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# Pathways to Need-Supportive Teaching: Teaching Mindsets and Motivation to Teach

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**Abstract** Teachers differ in the extent to which they support their students' basic psychological needs. To better understand these differences, we investigated how mindsets and motivation to teach English relate to their need-supportive teaching practices. Data was gathered from 348 EFL instructors (261 female, 87 male;  $M_{age} = 38.47$ , SD = 9.22) working at state and private universities in Turkey through the following self-report questionnaires: the Implicit Theories of Intelligence Scale (ITIS; Dweck et al., 1995), the Comprehensive Relative Autonomy Index (C-RAI; Sheldon et al., 2017), and the Teacher as a Social Context Questionnaire (TASC-Q; Belmont et al., 1988). Results of structural equation modeling revealed that language instructors' fixed teaching mindset beliefs had both direct and indirect relationships with their need-supportive teaching through quality of teaching motivation. The direct relationships suggest that instructors who believe their teaching ability is a fixed trait are less likely to teach for autonomous reasons, such as personal interest and values, and more inclined to teach out of external reasons, such as pressure from supervisors. The indirect relationships suggest that autonomous teaching motivation mediates the negative relationships between fixed teaching mindset and provision of involvement and structure. These findings highlight the important role of teaching mindsets and motivation in promoting need-supportive learning environments.

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# Introduction

Basic Psychological Need Theory (BPNT; Vansteenkiste et al., 2020), one of the sub-theories of Self-Determination Theory (SDT; Ryan & Deci, 2017), proposes three basic psychological needs: autonomy (the need to feel ownership of one's actions), competence (the need to feel effective in one's actions), and relatedness (the need to feel connected with others). The fulfillment of these needs is critical for individuals' optimal functioning and engagement. Within the realm of education, teachers have consistently been reported to facilitate student engagement and learning by nurturing students' needs for autonomy, competence, and relatedness (Michou et al., 2023; Reeve & Cheon, 2021). The degree to which educators meet their students' basic psychological needs characterizes their need-supportive teaching (NST). But what distinguishes some teachers from their counterparts in providing learners with more needsupportive instruction?

Teachers' mindsets (beliefs about the extent of malleability of human capacities) play an important role in shaping their instructional practices and relationships with students (Laine & Tirri, 2023). Dweck (2006) categorizes mindsets into two types: growth and fixed. A growth mindset entails the belief that abilities or intelligence can develop, while a fixed mindset entails the belief that they are unchangeable traits. The advantages of having a growth mindset over a fixed mindset have been well documented in several longitudinal (e.g., Yeager et al., 2014), cross-sectional (e.g., Bostwick et al., 2017), and interventional (e.g., Paunesku

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et al., 2015) studies. Mindsets do not operate in isolation, though (Dweck & Yeager, 2019; Lou et al., 2022). Instead, they are tightly connected to other motivational components such as effort beliefs, attributions, and achievement goals in a coherent meaning system (Dweck & Molden, 2017; Yu & McLellan, 2020). Considering this broader meaning system, teachers' beliefs about their own teaching ability could be closely linked with their motivation to teach and teaching strategies. Research has shown that educators' mindsets regarding students' intellectual abilities (e.g., Vermote et al., 2020) and their motivation to teach (e.g., Aelterman et al., 2019) are related to their NST. However, the role of teaching mindsets (the beliefs about the extent of malleability of teaching skills) and the quality of teaching motivation in explaining teaching-related outcomes has caught less attention (e.g., Nalipay et al., 2021). More surprisingly, prior research, except for a recent experimental study conducted by Akay (2023), has not sought to examine the joint contribution of English as a Foreign Language (EFL) instructors' teaching mindsets and motivations to their motivating teaching styles. We argue that instructors who believe their teaching ability can be improved through effort are more likely to find teaching and lesson preparation enjoyable and valuable (e.g., through the inherent enjoyment of effort or the value of self-improvement). Such autonomous teaching motivation can, in turn, be expected to relate to NST (Liu et al., 2020).

