Research paper

Understanding the dynamics of teaching styles and need satisfaction in the Chinese educational context

Jiawei Wang [a], Qiang Xing [b], Angelica Moè [c],[*]

[a] *Shenzhen Institute of Information Technology, China*
[b] *Department of Psychology, Guangzhou University, China*
[c] *Department of General Psychology, University of Padua, Italy*

ARTICLE INFO

ABSTRACT

The current study aimed at assessing the peculiarities of the relationships among perceived (de)motivating teaching styles and students need satisfaction/frustration in the Chinese context. A total of 1715 middle and high school students filled in measures of self-reported and perceived adoption of (de)motivating styles and need satisfaction/frustration. The results confirmed the positive relationship between perceived motivating teaching styles and students need satisfaction, as well as perceived demotivating teaching styles and students need frustration. Moreover, students need satisfaction was positively associated with their perception of a controlling teaching style. Theoretical and practical implications are discussed.

Teachers play an essential role in facilitating student achievement and general development (Tilbe & Gai, 2022) as well as their motivation, with their teaching styles playing a key role in this process (Aelterman et al., 2019). Teaching styles primarily influence students by affecting students' need satisfaction (Ryan & Deci, 2017, 2020). When students' basic psychological needs are satisfied, they become willing and able to engage in activities, receiving support from close others. This, in turn, fosters a range of positive outcomes such as engagement, positive affect, and intrinsic motivation (Ryan & Deci, 2017, 2020). The crucial link between need satisfaction and positive outcomes underscores the critical role of teachers' teaching styles in fostering students' well-being and overall development. Existing research, including studies by Aelterman et al. (2019), Amoura et al. (2015), and Montero-Carretero, Barbado, and Cervelló (2020), consistently demonstrates that the adoption of an autonomy-supportive and structuring teaching style is positively correlated with students' need satisfaction, while the use of controlling and chaotic teaching styles is consistently associated with students' increased need frustration.

It should be noted that most of these researches have been conducted in Western countries. Although there are studies carried out in East Asian countries, they are basically in the context of South Korea (e.g., Cheon, Reeve & Ntoumanisc, 2018; 2019; Cheon, Reeve, & Vansteenkiste, 2020; Jang, Kim, & Reeve, 2016). However, despite China and South Korea being representatives of East Asian culture, previous research has revealed they differ in various aspects, including uncertainty avoidance, masculinity-femininity, attention and information processing styles, and their perceptions of the two dimensions of "team players" (Minkov, 2018; Park, Lee, Kingsley Westerman, & Guan, 2019; Rhode, Voyer, & Gleibs, 2016). For instance, Minkov (2018) highlighted that individuals in Korea, in comparison to China, enjoy greater personal freedom and discretion in determining the rationality of social rules. These cultural nuances emphasize the need for a better understanding of the relationships among the four (de)motivating teaching styles and students' need satisfaction/frustration in different cultural contexts. This study aims to fill in this gap by exploring these relationships in China. By doing so, we aim to offer specific insights into how these teaching styles manifest and impact student need satisfaction in a cultural setting characterized by distinct values and norms. This exploration holds implications not only for advancing theoretical understanding but also for informing practical interventions aimed at optimizing teaching practices and enhancing student motivation and well-being in Chinese educational settings.

1. Characteristics of the (De)motivating teaching styles

Drawing on the assumptions of the Self-Determination Theory (SDT: Ryan & Deci, 2017), Aelterman et al. (2019) proposed four (de)motivating teaching styles including autonomy support, control, structure,

---

and chaos. Autonomy support refers to interpersonal behaviours aimed at cultivating intrinsic motivational resources (Reeve & Cheon, 2021). Teacher adoption of an autonomy-supportive style reflect in responsiveness (e.g., showing a willingness to actively listen to and acknowledge the feelings and viewpoints of students), supportive behaviours (e. g., nurturing student interest by making the lessons more interesting and enjoyable), and an explaining attitude (e.g., giving reasons for tasks and limitations) (Parr, Gladstone, Rosenzweig, & Wang, 2021). On the contrary, teacher adoption of a controlling style reflects into taking charge (Tilga, Hein, Koka, Hamilton, & Hagger, 2019), that is using commands to guide students to find the correct answers and push students to act through pressure (e.g., threats, criticism, and deadlines). Structure refers to the provision of clear guidelines, precise instructions, appropriate challenges, and constructive feedback by teachers, aiming to facilitate students in effectively achieving desired results (Cheon et al., 2020). Adopting a structuring style provides adequate guidance throughout the educational journey by establishing explicit rules and delineating the limits of tasks and exercises. At last, adopting the chaotic style, teachers refrain from providing sufficient support, leaving students to navigate their learning independently, which creates challenges for students in determining appropriate actions, behaviours, and skill development strategies (Aelterman et al., 2019).

1.1. Assessing the (De)motivating teaching styles

Based on SDT assumptions, Aelterman et al. (2019) proposed a two-dimensional model, useful to clearly figure out the different motivating and demotivating styles based on the two dimensions need support vs. need frustration along the horizontal axis and directiveness along the vertical axis, see Fig. 1. The circumplex model offers a more precise depiction of the specific position of various teaching styles and more subtle insight into the internal differences between each other.

