by language teachers.

Notably, Liu and Wu (2021) investigated both types of language teacher anxiety and found distinct triggers for each anxiety type. More general teaching anxiety included situation, institution, and psychological factors, while language use-specific anxiety was exclusively linked to a perceived lack in confidence and competence in target language use. Additionally, a recent review of the literature suggests that experience level, career stage, and native speaker status might systematically affect language teachers' anxiety levels (Goetze, 2023c). To date, only one longitudinal examination of language teacher anxiety exists, which provides initial evidence for the significance of these covariates. Ikeda et al. (2020) traced fluctuations of anxiety in six primary school EFL teachers over two terms, using a mixed methods approach. Findings show dynamic and idiosyncratic trajectories for each teacher and fluctuations were linked to person factors (experience level), situation factors (teaching demonstrations), and context factors (administrative roles). However, due to the small sample size and lack of additional longitudinal studies, it remains unclear whether these factors are general and systematic covariates of language teacher anxiety.

Previous Uses of Growth Curve Modeling (GCM) in (Language Teacher) Emotion Research

Considering that previous research suggests that (language) teacher emotions are situated subjective experiences that vary between individuals and potentially over time, some have argued that new methods are needed that go beyond a descriptive level to capture evidence for such dynamicity and variability (Zhang, 2022; Zhou et el., 2023). Growth curve modeling (GCM) has been introduced as one such method, which is particularly suited "for the investigation of temporal change in L2 affective variables" (Zhang, 2022, p. 2). GCM is a type of structural equation modeling, also known as mixed-effects modeling or multilevel modeling (Zhou et al., 2023), which affords the analysis and modeling of data at multiple levels, making

it possible to mathematically capture variations within and between individuals (Wickrama et al., 2016). Additionally, GCM is compatible with a complex and dynamic systems perspective, as it affords researchers to simultaneously trace intra- and inter-individual variations over time, while also examining the effect of covariates on the observed change patterns.

Put differently, the benefits of GCM vis-à-vis traditional analytical methods in SLA, such as regressions or AN(C)OVAs are manifold (Zhang, 2022; Zhou et el., 2023). First, time as a variable is automatically integrated in the model, making it suitable to examine longitudinal data. Second, GCM affords the simultaneous investigation of individual-level changes and inter-individual differences of trajectories of affective variables. Lastly, GCM offers the option to investigate the effect of covariates on trajectories at different levels of the model, making it possible to examine how more stable intra-personal factors (e.g., gender) and more dynamic situation factors (e.g., appraisals) affect variability in trajectories.

In SLA, only very few existing studies have applied this analytical approach to investigate language learner emotions, such as boredom and enjoyment. For example, Kruk et al. (2021) used GCMs to trace the development of the subdimensions of boredom in an online EFL class, finding that both subdimensions significantly decreased over time and intra- and inter-individual variances were explained by a global boredom factor. Elahi Shirvan et al. (2021) used GCMs to investigate the simultaneous development of L2 grit and FL enjoyment. Their findings showed significant covariances between grit and enjoyment levels, as well as change rates, leading the authors to conclude that a parallel process between enjoyment and grit exists. Due to the scarcity of language teacher emotion studies and the absence of longitudinal investigations in the domain, no previous study of language teacher emotions has employed GCM.

Research Questions

Based on the review of the literature, I pose the following research questions:

RQ$_1$: How do individual language teachers' anxiety and enjoyment levels change over time?

RQ$_2$: How do the rates of change in anxiety and enjoyment over time vary across teachers?

RQ$_3$: To what degree can the rates of change in language teachers' anxiety and enjoyment levels be explained by their gender, amount of teaching experience, and appraisals of coping potential?

Methodology

Participants

A total of 93 language teachers (20% male) with a mean age of 37.5 years (*SD* = 11.14) and 12.42 years of language teaching experience (*SD* = 8.94) participated in the study, which included the completion of three online surveys over a period of nine weeks. Participating teachers reported a broad range of home countries across multiple continents, including the United States, Germany, Sweden, Spain, Italy, India, Russia, Turkey, Chile, Argentina, Colombia, Palestine, Taiwan, and Nigeria, and an equally diverse range of L1s, including English, Italian, Spanish, Swedish, Catalan, German, French, Russian, Hindi, Arabic, Turkish, Hausa, Romanian, Serbian, Japanese, Chinese, Oriya, and Yoruba. Most teachers reported gaining their language teaching experience in the United States, but many also reported teaching experiences in other countries, including Japan, South Korea, Taiwan, Thailand,

Malaysia, Canada, Germany, Spain, Belgium, Greece, Italy, Sweden, Austria, France, Poland, Romania, Russia, Australia, Honduras, Paraguay, Costa Rica, Guatemala, El Salvador, Colombia, Peru, Argentina, Uruguay, Brazil, Bolivia, Nigeria, and Senegal. Target languages in participating teachers' classrooms included English (i.e., ESL/EFL), Spanish, German, French, Italian, Swedish, French, Serbian, Russian, Hindi, Hoocak, Japanese, Arabic, Hausa, Turkish, Chinese, Yoruba, and Wolof.

Instruments

Background information

A background information form collected basic demographic information from participants, including their gender, age, as well as their L1(s). Additionally, the form collected information on teachers' professional background, including teaching experience in years, all languages taught, and the language they considered having the most experience teaching.

Vignettes

This study adopts appraisal theory as its emotion framework (Lazarus, 1991), which posits that evaluations of stimuli in one's environment, rather than the stimuli themselves, are causally linked to the experience of an emotion. Additionally, it is based on the underlying assumption that language teachers' emotions are situation-specific and emerge from the interaction between person and situation factors (e.g., Frenzel, 2014). The study, therefore, adopts select classroom scenarios as units of analysis to collect emotion data from teachers. However, teacher-centered research presents the unique challenge that classroom scenarios cannot easily be replicated to collect the required quantities of data needed to conduct inferential statistical analyses with appropriate levels of statistical power.

To address this challenge, the study used vignette methodology (Goetze, 2023a) and utilized text-based vignettes, which have been validated in previous research (Goetze, 2018, 2023b). In line with vignette methodology, research participants were asked to create mental images (e.g., Kosslyn et al., 2006) of classroom situations based on the following two text-based stimuli, which are also available through the IRIS repository (https://www.iris-database.org/).

1. Your supervisor announces a visit to your class to observe your teaching. During the classroom visit, your supervisor sits in the back of your classroom, continuously taking notes. (henceforth Supervisor)
2. It is the first week of classes and you are still in the process of getting to know your students. This semester, you encounter a group of students in your classroom who give you a lot of negative attitudes. Specifically, they overestimate their language abilities and do not take you seriously as an instructor. Additionally, they constantly make irritated faces at you and at each other and frequently make disrupting remarks or jokes, which are unrelated to class content. (henceforth Student Attitudes)

Appraisal questionnaire

After reading each vignette and creating a mental image, participants were asked to appraise six dimensions of the scenario they had imagined themselves in, following Smith and Lazarus'

(1993) appraisal framework. These appraisals included the importance of the vignette content, the level of congruence of the vignette content with personal classroom or teaching goals, the level of personal accountability for the situation described in the vignette, the amount of problem-focused coping potential (i.e., the ability to act on the imagined situation to make it more congruent with one's goals), the amount of emotion-focused coping potential (i.e., the ability to adjust psychologically to the imagined situation regardless of its outcome), and the degree to which one expected the situation to change in the future. Each appraisal dimension was captured with two items, which were rated on a 10-point Likert-type scale that ranged from "not at all" (1) to "a great deal" (10). Sample items for the coping potential sub-scales included *To what extent did you think that you had the ability to accept or adjust to the situation emotionally, regardless of its outcome?* (i.e., emotion-focused coping potential) and *How certain were you that you had the ability to change (or keep) the situation the way you ideally wanted it to be?* (i.e., problem-focused coping potential). Only data pertaining to appraisals of emotion and problem-focused coping potential are used and reported in the current study.