Adopting NST is particularly important in foreign language learning contexts, where acquiring a new language is mostly considered challenging and anxiety-provoking (Zhang, 2019). Considering the challenges of learning a language experienced by students and the daily challenges teachers face, one of which is supporting students' motivation (Patall et al., 2022), it is important to understand the mechanisms that make language instructors need-supportive toward learners. Although mindset beliefs about students' abilities have been investigated among student samples (e.g., Zarrinabadi et al., 2021) and teacher samples in language learning contexts (e.g., Zarrinabadi & Afsharmehr, 2022), teaching mindsets (teachers' beliefs about their teaching ability) of language educators have only recently attracted the attention of researchers (e.g., Zarrinabadi et al., 2023).

Drawing on both Mindset Theory (Dweck, 2006) and SDT (2017), the present study aims to investigate whether language instructors' mindset beliefs regarding their teaching ability relate to their NST through their autonomous or controlled motivation to teach in a higher education context.

# **Instructors' Teaching Mindsets**

A recent review on teachers' mindsets conducted by Laine and Tirri (2023) revealed their relevance to the development of students' mindsets, quality of teaching, and instructional practices, providing evidence in favor of holding a growth mindset over a fixed or mixed mindset (i.e., fall between being fully fixed and fully growth on mindset, Lou et al., 2022). For example, Zarrinabadi and Afsharmehr (2022) found that teachers holding fixed and mixed mindsets, compared to those with growth mindsets, discriminate between high- and low-language-intelligence students by attributing superiority to the former in the pace of learning, engagement, and self-confidence. Although there are some studies investigating how teachers' mindsets about human capacities relate to their instructional practices (Rissanen et al., 2018, 2019), fewer studies exclusively investigated how these beliefs relate to their NST practices. For example, Vermote et al. (2020) revealed that instructors' mindsets about students' intellectual abilities, along with their motivation to teach, simultaneously relate to their NST. Although this finding provides an interesting framework to better understand what could make instructors more needsupportive toward their students-by pointing to the role of educators' mindset beliefs about students' abilities and quality of motivation-, educators' mindsets concerning the malleability of their own teaching were not considered.

Taking into consideration the mindset meaning system (MMS; Dweck & Molden, 2017) and the Language MMS (Lou & Noels, 2019; Lou et al., 2022) frameworks, which explain how mindset beliefs and other motivational factors such as attributions, effort beliefs, and achievement goals operate together, we highlight the importance of examining the role of educators' teaching mindsets and motivation in their instructional choices. Lou and Noels (2020) also pointed out the equally important role of supporting language learners' growth mindsets and basic psychological needs in a study where they integrated the motivational frameworks of mindset theory and SDT. To both build on this integration and test our assumption that teaching mindsets could be interconnected with other motivational constructs, forming a teaching mindset meaning system, we attempted to conduct the current study. Indeed, within the past few years, teaching mindsets have emerged as a promising field of investigation (e.g., Frondozo et al., 2020; Nalipay et al., 2019, 2021). Despite the growing interest in teaching mindsets in the general education domain, research on language teaching mindsets is still in its infancy (Haukås & Mercer, 2022).

## **Instructors' Quality of Motivation**

SDT (Ryan & Deci, 2017), a macro theory of human motivation, identifies different types of regulations of human behavior, which constitute different qualities of motivation in terms of internalization and locus of causality. On the one hand, autonomous motivation consists of intrinsic motivation (i.e., teaching out of sheer interest and enjoyment) and two highly internalized forms of extrinsic motivation: identified regulation (i.e., teaching out of personal values and beliefs) and integrated regulation (i.e., teaching in congruence with one's core values and sense of self). On the other hand, there is controlled motivation, which is composed of external regulation (i.e., teaching out of external pressures, such as attaining rewards or avoiding punishments) and introjected regulation (i.e., teaching out of internal pressures, such as feelings of guilt and shame or desire to be socially approved).

