Investigating the Circumplex Model of (De)Motivating Teaching Styles in Higher Education

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Abstract

A new circumplex model of (de)motivating teaching styles distinguishes not only between autonomy support and controlling behaviors which lead to basic need support/thwarting in students, but between the level of direction in teaching/learning. The latter are described by two styles - structure and chaos. However, investigations of this model are still rare, especially in the context of higher education. This study extends previous literature by examining the proposed circular nature of the model in a new higher education context and investigating teaching experience, education, identity, and teaching approaches as possible determinants of higher education teachers' (de)motivating styles. A total of 130 university teachers participated in an online survey and filled out Croatian versions of the SIS-HE Questionnaire, the Psychologically Controlling Teaching Questionnaire, part of the Teacher as a Social Context Questionnaire and the Approaches to Teaching Questionnaire. Multidimensional scaling analysis and correlational patterns confirmed the assumed circularity of the model. Correlational patterns with other instruments measuring teaching styles were in line with expectations. Out of all the examined teacher characteristics, only prior teacher education and teaching approaches were important determinants of higher education teachers' (de)motivating styles. Those with higher levels of teacher education used structure more and chaos less often. Having a student-centered teaching approach was related to using more motivating styles of autonomy support and structure and less chaos as a demotivating style, while a teacher-centered approach was related to the use of control and chaos as demotivating styles.

Keywords: circumplex model, (de)motivating teaching styles, higher education, teaching approaches

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Introduction

When students' basic psychological needs of autonomy, relatedness and competence are met in an educational context, students receive multiple benefits like higher levels of well-being and resilience, stronger motivation and engagement, and greater academic achievement (Ryan et al., 2023). The style teachers use to satisfy these needs and motivate students is crucial for shaping either the learning environments which lead to need support and better academic outcomes, or to need thwarting and lesser academic outcomes (Reeve, 2009; Vansteenkiste et al., 2020). Recently, a new circumplex model of (de)motivating teaching styles (Aelterman et al., 2019) was proposed, differentiating not only between autonomy supportive and controlling behaviors which lead to need support/thwarting, but between structure and chaos as the difference between the level of direction in teaching/learning. It seems that this model can be applied to describe behaviors and strategies of higher education teachers as well (Vermote et al., 2020). However, with only one study done in the context of higher education, further investigation is needed. In this research we extend previous literature by examining the circular nature of the circumplex model for higher education teachers in Croatia, and by exploring some new possible determinants of teachers' (de)motivating styles.

Circumplex Model of Teachers' (De)Motivating Styles

The circumplex model was proposed to provide an integrative and fine-grained investigation of different behaviors and strategies aimed to satisfy students' basic psychological needs (Aelterman & Vansteenkiste, 2023). Building upon previous work in distinguishing between autonomy support and controlling teaching (see Reeve, 2009 for a review), the circumplex model has an additional dimension of high/low directiveness, and is described by four styles, with eight subdimensions (Aelterman et al., 2019). Autonomy support and structure are styles aimed toward student need satisfaction and are considered motivating. On the other hand, control and chaos are considered demotivating styles since they are associated with basic needs thwarting. At the same time, control and structure are considered highly directive strategies, while autonomy support and chaos are considered strategies with low direction in teaching.

As Aelterman et al. (2019) describe, a teacher who **supports autonomy** shows interest in their students, and makes sure they volitionally engage in learning activities. A *participative* teacher invites students to provide suggestions, share their interests and gives meaningful choices to students. When the autonomy supportive teacher is being *attuned,* they accept negative feelings and students' point of view and provide meaningful reasons for activities tying them to students' personal interests. A teacher who uses **structure** is aware of students' proficiency level and progressively helps students to achieve learning goals. *Guiding* behaviors include providing appropriate step by step help and reflecting on mistakes so that students

become more independent and know how to improve. *Clarifying* behaviors include communicating expectations, giving detailed instructions and being transparent. **Controlling** teaching comprises of demanding and domineering behavior. Overall tone is one of pressure and insisting students behave in prescribed ways. While being *demanding* means that the teacher points out duties, threatens with sanctions and does not tolerate deviations from prescribed tasks, a *domineering* teacher takes it a step further by inducing feelings of guilt and shame, and exerting power over students. The **chaotic** teacher leaves students on their own. The *abandoning* teacher allows students to do whatever they want, rationalizing this with the belief that students need to learn to take responsibility for themselves. The *awaiting* teacher does not plan much and leaves initiative to the students.

From the above descriptions one can see how both controlling and structuring behaviors involve clear guidelines and instructions for students, in other words, higher levels of direction, but the difference is in the communication style and provision of help (vs. just giving answers to students). On the other hand, autonomy support and the chaotic style involve low levels of direction and giving students more freedom. However, the autonomy supportive teacher focuses on student needs and interests, while the chaotic teacher focuses on less work for himself leaving students confused and not knowing what to do or how to behave (Vermote et al., 2020). Hence, autonomy support and chaos are closer in the circumplex space than autonomy support and control, just as control and structure are closer than structure and chaos (Aelterman & Vansteenkiste, 2023).