Emotion questionnaire

Following the appraisal questionnaire, participants reported the quality and intensity of the emotion(s) they experienced while imagining the described classroom scenario. Emotion data was collected via an adapted version of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). The original PANAS is a 20-item scale that captures both the quality and intensity of an emotion. Specifically, each item on the PANAS is an emotion word (e.g., guilty, inspired) and respondents rate to what extent they have felt this way at a specific point in time or during a predetermined timeframe on a five-point Likert-type scale, which ranges from "not at all" (1) to "extremely" (5). The original scale includes 10 positive emotions (e.g., inspired, enthusiastic) and 10 negative emotions (e.g., ashamed, guilty).

Based on previous research that used the same vignettes and found a high degree of emotional complexity that included the presence of emotions not captured by the original PANAS scale (Goetze, 2023b), 15 emotion words were added to the original scale (e.g., joyful, surprised, calm, frustrated, optimistic) in the present study. The original five-point Likert-type rating scale was retained and the timeframe from which to report the emotions was set to the moment of the creation of the mental image.

Consequently, participants were presented with a list of 35 adjectives, each of which represented a distinct emotional state. For each adjective, participants reported whether and with what intensity they experienced that emotion at the moment they imagined themselves in the vignette scenario. In other words, the modified scale used single-item subscales to capture the presence and intensity of 35 emotions in each vignette respectively. Only the anxiety and enjoyment data are used and reported in the current study.

Procedure

The present study received approval from my institutional review board before data collection in September 2023. Survey data was collected as part of a larger project between October and December 2023 via Qualtrics from language teachers worldwide, using convenience and snowball sampling (Wilson & Dewaele, 2010). Recruitment included emails, calls for participation via professional network mailing lists, and social media posts. Participation in the

study required the completion of a set of three surveys. The surveys were administered three weeks apart, meaning that participants received a personalized email invitation to complete the next survey three weeks after completing the previous one. For each survey, teachers had seven days to record and submit their answers online. Each survey collected identifiers to connect survey responses to the same participant, but data was anonymized before analysis. Each survey presented text-based vignettes that described different classroom scenarios and asked respondents to imagine the scenario and to subsequently report the quality and intensity of the emotion(s) they would experience in such a scenario. The order of the vignettes was changed at every survey iteration.

Analyses

Data analysis followed the procedure outlined in Zhou et al.'s (2023) tutorial for growth curve modeling in applied linguistics. To answer RQ_1, the intra-individual changes in anxiety and enjoyment were examined by visually plotting each language teachers' trajectory for each emotion and each vignette. Additionally, Ordinary Least Squares regression models for each participant, each emotion, and each vignette were calculated to mathematically assess whether individual teachers' emotional experiences changed significantly over the course of a semester.

To answer RQ_2, individual and mean change trajectories were calculated and visually plotted for each emotion and vignette. The plots were examined to determine whether the mean change trajectory served as an adequate representation for individual teachers' emotional change over the semester. Following the visual inspection, unconditional growth curve models for anxiety and enjoyment for each vignette were calculated. These models use time as the sole variable to estimate the change trajectories, which aim to explain both intra-individual change and inter-individual differences in intra-individual change (Zhou et al., 2023).

To answer RQ_3, conditional growth curve models for anxiety and enjoyment for each vignette were calculated to estimate the effects of gender and amount of teaching experience as time-invariant covariates, as well as the effects of appraisals of emotion-focused coping potential and problem-focused coping potential as time-varying covariates on language teachers' emotion trajectories. Additionally, all conditional models were compared to their corresponding unconditional models using chi-square (χ^2) difference tests to explore whether time-invariant and/or time-varying factors have significant explanatory value for changes in teachers' trajectories for enjoyment and anxiety. All calculations were performed using the open-source *lattice, lme4* and *lmerTest* packages in R Studio Version 2024.04.1+748, adopting the R codes provided by Zhou et al.'s (2023) tutorial for individual growth curve modeling, which are available on IRIS (https://www.iris-database.org/).

Results

Descriptive Statistics

Table 1 contains the descriptive statistics for anxiety and enjoyment across both vignettes. Since both emotions were captured with single-item scales, no reliability coefficients are reported. Results indicate that the mean for both emotions across scenarios falls in the lower range of the rating scale (i.e., not at all (1), somewhat (2)). Additionally, unique trends can be observed for each vignette. In Supervisor, both anxiety and enjoyment have similar means that

slightly decrease across the timeframe of the study. In contrast, the means for both emotions are relatively stable across time in Student Attitudes.

Table 1

Descriptive Statistics for Anxiety and Enjoyment across Vignettes and Surveys

	Survey 1		Survey 2		Survey 3	
	M	*SD*	M	*SD*	M	*SD*
Supervisor						
Anxiety	2.84	1.31	2.64	1.29	2.37	1.29
Enjoyment	2.38	1.23	2.29	1.27	2.21	1.27
Student Attitudes						
Anxiety	2.62	1.35	2.69	1.23	2.65	1.24
Enjoyment	1.38	.83	1.38	.70	1.25	.54

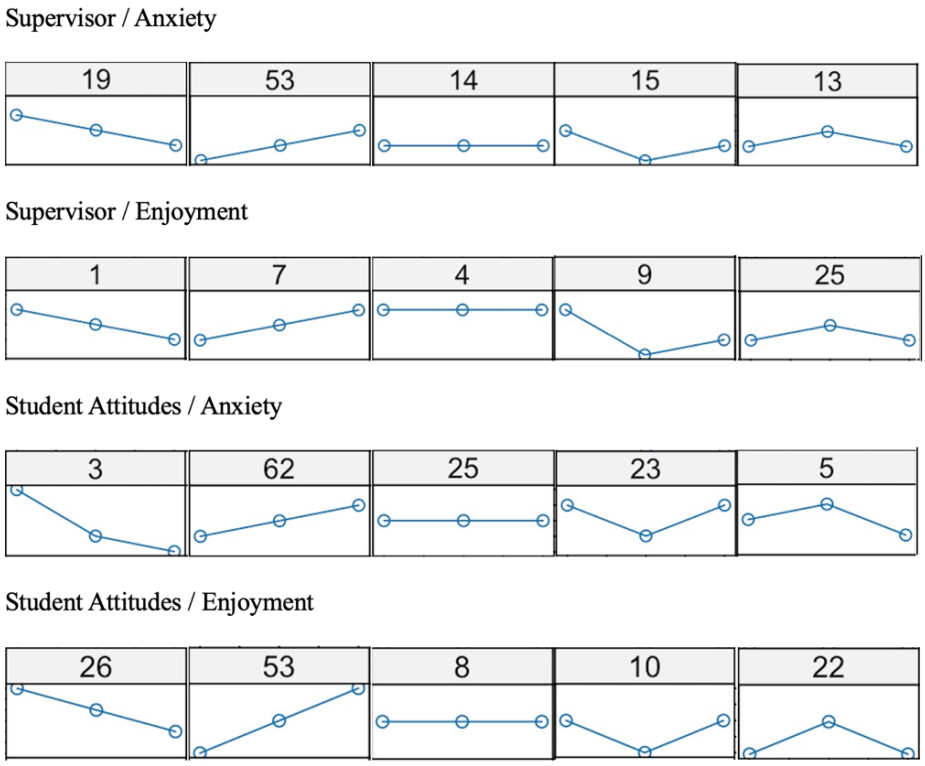
Notes: Survey 1 = October, Survey 2 = October / November, Survey 3 = November / December