Based on this model, Aelterman et al. (2019) also introduced a novel vignette-based questionnaire – the Situation-in-School (SIS), presenting the responders 15 typical situations that occur in schools and depicts four different potential teacher behaviours representing the four (de) motivating teaching styles respectively. The SIS was initially designed to assess teaching styles of middle and high school teachers and was later adjusted to the background of higher education (the Situation-in-School Questionnaire—Higher Education, SISQ-HE; Vermote et al., 2020), physical education teaching (the Situation-in-School Questionnaire—Physical Education, SISQ-PE; Escriva-Boulley et al., 2021), and healthcare professionals (the Situation in Self-management support-HealthCare Professionals. SIS-HCP; Duprez, Vansteenkiste, Beeckman, Verhaeghe, & Van Hecke, 2021).

The SIS has been validated in Spanish (Gerique-Rubira & García González, 2020), Korean (Cheon et al., 2020), Russian (Gordeeva & Sychev, 2021), Italian (Moè, Consiglio, & Katz, 2022), and Lithuanian (Gabrialavičiūtė, Raižienė, & Garckija, 2022). However, a Chinese version is lacking. Hence, a preliminary step of this research is to provide validation data for the Chinese version.

1.2. Perceived (De)motivating teaching styles and students need satisfaction/frustration

SDT posits three primary psychological needs (Ryan & Deci, 2017, 2020): autonomy (experiencing the freedom to choose and engage in personally meaningful and interesting activities), competence (experiencing a sense of efficacy and capability in attaining desired results), and relatedness (having meaningful and authentic connections with people). The fulfilment and thwarting of these psychological needs exert profound influences on individuals (Ryan & Deci, 2020). Meeting these needs contributes to beneficial consequences such as motivation, and healthy social relationships (Slemp, Lee, & Mossman, 2021). On the opposite, need frustration increases the risk of negative results like negative affect, and defensive behaviours (Chen et al., 2015).

Prior research found that student-perceived autonomy-supportive and structuring styles exhibit a positive correlation with need satisfaction (Cheon et al., 2020; Wang, Ng, Liu, & Ryan, 2016). On the contrary, as students' perception of controlling and chaotic styles increases, they are more prone to experiencing need frustration (Bartholomew et al., 2018; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). Therefore, autonomy-supportive and structuring teaching styles can be regarded as motivating, while controlling and chaotic teaching styles can be seen as demotivating (Aelterman et al., 2019; Moè, Consiglio, & Katz, 2022).

However, the majority of these findings have been discovered in Western countries (e.g., Bartholomew et al., 2018; Haerens et al., 2015), with a current lack of research in China. China possesses its unique cultural and educational characteristics; thus, these results may differ in the Chinese context. Consequently, there is a need for further investigation in China to explore the relationship between teaching styles and need satisfaction.

1.3. The dual-process model

Concerning autonomy-supportive and controlling styles, some researchers (e.g., Leo, Mouratidis, Pulido, López-Gajardo, & Sánchez-Oliva, 2022) argued that a lack of teacher autonomy support is not necessarily synonymous with the existence of a controlling teaching style. Also, the absence of teacher control is not always indicative of teachers using an autonomy-supportive teaching style. In these situations, teachers may maintain an indifferent attitude toward students or use a relatively neutral motivating style. Furthermore, they demonstrated that autonomy support and control may impact student academic outcomes via different mechanisms (Haerens et al., 2015; Jang et al., 2016). Thus, they proposed the so-called dual-process model (Haerens et al., 2015). They found that on the "bright" side of the model, the perception of teacher autonomy support indirectly predicts motivation and engagement through the mediating influence of fulfilling psychological needs, while on the "dark" side, the perceived controlling style indirectly influences controlled motivation, amotivation, and disengagement via need frustration (e.g., Haerens et al., 2015; Jang et al., 2016). Similarly, structuring and chaotic styles should correspond separately to the "bright" and "dark" sides of the dual-process model. In other words, a structuring teaching style should affect student desired outcomes through their need satisfaction, whereas a chaotic teaching style should predict maladjusted outcomes via the mediating role of need frustration.

1.4. Chinese cultural and educational background

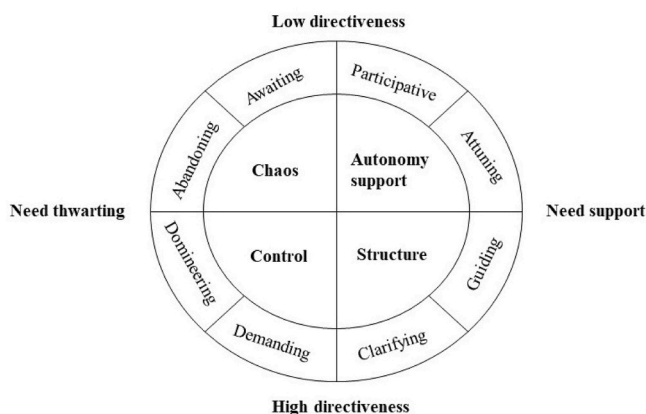The classroom size in China tends to be relatively large, with

Fig. 1. Graphical representation of the circumplex model (Aelterman et al., 2019).

teaching methods adopted by teachers being highly authoritarian. Traditional education in China typically revolves around a teacher-centered approach (Yang et al., 2013; Yu, Chen, Levesque-Bristol & Vansteenkiste, 2018). In China, the authority of teachers is not to be challenged, and they exercise strict control over the classroom (Zhou, Lam, & Chan, 2012). According to the findings of Tobin, Wu, and Davidson (1989), Chinese preschool teachers are inclined to use more rigorous teaching methods compared to their counterparts in Japan and the United States.