Aelterman et al. (2019) proposed a vignette-based instrument (Situations in School Questionnaire) to operationalize their model. Several studies confirmed the validity of this instrument and the circular nature of the model on middle- and high-school teachers in Belgium (Aelterman et al., 2019), Italy (Moè & Katz, 2020) and China (Wang, 2023). The instrument was also successfully adapted for physical education teachers in Belgium and France (Escriva-Boulley et al., 2021), and Spain (Burgueño et al., 2023).

Vermote et al. (2020) adapted the same instrument for higher education teachers in Belgium (Situations in Schools Questionnaire – Higher Education). However, theirs is the only study to date focusing on higher education teachers. At the same time, there are several differences between higher education teachers and teachers of other levels which make this population especially interesting for studying (de)motivating styles. Teaching might not be the most prominent part of their professional identity given that teaching fills out only part of their working time and assignments. In addition, formal teacher education is not obligatory for higher education teachers in some countries (e.g., in Croatia). Although the European higher education space is structured similarly, there are still differences between contexts regarding teacher training, teaching time and levels of support available which all call for further validation of the circumplex model for higher-education teachers.

Determinants and Outcomes of Teachers' (De)Motivating Styles

Numerous previous studies attest to the positive benefits of providing autonomy support to students (see Reeve & Cheon, 2021), and to the negative effects of controlling teaching (see Soenens et al., 2012). Framed by the circumplex model, Aelterman et al.'s (2019) study confirmed that teachers who use more autonomy support and structure have students with higher levels of autonomous motivation and self-regulated learning, lower levels of amotivation and oppositional defiance, and their students rate them as high-quality teachers. Opposite patterns were found for control and chaos as demotivating styles. In an observational study, Cents-Boonstra et al. (2021) confirmed the benefits of autonomy support and structure for students' engagement, while chaotic teaching behaviors led to low levels of student engagement. Given the encouraging results from these studies it is not surprising scholars began to focus on determinants of (de)motivating styles.

Several studies focused on teacher motivation due to the assumption that teachers need to have enough capability to achieve motivating behaviors such as autonomy support and structure. It seems that when teachers' own basic psychological needs of autonomy, relatedness and competency are satisfied they are more likely to use motivating styles, while thwarted/frustrated needs are associated with the use of demotivating styles (Aelterman et al., 2019; Moè et al., 2022; Vermote et al., 2022). In line with the bright and dark pathways of motivation (Haerens et al., 2015), those with an intrinsic/autonomous motivation for teaching also use more motivating styles, while those with extrinsic/controlled types of motivation use more demotivating styles (Aelterman et al., 2019; Vermote et al., 2020).

When experiencing higher levels of burnout, usually associated with lower capacity for adequate job performance (Saloviita & Pakarinen, 2021), teachers seem to use demotivating styles more often (Aelterman et al., 2019; Moè & Katz, 2020). Similarly, higher levels of adaptive emotional regulation (Moè & Katz, 2021), self-compassion (Moè & Katz, 2020) and teaching enthusiasm (Moè & Katz, 2022) seem to create higher capability for teachers to focus on autonomy supportive and structuring behavior in their classrooms. Focusing on higher-education teachers Vermote et al. (2020) found that having a growth mindset, i.e., believing students can grow their capacities through learning, is also associated with more frequent use of motivating styles. Croatian studies involving elementary, middle and high school teachers confirm the role of teachers' intrinsic motivation, need satisfaction and job satisfaction for more frequent use of autonomy support and structure as motivating styles (Čižić, 2023; Golešić, 2022), and add teacher self-efficacy as an important determinant of using more motivating and less demotivating styles (Balaško, 2023).

One study focused on contextual factors shaping teachers' (de)motivating styles. Vermote et al. (2022) investigated pressures coming from students, colleagues and the principal, and found that only perceiving a lack of understanding and unfriendly relationships with their students was linked to using more control and chaos, and less autonomy support and structure during teaching. As shown by this

short review, available research framed by the circumplex model is still very scarce, and further studies are needed to investigate other determinants of teachers' (de)motivating styles. To do so, in this study we focus on some teaching-related individual factors such as teaching experience, teacher education, prominence of teaching in the professional identity, and approaches to teaching.

Teaching Related Characteristics as Determinants of (De)Motivating Styles

Previous research, which only focused on autonomy supportive and controlling teaching, found that years of teaching experience are an important factor, with younger teachers being more controlling than more senior teachers considering the increased stress levels and burnout they tend to experience at the beginning of their career (Reeve, 2009). However, a recent study of physical education teachers, framed by the circumplex model, found teachers at the end of their career to be more controlling, while younger teachers were less structuring (Hellebaut et al., 2023). Nevertheless, we were not able to find studies focusing on higher education teachers in the context of (de)motivating styles as defined by the circumplex model, so further investigation is needed.