Intra-Individual Changes in Teachers' Anxiety and Enjoyment over Time

The visual inspection of the plots for emotion trajectories showed five unique patterns for language teachers' variability in anxiety and enjoyment across both vignettes. While some trajectories are flat and indicate no change over time, some show continuously increasing or decreasing slopes. Additionally, some slopes indicate an increase from Survey 1 to Survey 2 and a decrease at Survey 3, or vice versa, namely a decrease from Survey 1 to Survey 2 and an increase at Survey 3. Sample trajectories showing these patterns for each emotion and vignette are displayed in Figure 1.

Figure 1

Sample Anxiety and Enjoyment Trajectories across both Vignettes



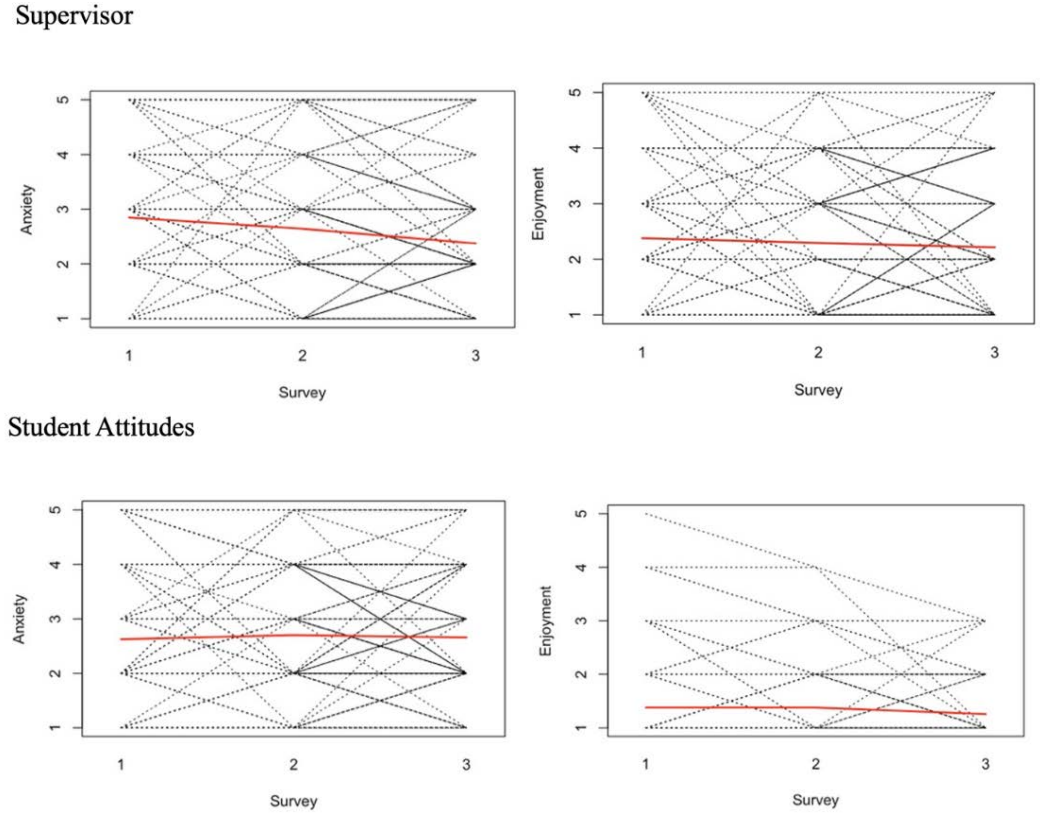
Ordinary Least Squares regression models for each language teacher for each emotion in each vignette confirmed that slopes differed from one another, and that some teachers' anxiety and/or enjoyment levels changed significantly within one or both scenarios across the nine-week period. Due to space restrictions, these models are not reported here but are available upon request.

Inter-Individual Differences in Teachers' Anxiety and Enjoyment Trajectories

Figure 2 visually represents the inter-individual differences in emotion trajectories for both vignettes. The dotted lines represent individual teachers' trajectories, while the red line represents the mean trajectory for each emotion and vignette respectively. The plots show strong variations in teachers' initial anxiety and enjoyment levels as well as their change trajectories for both vignettes. Additionally, the mean trajectories suggests that they do not adequately capture the inter-individual variability in teachers' emotion trajectories in either vignette.

Figure 2

Inter-Individual Differences and Mean Anxiety and Enjoyment Trajectories



Unconditional Growth Curve Models for Anxiety

All (un)conditional growth curve models for anxiety are displayed in Table 2. All models are two-level models, in which Level 1 estimates intra-individual changes over time and Level 2 describes inter-individual differences in teachers' anxiety trajectories. The unconditional models (i.e., Model 1) consider time as the sole explanatory variable for intra-individual change and inter-individual differences in intra-individual change.

In Supervisor, the initial mean anxiety score is 2.86 ($p < .001$) with an average slope of -.23 ($p < .001$), meaning that respondents felt moderately anxious when they imagined this

scenario for the first time, but their anxiety level decreased over the nine-week period by 0.23 points on average. The Level 1 residual (σ^2_ε = .46, *SD* = .68; 95% CI [.59, .78]) suggests that some of the variance in teachers' anxiety trajectory remains unexplained when time is the only explanatory variable in the model. Additionally, the Level 2 intercept (σ^2_0 = 1.24, *SD* = 1.11; 95% CI [.91, 1.35]) and slope (σ^2_1 = .04, *SD* = .21; 95% CI [.00, .40]) indicate that significant inter-individual differences in initial anxiety levels existed, while the change rate of anxiety did not significantly differ between teachers.

In Student Attitudes, the initial mean anxiety score is slightly lower (2.64, $p < .001$) with a mean slope of .01 (p = .787), meaning that teachers also felt somewhat anxious when they imagined this scenario for the first time. However, their anxiety level did not significantly change over the nine-week period. The Level 1 residual (σ^2_ε =.65, *SD* = .81, 95% CI [.73, .89]) indicates that unexplained variance in teachers' anxiety patterns remains when time is the sole explanatory variable. The Level 2 intercept (σ^2_0 = 1.07, *SD* = 1.03, 95% CI [.83, 1.27]) and slope (σ^2_1 = .00; *SD* = .05, 95% CI [.00, .18]) for this vignette also suggest that significant inter-individual differences in initial anxiety levels existed, while the change rate of anxiety did not significantly differ between teachers.