The associations between autonomous motivation and optimal human functioning have been well documented in empirical SDT research conducted with various samples, such as students (see Bureau et al., 2022 for a meta-analysis) and employees (e.g., Gillet et al., 2013). Within the teaching context, autonomously motivated teachers were found to experience greater well-being and display more favorable instructional practices than teachers driven by controlled motivation (see Slemp et al., 2020 for a meta-analysis). Research to date has demonstrated that teachers' quality of motivation, along with their beliefs about the degree of malleability of human capacities, are indeed linked to their motivating teaching behaviors (e.g., Leroy et al., 2007; Vermote et al., 2020).

# **Need-Supportive Teaching**

According to BPNT, there are three universal basic psychological needs, the fulfillment of which is related to humans' optimal functioning and well-being. In this sense, students can experience more autonomous forms of motivation when their needs for autonomy, competence, and relatedness are satisfied through the provision of autonomy support, structure, and involvement, respectively (Ryan & Deci, 2020). More recently, a large group of international researchers of SDT (Ahmadi et al., 2023) has created a classification tool for teachers' NST behaviors. For instance, they agreed on several exemplary teaching behaviors for autonomy-supportive teaching such as offering learners meaningful choices and providing students with rationales to perform a learning activity; for competence-supportive teaching such as giving clear instructions and providing optimal challenges; and for relatedness-supportive teaching such as showing unconditional positive regard and expressing affection.

Although the outcomes of NST, such as the increase in students' motivation and engagement, have been thoroughly investigated (e.g., Patall et al., 2024; Steingut et al., 2017), its antecedents have received relatively less attention. For instance, Liu et al. (2020) revealed that teachers' autonomous motivation positively and controlled motivation negatively predicted their NST. All in all, instructors' autonomous motivation to teach seems to matter to ensure a need-supportive learning environment since autonomously motivated teachers are more likely to put effort into teaching due to the inherent joy they experience while teaching and the value they place on their profession. In other words, they feel or think about their own reasons for engaging in more need-supportive practices (Roth et al., 2007).

#### The Present Study and Hypotheses

While previous research on the antecedents of NST pointed to teachers' mindsets about learners' capacities (e.g., Leroy et al., 2007) and their autonomous motivation (e.g., Aelterman et al., 2019), only one study (Vermote et al., 2020) has investigated their joint roles in predicting NST in a higher education context. However, Vermote et al. (2020) measured instructors' mindset beliefs about students' intelligence rather than their own teaching ability. Furthermore, educators' beliefs about the degree of malleability of their own teaching ability were found to explain optimal teachingrelated outcomes, such as higher work engagement via their autonomous motivation to teach (Nalipay et al., 2021). This makes sense, given that NST should be bound to teachers' beliefs about themselves and not just what they think about their students (Daumiller et al., 2022a). In particular, considering the MMS framework (Dweck & Molden, 2017), different teaching mindsets may be linked to different forms of teaching motivation, which could explain the variance in the levels of NST. We aimed to test this argument and investigate how EFL instructors' mindsets about their teaching ability and the quality of their motivation to teach matter for their need-supportive practices in higher education. This study will enhance our understanding of the correlates of teaching approaches in EFL settings and inform programs for teachers' professional development.

Presumably, educators with fixed teaching mindsets are more likely to attribute experienced challenges to their lack of competency. For this reason, they are more vulnerable to developing an ego-concerned, threat-avoidant, rewardseeking motivation as they are more sensitive to feedback on their teaching practices. Consequently, educators with a fixed teaching mindset, driven by controlled motivation in teaching, are more likely to avoid the challenge of being need-supportive towards their students. From this perspective, we assumed that instructors' autonomous motivation to teach would partially mediate the relationship between their fixed teaching mindset beliefs and their NST practices in language classrooms. Partial mediation was assumed because a fixed teaching mindset that makes educators sensitive to criticism and close scrutiny of their teaching practices (Thadani et al., 2010) could have both direct and indirect effects on NST styles.

Based on these assumptions, we proposed the following hypotheses:

*Hypothesis 1a* Fixed teaching mindsets are negatively related to autonomous forms (i.e., intrinsic and identified regulations) of teaching motivation.