Many behaviors and reactions describing a specific (de)motivating style come to light either during preparing for and delivering instructions or during situations which require classroom management. Optimal instructional strategies, quality classroom management as well as teachers' knowledge on how to best motivate students to learn are all integral parts of teacher education and teaching competencies (e.g., see González Ferrera & Yarosh, 2018). However, higher-education teachers, at least in some countries, are not obligated to undergo any formal teacher education, although some of them decide to as part of their life-long learning process. We argue that those who had training in teaching will be prone to use more motivating than demotivating styles while interacting with their students.

Similarly, we argue that higher education teachers who value teaching as a more important part of their professional identity will also report on using more motivating than demotivating styles. Some authors have shown that research activities can conflict with teaching activities, impacting higher education teachers' job performance (Geschwind & Broström, 2015). Since teaching is only one aspect of their university job, higher education teachers who value this aspect of their job more might also be more intrinsically motivated for teaching, which has been linked to using more motivating styles in a previous study (Vermote et al., 2020).

Having a student-centered focus is theorized to be an important antecedent of both autonomy-supportive behaviors (Reeve & Cheon, 2021; Vansteenkiste et al., 2019) and structuring behaviors (Aelterman & Vansteenkiste, 2023). However, we did not find previous studies which empirically investigated the relationship. Trigwell et al. (1994) distinguish between two broad approaches to teaching in higher education. A student-centered approach focuses on students' needs and interests, and the teacher's role is to facilitate a conceptual change in learning, and not just to

disseminate information (Trigwell et al., 1999). Teachers favoring this approach give meaningful choices to students, emphasize the relevance of tasks in everyday life and future, and invite students to articulate their own opinions, interests, and offer critique (Assor et al., 2002; Pedersen & Liu, 2003). The teacher-centered approach focuses on the teacher disseminating knowledge to students (Trigwell et al., 1999). Teachers expect students to reproduce the material in a similar manner, and they value good planning and students who accept new information without question (Trigwell & Prosser, 2020). Mladenovici and Ilie (2023), in their longitudinal study, found that teaching approaches precede other teaching beliefs and behaviors, giving credence to investigating teaching approaches as a factor determining their (de)motivating styles.

Teachers' use of student-centered approaches has been linked to higher student engagement and better academic outcomes, while the opposite was found for teacher-centered approaches (Uiboleht et al., 2018). The student-focused approach involves meeting student needs and facilitating independent learning, while the teacher-focused approach involves disseminating information and making sure students understand the material (Kember & Kwan, 2000). Although there are clear conceptual similarities between the student-centered approach and autonomy-supportive teaching behaviors, and the teacher-centered approach and controlling teaching behaviors, structuring behaviors, as described by the circumplex, seem to map onto both a student-centered and a teacher-centered approach. Because of this overlap, investigating the relationship between teaching approaches and (de)motivating styles can provide findings which further confirm this model.

Present Study

In this study we extend previous literature by examining the circumplex model in Croatian higher education setting. Our study had two goals: (1) to examine the circular nature of the model, and (2) to examine teaching approaches, experience, importance of teaching for their professional identity, and levels of teacher education as determinants of higher education teachers' (de)motivating styles. Given that the Situations in Schools Questionnaire – Higher Education (SIS-HE; Vermote et al., 2020) was first developed for use within the context of EU higher education, we expected to confirm the circular nature of the model in the Croatian context. In addition, we expected teachers' motivating styles of autonomy support and structure to be positively related to similar instruments used to operationalize teachers' structuring and autonomy supportive behaviors, while being negatively related to controlling behaviors. We expected the opposite pattern for teachers' demotivating styles of control and chaos. As described earlier, we expected teachers with more experience, higher levels of teacher education, who value teaching as an important part of their professional identity, and with a student-focused teaching approach to report using more autonomy support and structure as motivating styles, and less control and chaos as demotivating styles.

Method

Participants

A total of 130 university teachers (from research assistants to full professors; 72.2% women) from several Croatian universities and colleges participated in the study. They were 23 to 66 years of age ($M = 44.6$), with an average of 16.52 years of working experience ($SD = 10.11$; range: 1 to 40 years). They had backgrounds in social sciences (37.7%) and humanities (22.3%), natural sciences (22.3%), technical sciences (4.6%), biomedicine and interdisciplinary areas (7.7%). Most were employed at public faculties (87.7%) with the rest working at private faculties or colleges. Additional 17 university teachers from different scientific fields (from research assistants to full professors) and working experience participated in two focus groups used to translate the instrument (see Procedure).