Table 2

Parameter Estimates for the (Un)Conditional Growth Curve Models for Anxiety

			Supervisor					Student Attitudes			
	Parameter	Model 1 (Time)	Model 2 (Gender)	Model 3 (Exp.)	Model 4 (EC)	Model 5 (PC)	Model 1 (Time)	Model 2 (Gender)	Model 3 (Exp.)	Model 4 (EC)	Model 5 (PC)
Fixed effects	Intercept (β_{00}) (T)	2.86***	2.96***	3.00***	4.15***	3.89***	2.64***	2.85***	2.47***	4.27***	3.83***
	Slope (β_{10}) (T)	-.23***	-.25***	-.21*	-.26	-.36	.01	-.01	.14	-.23	-.31
	Intercept (β_{01}) (G)		-.50					-1.01**			
	Slope (β_{11}) (G)		.09					.14			
	Intercept (β_{01}) (E)			-.25					.27		
	Slope (β_{11}) (E)			-.04					-.21		
	Intercept (β_{20}) (EC)				-.17**					-.25***	
	Interaction (β_{30}) (EC x Survey #)				.00					.04	
	Intercept (β_{20}) (PC)					-.14*					-.19***
	Interaction (β_{30}) (PC x Survey #)					.01					.05
Random effects											
Level 1	Residual (σ^2_ε)	.46	.46	.46	.47	.48	.65	.65	.64	.63	.65
Level 2	Intercept (σ^2_0)	1.24	1.20	1.22	1.02	1.02	1.07	.90	1.06	.65	.82
	Slope (σ^2_1)	.04	.04	.04	.03	.03	.00	.00	.00	.00	.00
	Correlation (r_{10})	-.42	-.40	-.44	-.38	-.27	-1.00	-1.00	-1.00	1.00	1.00
Goodness-of-fit	Deviance	790.05	787.63	788.19	776.05	782.58	831.36	820.50	828.11	801.91	818.5
	AIC	802.05	803.63	804.19	792.05	798.58	843.36	836.50	844.11	817.91	834.5
	BIC	823.83	832.68	833.24	821.10	827.63	865.15	865.55	873.16	846.96	863.5

Notes: ***p < .001, **p < .01, *p < .05; T = time, G = gender, E = experience, EC = emotion-focused coping, PC = problem-focused coping

Time-Invariant Explanatory Variables for Anxiety: Gender and Teaching Experience

Models 2 and 3 present the conditional growth curve models for time-invariant covariates that might account for a portion of the unexplained variance in the unconditional model. Model 2 uses gender as a covariate, while Model 3 uses the amount of teaching experience. To account for effects of gender, the sample was divided and coded into male and non-male (i.e., including female and non-binary teachers). To account for amount of teaching experience, the sample was divided into novice language teachers with up to eight years of experience, and experienced language teachers with more than eight years of experience.

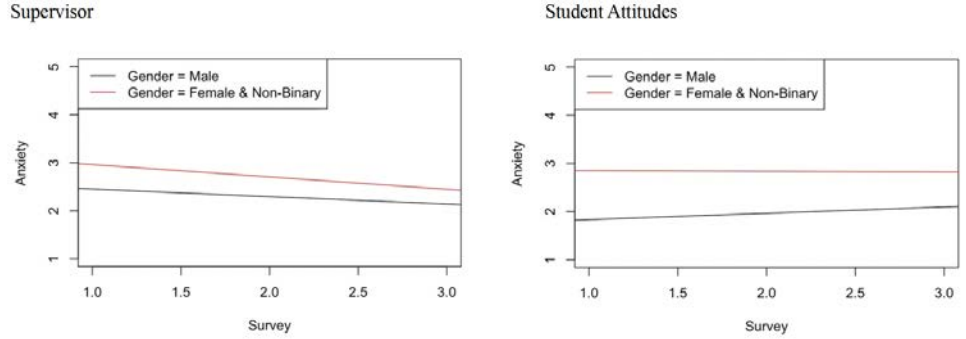
Model 2: Gender

In Supervisor, female and non-binary teachers reported higher anxiety levels (β_{00} = 2.96, p < .001) than their male peers (β_{01} = -.50, p = .121), although the difference is statistically insignificant. The difference in change rate is also statistically insignificant, even though female and non-binary teachers reported a higher rate (β_{10} = -.25, p < .001) than their male peers (β_{11} = .09, p = .470). The Level 1 residual (σ^2_ε = .46; *SD* = .68; 95% CI [.59, .78]) suggests that there is still unexplained variance in language teachers' anxiety trajectories when gender is controlled for. The Level 2 intercept (σ^2_0 = 1.20, *SD* = 1.09; 95% CI [.89, 1.33]) and slope (σ^2_1 = .04, *SD* = .21; 95% CI [.00, .40]) indicate inter-individual differences in initial anxiety levels but no significant differences in the change rate. The chi-square difference test ($\Delta\chi^2$ = 2.41, Δdf = 2, p = .298) suggests that gender is not a strong explanatory variable for differences in teachers' anxiety trajectories in the Supervisor vignette.

In Student Attitudes, female and non-binary teachers reported significantly higher anxiety levels (β_{00} = 2.85, p < .001) than their male peers (β_{01} = -1.01, p < 0.01), but no statistically significant differences for the mean rate of change was found. Similar to the Supervisor vignette, the Level 1 residual score (σ^2_ε = .65, *SD* = .80; 95% CI [.71, .89]) suggests remaining unexplained variance in the change patterns of anxiety when gender is controlled for. The Level 2 intercept (σ^2_0 = .90, *SD* = .95; 95% CI [.75, 1.18]) and slope (σ^2_1 =.00, *SD* = .03; 95% CI [.00, .13]) reveal significant inter-individual differences in initial anxiety levels, but the variability in the rates of change is statistically insignificant again. Despite these findings, the chi-square difference test ($\Delta\chi^2$ = 10.86, Δdf = 2, p = .004) suggests that gender has a strong explanatory value for differences in teachers' anxiety trajectories in the Student Attitudes vignette. The results for Model 2 for both vignettes are visually represented in Figure 3.

