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Language aptitude and its links with metalinguistic knowledge, self-efficacy, anxiety, and language maintenance in multilingual language teachers

Raees Calafato 

Department of Languages and Literature Studies, Faculty of Humanities, Sports, and Educational Science, University of South-Eastern Norway, Drammen, Norway

ABSTRACT

Language teachers cannot help their students develop high levels of metalinguistic knowledge and language aptitude if they themselves are found lacking in these abilities. This article reports on a study that utilised a descriptive correlational mixed-methods research design to gather data from 89 multilingual teachers of English, Chinese, French, German, and Spanish from secondary schools regarding the relationship between their language aptitude, metalinguistic knowledge, language maintenance habits, self-efficacy, and anxiety. The findings revealed that participants' metalinguistic knowledge, anxiety, and formally acquired multilingualism positively correlated with their language aptitude. Moreover, those possessing advanced language aptitude engaged in language maintenance habits that were both quantitatively and qualitatively different from those who exhibited weaker aptitude.

IZOH (O'ZBEK)

Agar, til o'qituvchilarida yuqori darajadagi metallingvistik bilim va til qobiliyati yetishmayotgan bo'lsa, ular o'z talabalariga bu ko'nikmalarni rivojlantirishga yordam bera olishmaydi. Ushbu maqolada o'rta maktablardan ingliz, Xitoy, frantsuz, nemis va ispan tillarining 89 nafar ko'p tilli o'qituvchilarining til qobiliyatlari, metallingvistik bilimlari, tilni saqlash odatlari, o'z-o'zini samaradorligi va xavotirlari o'rtasidagi bog'liqlik haqidagi ma'lumotlarini tavsiflovchi korrelyatsion aralash usul yordamida to'plagan tadqiqot hisoboti keltirilgan. Topilmalar shuni ko'rsatdiki, ishtirokchilarning metallingvistik bilimlari, tashvishlari va rasmiy ravishda o'rganilgan ko'p tillilik ularning til qobiliyati bilan ijobiy bog'liqdir. Bundan tashqari, ilg'or til qobiliyatiga ega bo'lgan ishtirokchilar tilni saqlash bo'yicha faoliyat bilan shug'ullanadilar, ular zaifroq qobiliyatga ega bo'lgan ishtirokchilardan miqdoriy va sifat jihatidan farq qiladi.

PLAIN LANGUAGE SUMMARY

Language teachers should ideally be good at learning and using languages themselves so that they can assist their students in developing effective language learning habits and advancing more rapidly. This ability (i.e., being good at learning and using languages), however, has been little explored among language teachers, though research suggests that it could be predicted by how adeptly teachers can explain

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til qobiliyati;
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o'qituvchilari; tashvish;
o'z-o'zini samaradorlik

CONTACT Raees Calafato  Raees.Calafato@usn.no  Department of Languages and Literature Studies, Faculty of Humanities, Sports, and Educational Science, University of South-Eastern Norway, Grønland 58, 3045 Drammen, Norway

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language rules, structure, and use to their students, including how confident or anxious they feel when doing so. It may also be related to how many languages teachers have learned and the extent to which they make efforts to maintain their proficiency in the languages they teach since learning multiple languages and actively working to maintain their language skills could lead to a deeper understanding of language learning processes, making them better equipped to support their students in their language learning journey. Eighty-nine teachers of English, Chinese, French, German, and Spanish from secondary schools completed a test evaluating their ability to learn languages effectively. They also participated in interviews aimed at understanding how comprehensively they could identify, explain, and correct language errors made by students, their anxiety and confidence when doing so, the number of languages they had learned, and the measures they took to maintain their proficiency in the languages they taught. The findings revealed that participants who had learned more languages and were more competent in identifying, explaining, and correcting language errors were also better at learning and using languages. They also engaged in activities that were different from those preferred by participants with less skill in learning and using languages.

Introduction

Researchers have become increasingly cognizant of the role played by teachers and their complex skill set in promoting successful language learning in the multilingual and multicultural classrooms that have become prevalent worldwide (Calafato, 2022a, 2022b; Raud & Orekhova, 2022), including how teachers' metalinguistic knowledge and language aptitude may impact students' learning outcomes (Aslan, 2015; Calafato, 2021; Ng, 2018). Metalinguistic knowledge refers to the ability to analyse and articulate the structure of language, understand the functions of different linguistic elements, and consciously and intentionally make decisions about language use (Andrews, 2007). Language aptitude encompasses the ability to learn and effectively use language; it incorporates problem-solving skills and has been linked to various cognitive abilities such as working memory, processing speed, and perceptual acuity (Doughty, 2019; Wen et al., 2017). Studies have traditionally investigated metalinguistic knowledge and language aptitude separately, though an emerging body of evidence suggests a positive, albeit sometimes modest, relationship between the two (Hyltenstam, 2021). Crucially, there are also indications that metalinguistic knowledge and language aptitude can be developed through effort and experience (Falk et al., 2015; Grigorenko et al., 2000; Wen et al., 2017), implying that teachers could potentially help their learners hone these abilities further through classroom instruction.