Measures

Situations in Schools Questionnaire – Higher Education (SIS-HE; Vermote et al., 2020). The original questionnaire consists of 10 vignettes and multiple responses to each vignette (56 responses in total). First, we translated and back-translated the original questionnaire. Additionally, an English language expert checked the translation and proposed changes. Since the original questionnaire was developed in a different higher education context (Belgium), we additionally examined the clarity of the items and their appropriateness for the Crotian context by using a participatory approach (Formea et al., 2014) and involving higher education teachers directly in the translation process through two focus groups. We found that items are clear and understandable. Teachers from STEM backgrounds found the situations and the described teacher reactions just as appropriate for their classes as did social sciences and humanities teachers. While going through individual response options for each situational vignette, participants agreed that each described teacher behavior is representative of a reaction in higher education in Croatia. In addition, our participants found that some teacher reactions, typical for higher education teachers in Croatia, were lacking in certain situational vignettes, so we added a total of 7 responses to 3 vignettes and added a new vignette with 9 responses describing an assessment situation with the goal of clarifying and broadening the questionnaire. The adapted Croatian version consists of 11 vignettes and 72 items. An example of the situation described in the vignette is *You are covering a difficult subject that requires a lot of effort from the students, you…* after which the participants are presented with multiple responses. They need to indicate to what degree each of these responses describes their own behavior while teaching, ranging from 1 (*does not describe me at all*) to 7 (*describes me extremely well*) – (a) *… seek new or different ways to make the lesson more interesting and meaningful for the students (autonomy supportive – attuning); (b) … simply command them: "Stay attentive during this*

class! If not, you won't make it!" (control – domineering); (c) ... divide the lesson content into pieces and ensure that there is sufficient time for repetition (structure – guiding); (d) ... offer students the option to go through an introductory text in preparation for the lesson (autonomy support – participative); (e) ... don't worry too much in advance. You wait and see if any difficulties arise (chaos – awaiting); (f) ... make it clear to the students that they have to pay attention or otherwise they have to leave the classroom (control – demanding). The results on the teaching approach subscales were calculated using the scoring key Vermote et al. (2020) provided, extended with the added responses and the 11th vignette. Number of items and reliabilities of the subscales are reported in Table 1.

Psychological Controlling Teaching Questionnaire (PCTQ; Soenens et al., 2012) consists of 7 items designed to measure self-reported teacher behaviors aimed to control student behaviors in their classrooms (e.g., *I am less friendly with my students if they don't see things my way.*). The answers were given on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha was .67.

Teacher as Social Context Questionnaire (TASC; Belmont et al., 1988) is used to operationalize teacher behaviors aimed to support students' autonomy, involve students in lectures, and structure the teaching activities. In this study we used two subscales: Autonomy support (Cronbach's α = .70; 12 items, e.g., *I try to give this student a lot of choices about classroom assignments.*) and Structure (Cronbach's α = .73; 15 items, e.g., *I try to be clear with this student about what I expect of him/her in class.*). The answers were given on a scale ranging from 1 (*not at all true*) to 4 (*very true).*

Approaches to Teaching Questionnaire (Vizek Vidović et al., 2005) consists of 10 items which measure teacher-centered teaching (5 items, Cronbach's α = .53, e.g., *Students in class should listen carefully and not interrupt the teacher with questions, so that they can learn successfully.*) and student-centered teaching (5 items, α = .63., e.g., *Students should participate in evaluating their own progress.*). The answers were given on a scale from 1 (*I completely disagree*) to 4 (*I completely agree*).

Together with socio-demographic data, participants were asked additional questions about their *teaching experience* (how many years they have been working in higher education) and the *prominence of teaching in their professional identity* (on a visual analog scale ranging from 0 to 100 participants indicated the importance that being an excellent teacher held for their professional identity). We asked them whether they received teacher training during their initial studies (yes/no), whether they had completed any additional education or programs focused on the development of teaching competencies after obtaining their degree where they indicated all that applies to them (no, one or more one-day training programs, at least a three-day program without a degree, couple of weeks/months-long program with an official assessment and a degree), and whether any of the above was specially focused on teaching in higher education (yes/no). Their *level of teacher training* was

defined as a composite of yes responses to the five described options, ranging from 1 to 5, with a higher numerical value indicating higher levels of teacher training.

Procedure

The participants were invited to participate in the survey through official e-mail notices at their faculties, or by e-mails sent directly by the authors. After reading and signing an informed consent, participants completed an online questionnaire in Croatian. First, they filled out the SIS-HE, while other scales were randomly rotated, with socio-demographic questions always being last. At the end, participants were given the researchers' contacts in case of questions about the study or its results. The study was approved by the Ethics Committee of the Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb.