Confucianism serves as the predominant philosophical guidance in Chinese culture, emphasizing obedience. Chinese children are taught to obey authority figures, such as teachers, from an early age (Huang & Lamb, 2014). Shen's report (2008) revealed that both elementary and secondary school students perceive their relationship with teachers primarily as one of obedience, with few considering it to be egalitarian. The majority of students reported experiencing various forms of punishment. Chinese children also demonstrate higher levels of compliance. According to a cross-cultural study (Lewis, Romi, Katz, & Qui, 2005), in comparison to students in Australia and Israel, Chinese students are the most likely to perceive disciplinary actions by teachers as justified and exhibit the lowest levels of negative emotions towards teachers. Furthermore, the controlling style is widely embraced and even anticipated by students in China. Should teachers refrain from assuming an authoritative role, students may experience a sense of unease (Thanh Pham & Renshaw, 2015).

Although the controlling teaching is prevalent in China, it does not imply that autonomy is unimportant for Chinese students. For instance, research has found that when teachers guide them in an autonomy-supportive way, Chinese students are more likely to endorse the personal significance of mundane learning tasks and exert greater effort (Bao & Zhang, 2008). Teacher autonomy support is beneficial for students' autonomous motivation (Lau, 2014), even for students living in rural areas of China (Zhou, Ma, & Deci, 2009), where the influence of individualistic and autonomous values is less pronounced compared to urban areas (e.g., Wu, Zhou, Chen, Cai, & Sundararajan, 2018).

To the best of our knowledge, only a few studies have explored the relationships between perceived teaching styles and students' experiences of need satisfaction/frustration (e.g., Zhou, Hiver & Al-Hoorie, in press-a). Specifically, perceived autonomy-supportive style is positively associated with need satisfaction, while perceived controlling style is positively related to need frustration. However, the relationships between other teaching styles and students need satisfaction/frustration is unclear. Therefore, there is a need to investigate the relationships between (de)motivating teaching styles and need satisfaction/frustration in the Chinese educational context.

1.5. Aims and hypotheses

The current study aimed at assessing the relationships between perceived (de)motivating teaching styles and students need satisfaction/frustration in the Chinese educational context by also providing validation data for the Chinese version of the SIS. While investigating these associations, we controlled for the influence of social desirability, which has been found to be related to teachers' adoption of (de)motivating styles (e.g., Aelterman et al., 2019).

The following hypotheses lead the research:

H1. Perceived motivating teaching styles are positively associated with students need satisfaction.

H2. Perceived demotivating teaching styles are positively associated with students need frustration.

2. Method

2.1. Participants

Participants for this study were recruited from six middle and high schools located in Guangdong and three in Gansu provinces. The teacher sample consisted of 1550 volunteer participants (566 males, 36.5%), having an average age of 39.00 years ($SD = 8.61$, range $= 20$–72) and 15.86 years spent in the teaching profession ranging from 0 to 46 ($SD = 9.4$). Of these, 757 were working in middle schools (48.8%), while the other 793 were in high schools (51.2%), teaching different subjects such as Chinese (251, 16.2%), mathematics (249, 16.1%), English (209, 13.5%), physics (119, 7.7%), history (98, 6.3%), and others (40.2%). A total of 1715 students, including 852 boys (49.7%), voluntarily completed the questionnaires: $M_{age} = 15.57$ years ($SD_{age} = 1.57$, range $= 11$–18). All participants were Chinese nationals.

2.2. Measures

Measures for teaching styles and social desirability follow the standard back-translation procedure (Brislin, 1980). That is, the Chinese version was translated from English to Chinese by a researcher proficient in both English and Chinese. Subsequently, the translated version was back-translated by another researcher, who also fluent in both languages. A third researcher, fluent in English, compared the back-translations with the original English version of SIS. Discrepancies were discussed until the complete agreement was reached.

2.2.1. Teacher measures

Teaching Styles. The measurement of teaching styles was conducted using the SIS (Aelterman et al., 2019), which presents 15 typical teaching vignettes (e.g., "During a class assignment, you notice that some students are showing signs of anxiety. Sensing that anxiety, you:"), each accompanied by four possible reactions teachers may have: autonomy supportive (e.g., "Acknowledge that they look anxious and stressed. Invite them to voice their sense of unease."), structuring (e.g., "Break down the steps needed to handle the assigned task so that they will feel more capable of mastering it."), controlling (e.g., "Insist that they must act in a more mature way.") or chaotic (e.g., "Don't worry about it—let it pass on its own."). The full version is available by asking the first author. Teachers were asked to evaluate the degree to which each potential reaction in each teaching condition describes their typical response to these situations, utilizing a 7-point Likert scale, ranging from 1(does not describe me at all) to 7(describes me extremely well).