In terms of research, numerous studies have investigated the metalinguistic knowledge and language aptitude of language learners (e.g., Chalmers et al., 2021; Hyltenstam, 2021; Thompson, 2013), though few have examined these abilities in language teachers (e.g., Andrews, 1999; Luo et al., 2020). Furthermore, little is known about how language teachers' metalinguistic knowledge and language aptitude interact with other cognitive and affective variables, such as their multilingualism, self-efficacy, anxiety, or language maintenance habits, to impact language learning outcomes (see Aslan, 2015; Calafato, 2019; Ng, 2018). Indeed,

while language teachers and language learners have certain similarities, they have distinct roles, perspectives, and experiences, characterized by cognitive, metacognitive, and affective differences (McDonough, 2002; see also Borg, 2006). Studies on language teachers suggest that their advanced metalinguistic knowledge can positively influence language learning outcomes in students by enabling teachers to effectively explain language structure and usage, identify common errors and misconceptions, and provide valuable feedback (Aslan, 2015; Calafato, 2022a). However, these insights are often derived from anecdotal evidence due to the generally qualitative nature of such studies; they also tend to consist of small participant samples and focus on a single variable (or variable pair). This is despite metalinguistic knowledge and language aptitude being complex abilities that, as already mentioned, interact with a range of cognitive and affective variables.

One variable that has received significant attention from governments worldwide as an asset worth developing among citizens is individual multilingualism (Busch, 2011; Calafato, 2021; Gao & Zheng, 2019). Research has demonstrated that learners who are proficient in multiple languages exhibit higher levels of language proficiency across various measures (Hirosh & Degani, 2018). Moreover, the learning of multiple foreign languages (FLs) has become the norm in many educational systems globally, with students often required to study more than one FL at school and university (Busch, 2011; Calafato, 2021; Chen et al., 2020). Given that language teachers often share a similar educational background to their students, they too can be multilingual, making it important to include teacher multilingualism as a variable in investigations related to language education. This is because multilingualism forms an integral part of language teachers' professional and personal identity (Calafato, 2022a, 2022b; Ellis, 2004) and can impact students' progress. However, studies on language teacher multilingualism, much like those focusing on teachers' metalinguistic knowledge and language aptitude, are limited in number, frequently involve small participant samples, explore variables in isolation (Calafato, 2019), and do not provide much assessment data on participants' multilingualism, metalinguistic knowledge, and language aptitude, and the extent to which multilingualism correlates with the latter two.

Exploring the interplay between teachers' metalinguistic knowledge, language aptitude, and multilingualism could help us better understand their professional development, teaching effectiveness, and personal growth (see Ng, 2018), including the possible influence of affective factors on their cognitive abilities, which have traditionally been studied separately (Swain, 2013). For example, research indicates that language teachers may doubt their metalinguistic knowledge, increasing their anxiety and negatively affecting their behaviour in the classroom (Aslan, 2015; Calafato, 2022a). While not systematically explored in connection with metalinguistic knowledge and language aptitude, teacher anxiety (and self-efficacy) has been shown to correlate with student achievement (Myhill et al., 2013), as well as teacher performance (Klassen & Tze, 2014) and language proficiency (Faez et al., 2021). Finally, since studies indicate that individuals can develop their metalinguistic knowledge and language aptitude through effort and experience (e.g., Falk et al., 2015; Wen et al., 2017), language teachers' engagement in activities that support their language proficiency, that is, their language maintenance habits, may have a bearing on how this proficiency evolves and impacts their teaching (Calafato, 2022c). In this regard, studies have primarily explored teachers' language maintenance habits in relation to their oral proficiency in their taught languages, and then mostly in the United States (e.g., Bell & Borden, 2022; Sullivan, 2011).

Sullivan (2011) conducted a study involving 734 language teacher candidates in the United States and found a positive correlation between their oral proficiency and the *diversity* of activities in which they engaged to practice the languages they taught. The activities included reading newspapers or literature, watching television and movies, practising with native speakers, and listening to music. Moreover, participants with higher oral proficiency reported writing more frequently in the target language compared to those with weaker proficiency, who mainly focused on reading and listening to music. Similarly, Bell and Borden (2022) examined the language maintenance habits and oral proficiency of 104 language teachers in the United States, discovering that teachers with higher proficiency levels actively engaged in a wider range of activities and consciously reflected on their language learning. The researchers observed that such language maintenance could positively impact teachers' oral proficiency, as well as enhance their self-efficacy and pedagogical practices during teaching. Given the link between language maintenance habits and proficiency, it is equally plausible that these habits positively relate to their metalinguistic knowledge and language aptitude, which, as already mentioned, also predict proficiency (Doughty, 2019; Elder & Manwaring, 2004) and can be improved through effort.

This article reports on a study that sought to contribute to existing research on multilingual language teachers by investigating the relationship between teachers' metalinguistic knowledge, self-efficacy and anxiety when applying this knowledge in their teaching, language maintenance habits, multilingualism (languages taught, languages learned beyond first languages and those they taught, and their entire linguistic repertoire), and language aptitude. To explore these interactions, a descriptive correlational research design incorporating qualitative and quantitative elements was implemented, and data were gathered from non-native teachers of English, Chinese, French, German, and Spanish (all as an FL) working in secondary schools in Uzbekistan. Notably, a quarter of the participants reported teaching two or more FLs concurrently. The study's originality lies in its focus on examining the relationship between language aptitude, metalinguistic knowledge, language maintenance habits, and affective factors among multilingual language teachers, including those teaching multiple languages. The goal was to provide a more comprehensive understanding of the factors contributing to successful language teaching in diverse linguistic contexts. The findings hold significant implications for teacher educators and language policymakers because they shed light on the multifaceted nature of language teacher cognition and affect and can inform the development of effective strategies and interventions to enhance language teaching practices, benefiting both teachers and learners.