*Hypothesis 1b* Fixed teaching mindsets are positively related to controlled forms (i.e., introjected and external regulations) of teaching motivation.

*Hypothesis 2a* Instructors' autonomous forms of teaching motivation are positively related to their NST.

*Hypothesis 2b* Instructors' controlled forms of teaching motivation are negatively related to their NST.

*Hypothesis 3* The relationship between fixed teaching mindsets and NST is partially mediated by instructors' autonomous and controlled forms of teaching motivation.

By testing these hypotheses, we aimed to elucidate whether teaching mindsets predict NST via different forms of autonomous or controlled motivation to teach English in a higher education context.

# Method

# **Sample and Procedure**

Data were collected from 377 EFL instructors working in Turkish tertiary education; however, 29 cases were excluded because they gave incorrect answers to two attention-check items embedded in the survey to detect random responses (Shamon & Berning, 2020). The final sample comprised 348 instructors (261 female, 87 male) with a mean age of 38.47 (SD=9.22) years. Among them, 303 instructors were Turkish, 10 American, 11 British, and 22 other nationalities. On average, the teaching experience of the participants ranged from one to four years (7.5%) to over 20 years (26.1%). After obtaining approval from the ethics committee for research with human participants of the first author's institution, data were gathered either on-site (n=101) by visiting the campuses or remotely (n=276) through the Qualtrics software platform.<sup>1</sup> All participants were informed about their anonymous participation and right to withdraw from the study.

## Measures

As the sample of the current study was composed of EFL instructors who were proficient in English, all questionnaires were administered in English.

## **Teaching Mindset Beliefs**

To measure teaching mindsets, we used the fixed mindset items of the implicit theories of intelligence scale (ITIS; Dweck et al., 1995) because the construct is considered unitary and respondents could become confused if the same concept was rephrased repeatedly (Dweck et al., 1995). This practice has been adopted in many subsequent studies (e.g., Yeager et al., 2019). We slightly modified the measure for teachers to self-report their mindset beliefs about their own teaching ability. For instance, instead of using the original item "You can learn new things, but you can't really change your basic intelligence." we slightly modified the item to better appeal to our sample (e.g., "You can learn new teaching approaches, but you can't really change your basic teaching ability."). Items were scored on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the modified version was satisfactory  $(\alpha = .88).$ 

#### Instructors' Self-determined Motivation for Teaching

The Comprehensive Relative Autonomy Index (C-RAI; Sheldon et al., 2017) was used to measure self-determined motivation for teaching. Following the stem statement "I am trying to teach well," five subscales were assessed on a 5-point Likert type scale: intrinsic (4 items; e.g., "because I enjoy teaching"), identified (4 items; e.g., "because I strongly value teaching"), positive introjected (4 items; e.g., "because I want to be proud of myself"), negative introjected (4 items; e.g., "because I would feel like a failure if I didn't teach well"), and external (4 items; e.g., "because important people (i.e., directors, students, parents) will like me better if I teach well") regulation. Inspection of the correlations among the 5 subscales of C-RAI showed that positive introjected regulation was moderately positively correlated with both intrinsic regulation (r = .33, p < .01) and identified regulation (r = .40, p < .01). By contrast, negative introjected regulation, according to the continuum of self-determination, was weakly positively associated with intrinsic regulation (r = .12, p < .05) and moderately positively associated with identified regulation (r = .27, p < .01). Considering these results, we kept only negative introjected regulation in our analysis as a better representative type of controlled

<sup>&</sup>lt;sup>1</sup> We conducted a MANOVA to investigate whether study variables differed as a function of the survey completion mode. Results showed that the multivariate effect of how the participants completed the survey was significant, *Wilks'*  $\lambda = .95$ , *F* (9, 338)=2.18, *p*=.02, partial  $\eta^2 = .06$ . Examining the results of univariate analyses indicated that participants who completed the survey in-person, compared to the ones who completed it online, reported higher fixed mindset beliefs about their own teaching autonomy-supportive teaching styles. Therefore, the response mode of the participants was included as a covariate in our hypothesized model.