Results

Descriptives

The reliability of each (de)motivating style was satisfactory and in accordance with previous studies (see Table 1). Higher education teachers reported on using more autonomy supportive and structuring behaviors than behaviors describing controlling and chaotic styles ($F = 410.97$, $p < .0001$). Autonomy support and structure, as motivating styles, were highly positively related, as were control and chaos as demotivating styles. In line with expectations, correlations between motivating styles (autonomy support and structure) and chaos as a demotivating style were negative. We did not find significant correlations between the demotivating style of control and other motivating styles (see Table 2).

Table 1

Descriptive Statistics of the SIS-HE Subscales (N = 130)

| Subscales	M	SD	α	k
Autonomy support (AS)	5.01	0.937	.86	17
Participative	4.41	1.130	.77	9
Attuning	5.61	0.873	.75	8
Structure (ST)	5.38	0.848	.86	19
Guiding	5.56	0.907	.78	8
Clarifying	5.20	0.928	.78	11
Control (CON)	2.30	0.783	.82	19
Demanding	2.92	1.002	.70	7
Domineering	1.70	0.657	.75	12
Chaos (CH)	2.28	0.764	.80	17
Abandoning	2.08	0.796	.73	9
Awaiting	2.36	0.845	.66	8

Note. α = Cronbach alpha; k = number of items.

Circular Nature of the Model

To examine the circular nature of the model we first performed a multidimensional scaling analysis (MDS, Borg et al., 2013) using the ALSCAL procedure in SPSS with Euclidian distance measures. This type of analysis yields a graphical representation in which questionnaire items that are highly correlated are represented close to each other in a geographical space, with negatively correlated items displayed opposite each other. Results confirmed the expected two-dimensional nature of the data (see Figure 1). S-stress indices declined from .144 for the one-dimensional representation to .109 for the two-dimensional representation, with further very small declines for three- and four-dimensional representations (improvement between .00019 and .00049). When withholding two dimensions, 96% of the distances were represented in the model. One dimension (X-axis) can be interpreted in terms of need-thwarting and need-supportive teacher behaviors, with controlling and chaotic items (except one) yielding negative correlations and autonomy-supportive and structuring items (except two) yielding positive coordinates on this dimension. The second dimension (Y-axis) can be interpreted in terms of high vs. low directiveness. Controlling items (expect two) loaded on the high directiveness side of the geographical space, and chaotic items (expect two) loaded on the low directiveness side. Patterns for the autonomy-supportive and structuring items were less clear, however most of the structuring items loaded on the high directiveness side, and most autonomy-supportive items loaded on the low directiveness side.

Figure 1

Multidimensional Scaling Analysis
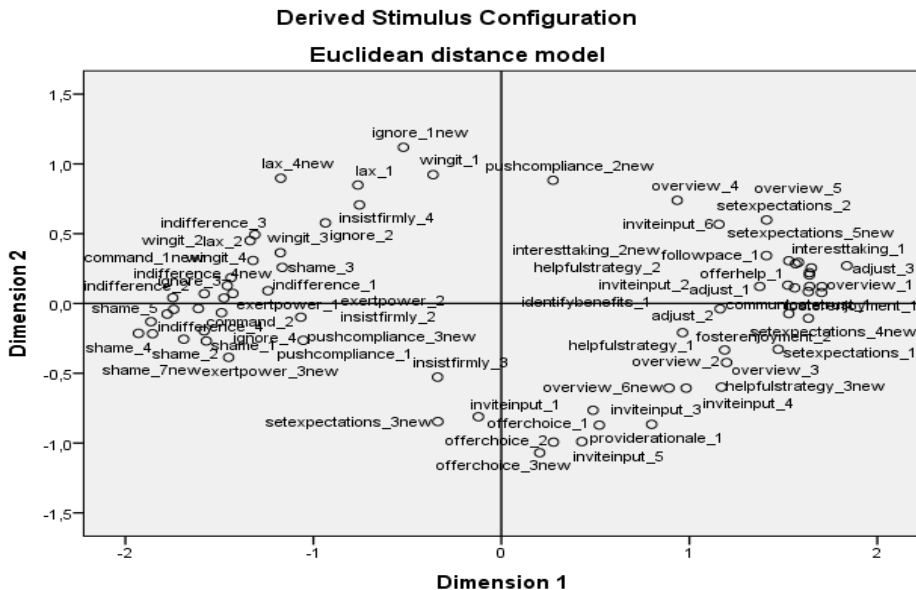
Note. Autonomy support - Participative: (Invite_input1, Invite_input2, Offer_choice1, Invite_input3, Invite_input4, Invite_input5, Invite_input6, Offer_choice2; Offer_choice3new); Attuning: (Provide_rationale1, Foster_enjoyment1, Foster_enjoyment2, Identify_benefits1, Follow_pace1, Interest_taking1, Interesttaking_2new); Structure - Guiding: (Communicate_trust1, Helpful_strategy1, Helpful_strategy2, Adjust1, Adjust2, Adjust3, Offer_help1, Helpfulstrategy_3new); Clarifying: (Set_expectations1, Overview1, Set_expectations2, Overview2, Overview3, Overview4, Overview5, Set_expectations3new; Set_expectations4new; Set_expectations5new, Overview_6new); Control - Demanding: (Insist_firmly1, Push_compliance1, Insist_firmly2, Insist_firmly3, Insist_firmly4, pushcompliance_2new, pushcompliance_3new); Domineering: (Shame1, Shame2, Exert_power1, Exert_power2, Shame3, Shame4, Command1, Shame5, Shame6, shame_7new, exertpower_3new, command_1new); Chaos - Abandoning: (Indifference1, Indifference2, Indifference3, Ignore1, Ignore2, Ignore3, Indifference4, ignore_1new, indifference_4new); Awaiting: (Wing_it1, Wing_it2, Lax1, Wing_it3, Lax2, Lax3, Wing_it4, lax_4new)