Assessing metalinguistic knowledge and language aptitude

Metalinguistic knowledge is the conscious, verbalizable knowledge that individuals, language teachers in this study, possess about the syntactic, morphological, lexical, and pragmatic features of the language(s) they teach (Andrews, 2007). It includes explicit knowledge about these categories as well as explicit knowledge about the relations between them. Although individuals may acquire a language intuitively and implicitly, a language teacher *must* be able to verbalize their knowledge effectively and comprehensively about language (Andrews, 1999). This is because, in their role as educators, they are often asked by students to explain grammar rules and language structure clearly and may struggle to do so if they have limited metalinguistic knowledge (Aslan, 2015). As for language aptitude, it refers to

a set of cognitive abilities that predict learning rate and ultimate attainment, traditionally comprising “phonetic coding, analytic ability, and rote memory, which roughly correspond to pronunciation, grammar, and vocabulary learning, respectively” (Li & Zhao, 2021, pp. 25–26). Given the strong correlations between language aptitude and learning outcomes, as well as between language aptitude and general intelligence (Wen et al., 2017), it is reasonable to assume that language aptitude can have a similarly significant impact on teaching effectiveness, even if this relationship has not yet been fully explored in studies. Indeed, it stands to reason that language teachers possessing higher levels of language aptitude would serve as better role models of the competent language user for their students and could potentially draw upon their aptitude to help their students develop their aptitude further.

Multilingualism and its effects on language aptitude and metalinguistic awareness

Multilingualism, which signifies individual multilingualism in this study, encompasses an individual’s ability to use and understand multiple languages (Marshall & Moore, 2018). Taking a dynamic systems approach to multilingualism (Jessner, 2008), which views an individual’s internal linguistic system as fluid and interconnected, one may assume that an individual’s language aptitude and metalinguistic knowledge would be influenced by the number of languages they know and use. This notion is supported by studies on language learners, where positive correlations between multilingualism and performance in various language learning tasks were discovered, including in syntax acquisition, lexical learning, translation tasks, and language aptitude tests (Gibson & Hufeisen, 2003; Klein, 1995; Ma et al., 2018; Nayak et al., 1990; Thompson, 2013). Thompson (2013) argues that individuals with previous language experience have greater metalinguistic awareness, with Herdina and Jessner (2002) suggesting that this heightened awareness positively impacts language aptitude. However, most studies have examined the relationship between multilingualism and metalinguistic knowledge or language aptitude in isolation, and some have found no significant differences in language aptitude or metalinguistic knowledge based on multilingualism (Nation & Mclaughlin, 1986; Sawyer, 1992; Thomas, 1988). Still, these studies have focused on language learners rather than language teachers.

Affect as a mediating variable

There has been a growing recognition of the significance of affective variables in language learning and teaching in recent years (White, 2018). Teaching, as noted by Richards (2022), is not only a rational activity but also an emotionally charged social endeavour that influences teachers’ practices and interactions with learners. Concerning metalinguistic knowledge and language aptitude, language teachers who experience anxiety about their ability to explain the various aspects of the language they teach may avoid doing so (Aslan, 2015; Borg, 2001), and this anxiety could potentially hinder the development of their language aptitude. For instance, studies on language *learners* have found negative correlations between different forms of FL anxiety (e.g., academic, cognitive, and social anxiety), often measured using the FL Classroom Anxiety Scale (MacIntyre, 2017), and language aptitude, metalinguistic knowledge, and achievement (Li, 2017; Rutgers & Evans, 2017; Sparks & Ganschow, 2007). Rutgers and Evans (2017) reported that students enrolled in bilingual

Dutch-English education exhibited lower levels of anxiety and a slight metalinguistic advantage compared to their monolingual counterparts in the regular Dutch program when learning German as a third language. The researchers suggested that these patterns may stem from the bilingual stream students' greater experience as language learners and their willingness to explore alternative strategies.

It is then no surprise that to capture the complexity of successful language learning, researchers have advocated for a broader approach to the study of language aptitude and metalinguistic knowledge, one that includes affective and conative components (Kormos, 2013). In this regard, besides anxiety, self-efficacy is another affective factor that has received considerable attention from researchers (Chesnut & Burley, 2015; Wang & Sun, 2020), though it has been less explored in language teachers than learners, especially regarding metalinguistic knowledge, language aptitude, and multilingualism (see Calafato, 2022a, 2022b). Wyatt and Dikilitaş (2021) emphasize the importance of language teachers feeling efficacious in their work to provide learner-centred and context-sensitive instruction, albeit the researchers did not investigate the relationship between teachers' self-efficacy, metalinguistic knowledge, and language aptitude. Nevertheless, they found a positive association between teachers' low self-efficacy vis-à-vis grammar instruction, lower scores on grammatical awareness tasks, which would have required them to draw on their metalinguistic knowledge, and avoidance of certain activities. Their findings align with the experiences of one of the teacher participants in Borg's (2001) study, Dave, suggesting that participants may have possessed underdeveloped language aptitude (even if this link was not explicitly explored in the studies).