Figure 3

Gender Differences in Anxiety across Vignettes



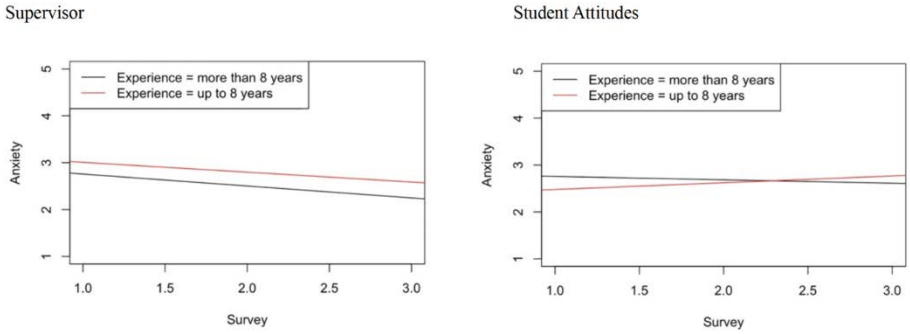
Model 3: Teaching experience

In Supervisor, novice teachers reported higher anxiety levels (β_{00} = 3.00, p < .001) than their experienced peers (β_{01} = -.25, p > .1), although the difference is statistically insignificant. The difference in change rate is also insignificant, though novices reported a higher rate (β_{10} = -.21, p < .05) than experienced teachers (β_{11} = -.04, p > .1). The Level 1 residual (σ^2_ε = .46, *SD* = .68; 95% CI [.59, .78]) suggests that unexplained variance in language teachers' anxiety trajectories remains when teaching experience is controlled for. The Level 2 intercept (σ^2_0 = 1.22, *SD* = 1.10; 95% CI [.90, 1.34]) and slope (σ^2_1 = .04, *SD* = .21; 95% CI [.00, .40]) indicate inter-individual differences in initial anxiety levels but no significant unexplained variability in anxiety change rate. The chi-square difference test ($\Delta\chi^2$ = 1.85, Δdf = 2, p = .395) suggests that that teaching experience is not a meaningful variable in explaining differences in teacher anxiety trajectories in the Supervisor vignette.

In Student Attitudes, novice teachers reported lower anxiety levels (β_{00} = 2.47, p < .001) than their experienced peers (β_{01} = .27, p = .298), although the difference is statistically insignificant. Similarly, no statistically significant differences for the change rate of anxiety were found. However, results suggest that novice teachers' anxiety increased slightly, while experienced teachers' anxiety decreased over time. The Level 1 residual (σ^2_ε = .64, *SD* = .80; 95% CI [.71, .89]) suggests that unexplained variance in language teachers' anxiety trajectories remains after controlling for teaching experience. The Level 2 intercept (σ^2_0 = 1.06, *SD* = 1.03; 95% CI [.83, 1.26]) and slope (σ^2_1 = .00, .05; 95% CI [.00, .33]) reveal significant inter-individual differences in initial anxiety levels, while the variability in change rates is statistically insignificant. The chi-square difference test ($\Delta\chi^2$ = 3.25, Δdf = 2, p = .196) suggests that teaching experience is not a significant explanatory variable for differences in teacher anxiety trajectories in the Student Attitudes vignette either. The results for Model 3 for both vignettes are visually represented in Figure 4.

Figure 4

Experience-Based Differences in Anxiety across Vignettes



Time-Varying Explanatory Variables for Anxiety: Emotion- and Problem-Focused Coping

Model 4: Emotion-focused coping

In Supervisor, the interaction effect of emotion-focused coping and time is not significant (β_{30} = .00, p > .05), indicating that teachers' anxiety levels did not change according to fluctuations in appraisals of emotional coping capability over time. However, the estimate for the Level 1 intercept is significant (β_{20} = -.17, p < .01), meaning that teachers' anxiety levels were significantly lower, when emotion-focused coping was controlled for. Consequently, the chi-

square difference test ($\Delta\chi^2$ = 13.99, Δdf = 2, p < .001) suggests that emotion-focused coping has a strong explanatory value for differences in language teachers' anxiety trajectories in the Supervisor vignette.

In Student Attitudes, the findings are similar. The interaction effect of emotion-focused coping and time is not significant (β_{30} = .04, p = .222), while the Level 1 intercept is significant (β_{20} = -.25, p < .001). The chi-square difference test ($\Delta\chi^2$ = 29.45, Δdf = 2, p < .001) suggests that emotion-focused coping has a strong explanatory value for differences in language teachers' anxiety trajectories in the Student Attitudes vignette as well.

Model 5: Problem-focused coping

Findings for Model 5 mirror those of Model 4 for both vignettes. In Supervisor, the rate of change in anxiety did not correspond to fluctuations in appraisals of problem-focused coping capability (β_{30} = .01, p > .05). However, the estimate for the Level 1 intercept is significant (β_{20} = -.14, p < .05) and the chi-square difference test ($\Delta\chi^2$ = 7.46, Δdf = 2, p = .023) suggests that problem-focused coping contributes significant explanatory value for differences in language teachers' anxiety trajectories in the Supervisor vignette.

In Student Attitudes, the rate of change in anxiety levels is also not related to fluctuations in appraisals of problem-focused coping capability (β_{30} = .05, p = .115), although the Level 1 intercept is significant (β_{20} = -.19, p < .001). Similar to the Supervisor vignette, the chi-square difference test ($\Delta\chi^2$ = 12.87, Δdf = 2, p = .002) suggests that problem-focused coping also has a strong explanatory value for differences in language teachers' anxiety trajectories in the Student Attitudes vignette.

Unconditional Growth Curve Models for Enjoyment

Results for the (un)conditional growth curve models for enjoyment are displayed in Table 3. The unconditional model for the Supervisor vignette shows that the initial mean enjoyment score is 2.39 (p < .001) with a mean slope of -.09 (p = .158), meaning that teachers experienced some enjoyment when they imagined this scenario for the first time, but their enjoyment level decreased over the nine-week period by .09 points on average. The Level 1 residual (σ^2_ε = .62, *SD* = .79; 95% CI [.68, .91]) suggests that some of the variance in teachers' enjoyment trajectories remains unexplained when time is the only explanatory variable. Additionally, the Level 2 intercept (σ^2_0 = .90; *SD* = .95, 95% CI [.72, 1.19]) and slope (σ^2_1 = .06; *SD* = .24, 95% CI [.00, .46]) indicate significant inter-individual differences in initial enjoyment levels, while the inter-individual differences in the change rate of enjoyment are not significant.

The unconditional model for the Student Attitudes vignette shows that the initial mean enjoyment score is 1.39 (p < .001) with a mean slope of -.05 (p = .171), meaning that teachers barely experienced enjoyment when they imagined this scenario for the first time and their enjoyment level further decreased over the nine-week period, albeit not at a statistically significant rate. Additionally, the Level 1 residual (σ^2_ε =.11, *SD* = .33; 95% CI [.29, .38]) indicates that there is remaining unexplained variance in teachers' enjoyment trajectories when time is the sole explanatory variable in the model. The Level 2 intercept (σ^2_0 = .61, *SD* = .78; 95% CI [.66, .93]) and slope (σ^2_1 = .11, *SD* = .34; 95% CI [.26, .42]) further suggest significant inter-individual differences in initial enjoyment levels, while no significant inter-individual differences for the change rate of enjoyment were found.

Time-Invariant Explanatory Variables for Enjoyment: Gender and Experience
Model 2: Gender

In Supervisor, female and non-binary teachers reported lower initial levels of enjoyment (β_{00} = 2.32, $p < .001$) than their male peers (β_{01} = .32, p = .288), although the difference is not significant. The difference in change rate of enjoyment is also statistically insignificant, though female and non-binary teachers reported a slightly lower change rate (β_{10} = -.06, p = .342) than male teachers (β_{11} = -.11, p = .461). The Level 1 residual (σ^2_ε = .62, *SD* = .79; 95% CI [.68, .90]) suggests that unexplained variance in teachers' enjoyment trajectories in the Supervisor vignette remains, when gender is controlled for. The Level 2 intercept (σ^2_0 = .89, *SD* = .94; 95% CI [.71, 1.18]) and slope (σ^2_1 = .05, *SD* = .24; 95% CI [.00, .45]) further indicate inter-individual differences in initial enjoyment levels, but no significant inter-individual differences in the change rate of enjoyment. The chi-square difference test ($\Delta\chi^2$ = 1.20, Δdf = 2, p = .546) suggests that gender is not a meaningful variable in explaining differences in teachers' enjoyment trajectories in the Supervisor vignette.