Teacher Need Satisfaction and Need Frustration. The assessment of need satisfaction and frustration was conducted using the Basic Psychological Need Satisfaction and Frustration scale (BPNSNF: Chen et al., 2015). The BPNSNF comprises 24 items that measures the levels of satisfaction (e.g., "I feel a sense of choice and freedom in the things I undertake") or frustration ("I feel forced to do many things I wouldn't choose to do") related to psychological needs: autonomy, relatedness, and competence. Participants were instructed to evaluate every item on a 5-point Likert scale, ranging from 1(completely disagree) to 5 (completely agree). For the aims of this study, "at school" was added in the stem to reflect the teaching context better. The items related to need satisfaction and need frustration were summed to calculate two scores, which were then divided by 12.

Teacher Social Desirability. Social desirability was assessed with the Balanced Inventory of Desirable Responding (BIDR: Paulhus, 1991; Hart, Ritchie, Hepper, & Gebauer, 2015). Participants were requested to evaluate on a 6- point Likert scale, ranging from 1(strongly disagree) to 6 (strongly agree), each of the 16 items referring to self-deceptive enhancement (SDE) or impression management (IM). SDE involves the tendency that respondents want to answer honestly but unconsciously give overly positive answers to make them look good (e.g., "I am a completely rational person"). At the same time, IM refers to respondents

consciously performing a favourite public image (e.g., "I always obey laws, even if I'm unlikely to get caught"). Two scores were obtained by adding up the items for SDE and IM separately and dividing each sum by 8.

2.2.2. Student measures

Perceived Teaching Styles. To measure the student-perceived teaching styles, the 15 vignettes of the SIS were slightly adjusted to the student perspectives, as done by Aelterman et al. (2019). Students were instructed to evaluate how much every possible reaction of each teaching condition describes their typical teacher responses to these situations on a 7-point Likert scale, ranging from 1(does not describe my teacher at all) to 7(describes my teacher extremely well).

Student Need Satisfaction and Need Frustration. Student need satisfaction and frustration were measured using the BPNSNF (Chen et al., 2015). Similarly, "at school" was added in the stem to better reflect the teaching context.

Student Social Desirability. The shorter 16-item BIDR (Hart et al., 2015) was also used to assess student social desirability.

The reliabilities of these instruments for the current samples are shown in Table 1.

2.3. Procedure

This study received approval from the Ethical Committee at Guangzhou University and conducted in accordance with Ethical standards. Participants were invited to complete the SIS, BPNSNF, and 16-item version BIDR questionnaires online via Wenjuanxing (a data collection platform like Qualtrics, commonly used in China). Participants were required to sign an informed consent form at first. In addition, regarding the student sample, as the majority of the students were minors, parental informed consent was gained prior to presenting the informed consent form to the students. All parents agreed their children's participation in the study.

2.4. Data analysis

First, to assess the Chinese-SIS psychometric properties MultiDimensional Scaling (MDS) and a Generalized Procrustes Analysis (GPA) were run in SPSS 25.0 (IBM Corp., 2017) and Lisrel version 8.8 (Jöreskog & Sörbom, 2006) respectively. Subsequently, a Confirmatory Factor Analysis (CFA) employing robust maximum likelihood estimation (MLR) in Mplus version 8.0 (Muthén & Muthén, 2017) was conducted to assess the factorial structure. Three model fit indices were employed to assess the goodness of fit: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). According to the recommendations of Marsh, Hau, and Wen (2004), CFI and TLI values exceeding 0.90 and 0.95, respectively, are considered indicators of adequacy and excellence. Additionally, RMSEA values below 0.08 indicate adequacy, while values below 0.06 suggest excellent fit (Marsh et al., 2004). It is important to note that these cutoff values should be considered as guidelines, and their appropriateness may vary depending on the characteristics and complexity of the model being tested. Then, JRule (Oberski, 2013), a program for post-processing CFA results in Mplus (Aelterman et al., 2019), was applied to address potential issues related to correlated residuals and further improve model fit.

To test the relationships between the adoption of different teaching styles and need satisfaction/frustration among teacher and student samples in the Chinese educational context, a correlation analysis was performed for teacher and student samples separately.

Additionally, paired t-tests were conducted to explore significant differences between specific pairs of motivating teaching styles. The t-tests were performed using SPSS 25.0, and the significance level was set at 0.05.