Research questions

Due to the dearth of research on the interplay between language aptitude, metalinguistic knowledge, and multilingualism in language teachers, particularly those teaching multiple FLs, and how these relationships intersect with affective factors such as self-efficacy and anxiety, as well as teachers' language maintenance habits, this study sought to investigate the following two questions as part of its research focus:

1. To what extent are language teachers' multilingualism, metalinguistic knowledge, self-efficacy to apply this knowledge when teaching, and associated anxiety predictive of their language aptitude?
2. To what extent do the language maintenance habits of language teachers who possess more advanced language aptitude differ from those with weaker aptitude?

Methods

Research design

The study employed a mixed-methods, cross-sectional, descriptive correlational design (McBurney & White, 2009) to achieve a comprehensive understanding of the interactions between the language aptitude, metalinguistic knowledge, self-efficacy, anxiety, and language maintenance habits of multilingual language teachers. Such a design allowed for both quantitative and qualitative data collection, enabling a nuanced exploration of these

variables, with the study's aim being to describe their extent, examine their relationships, and gain personalised insights into participants' experiences and habits while also refraining from establishing causation.

Participants

Eighty-nine non-native FL teachers participated in the study (89.5% female and 10.5% male) from ten secondary schools in Tashkent, Uzbekistan (grades 9–11), with the largest proportion teaching English (69.7%), followed by German (31.5%), French (11.2%), Chinese (7.9%), and Spanish (4.5%). The majority (68.5%) of participants reported teaching a single FL, while 24.7% taught two FLs and 6.7% taught three FLs. On average, the participants had 17.76 years of teaching experience and were 45.09 years old. Participants' first languages were Uzbek (51.7%), Russian (46.1%), and Tatar (2.2%). Concerning their own language learning experiences, 36.0% of the participants had only learned the FL(s) they taught, while 41.6% had learned one additional FL (i.e., besides the languages they taught), 14.6% had learned two additional FLs and 7.9% had learned three or more additional FLs. The additional FLs they reported learning comprised Italian, Latin, Polish, Portuguese, Swedish, Japanese, Korean, Hungarian, and Greek. Note that language teachers working in schools in Uzbekistan must possess a bachelor's degree in their taught language that includes courses on methodology and pedagogy (Jalilov, 2021). They also need to obtain a government-approved national or international language certificate documenting proficiency to at least a B2 level, according to the Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2020), in their taught language.

FL education in schools in Uzbekistan generally starts with English in the first grade, with students able to study a second FL from the fifth grade onwards. The core curriculum for schools aligns FL teaching with the CEFR (Council of Europe, 2020), adapting pan-European recommendations and prioritizing the four major skills: listening, speaking, reading, and writing (Tolibjonov et al., 2020). Beyond developing students' language proficiency, FL teachers in Uzbekistan's schools must also focus on building their cultural skills and learning strategies. The overall goal is to enable effective communication and foster cultural awareness and an appreciation of linguistic diversity (Tolibjonov et al., 2020). Teachers of different FLs (instead of just one FL) were included in the study because such an approach can provide a broader perspective on language teaching in a given context. Additionally, it may enhance the generalizability of the findings since it avoids having one language as the sole focal point (e.g., English), which is quite common in language education research. Indeed, even with a limited number of participants teaching different languages, the data can offer rich insights that a plurality of FL teachers could find accessible and useful. Finally, exploring teachers based solely on one FL might not fully represent the experiences of those teaching multiple languages concurrently, which is not uncommon in the context of the current study.

Convenience sampling was employed, leveraging prior connections with the schools (students at the schools had participated in a previous project). To recruit teachers, the school principals were contacted *via* email and informed of the study's scope. They were asked for assistance in recruiting language teachers and provided with an invitation letter that they sent to their language department heads, who then forwarded it to the teaching staff. The invitation included an email address to which interested teachers could reply to indicate their consent to participate. Participant confidentiality was also emphasized in the invitation

letter, including the implementation of data encryption measures and that participants had the right to withdraw from the study at any time (*via* email). Interested teachers who replied to the email address in the invitation letter were sent a link to a language aptitude test that they were asked to complete online. Toward the end of the test, they had to indicate their availability for an interview based on a matrix comprising several dates and time slots (or suggest dates and times of their choosing in a space provided under the matrix).

Data collection

The study consisted of two phases: an online language aptitude test and semi-structured interviews. Participants first took the Language Aptitude Test (LAT) (Oxford University, 2020), which is out of 50 points. They were required to complete it in one sitting and without the use of any aids. They were given a week to submit the completed test, after which they were contacted *via* email to schedule an interview based on the time slots they had selected when doing the LAT (see “Research design” section). The interviews (for the schedule, see [Appendix](#)) were held online and lasted an average of 90–150 min, depending on the number of FLs participants taught. During the interviews, participants’ metalinguistic knowledge was assessed through their untimed analysis of texts written by secondary school students. The texts, one per language taught, were selected from the TRAWL corpus for English, French, and German (Dirdal et al., 2022), CEDEL2 for Spanish (Lozano, 2022), and the TOCFL Learner Corpus for Chinese (Lee et al., 2019) (for examples, see [Appendix](#)). Each text was approximately 300–350 words (converted into simplified Chinese characters for the TOCFL Learner Corpus) and modified to include six lexical, grammatical, and pragmatic errors (a total of 18 errors per text). Participants received one point for identifying, explaining, and correcting each error, earning a maximum of three points per error and 54 points per text based on the 18 errors each text contained.