Following Aelterman et al. (2019) and Vermote et al. (2020) we analyzed correlational patterns between all eight subdimensions (see Table 2). The highest correlations were observed between the subdimensions of the same broader teaching style. Subdimensions of autonomy support and structure, both considered motivating styles, were positively related to each other. We found the same for demotivating styles of control and chaos, except for no correlation between demanding and abandoning subdimensions. Furthermore, we observed negative correlations between motivating styles subdimensions, and demotivating styles subdimensions. In line with the circumplex model, we observed an ordered pattern of correlations with adjacent dimensions being more strongly and positively correlated, with correlations decreasing and becoming more negative with moving along the circumplex.

Table 2

Pearson Correlations Between the Subdimensions and Between the Dimensions of the Circumplex Model

	ST	CON	CH	2	3	4	5	6	7	8
1. Participative				.746**	.670**	.626**	.078	-.128	-.323**	-.348**
2. Attuning					.729**	.679**	.206*	-.096	-.452**	-.284**
3. Guiding						.684**	.192*	-.074	-.445**	-.316**
4. Clarifying							.232**	-.032	-.417**	-.347**
5. Demanding								.634**	.064	.244**
6. Domineering									.420**	.334**
7. Abandoning										.602**
8. Awaiting										-
Autonomy support (AS)	.786**	-.005	-.430**							
Structure (ST)		.073	-.463**							
Control (CON)			.318**							
Chaos (CH)			-							

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

Correlational Patterns With Other Measures of Teaching Behaviors

Observed correlational patterns (see Table 3) are in line with our expectations. Only the controlling and chaotic demotivating styles, but not motivating styles, were related to a different measure of controlling teaching. Other measures of teacher autonomy and structure were positively related to SIS-HE autonomy support and structure, and negatively with SIS-HE control and chaos. Non-significant correlation between control and another measure of structure was an exception. However, this result mirrors the non-significant correlation between control and structure as measured by the SIS-HE. Observed correlational patterns speak in favor of convergent and discriminant validity of the Croatian version of the SIS-HE.

Table 3

Correlations of SIS-HE Dimensions With Other Measures of Teaching Behaviors (N = 130)

	Psychologically controlling teaching	Teacher as a social context - autonomy	Teacher as a social context - structure
Autonomy support	-.129	.490**	.599**
Structure	-.096	.267**	.622**
Control	.300**	-.306**	-.045
Chaos	.341**	-.449**	-.475**

**p < .01.

Determinants of Teachers' (De)Motivating Styles

For our second research goal, we performed a series of hierarchical regression analyses, one for each motivating style, to examine whether individual teacher characteristics in the first step, and their teaching approaches in the second step, are possible determinants of their (de)motivating styles. Results are shown in Tables 4 and 5. On the bivariate level, teachers with more teaching experience also had more teacher training, but teaching experience was unrelated to other teacher characteristics. Interestingly, higher levels of teacher training were unrelated to a student-centered teaching approach but were negatively related to a teacher-centered teaching approach. Valuing teaching as an important part of their professional identity was unrelated to our study variables.

Regression results show that teaching experience, levels of teacher training, and valuing teaching as an important part of professional identity hardly played a role for teachers' (de)motivating styles. Having more teacher training was a significant determinant of using more structure and less chaos. In accordance with our expectation, having a student-centered teaching approach was related to having more pronounced autonomy support and structure as motivating styles, and a less pronounced chaotic demotivating style. Having a more pronounced teacher-centered style was related to having more pronounced demotivating styles of control and chaos but was unrelated to motivating styles. These sets of predictors were more successful in explaining the variance of autonomy support and chaos, than the variance of structure and control.