Table 1
Descriptive statistics, reliabilities, and partial correlations. Above diagonal students, below teachers.

variables	N items	teachers M(SD)	age	gender	SDE	IM	1	2	3	4	5	α	students M(SD)	age	gender	SDE	IM
styles																	
1. motivating	26	5.34(0.82)	0.06*	0.07*	0.40***	0.39***	–	0.20***	-0.17***	0.36***	-0.26***	0.94	5.30(0.87)	0.18***	-0.00	0.32***	0.34***
2. controlling	13	4.57(1.00)	0.06*	-0.09**	-0.01	-0.02	0.50***	–	0.42***	0.07**	0.13***	0.84	4.50(0.95)	0.07**	-0.20***	-0.03	-0.12***
3. chaotic	13	3.83(1.15)	0.07**	-0.13***	-0.14***	-0.18***	0.26***	0.73***	–	-0.04	0.20***	0.85	3.22(0.99)	0.01	-0.20***	-0.18***	-0.29***
Need-based experiences																	
4. satisfaction	12	3.62(0.57)	0.00	-0.02	0.49***	0.28***	0.14***	-0.00	-0.03	–	-0.42***	0.89	3.80(0.60)	0.18***	-0.10***	0.45***	0.28***
5. frustration	12	2.34(0.61)	-0.07**	-0.05	-0.54***	-0.33***	-0.01	0.13***	0.15***	-0.29***	–	0.91	2.42(0.76)	-0.09***	0.00	-0.56***	-0.42***
α	–	–	–	–	0.75	0.75	0.95	0.88	0.90	0.87	0.87	–	–	–	–	0.66	0.70

Note. Controlled for social desirability, age, and gender (1 = male, 2 = female).
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

3. Analyses and results

3.1. Internal validity and psychometric properties

The confirmation of the two-dimensional representation was evident in both samples, as indicated by the significant decrease in normalized raw stress observed from the one-dimensional to the two-dimensional solution and the Scree plot (see Fig. 2).

The GPA further confirmed that the two-dimensional structure remained consistent and stable across teacher and student data.

The fit of the 8-factor model was unsatisfactory for both samples: teachers, $\chi^2(1682) = 9164.666$, $p < 0.001$, $CFI = 0.792$, $TLI = 0.781$, $RMSEA = 0.054$, loadings 0.38 to 0.79, and students, $\chi^2(1682) = 7723.779$, $p < 0.001$, $CFI = 0.799$, $TLI = 0.788$, $RMSEA = 0.046$, loadings 0.28 to 0.78. The issue of a non-positive definite latent variable covariance matrix was also identified. To address it, we combined the four subareas of autonomy-supportive and structuring teaching styles and the two subareas of the controlling style into two factors. Since the other teaching styles had combined their subareas, we also combined the two subareas of the chaotic style into one factor, resulting in a 3-factor model of motivating, controlling, and chaotic teaching styles. However, the model fit was still unsatisfactory among teachers, $\chi^2(1707) = 9799.718$, $p < 0.001$, $CFI = 0.775$, $TLI = 0.767$, $RMSEA = 0.055$, loadings 0.10 to 0.79, and students, $\chi^2(1707) = 8630.149$, $p < 0.001$, $CFI = 0.769$, $TLI = 0.761$, $RMSEA = 0.049$, loadings -0.06 to 0.78.

The fit improved using the Mplus JRule (Oberski, 2013): teachers, $\chi^2(1539) = 5473.082$, $p < 0.001$, $CFI = 0.891$, $TLI = 0.874$, $RMSEA = 0.041$, loading 0.12 to 0.80, and students, $\chi^2(1518) = 4482.065$, $p < 0.001$, $CFI = 0.901$, $TLI = 0.885$, $RMSEA = 0.034$, loadings -0.15 to 0.77; nevertheless, some values did not reach the recommended levels (Hu & Bentler, 1999). To address this issue, the items with the lowest loadings were removed (i.e., items 1 and 4), resulting in an acceptable model among teachers, $\chi^2(1151) = 3850.341$, $p < 0.001$, $CFI = 0.911$, $TLI = 0.897$, $RMSEA = 0.039$, loadings 0.40 to 0.80, and students, $\chi^2(1130) = 3264.258$, $p < 0.001$, $CFI = 0.917$, $TLI = 0.902$, $RMSEA = 0.033$, loadings 0.20 to 0.78.
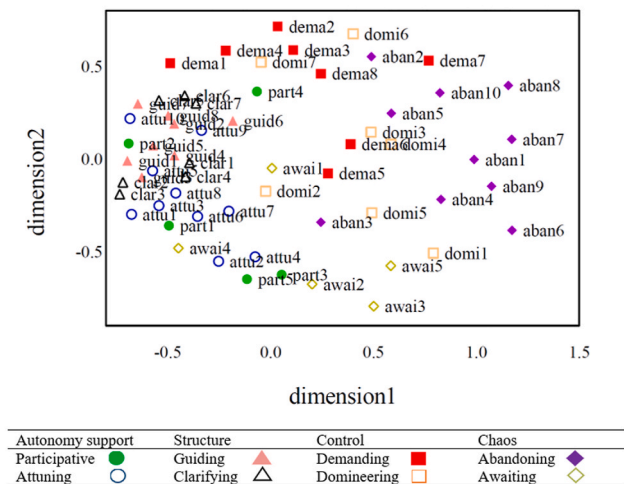
3.2. Relationships among need satisfaction and frustration and teaching styles

In line with established practices and to ensure comparability with prior research, we chose to calculate partial correlations, as utilized by Aelterman et al. (2019) in the original validation of the instrument. This analytical approach allows us to explore the relationships between variables while accounting for the potential influence of covariates. Our decision was motivated by the aim of directly comparing our findings with those obtained in the foundational study by Aelterman et al. (2019). While we acknowledge the availability of alternative analytical techniques, the use of partial correlations in this context aligns with the methodological framework of the referenced study and contributes to the coherence of our research within the broader literature on motivating and demotivating teaching styles.