The scoring format (i.e., the three levels of identifying, explaining, and correcting) used for the metalinguistic knowledge assessment mirrored the scoring approach implemented by D’Angelo and Sorace (2022) and Roehr (2008), who observed that identifying, explaining, and correcting errors were all components of the same construct: metalinguistic knowledge. As for the use of corpora in the metalinguistic knowledge assessment, it bears mentioning that corpora have been used in language teaching for over two decades (Golonka et al., 2014; Vannestål & Lindquist, 2007), with more recent studies combining corpora and interviews to explore the metalinguistic knowledge of L2 users (e.g., Çandarlı, 2022). During the interviews, participants were also asked about their language background, self-efficacy in applying their metalinguistic knowledge in teaching (metalinguistic knowledge was defined at the start of the interview), their anxiety related to this, and their language maintenance habits. Regarding language background, specifically, participants were queried about the number of first languages they spoke, as well as the number of FLs they taught and those they had learned in addition to the ones they taught. The latter two (i.e., the number of FLs taught and learned besides) were used as variables representing their formally acquired multilingualism (i.e., excluding their first languages). In contrast, their entire linguistic repertoire (ELR) included their first languages, FLs taught, and FLs learned besides, constituting their overall multilingualism (Cenoz, 2013).

Regarding their self-efficacy and anxiety when applying their metalinguistic knowledge in their teaching, participants were first asked to rate their overall anxiety and self-efficacy

levels on a scale from 1 to 6, with 1 representing very low anxiety and self-efficacy, and 6 representing high anxiety and self-efficacy (see [Appendix](#)). They did this for each language they taught, seeing as teachers' metalinguistic knowledge has been shown to vary from language to language (Aslan, 2015). Participants were then asked additional questions regarding their self-efficacy and anxiety to probe potential factors contributing to their reported ratings. For example, participants were asked about their capacity to discuss the nuances of word meanings and how context influences word selection and language use. They were also asked if they felt nervous when having to discuss grammar rules and the sounds of their taught languages. There were several reasons to use a single question to have participants rate their overall self-efficacy and anxiety based on a 6-point scale. First, such an approach allows participants to give a broad, quantified assessment of their self-efficacy and anxiety levels without delving into specific details immediately (Bowling, 2005). Second, it is quick, convenient, and often just as adequate as longer, multi-item scales (Bowling, 2005; Edwards et al., 2023). Third, it strongly mirrors the approach often used to collect self-reported data on other language teacher variables, such as their language proficiency (Sadeghi et al., 2020). Each interview was audio-recorded and conducted in English.

Analysis

The data were analysed in SPSS 28 and ATLAS.ti. Moderated multiple regression using the PROCESS macro (Hayes, 2017) was conducted to explore the relationship between participants' language aptitude (measured *via* their LAT test scores out of 50), metalinguistic knowledge (based on their metalinguistic knowledge assessment scores out of 54 per language from the interviews), and self-efficacy and anxiety when applying said knowledge in their teaching (using the 6-point rating scale applied for both variables in the interviews; see "Data collection" section). The participants' ELR (i.e., their overall multilingualism) was utilized as a moderator variable. Participants' responses to the metalinguistic knowledge assessment were transcribed from the interviews and then scored (out of 54 points). The transcribed interview responses regarding participants' self-efficacy, anxiety, and language maintenance habits were coded inductively and thematically following the steps outlined by Braun and Clarke (2012): familiarising oneself with the data, generating initial codes, identifying themes, reviewing and refining codes into larger categories, defining, naming, and finalising the themes. Note that only participants' 6-point self-ratings for their self-efficacy and anxiety from the interviews were used during data analysis. As already mentioned, the self-ratings served as a direct, easily comparable, quantitative representation of participants' self-efficacy and anxiety levels.

The codes and themes generated from the additional questions regarding participants' self-efficacy and anxiety levels provided corroborating reasons for why participants rated their self-efficacy and anxiety highly or poorly. They were not used during statistical analysis and are not covered here due to space limitations and conciseness since the study sought mainly to understand the extent to which participants' self-efficacy and anxiety when applying their metalinguistic knowledge in their teaching predicted their language aptitude, and not why their self-efficacy and anxiety were at the levels they were. The coding process for participants' language maintenance habits led to the creation of two categories: passive engagement and active engagement (for an example of the coding process, see [Table 1](#)). Passive engagement encompassed activities mentioned by

Table 1. Example of the coding process for language maintenance.

Participant	Extract	Codes	Theme
11FU-DE	<i>How do you maintain your level of German? I attend seminars. I read texts on linguistics and listen to Deutsche Welle programs. I also review grammar when preparing for classes. Sometimes, I read materials on German studies on the Internet.</i>	seminar; listen to DW; review grammar; read academic texts; read academic texts online;	passive engagement; active engagement; medium

Note. F = female, U = L1 is Uzbek, DE = teaching German, DW = Deutsche Welle.

participants where they processed information in the target language without actively producing it (e.g., watching TV or listening to music), while active engagement comprised activities involving active language production (e.g., speaking with native speakers). Participants' active and passive engagement were then analysed, including the type and number of activities, based on their LAT scores. Here, the scores were divided into four quartiles, after which the distribution of passive and active engagement was examined within each quartile, as well as between quartiles, including activity frequency (i.e., how many participants within a quartile mentioned the activity) and the number of activities undertaken per participant in each quartile.