Fig. 1 The Hypothesized Model

*Note.* Factor indicators and residuals are not depicted for reasons of presentation simplicity. Provision of Autonomy=Autonomy-supportive teaching; Provision of Structure=Competence-Supportive Teaching; Provision of Involvement=Relatedness-Supportive Teaching

motivation than positive introjected regulation. Internal consistency for each subscale ranged from .70 to .89. A CFA with four latent factors to which the corresponding 4 items were loaded yielded the following acceptable fit indices:  $\chi^2$  (98)=251.93, *p* < .001, TLI=.98, CFI=.98, RMSEA=.07, 90% CI [.057, .077], SRMR=.05.

## **Need-Supportive Teaching**

NST was measured using the short version of the teacher as a social context questionnaire (TASC-Q; Belmont et al., 1988). It consists of 33 items scored on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*) and 3 subscales that measure autonomy-support (e.g., "I try to give my students a lot of choices about classroom assignments"); structure (e.g., "I try to be clear with my students about what I expect of them in class"); involvement (e.g., "My students can count on me to be there for them").

Involvement ( $\alpha$  = .81) consisted of 12 items measuring instructors' affection (3 items), attunement (3 items), dedication of resources (3 items), and dependability (3 items). *Structure* ( $\alpha$  = .79) consists of 12 items tapping instructors' help and support (3 items), clarity of expectations (3 items), contingency (3 items), and adjustment of teaching strategies (3 items). Autonomy-support ( $\alpha = .62$ ) included 9 items measuring instructors' respect for learners' thoughts and feelings (3 items), providing choice (3 items), and relevance (3 items).

A second-order CFA yielded the following acceptable fit indices:  $\chi^2$  (480) = 1343.78, p < .001, TLI = .89, CFI = .90, RMSEA = .07, 90% CI [.067, .076], SRMR = .07. Following the inspection of item loadings, we decided to delete the third item of dependability and the first item of contingency sub-dimensions due to low factor loadings (.30 and .32, respectively). After deleting these two items, the final CFA yielded the following acceptable fit indices:  $\chi^2$  (419) = 1223.85, p < .001, TLI = .89, CFI = .90, RMSEA = .07, 90% CI [.069, .079], SRMR = .07.

#### Data Analysis

Structural equation modeling was conducted using *Mplus* 8 (Muthén & Muthén, 2017) to test the associations between instructors' mindset beliefs, motivation to teach, and NST. The hypothesized model (See Fig. 1) was tested using the Weighted Least Squares Mean and Variance

Table 1 Descriptive statistics, bivariate, and manifest correlations

Variable	М	SD	1	2	3	4	5	6	7	8
1. Fixed teaching mindset	2.29	0.86	-	.15**	.03	25***	24***	28***	28***	21***
2. External regulation	2.45	0.75	.21***	_	.35***	12*	16**	18***	21***	17***
3. Introjected regulation	3.74	0.79	.02	.40***	_	.27***	.12*	.07	.009	.09
4. Identified regulation	4.43	0.49	35***	21***	.43***	-	.72***	.37***	.42***	.57***
5. Intrinsic regulation	4.24	0.62	30***	22***	.20***	.88***	-	.38***	.44***	.59***
6. Autonomy-supportive teaching	3.82	0.40	41***	26***	.15*	.65***	.63***	-	.45***	.55***
7. Competence-supportive teaching	3.90	0.43	35***	31***	.11	.59***	.58***	.81***	-	.54***
8. Relatedness-supportive teaching	4.00	0.45	26***	27***	.21***	.81***	.81***	.88***	.77***	-

*Note*. N = 348; The upper-diagonal matrix shows the bivariate correlations. The lower-diagonal one shows the manifest correlations \* p < .05. \*\* p < .01. \*\*\* p < .001

(WLSMV) estimator because of the ordinal-categorical nature of Likert-type items (Finney & DiStefano, 2013; Flora & Curran, 2004) and the distribution of the data.