The Pearson correlations among the variables were analysed. To establish a rationale for the choice of control variables, we referred to previous research (e.g., Aelterman et al., 2019; Assor, Feinberg, Kanat-Maymon, & Kaplan, 2018; Moè, Consiglio, & Katz, 2022; Chen et al., 2015) that included age, gender, and social desirability. Additionally, given the significant correlations of these variables with most of the research variables, the analysis controlled for the potential influence of these factors, as shown in Table 1.

The results showed positive relationship between teacher need satisfaction and their adoption of a motivating teaching style ($r = 0.14$, $p < 0.001$), whereas need frustration related to using controlling ($r = 0.13$, $p < 0.001$) and chaotic teaching styles ($r = 0.15$, $p < 0.001$). Similarly, the student-perceived motivating teaching style was linked with their experience of need satisfaction ($r = 0.36$, $p < 0.001$), whereas the perceived demotivating teaching styles were related to their experience of need frustration ($r = 0.13$, $p < 0.001$ and $r = 0.20$, $p < 0.001$ for the controlling and chaotic styles respectively). Moreover, as a confirmation of the distinction between the light and dark paths, our study found no significant association between need satisfaction and demotivating teaching styles ($r = -0.00$, $p = 0.88$ and $r = -0.03$, $p = 0.21$ for the controlling and chaotic styles respectively), nor between the experience of need frustration and embracing of a motivating teaching style among teachers ($r = -0.01$, $p = 0.75$). As for the student perspective, no significant relationship was confirmed between the experience of need satisfaction and the perception of a chaotic teaching style ($r = -0.04$, $p = 0.08$). However, a negative association was found between student need frustration and their perception of a motivating teaching style ($r = -0.26$, $p < 0.001$). Surprisingly, it was revealed that student need satisfaction was positively associated with their perception of a controlling teaching style ($r = 0.07$, $p < 0.01$). To visually depict these findings, Fig. 3 presents a graphical representation of the results.

Panel a. Teachers

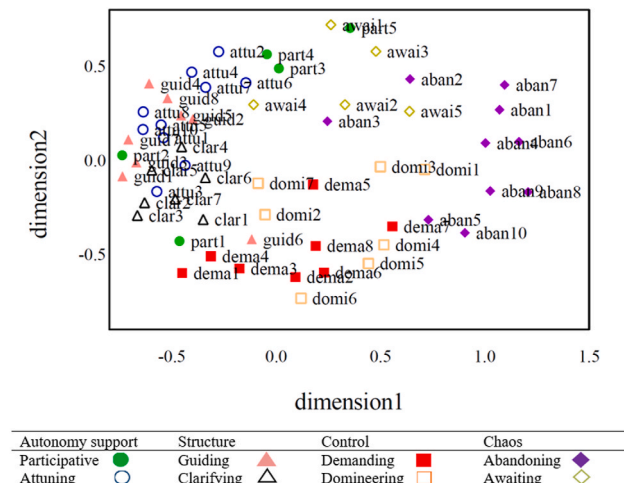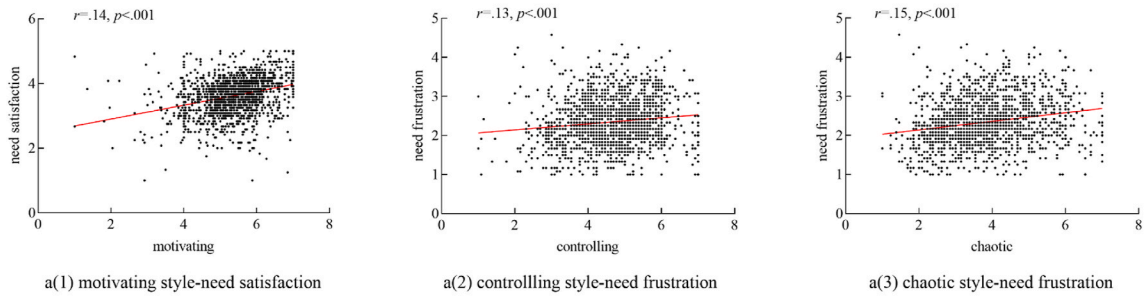| Autonomy support		Structure		Control		Chaos	
Participative	●	Guiding	▲	Demanding	■	Abandoning	◆
Attuning	○	Clarifying	△	Domineering	□	Awaiting	◇

Panel b. Students

Autonomy support		Structure		Control		Chaos	
Participative	●	Guiding	▲	Demanding	■	Abandoning	◆
Attuning	○	Clarifying	△	Domineering	□	Awaiting	◇

Fig. 2. The SIS two-dimensional representation.