Results

Figure 1 provides descriptive statistics for participants' metalinguistic knowledge (out of 54 points), self-efficacy and anxiety (on a six-point scale), and language aptitude (out of 50 points). As can be seen in the figure, participants obtained relatively low scores on both the metalinguistic knowledge and language aptitude assessments on average. However, they expressed high levels of self-efficacy and moderate levels of anxiety when applying their metalinguistic knowledge in their teaching. Pearson correlation test results indicated a statistically significant, weak (for interpreting correlation strength, see Plonsky & Oswald,

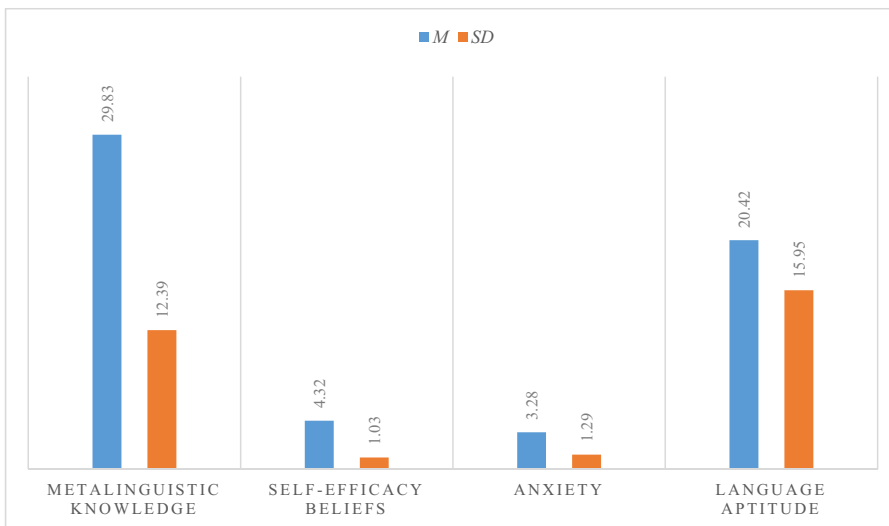


Figure 1. Participants' metalinguistic knowledge, self-efficacy, anxiety, and language aptitude.

Note. $N = 89$.

2014), positive correlation between participants' metalinguistic knowledge and language aptitude ($r = .32, p < .001$).

Table 2 presents the descriptive statistics for participants' metalinguistic knowledge scores divided into quartiles based on their performance on the LAT. The first quartile represents participants with the lowest aptitude scores, while the fourth quartile contains those with the highest scores. As can be seen in the table, there is a noticeable upward cline in participants' metalinguistic knowledge scores as one progresses from the lower to the higher language aptitude quartiles, suggesting a positive association between language aptitude and metalinguistic knowledge.

Table 3 provides the parameter estimates of a multiple regression that considered the moderating influence of participants' ELR on the relationship between their metalinguistic knowledge (independent variable) and language aptitude (outcome variable). Anxiety, self-efficacy, the number of languages learned (excluding first languages and those they taught), and languages taught were included as covariates. The proposed model statistically significantly outperformed the null model and explained 31% of the variance [$F(7, 81) = 5.24, p < .001, R^2 = .31$], with the findings revealing that participants' metalinguistic knowledge, anxiety, and the number of languages they taught and had learned statistically significantly and positively predicted their language aptitude.

The thematic analysis revealed notable differences in language maintenance habits between participants in the higher and lower language aptitude quartiles (see Table 2), with those in the higher quartiles (i.e., the third and fourth quartiles) demonstrating a broader range of activities and a focus on active rather than passive engagement. Specifically,

Table 2. Participants' metalinguistic knowledge scores based on language aptitude quartiles.

Language aptitude scores	Metalinguistic knowledge scores		
	<i>n</i>	<i>M</i>	<i>SD</i>
1st quartile	22	22.50	12.34
2nd quartile	41	30.12	10.82
3rd quartile	19	35.05	12.42
4th quartile	7	37.29	12.11

Table 3. Regression parameter estimates with participants' entire linguistic repertoire as the moderator variable.

Variable	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	LLCI	ULCI	<i>sr</i>	<i>sr</i> ²
Constant	-11.27	5.09	-2.21	.030	-21.40	-1.14	-	-
Metalinguistic knowledge (MK)	.38	.12	3.22	.002	.14	.61	.30	.09
Entire linguistic repertoire (ELR)	-.07	1.76	-.04	.970	-3.56	3.43	-.00	.00
MK * ELR	-.08	.05	-1.46	.148	-.19	.03	-.13	.02
Number of languages taught	4.46	1.35	3.30	.001	1.77	7.14	.30	.09
Self-efficacy	.22	.59	.37	.711	-.95	1.38	.03	.00
Anxiety	1.18	.47	2.50	.014	.24	2.12	.23	.05
Number of languages learned	2.49	1.08	2.31	.024	.34	4.64	.21	.05

Note. LLCI = lower-level confidence interval; ULCI = upper-level confidence interval; *sr* = semipartial correlations; *sr*² = squared semipartial correlations; language aptitude was the outcome variable.

participants in the third (63.2%; $n = 12$) and fourth quartiles (85.7%; $n = 6$) engaged in activities outside of school involving writing and speaking in the languages they taught. In contrast, none of the participants in the first and second quartiles mentioned engaging in such activities. Regarding writing activities, participants in the third and fourth quartiles reported translating literary fiction and non-fiction, evaluating their writing skills through online tests and evaluation tools, and completing written assignments through participation in MOOCs. In terms of speaking practice, they mentioned attending seminars and workshops designed for language teachers and conversing with native speakers of the languages they taught. Interestingly, a large proportion of participants in the fourth quartile (57.1%; $n = 4$) and third quartiles (47.4%; $n = 9$) expressed a desire for immersion in the target language and said they actively sought out opportunities to use the target language outside of school. One participant from the third quartile, who taught German, highlighted the insufficiency of solely relying on one's teaching to maintain language proficiency, stating, "When you've been checking texts no more difficult than 'Ich habe eine Katze' for twenty years, you start forgetting the language."