Instructors' institutional affiliation (i.e., working in either state or private universities, Akay, 2023) and gender (Aelterman et al., 2014) have both been found to be closely associated with their NST. Thus, all hypothesized relations were tested by including gender, the university type in which instructors work, and the mode of survey completion as covariates to test the unique contribution of teaching mindset beliefs to NST.

We assessed the model fit based on the following criteria recommended by Hu and Bentler (1999) and Kline (2015): Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values at or above .90 and .95, Root Mean Square Error of Approximation (RMSEA) value at .06 or lower and standardized Root Mean Square Residual (SRMR) value at .08 or lower.

# Results

# Preliminary Analyses: Descriptive Statistics and Bivariate Correlations

Table 1 reports the descriptive statistics computed for the study variables, as well as the manifest and bivariate correlations among them. Except for the associations between negative introjected regulation and instructors' mindset beliefs as well as need-supportive teaching styles, the correlations among instructors' fixed mindset beliefs, different regulatory styles of teaching motivation, and NST styles were found to range from small to high in magnitude and statistically significant, indicating the presumed associations among these constructs.

#### **Main Results**

Before testing the structural model, we tested the measurement model, which indicated an acceptable model fit for the data:  $\chi^2$  (1139) = 2276.82, p < .001, TLI = .93, CFI = .94, RMSEA = .05, 90% CI [.050, .057], SRMR = .07. Next, we tested our hypothesized structural model and included the gender, the response mode of participants, and the university type they work for as covariates. The fit of the initial structural model was acceptable:  $\chi^2$  (1269) = 2440.43, p < .001, TLI = .93, CFI = .94, RMSEA = .05, 90% CI [.048, .055], SRMR = .07. A closer examination of path coefficients revealed that fixed teaching mindsets significantly predicted all regulatory styles (except introjected) in the anticipated directions, ranging from medium to large in magnitude. However, autonomysupportive teaching was predicted by none of the motivation types, and no significant path emerged between controlled regulations (i.e., introjected and external) and relatedness-supportive teaching. Based on these initial results, we modified our hypothesized model by removing the non-significant paths to eliminate free parameters and find a better model with a properly specified covariance structure (Kline, 2015).

After removing the non-significant paths, the final model also showed a good fit:  $\chi^2(1298) = 2543.61$ , p < .001, TLI = .92, CFI = .93, RMSEA = .05, 90% CI [.051, .057], SRMR = .08. The standardized model results (see Fig. 2) revealed that instructors' fixed teaching mindset negatively predicted their intrinsic and identified regulations ( $\beta$ =-.49, p < .001;  $\beta$ =-.55, p < .001, respectively) and positively predicted their external regulation ( $\beta$ =.28, p < .001). While this finding fully supports our hypothesis (H1a) indicating that instructors with fixed teaching mindsets are less likely to experience autonomous forms of teaching motivation (i.e., intrinsic and identified regulations), it partially supports *H1b* 



#### Fig. 2 Results of the Tested Structural Model

*Note.* Factor indicators, covariates, and (residual) correlations between external, introjected, identified, and intrinsic motivation as well as between provision of autonomy, structure, and involvement were modeled, but not depicted for reasons of presentation simplicity; All coefficients are standardized; Standard errors are presented in brackets; \*\*\* p < .001, \*\* p < .01, \*\* p < .05

as fixed teaching mindsets positively predicted only external (and not introjected) regulation.

In partial support of our hypotheses (H2a and H2b), instructors' competence support was positively predicted by their intrinsic regulation ( $\beta = .54$ , p < .001) and negatively predicted by their external regulation ( $\beta = -.09$ , p = .03). As for their relatedness support, only *H2a* was partially supported. More precisely, although it was predicted by intrinsic motivation ( $\beta = .58$ , p < .001), the path from identified regulation was found to be non-significant ( $\beta = .20$ , p = .07). Contrary to our expectation, autonomy support was not predicted by any form of teaching motivation, but only by fixed teaching mindsets ( $\beta = -.68$ , p < .001).