Table 3

Parameter Estimates for the (Un)Conditional Growth Curve Models for Enjoyment

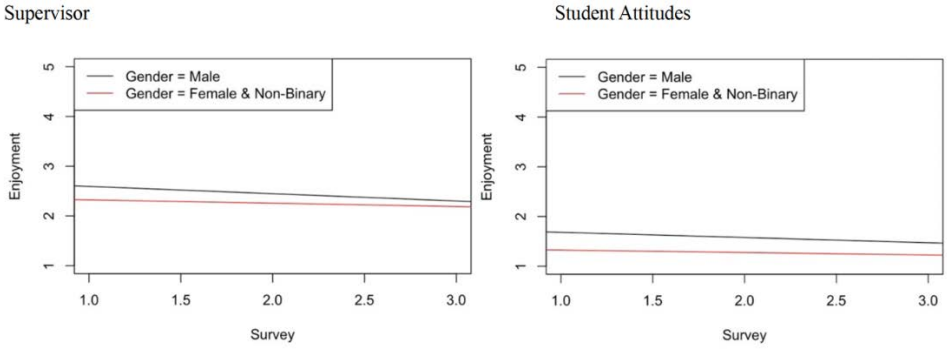
		Supervisor					Student Attitudes				
	Parameter	Model 1 (Time)	Model 2 (Gender)	Model 3 (Exp.)	Model 4 (EC)	Model 5 (PC)	Model 1 (Time)	Model 2 (Gender)	Model 3 (Exp.)	Model 4 (EC)	Model 5 (PC)
Fixed effects	Intercept (β_{00}) (T)	2.39***	2.32***	1.98***	.55	.25	1.39***	1.32***	1.28***	.81***	.77***
	Slope (β_{10}) (T)	-.09	-.06	-.05	.27	.35	-.05	-.04	-.02	.13	-.01
	Intercept (β_{01}) (G)		.32					.35			
	Slope (β_{11}) (G)		-.11					-.05			
	Intercept (β_{01}) (E)			.69**					.18		
	Slope (β_{11}) (E)			-.06					-.05		
	Intercept (β_{20}) (EC)				.24***					.08**	
	Interaction (β_{30}) (EC x Survey #)				-.04					-.03	
	Intercept (β_{20}) (PC)					.29***					.09**
	Interaction (β_{30}) (PC x Survey #)					-.06					-.01
Random effects											
Level 1	Residual (σ^2_ε)	.62	.62	.62	.61	.64	.11	.11	.11	.10	.11
Level 2	Intercept (σ^2_0)	.90	.89	.78	.72	.53	.61	.59	.60	.57	.56
	Slope (σ^2_1)	.06	.05	.05	.04	.02	.11	.11	.11	.11	.11
	Correlation (r_{10})	-.11	-.09	-.07	.08	.54	-.80	-.80	-.79	-.79	-.81
Goodness-of-fit	Deviance	828.30	827.09	819.47	809.39	801.6	472.41	468.28	471.23	462.74	456.96
	AIC	840.30	843.09	835.47	825.39	817.6	484.41	484.29	487.23	478.74	472.96
	BIC	862.05	872.09	864.46	854.38	846.6	506.15	513.28	516.22	507.73	501.96

Notes: ***p < .001, **p < .01, *p < .05; T = time, G = gender, E = experience, EC = emotion-focused coping, PC = problem-focused coping

In Student Attitudes, female and non-binary teachers reported significantly lower initial levels of enjoyment (β_{00} = 1.32, p < .001) than their male peers (β_{01} = .35, p = .095). However, the difference in change rate of enjoyment is statistically insignificant, with female and non-binary teachers showing almost the same change rate (β_{10} = -.04, p = .325) as male teachers (β_{11} = -.05, p = .590). The Level 1 residual (σ^2_ε = .11, *SD* = .33; 95% CI [.29, .38]) suggests that some unexplained variance in teachers' enjoyment trajectories remains after controlling for gender. The Level 2 intercept (σ^2_0 = .59; *SD* = .77; 95% CI [.65, .91]) and slope (σ^2_1 = .11; *SD* = .34; 95% CI [.26, .42]) indicate that significant differences in initial enjoyment levels and in the change rate of enjoyment exist between teachers. However, the chi-square difference test ($\Delta\chi^2$ = 4.12, Δdf = 2, p = .127) suggests that gender does not have any significant explanatory value for enjoyment trajectories in the Student Attitudes vignette. The results for Model 2 for both vignettes are visually represented in Figure 5.

Figure 5

Gender Differences in Enjoyment across Vignettes



Model 3: Teaching experience

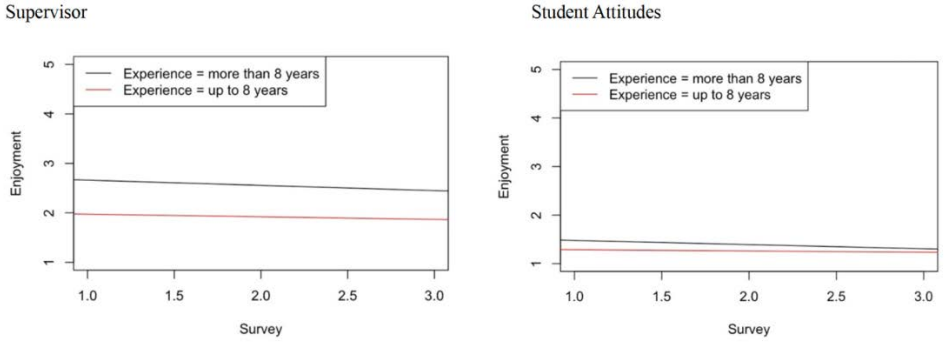
In Supervisor, novice teachers reported significantly lower enjoyment levels (β_{00} = 1.98, p < .001) than their experienced peers (β_{01} = .69, p = .004). However, the difference in change rate of enjoyment is statistically insignificant, with novices (β_{10} = -.05, p = .596) and experienced peers (β_{11} = -.06, p = .617) reporting roughly equal rates. The Level 1 residual (σ^2_ε = .62, *SD* = .79; 95% CI [.68, .90]) suggests that some unexplained variance in teachers' enjoyment trajectories remains after teaching experience is controlled for. The Level 2 intercept (σ^2_0 = .78, *SD* = .88; 95% CI [.65, 1.12]) and slope (σ^2_1 = .05, *SD* = .24; 95% CI [.00, .46]) indicate that inter-individual differences in initial enjoyment levels exist, while the differences in enjoyment change rate are not significant between teachers. Nevertheless, the chi-square difference test ($\Delta\chi^2$ = 8.83, Δdf = 2, p = .012) suggests that teaching experience had significant explanatory power to account for differences in enjoyment trajectories in the Supervisor vignette.