Table 4

Correlations of the Individual Teacher Characteristics, Teacher's Approaches, and (De)Motivating Styles (N = 130)

	Level of teacher training	Teacher professional identity	Student-centered teaching approach	Teacher-centered teaching approach	Autonomy support	Structure	Control	Chaos
Teaching experience	.305**	-.122	-.031	-.088	.098	.043	-.013	-.035
Level of teacher training		.083	.113	-.300**	.159	.222*	-.025	-.287**
Teacher professional identity			.000	-.017	-.006	.049	.024	-.007
Student-centered teaching approach				-.237**	.466**	.304**	-.212*	-.415**
Teacher-centered teaching approach					-.214*	-.059	.320**	.431**

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

Table 5

Hierarchical Regression Analyses' Results for Teacher (De)Motivating Styles (N = 130)

	Autonomy support β		Structure β		Control β		Chaos β	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Teaching experience	.054	.093	-.015	.022	.011	-.011	.056	.024
Level of teacher training	.148	.040	.212*	.170	-.033	.110	-.279**	-.120
Teacher professional identity	-.010	.006	.019	.032	.006	-.012	-.070	-.093
Student-centered teaching approach		.430**		.309**		-.144		-.344**
Teacher-centered teaching approach		-.119		.045		.333**		.305**
R	.177	.495**	.208	.364**	.030	.370**	.277*	.563**
R^2	.031	.245**	.043	.132**	.001	.137**	.077*	.317**
Adjusted R^2	.005	.210**	.016	.091**	-.027	.096**	.051*	.284**
ΔR^2		.213**		.089**		.136**		.240**

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

Discussion

Results of this study confirm the circular nature of the circumplex model for higher education teachers in the Croatian context. Multidimensional scaling results and the observed correlational patterns were in accordance with our expectations and with Aelterman et al.'s (2019) original study and Vermote et al.'s (2020) study on higher education teachers. Teacher reactions/behaviors added to the SIS-HE vignettes, just like the newly added vignette describing an assessment preparation situation seem to be non-problematic, and even add to the reliability of (de)motivating styles. Given the goal and scope of this study, we did not focus on the internal structure of the instrument. Since high correlations between adjacent (sub)dimensions of the circumplex model are theoretically expected, it might not be possible to factor-analytically separate them (Aelterman & Vansteenkiste, 2023), as some studies on coaches and athletes found (Delrue et al., 2019). However, correlational patterns with similar instruments used to operationalize teachers' provision of autonomy and structure, as well as teachers' controlling behavior, were in line with our expectations and previous studies, contributing to the conclusion about both convergent and discriminant validity of the Croatian version of the SIS-HE. Further studies are needed to confirm the stability of these results.

We expected that styles and subdimensions closer in the circumplex space will be correlated, however we did not find significant bivariate correlations between structure and control, and this seems to be because of nonsignificant associations between the domineering subdimension and other structuring teaching behaviors. Although not in accordance with results from the Aelterman et al. (2019) study, our results are in line with Italian studies on high-school teachers (Moè & Katz, 2020, 2022) and Vermote et al. (2020) study on higher education teachers. One explanation for these results could lie in the low variability of responses indicating the domineering approach, which could be due to socially desirable responding or to inherent differences in teacher behaviors enacted at the higher education levels. Future studies should look into the similarities and differences between structuring and controlling behaviors, and investigate them in more depth.

Out of all teacher characteristics investigated in this study, only prior teacher education and teaching approaches seem to be important determinants of higher education teachers' (de)motivating styles. Higher education teachers with higher reported levels of teaching competencies reported using more structuring and less chaotic behaviors while teaching. In other words, having some sort of formal teacher training seems to be associated only with the directiveness dimensions of (de)motivating styles, and not with the dimension of need support/thwarting. It is plausible that teacher education programs focus more on topics of instruction and effective teaching, and less on topics of learning motivation and how to support it in students, which is why teacher training levels were related more to the directiveness dimension of the circumplex. However, numerous studies show that it is possible for

teachers to learn how best to enact need supportive behaviors (Ahmadi et al., 2022) and that such interventions can be highly effective (Reeve et al., 2022). Our findings have important practical implications for teacher interventions and teacher training programs aimed at higher education teachers.

Teachers who put students in the center of their teaching are more likely to use motivating styles of autonomy support and structure, and less likely to use the chaotic demotivating style. On the other hand, teachers who put themselves and knowledge transfer in the center of their teaching are more likely to use both control and chaos as demotivating styles, and not motivating styles. These results are in line with theoretical assumptions which state that a student-centered teaching approach provides a base for the teacher to adopt a motivating style (Aelterman & Vansteenkiste, 2023) and conceptual similarities between autonomy supportive behaviors and the student-centered teaching approach. Our results confirm these theoretical assumptions, and further extend the literature by showing that having a student-centered teaching approach is related to using more structuring and less chaotic behaviors, lending further credence to the notion that student-centered teaching should be a gold standard in higher education. However, we are mindful of a relatively low reliability of our measure of teaching approaches and call for future studies to use other operationalizations before firm conclusions are drawn.