Regarding our Hypothesis 3, the indirect effects showed that intrinsic motivation mediated the negative relation between instructors' fixed mindsets and their provision of involvement ( $\beta$ =-.29, 95% CI [-.41, -.17], *p* < .001). Furthermore, the results also demonstrated that both external ( $\beta$ = -.03, 95% CI [-.05, -.001], *p*=.043) and intrinsic regulations ( $\beta$ = -.27, 95% CI [-.33, -.21], *p* < .001) mediated the negative relationship between instructors' fixed teaching mindsets and their competence-supportive teaching.

With regard to the covariates, our model results did not reveal any significant paths between the response mode of the participants and NST. In other words, completing the survey on-site or online did not yield any difference. Further and in line with the previous research (e.g., Aelterman, 2014), female EFL instructors scored significantly higher in relatedness-supportive ( $\beta = .15$ , p = .005) and competencesupportive ( $\beta = .13$ , p = .014) teaching styles compared to their male counterparts. EFL instructors working at state universities were found to better satisfy their learners' need for competence ( $\beta = -.13$ , p = .015), compared to their colleagues working at private universities.

## Discussion

The purpose of the current study was to investigate whether teaching mindsets account for educators' NST either directly or indirectly through the quality of motivation to teach. The results supported our hypothesis that educators with fixed teaching mindsets would be more prone to perceive challenging teaching situations or negative feedback as threats to their teaching ability and, therefore, become more sensitive to how others view their teaching ability (Thadani et al., 2010). In other words, instructors with fixed teaching mindsets were found to be driven by controlled forms of teaching motivation, which would consequently lead them to adopt less need-supportive teaching approaches.

# How Fixed Teaching Mindsets Relate to Different Forms of Teaching Motivation (Hypothesis 1)

Our findings revealed that fixed teaching mindsets negatively predicted both regulatory styles of autonomous motivation (i.e., identified and intrinsic regulations), verifying Hypothesis H1a. However, fixed teaching mindsets positively predicted only one regulatory style of controlled motivation (i.e., external regulation), partially confirming Hypothesis H1b. This means that when instructors believe that their teaching ability is a fixed trait, they are less likely to teach for autonomous reasons (e.g., teaching out of sheer interest and personal values) and more likely to teach out of external pressures. Contrary to expectations, instructors' fixed teaching mindset beliefs were not found to be associated with teaching out of internal pressures, such as feelings of guilt or desire to be socially approved. This is an interesting result considering the less internalized nature of external regulation compared to the more internalized nature of introjected regulation (Zhao et al., 2018). It seems that a fixed teaching mindset hampers the internalization process of the reasons for teaching. Further research is needed to replicate this interesting result, which reveals the rigid motivational disposition of teachers who believe that their teaching ability cannot improve.

# How Different Forms of Teaching Motivation Relate to NTS (Hypothesis 2)

Our findings partially supported the hypotheses regarding the associations between different forms of teaching motivation and three dimensions of NST (*H2a & H2b*). As for the presumed links between different forms of teaching motivation and autonomy support, surprisingly, the results did not yield any significant associations. Instructors' fixed teaching mindset negatively and directly predicted their autonomysupportive teaching, regardless of how their teaching was regulated. This finding not only indicates the crucial role of teaching mindsets in supporting or thwarting learners' need for autonomy but also signals the necessity of designing growth teaching mindset interventions to facilitate autonomy-supportive environments.

Regarding the presumed associations between different forms of teaching motivation and competence support, the findings partially supported H2a and H2b. Only external and intrinsic regulations were found to be negatively and positively associated with competence-supportive teaching, respectively. Regarding the presumed associations between different forms of teaching motivation and provision of involvement (i.e., relatedness-supportive teaching), the results partially supported H2a yet provided no support for H2b. In other words, relatedness support was only predicted by one form of autonomous motivation that is intrinsic regulation. This finding aligns with the nature of supporting learners' need for relatedness. When driven by more autonomous forms of teaching motivation, educators are more likely to build rapport with their students, thereby meeting learners' need for feeling connected to others. However, it is unlikely that instructors teaching for external reasons will invest time in forming strong bonds with their students.