In terms of passive language engagement, most participants in the first quartile (81.8%; $n = 18$) and over half of those in the second (51.2%; $n = 21$), third (52.6%; $n = 10$), and fourth (57.1%; $n = 4$) quartiles reported reading literary fiction, news articles, and social media content in the languages they taught. However, participants in the third (26.3%; $n = 5$) and fourth (57.1%; $n = 4$) quartiles, unlike those in the other quartiles, also mentioned reading academic journals and books related to language pedagogy, linguistics, and psychology. Moreover, participants in the first (59.1%; $n = 13$) and second quartiles (56.1%; $n = 23$) engaged in passive activities in isolation. For example, they reported either reading fiction or watching TV. It is worth noting that among participants who taught more than one FL, a significant majority (89.3%; $n = 25$) employed a different combination of activities per language taught. For instance, one participant teaching English and French mentioned reading English literary fiction and communicating with native-speaker friends in English to maintain their English proficiency, whereas they attended seminars and conferences and worked with an online tutor to maintain their proficiency in French. Similarly, another participant teaching English, French, and German described their language maintenance strategies as follows: reading academic journals and watching TED Talks for English, following their favourite French bloggers on YouTube, reading contemporary literary fiction for French, and watching German cinema for German.

Discussion

Before discussing the findings, it is important to acknowledge the limitations of the present study. Firstly, the participant sample was relatively small, affecting the generalizability of the findings. Secondly, while this study explored the relationship between language teachers' metalinguistic knowledge, self-efficacy, anxiety, multilingualism (formally acquired and their ELR), and language aptitude, it did not investigate how these variables influenced their teaching practices or their use of instructional materials, thereby limiting the study's pedagogical relevance. Third, data regarding participants' financial status were not gathered, though their finances could have had a material impact on their ability to access resources in support of their language maintenance habits. Fourth, participants' motivation to be

language teachers was not explored, meaning that some participants may have felt that they had sufficient language proficiency to carry out their tasks and did not feel the need to engage in language maintenance extensively. Additionally, the data collected in this study were cross-sectional, capturing a snapshot of the participants' characteristics and language maintenance habits at a specific point in time. Despite these limitations, the present study provides valuable insights into the relationship between language teachers' metalinguistic knowledge, self-efficacy, anxiety, and language aptitude while also examining the moderating influence of their ELR on this relationship.

Regarding the first research question, the findings revealed that participants' metalinguistic knowledge, anxiety, the number of languages they taught, and those they had learned (excluding their first and taught languages) statistically significantly and positively predicted their language aptitude. Moreover, an examination of the squared semipartial correlations (see [Table 3](#)) indicated that participants' metalinguistic knowledge and the number of languages they taught were the most influential factors in explaining the variance in their language aptitude. The findings concerning the links between participants' metalinguistic knowledge and language aptitude find some support in Alderson et al. (1997) and Hyltenstam (2021), who observed a positive, weak link between the metalinguistic knowledge and language aptitude of university students and adult multilinguals respectively. Concerning the links between the number of languages taught and learned and language aptitude, it is worth noting that the significance of the relationship between multilingualism and language aptitude depended on how multilingualism was operationalized. When taken as one's ELR (Cenoz, 2013), no significant correlations with language aptitude were found. However, when multilingualism was operationalized as the number of languages taught, which is unique to multilingual language teachers, or the number of languages learned (excluding first and taught languages), a significant relationship emerged, as already mentioned.

Learning foreign or second languages likely requires more explicit planning, strategizing, and reflection than when individuals acquire their first languages, which occurs primarily implicitly and unconsciously (Nor & Ab Rashid, 2018). As more languages are learned, individuals refine their strategizing, reflection, and planning, and further develop their language aptitude. A similar, perhaps more intense, process occurs in language teachers who teach multiple FLs in that they may benefit from increased opportunities to engage with different linguistic systems and structures systematically, including from a pedagogical viewpoint. This aligns with the concept of dynamic interactions between multilingualism and metalinguistic knowledge and awareness discussed by Jessner (2008). Drawing upon experiential learning theory (Kolb, 2014), one can also argue that teaching multiple languages exposed participants to a more diverse range of language *learners* beyond themselves, providing them with deeper insights into effective language teaching and learning strategies and ultimately benefitting their language aptitude. Another feature of teaching multiple FLs is that it requires teachers to maintain their language proficiency across multiple languages due to, at the very least, professional exigencies, thereby compelling them to engage in language maintenance activities for each of the languages they teach.