Panel a. Teachers

a(1) motivating style-need satisfaction   a(2) controllling style-need frustration   a(3) chaotic style-need frustration

Panel b. Students

b(1) perceived motivaitng style-need satisfaction   b(2) perceived controlling style-need frustration   b(3) perceived chaotic style-need frustration
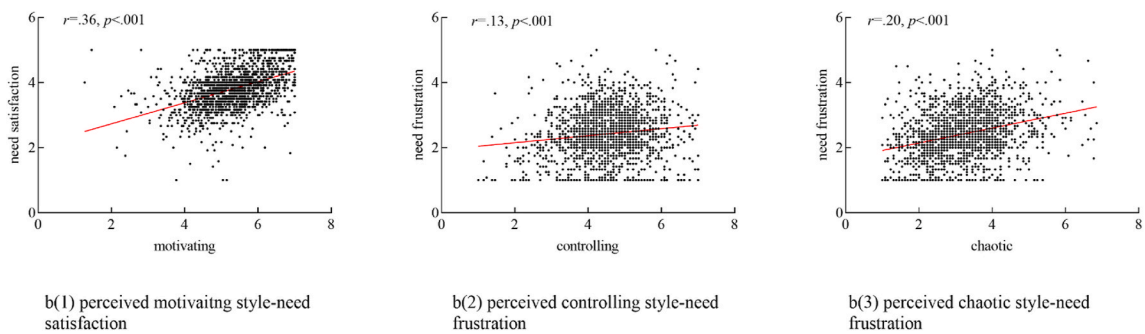
Fig. 3. The correlation between (De)motivating teaching styles and need satisfaction/frustration.

3.3. Difference between teaching styles

The results of the paired samples *t*-test showed that teachers' tendency to adopt the motivating teaching styles were significantly higher

than the adoption of the controlling (t (1549) = 31.23, $P < 0.001$, Cohen's d = 0.85) and chaotic teaching styles (t (1549) = 45.01, $P < 0.001$, Cohen's d = 1.51). In addition, teachers' tendency to adopt the controlling teaching style was significantly higher than that of adopting
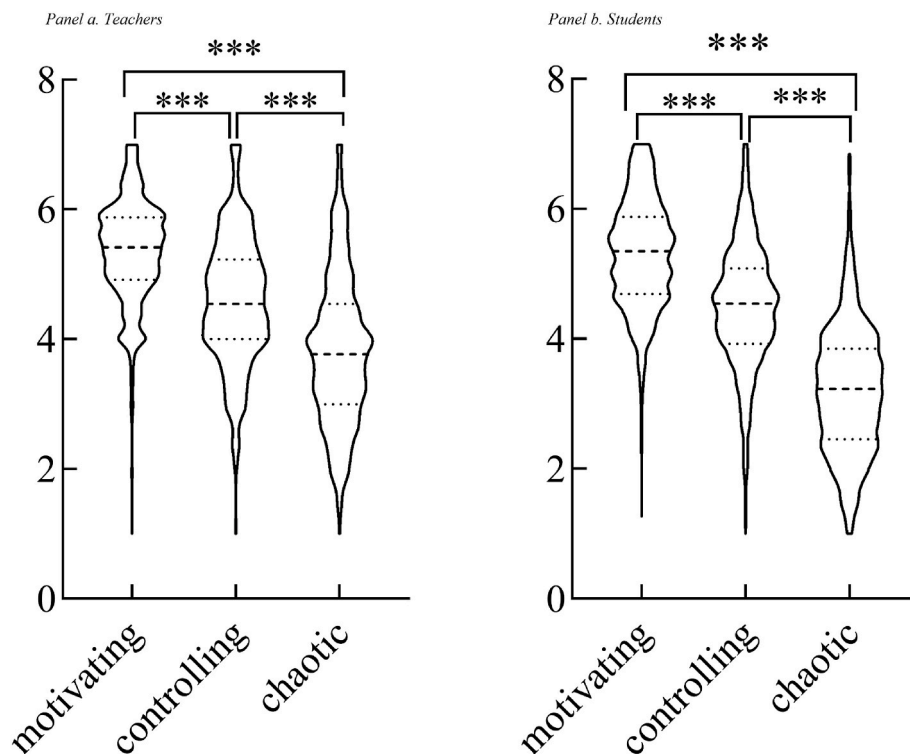

Fig. 4. Difference between teaching styles.

the chaotic teaching style (t (1549) $=$ 35.35, $P <$ 0.001, Cohen's d $=$ 0.68). The results of paired samples t-test in the student sample were the same. Specially, perceived motivating teaching styles were significantly higher than perceived controlling (t (1714) $=$ 28.23, $P <$ 0.001, Cohen's d $=$ 0.88) and chaotic teaching styles (t (1714) $=$ 59.22, $P <$ 0.001, Cohen's d $=$ 2.25), respectively. Moreover, students' perceived controlling teaching style was significantly higher than their perception of the chaotic teaching style (t (1714) $=$ 52.21, $P <$ 0.001, Cohen's d $=$ 1.33). To provide a visual representation of these results, Fig. 4 illustrates the findings graphically.

4. Discussion

This study aimed at investigating the connections between student need satisfaction/frustration and perceived motivating and demotivating teaching styles in China. Consistent with previous findings in Western countries (e.g., Aelterman et al., 2019) and our assumptions, the results confirmed the positive associations between students need satisfaction and their perception of a motivating teaching style, and between students need frustration and the perceived demotivating teaching style. Moreover, consistent with the dual-process model (Haerens et al., 2015), there was no significant relationship between students need satisfaction and the perceived chaotic style. However, a significant negative connection between student need frustration and their perception of a motivating teaching style was found. Finally, surprisingly student need satisfaction was positively related to their perception of a controlling style.