# The Mediating Role of Teaching Motivation in the Relationship Between Fixed Teaching Mindset and NST (Hypothesis 3)

As for the presumed mediating role of quality of motivation in the relationship between fixed teaching mindsets and NST, EFL instructors' fixed teaching mindsets were found to have an indirect effect on their relatedness-supportive teaching through intrinsic regulation. Moreover, instructors' fixed teaching mindsets had indirect effects on their competencesupportive teaching via intrinsic and external regulations of teaching behavior. All in all, EFL instructors holding fixed teaching mindsets were less likely to adopt NST practices. This finding is in line with the previous research examining the associations between teachers' mindset beliefs about the malleability of human capacities and need-supportive teaching styles (Vermote et al., 2020). Reporting low levels of fixed teaching mindset, for instance, was the only factor contributing uniquely to instructors' autonomy-supportive teaching style. This makes sense as one cannot expect teachers who do not even believe in the malleability of their teaching capacity to believe in the relevance of autonomy support to improve students' capacities.

# **Limitations and Future Research**

When interpreting the results of this study, some limitations must be addressed. First, the cross-sectional design of the study prevented causation predictions. Therefore, future researchers should conduct longitudinal and experimental studies to test whether teaching mindsets result in specific types of teaching motivations or NST styles (see Akay, 2023). Second, we relied on the instructors' self-reports. However, Daumiller et al. (2022b) pointed out discrepancies between educators' self-ratings and others' ratings in the measurement of instructional practices. To avoid monomethod bias and gain an in-depth understanding of typical manifestations of NST, future research should assess NST through student reports (e.g., Michou et al., 2023) or lesson observations (e.g., Stroet et al., 2015). Finally, the bulk of the data was gathered from EFL instructors teaching in Turkey. Collecting data from instructors teaching in other countries and teaching different subjects may enable future researchers to present cross-cultural or cross-subject differences in NST (e.g., Haw & King, 2022).

#### **Practical Implications**

Teacher-focused interventional studies have proved that teachers can be trained to teach in a more need-supportive way (Reeve & Cheon, 2021). Our findings could build on this evidence by highlighting the importance of designing broader-spectrum NST interventions targeting to facilitate an adaptive MMS of teachers which encompasses the growth teaching mindset and autonomous forms of teaching motivation. Growth teaching mindsets can be induced through direct interventions like those designed for students (e.g., Yeager et al., 2019). Moreover, a growth teaching mindset can be developed indirectly by creating a growth institution culture (i.e., the mindset-plus-supportive-context), which will sustain the effects of growth mindset interventions (Yeager et al., 2022). If instructors are supported with instructional resources offering solutions to teaching challenges and professional development initiatives tailored to their needs, they receive the message from their institution that their needs matter and that their profession is valuable and appreciated. Under such conditions, they are more likely to develop an autonomous teaching motivation, which in turn will contribute to a caring attitude toward their students (provision of involvement). As our findings showed, by targeting instructors' growth teaching mindset, we could directly enhance their autonomy-supportive teaching style and provision of structure in the classroom.

## Conclusion

Extending the findings of prior studies exploring educators' mindset beliefs regarding their teaching ability (e.g., Nalipay et al., 2021) and students' learning ability (e.g., Leroy et al., 2007), we revealed the direct and indirect effects of teaching mindsets on NST in a higher education context. In particular, fixed teaching mindsets do not adequately contribute to the instructors' NST (Vermote et al., 2020). More precisely, we found that instructors with fixed teaching mindsets were less likely to experience autonomous forms of motivation, leaving them less inclined to adopt NST. This finding indicates the importance of developing a growth mindset culture among teachers to promote NST, which in turn will enable learners to thrive.

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#### Declarations

Competing interests None.

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