In Student Attitudes, novice teachers also reported lower enjoyment levels (β_{00} = 1.28, p < .001) than their experienced peers (β_{01} = .18, p = .293), although the difference is statistically insignificant. The intra-individual difference in change rate of enjoyment was also statistically insignificant, with novices reporting a slightly lower rate (β_{10} = -.02, p = .696) than their experienced peers (β_{11} = -.05, p = .520). The Level 1 residual (σ^2_ε = .11, *SD* = .33; 95% CI [.29, .38]) suggests some unexplained variance in teachers' enjoyment trajectories remains after

controlling for teaching experience. The Level 2 intercept (σ^2_0 = .60, *SD* = .78; 95% CI [.65, .91]) and slope (σ^2_1 = .11, *SD* = .34; 95% CI [.26, .42]) indicate that significant inter-individual differences in initial enjoyment levels and change rates exist. However, the chi-square difference test ($\Delta\chi^2$ = 1.18, Δdf = 2, *p* = .553) suggests that teaching experience is not a meaningful explanatory variable for differences in teacher enjoyment trajectories in the Student Attitudes vignette. The results for Model 3 for both vignettes are visually presented in Figure 6.

Figure 6

Experience-Based Differences in Enjoyment across Vignettes



Time-Varying Explanatory Variables for Enjoyment: Emotion- and Problem-Focused Coping

Model 4: Emotion-focused coping

In Supervisor, the interaction effect of emotion-focused coping and time is not significant (β_{30} = -.04, *p* = .221), indicating that teachers' enjoyment levels did not change according to fluctuations in appraisals of emotional coping capability over time. However, the Level 1 intercept is significant (β_{20} = .24, *p* < .001), meaning that teachers' enjoyment levels are significantly higher when emotion-focused coping is controlled for. The chi-square difference test ($\Delta\chi^2$ = 18.91, Δdf = 2, *p* < .001) further suggests that emotion-focused coping holds a strong explanatory value for differences in language teachers' enjoyment trajectories in the Supervisor vignette.

The results for Student Attitudes are similar. The interaction effect of emotion-focused coping and time is also not significant (β_{30} = -.03, *p* = .160), while the Level 1 intercept is significant (β_{20} = .08, *p* = .003). The chi-square difference test ($\Delta\chi^2$ = 9.67, Δdf = 2, *p* = .007) suggests that emotion-focused coping holds a strong explanatory value for differences in language teachers' enjoyment trajectories in the Student Attitudes vignette as well.

Model 5: Problem-focused coping

In Supervisor, the interaction effect of problem-focused coping and time is not significant (β_{30} = -.06, *p* = .123), indicating that teachers' enjoyment levels did not change according to fluctuations in appraisals of problem-focused coping capability over time. However, similar to Model 4, the Level 1 intercept is significant (β_{20} = .29, *p* < .001). The chi-square difference test ($\Delta\chi^2$ = 26.66, Δdf = 2, *p* < .001) suggests that problem-focused coping also has a strong explanatory value for differences in enjoyment trajectories in the Supervisor vignette.

The results for Student Attitudes mirror those of Supervisor. The interaction effect of problem-focused coping and time is not significant (β_{30} = -.01, p = .653), while the Level 1 intercept (β_{20} = .09, p = .002) returned a significant finding. The chi-square difference test ($\Delta\chi^2$ = 15.44, Δdf = 2, p < .001) suggests that problem-focused coping also has a strong explanatory value for differences in language teachers' enjoyment trajectories in the Student Attitudes vignette.

Discussion

Longitudinal Change in Teachers' Emotion Trajectories

RQ_1 investigated how individual teachers' emotion trajectories change over time. Findings confirmed the existence of multiple unique patterns of change within and between teachers across emotions and classroom vignettes. While some teachers' emotion levels changed significantly within one or both vignettes across the nine-week period, other teachers' trajectories remained flat and indicated no changes in emotion levels over time. Additionally, some teachers' anxiety levels changed dynamically over time, while their enjoyment level remained stable and vice versa.

These results confirm that, like language learner emotions, language teacher anxiety and enjoyment are independent emotional experiences rather than two sides of the same coin (Dewaele & MacIntyre, 2014). Hence, the experience of anxiety does not preclude the simultaneous experience of enjoyment or vice versa. At the same time, it is possible that neither or only one of both emotions is experienced in the (imagined) language classroom and that these constellations of presence and absence of emotions can dynamically change over time and/or differ between teachers, even within frequently recurring teaching situations, such as a supervisor observation. This dynamicity and unpredictability of presence and change in anxiety and enjoyment in the current study support the call for more studies of teacher emotions that adopt a complex and dynamic systems theory (CDST) lens (Hiver, 2022; Mercer, 2018). According to Hiver (2022), using CDST as a conceptual framework for language teacher research affords a holistic and simultaneous examination of multiple interdependent and contextually situated variables. Using this complexity approach and process-oriented perspective on dynamic changes over time, future research could, for example, examine the degree to which changes in either or both emotions are related to an ongoing dynamic and adaptive restructuring of the teachers' goals for ideal classroom environments in response to (challenging) teaching experiences.

Additionally, the evidence for the variance in intra-individual changes in both anxiety and enjoyment in both vignettes raises questions about the role of situation factors in the activation of emotion episodes. According to appraisal theory, it is not the situation itself but rather the cognitive evaluation of the situation that activates an emotional episode (e.g., Lazarus, 1991). Consequently, the current findings suggest that some teachers appraised each imagined scenario similarly over time, which resulted in recurring and equal emotion experiences and, consequently, flat emotion trajectories with little to no change. However, other teachers seem to have evaluated the imagined scenarios differently over time, which resulted in more varied emotional experiences and dynamic emotion trajectories. Since participating teachers did not verbalize the mental images that they created of the vignettes, questions remain about the constant or varying foci and details in teachers' imaginations that may have impacted appraisals

and, consequently, reported emotions. Considering the consistent and significant findings for coping appraisals as strong explanatory variables for emotion trajectories in the present study, future research could improve upon this current methodological limitation and explore whether and how mental images of teaching scenarios change over time, potentially shedding more light on situation factors and teachers' attentional foci that systematically impact language teachers' appraisals and resulting emotions.

Inter-Individual Differences in Teachers' Emotion Trajectories

RQ_2 examined the level of variability in emotion change rates across teachers. The visual plots showed significant variability in the rates of emotion change and suggested that the mean change trajectory did not adequately capture this level of inter-individual variability. This observation supports the claim that a traditional variable-centered approach, using summary statistics, may conceal some of the richness and complexity in variability of emotional change at the individual and group level. At the same time, the mean group trajectory serves as a foundation for comparison and its visualization clearly illustrates the great extent to which teachers' emotion levels and emotion trajectories differ from one another (Zhou et al., 2023).

The unconditional growth curve models further confirm that time alone did not yield sufficient explanatory power to account for intra-individual change and inter-individual differences in intra-individual change in anxiety and enjoyment for both vignettes. This finding indicates that other variables contribute systematically to shifts in teachers' emotional experiences in the language classroom. In other words, findings from the growth curve modeling (GCM) in the present study go beyond asserting that teachers' classroom emotions change or fluctuate dynamically over time and provide evidence for the fact that aspects other than time might provide systematic explanatory value for the observed inter-individual variability in emotion levels and emotion change.