At the same time, the findings suggest that the impact of multilingualism on language aptitude is not necessarily determined by the number of languages one knows but rather by how those languages are used and learned, partially challenging the notion that knowing more languages (e.g., quadrilinguals versus trilinguals versus bilinguals) linearly equates to

a heightened ability to acquire additional languages (see Hirosh & Degani, 2018; Hufeisen & Jessner, 2009). In other words, it does not directly follow that individuals with multiple L1s would exhibit advanced language aptitude simply by dint of their L1 repertoire, raising important questions about the mechanisms that contribute to enhanced language aptitude in multilingual individuals and shifting the emphasis, as already mentioned, from language quantity to the contextual aspects of language acquisition, particularly the effects of formal learning and teaching environments. For educators, this means that they should also be careful to avoid making assumptions of (improved) language learning ability based solely on the number of languages students speak, especially if these languages are exclusively their L1s. Meanwhile, the positive correlations observed between participants' anxiety and their language aptitude hint at an important phenomenon: experiencing anxiety when applying one's metalinguistic knowledge in one's teaching can serve as a catalyst for teachers to become more aware of their own linguistic abilities and limitations. This heightened awareness, often referred to as attentiveness (Young, 1992), might have motivated participants to work towards improving their language proficiency actively and diligently, resulting in higher language aptitude.

While previous studies have indicated that anxiety, under certain conditions, can have a positive correlation with language learning outcomes (Sajedi, 2017; Sullivan, 2011), the specific effects of anxiety on language aptitude in language teachers have generally not been explored, though they have been implied in some studies. For instance, regarding the relationship between language teachers' anxiety and oral proficiency in the taught language, Sullivan (2011, p. 252) notes:

It may be that those who are nervous are geared up in ways that improve their performance. Teacher candidates who do not have an accurate self-perception (i.e., are inaccurately confident in their oral L2 proficiency) are less likely to seek out new opportunities to learn and improve. Those who perceive that they already possess expertise are unlikely to believe that they need to grow and improve.

The findings pertaining to the second research question revealed differences in the language maintenance habits of participants depending on their language aptitude. Participants in the higher quartiles (see Table 2) reported active engagement and more diverse activities. Even during passive engagement, their reading habits, for instance, extended beyond literary fiction and news articles to encompass texts on language pedagogy, linguistics, and psychology. In contrast, a considerable portion of participants from the lowest quartile reported relying solely on their teaching for language maintenance, indicating limited engagement with their taught languages outside of work. While previous studies on language teachers have not specifically examined the relationship between their language maintenance habits, language aptitude, and metalinguistic knowledge, Sullivan (2011) found that language teacher candidates with advanced oral proficiency in their taught languages engaged in a wider range of activities and wrote more frequently than those with weaker proficiency, who primarily engaged in passive activities like reading and listening to music. Using experiential learning theory (Kolb, 2014) as a basis, one can argue that participants' engagement in a broader range of activities, particularly ones with active engagement, facilitated the acquisition of a wider set of language skills and a deeper understanding of the languages they taught, likely contributing to higher levels of language aptitude and metalinguistic knowledge. The findings are also partially supported

by Bonilla et al. (2021), who reported a positive correlation between the overall proficiency of language learners with average or above-average aptitude and their engagement in activities involving writing and speaking.

Conclusion and implications

Language teachers who possess limited metalinguistic knowledge and language aptitude may struggle to guide their students in developing these key abilities, ultimately negatively impacting their progress. To address this issue, and based on the study's findings, language teachers should actively engage in a variety of language maintenance activities that encompass both passive and, more crucially, active productive engagement with the language (i.e., activities involving speaking and writing). Teacher educators, in turn, need to place greater emphasis on engaging with language teachers regarding their language maintenance habits outside of the classroom. This requires a shift in focus from solely prioritizing classroom practices to explicitly and systematically acknowledging the impact of language maintenance activities outside of the classroom on language teaching effectiveness. Moreover, the study's findings highlight that language teachers who teach and have learned multiple FLs tend to possess higher language aptitude. Teacher educators could try to help language teachers further develop their language aptitude by requiring them to learn an FL (up to a certain level) as part of their study program or by recommending they undertake language learning initiatives independently (e.g., for additional credit). Another approach would be to integrate language aptitude tests, such as the LAT, into coursework, with a focus on enhancing student teachers' effective use of strategies.

Language teacher education programs should also prioritize the systematic development of metalinguistic knowledge among teachers. Currently, many programs can focus primarily on language *pedagogy* without paying much attention to teachers' verbalizable knowledge of the target language, perhaps assuming that teacher candidates already possess this knowledge. However, this might not be the case. As for studies, researchers should strive to include multiple operationalizations of multilingualism in their projects so that we may obtain more nuanced insights into its interactions with learning and teaching outcomes, for example, first languages, including dialects, versus foreign languages or productive versus receptive multilingualism (see Cenoz, 2013). Finally, there is a need for a more comprehensive exploration of the dynamics between affective variables, metalinguistic knowledge, and language aptitude, especially in relation to teaching practices and learning outcomes. Future studies may seek to not only investigate the emotions that language teachers associate with their ability to articulate and reflect on specific linguistic features or their language aptitude but also how these emotions impact their classroom practices. Researchers could also examine how teachers regulate these emotions, including if they implement specific strategies, such as cognitive reappraisal or mindfulness, and the extent to which these strategies contribute to reducing their anxiety and increasing their motivation and focus when teaching.

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No potential conflict of interest was reported by the author(s).

Notes on contributor

Raees Calafato is an Associate Professor of English at the University of South-Eastern Norway (USN), where he is co-leader of the research group *Flerspråkighet, læring og utvikling*. His research interests include multilingualism, teacher education, foreign language teaching, and literature in language education.

ORCID

Raees Calafato  <http://orcid.org/0000-0001-8222-6772>

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