The present study has several other limitations. We used a self-report questionnaire; therefore, future studies should also include student assessments of their teachers' styles, which could additionally help with the problem of social desirability. The self-selection of participants in this study should also be acknowledged, as our data indicate that the majority of them have teacher training and indicated that teaching is an important aspect of their professional identity. Future studies should try to employ more representative samples, or at least aim, as we did, towards a heterogenous sample regarding various scientific backgrounds of higher education teachers who participated.

The sets of predictors we used were more successful in explaining the variance of autonomy support and chaos than in explaining the variance of structure and control. Thus, in future studies, the relationship of other constructs to de(motivating) styles should be examined. This includes teachers' needs for autonomy, support, and relatedness, as well as teachers' emotions and emotional regulation strategies (see also Moè & Katz, 2022). The broader context should also be explored, considering both behaviors of students and how the system in which university teachers work enables their autonomy and how much their job's teaching aspect and their investment in it are valued at their faculties. Also, longitudinal studies are desirable in this field.

Conclusion

Our results speak in favor of the verified theoretical model and findings of previous research on teachers in higher education. In addition, we observed the expected correlations of SIS-HE with other similar instruments in the Croatian sample. Our findings show that prior teacher education and teaching approaches are determinants of the motivating styles of university teachers. More experienced and educated teachers report using more structuring and less chaotic motivation styles during teaching but at the same time they do not provide greater support for student autonomy. A student-centered teaching approach leads to more frequent use of motivating styles of autonomy support and structure and less chaotic demotivating style, while a teacher-centered approach leads to the use of control and chaos as demotivating styles.

From these findings, it is possible to draw some practical guidelines for future education of university teachers: in parallel with the development of teaching skills special attention should be paid to the development of their motivating styles indicating how to encourage student autonomy and ensure appropriate structure in teaching. At the same time, it is important to clearly point out the consequences of using control and chaos while teaching. Based on self-determination theory research, teachers can support autonomy by providing meaningful rationale and choices for learning activities (e.g., free choice of topics for projects; using choice boards during assessment), openly communicating with students (e.g., inviting student feedback), creating a safe environment (e.g., for students to express differing opinions), and using non-controlling language (e.g., avoiding demands and threats). Teaching university teachers how to give constructive feedback, scaffold learning activities, give clear instructions, and assessment criteria will enable them to use more structure, without necessarily using more control in their lectures. Available research shows that such educational interventions based on self-determination theory can be largely effective (Ahmadi et al., 2023; Su & Reeve, 2011).

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Ispitivanje kružnoga modela (de)motivirajućih nastavničkih stilova u visokome obrazovanju

Sažetak

Novi kružni model (de)motivirajućih nastavničkih stilova opisuje ponašanja nastavnika pomoću dviju dimenzija – jedna se odnosi na stupanj podržavanja/frustracije osnovnih psiholoških potreba studenata, a druga na stupanj usmjeravanja u poučavanju/učenju. Nastavnička ponašanja koja podržavaju potrebe studenata i usmjeravaju studente opisana su stilom koji podržava autonomiju i strukturirajućim stilom, koji se smatraju motivirajućim stilovima. S druge strane, ponašanja koja su povezana s frustriranim potrebama i niskim usmjeravanjem studenata opisana su kontrolirajućim i kaotičnim stilovima te se smatraju demotivirajućima. Dosadašnja su istraživanja toga modela još uvijek rijetka, posebno u kontekstu visokoga obrazovanja. Ovo istraživanje proširuje dosadašnje spoznaje provjeravajući model u kontekstu hrvatskoga visokog obrazovanja te ispitujući nastavničko iskustvo, obrazovanje, identitet i pristupe poučavanju kao potencijalne odrednice nastavničkih (de)motivirajućih stilova. U *online* istraživanju sudjelovalo je ukupno 130 sveučilišnih nastavnika koji su ispunili hrvatsku verziju Upitnika o situacijama u školama – visokome obrazovanju, Upitnik o psihološki kontrolirajućem poučavanju, dio Upitnika o nastavniku kao socijalnome kontekstu te Upitnik o nastavničkim pristupima poučavanju. Multidimenzionalno skaliranje i analiza korelacijskih obrazaca potvrdili su kružnu prirodu modela. Povezanosti s drugim instrumentima koji mjere nastavničke stilove bile su u skladu s očekivanjima. Od ispitanih su se varijabli samo prethodno nastavničko obrazovanje i pristupi poučavanju pokazali značajnim odrednicama nastavničkih (de)motivirajućih stilova. Sveučilišni nastavnici s više prethodnoga obrazovanja u području nastavničkih kompetencija izjavljuju da više koriste strukturirajući i manje kaotični stil. Nastavnici koji koriste pristup poučavanju usmjeren na studente koriste i više motivirajućih stilova podržavanja autonomije i strukture te manje kaotičnoga stila, dok je pristup poučavanju usmjeren na nastavnika povezan s više korištenja kontrole i kaosa kao demotivirajućih stilova.