However, more descriptive and theoretical research on language teacher emotions is necessary to identify explanatory situation (e.g., class time), context (e.g., average class size), and person variables (e.g., age, motivation) beyond the ones used in the current study. Understanding which aspects systematically contribute to (un)pleasant emotion levels and emotion change is especially useful for language teacher trainers who aim to prepare pre-service teachers for emotional challenges in the classroom and to equip them with emotion-regulation strategies or social-emotional teaching skills.

The Role of Gender, Experience, and Coping Potential in Teachers' Emotion Trajectories

RQ_3 explored the degree to which theoretically and empirically determined time-invariant (gender, teaching experience) and time-varying (emotion- and problem-focused coping potential) variables can explain the variability of language teachers' rates of change in anxiety and enjoyment over time. Results of the conditional GCMs showed that the explanatory power of time-invariant and time-varying variables was nuanced across emotions and vignettes. For anxiety, gender accounted for significant differences in teachers' initial anxiety levels in both vignettes and yielded significant explanatory power for differences in anxiety trajectories in the Student Attitudes but not in the Supervisor vignette. In contrast, teaching experience did not have any significant explanatory value for inter- and intra-individual differences in language teachers' anxiety trajectories. For enjoyment, the findings were reversed. Teaching

experience significantly accounted for differences in teachers' initial enjoyment levels and yielded strong explanatory power for differences in enjoyment trajectories in the Supervisor but not the Student Attitudes vignette. In contrast, gender did not yield significant explanatory power for differences in enjoyment trajectories in either vignette, even though the variable significantly accounted for some differences in teachers' enjoyment levels and for inter-individual variability in the change rate of enjoyment in the Student Attitudes vignette. Findings for the time-varying variables emotion- and problem-focused coping were the same for both emotions across both vignettes. Both variables yielded strong explanatory power for differences in initial emotion levels and trajectories in both vignettes, even though no significant interaction effect for time and coping was found in any of the conditional GCMs.

These findings suggest that gender, teaching experience, and the nature of a classroom situation might play a significant role in language teachers' experience of classroom emotions. For example, in the more confrontational situation, Student Attitudes, during which students display continuous and unsolicited disruptive behavior, female and non-binary teachers reported significantly higher anxiety and lower enjoyment levels than male peers, while no such gender differences were found for the Supervisor vignette, which focuses on a situated performance evaluation. At the same time, teaching experience did not have any significant explanatory power in the Student Attitudes vignette, but significantly accounted for emotional variance in the Supervisor vignette, which elicited higher anxiety and lower enjoyment levels from novice teachers.

It is possible that the more stable characteristics, such as gender or experience level, lead language teachers to perceive classroom situations as more threatening than challenging. For example, disruptive students could be perceived as more threatening by female and non-binary teachers, while a performance evaluation might be more threatening to novice teachers. Such overarching threat appraisals of (teaching) situations have been linked to the experience of more unpleasant emotions such as anxiety, while challenge appraisals have been associated with increased pleasant emotions such as enjoyment (Skinner & Brewer, 2002). Future research could investigate whether a link between dispositions for threat or challenge appraisal and more stable teacher characteristics exist. Depending on the empirical support for such a link, emotion-focused language teacher training or professional development could be individualized for respective teacher groups through strategies that enable teachers to effectively reappraise threatening classroom situation as challenging.

The significant and consistent findings for coping appraisals in the present study lend further support to pursuing this line of research and confirm appraisal-related hypotheses. Teachers who evaluated their abilities to effectively act upon or to psychologically adjust to the classroom scenario they imagined, reported significantly decreased anxiety and significantly increased enjoyment levels (Ellsworth & Scherer, 2003). It is possible that, if teachers initially perceived the Student Attitudes vignette as threatening, they reported higher initial anxiety and lower initial enjoyment levels. However, data in the present study suggests that, if teachers appraised their ability to physically and psychologically cope with this situation as increasing over time, their anxiety levels significantly decreased and enjoyment levels significantly increased. However, based on the present study design, it is only possible to speculate whether teachers' threat and challenge appraisals were activated and whether systematic links to coping potential exist. Nevertheless, pursuing future research into the link

between language teachers' threat and challenge appraisal dispositions, situated classroom appraisals, and classroom emotions appears to be a fruitful and promising endeavor for researchers and practitioners alike.

Limitations

While the study yielded some noteworthy and important new insights into the variability of dynamic changes in language teachers' anxiety and enjoyment trajectories, some limitations to the current findings need to be addressed. First, the use of non-probability sampling methods limits the generalizability of the findings. Second, the diversity of participating teachers' backgrounds, contexts, and experiences was not controlled for, which could have contributed to the observed variability in the data. Third, emotions and coping appraisals were only captured with one-item and two-item scales, respectively, which limit the reliability and validity of the data. Fourth, the cut-off-point for the categorization of teachers into novice and experienced was arbitrary. Setting the cut-off-point to one or five years, rather than eight years, might alter the results. Similarly, the unequal gender ratio in the sample and the decision to group non-binary teachers with the female teacher group could have impacted study findings. Fifth, while studies using vignette methodology for the study of emotions in appraisal-based frameworks have provided convincing evidence for the validity of their findings (Schorr, 2001), the use of mental imagery as a basis for emotion data elicitation raises concerns about various aspects of validity, including construct and ecological validity of findings. Lastly, while GCM is well suited to analyze longitudinal data at the individual and group level it cannot capture how different variables interact (Zhou et al., 2023). To examine longitudinal changes in language teacher anxiety and enjoyment simultaneously, person-centered analytical approaches (Ryan, 2019) or parallel process growth curve models (Zhang, 2022) might be more suitable.

Conclusion

The aim of this study was to describe language teachers' anxiety and enjoyment trajectories across different classroom scenarios over time and to explore whether time-invariant and time-varying factors lend explanatory power to individual emotion change rates over time and to inter-individual differences in language teachers' emotion change rates. Findings showed great variability between individual teachers' anxiety and enjoyment levels and moderate, yet mostly insignificant, variance in change rates between teachers. Results also suggested systematic effects of gender and teaching experience in distinct teaching scenarios, while coping appraisals as time-varying person factors consistently contributed explanatory power to emotion trajectory variation across both vignettes. Overall, the present study confirmed the value of using GCM in applied language education research (Zhou et al., 2023) that focuses on the systematic investigation of language teacher emotions. It provided empirical evidence for the situatedness and dynamicity of language teachers' classroom emotions, which have been linked to student emotions (Moskowitz & Dewaele, 2021), student achievement and perceived instructional quality (Frenzel et al., 2021), as well as (language) teacher well-being (Sulis et al., 2022).

ORCID

https://orcid.org/0000-0002-4856-760X

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Ethics Declarations

This study was approved by the University of Wisconsin-Madison's Research Ethics Committee (approval no. 2023–1198). All participants provided informed consent prior to enrollment and data collection in the study.

Competing Interests

No, there are no conflicting interests.

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