Validating the Chinese version of the SIS was the secondary purpose of the present study and the results confirmed the reliability and validity of it. The reliability of the subscales in both teacher and student samples was comparable to the original version. In assessing the reliability of our main scale, we opted to use Cronbach's alpha coefficient, aligning with the approach taken by Aelterman et al. (2019) in their original validation of the instrument. This methodological choice was intentional, aiming to ensure the comparability of our results with those obtained in the foundational study by Aelterman and colleagues. While we acknowledge the critiques of Cronbach's alpha, particularly in the context of congeneric items, our decision was guided by the priority of maintaining consistency with established practices in the field. The dimensionality and robustness results provided evidence of the internal validity for the Chinese version of the SIS. However, instead of replicating the identical 8-factor structure in line with the original version, the results of the present study confirmed a 3-factor model including motivating, controlling, and chaotic teaching styles. Specifically, unlike the original SIS, autonomy-supportive and structuring teaching styles were not separate but combined into one factor in the Chinese version. This adjustment can be justified also theoretically, since these two styles are both motivating and previous researches revealed a significant positive correlation between them (Aelterman et al., 2019; Moè, Consiglio, & Katz, 2022; Escriva-Boulley et al., 2021; Vansteenkiste et al., 2012; Vermote et al., 2020).

Notably, in the Chinese version of the SIS the vignettes about "classroom rules" and "motivating students" were not included, on a statistical basis. This makes sense also considering the peculiarities of the Chinese educational system. In the Chinese educational context, there is often a teacher-centered approach characterized by strict disciplinary constraints (Fabris, Lin, & Longobardi, 2023). Additionally, Chinese students are instilled with the importance of academic achievement from an early age and are emphasized to show obedience and respect towards teachers (Yang et al., 2013). Consequently, in schools rooted in Confucianism, Chinese students demonstrate high self-discipline to maintain harmony and pursue individual endeavors, thereby assisting peers to ensure consistent behavior (Ning, 2019). In this situation, Chinese teachers typically invest less effort in formulating classroom rules. Inconsistent results on the scenario "motivating students" in China prompted analysis of potential unique factors. For

instance, traditional Chinese educational culture accentuates strict student management and places a high value on academic performance (Fabris et al., 2023; Zhou et al., 2012). Prior research further suggests that, uniquely in China, students' exam scores are considered a hallmark of good teachers (Liu & Meng, 2009). Consequently, teachers, prioritizing students' academic performance, take measures to ensure student motivation, regardless of the teaching styles adopted. In other words, all teaching styles seem to be motivating under such circumstances. Consequently, in China, the scenario of "motivating students" may not effectively distinguish between "motivating" and "demotivating" teaching styles. For instance, some teachers might opt to "minimize the lesson plan and let what happens in the lesson" – a practice associated with the chaotic style, due to external pressure. At the same time, they may feel compelled to adhere to the traditional model of teacher-led instruction and student listening to meet curriculum demands and ensure student achievement (Liu & Meng, 2009; Wang, 2011). Given that Chinese students are accustomed to this instructional model, these measures might be interpreted as orderly or planned actions. Consequently, chaotic teaching behaviours may be reframed as potentially supportive of student motivation. Future research could delve into in-depth interviews with teachers and students to explore the reasons for the divergence in outcomes in the context of motivating students in the Chinese educational environment compared to other countries.

4.1. (De)motivating teaching styles in Chinese educational settings

Previous research (Aelterman et al., 2019; Moè, Consiglio, & Katz, 2022; Escriva-Boulley et al., 2021; Vansteenkiste et al., 2012; Vermote et al., 2020) considered autonomy support and structure styles as separate yet positively correlated dimensions. However, the results of this study showed that in the Chinese context, autonomy support and structure should be regarded as a unified factor contributing to a motivating teaching style. Both teacher-reported and student-perceived perspective support this view. While the model considers autonomy support and structure as distinct (Aelterman et al., 2019), some researchers (e.g., Moè & Katz, 2020; De Loof, Struyf, Boeve-de Pauw, & Van Petegem, 2021) merged them because they highly correlated ($r =$ 0.72 and $r =$ 0.71, respectively), which is the basis for combing these two motivating teaching styles into one in the present study.

Additionally, the decision to merge autonomy support and structure stems from the intricate interplay between traditional, teacher-centered approaches and the introduced autonomy-supportive methods in response to educational reforms in China (Lee & Yin, 2011; Yan, 2012). Chinese teachers, facing substantial psychological and professional challenges, may find it challenging to fully embrace autonomy-supportive methods, particularly those accustomed to traditional teaching approaches (Lee & Yin, 2011; Yan, 2012). The importance of students' academic performance, coupled with the prevailing teacher-centered culture, further contributes to the adoption of autonomy support in a teacher-centered manner (Liu & Dunne, 2009; Yan, 2012). Thus, the combined motivating teaching style in China encapsulates both autonomy-supportive and structuring characteristics, fostering student autonomy while concurrently promoting the satisfaction of student competence. Notably, no study, to the best of our knowledge, has specifically investigated (de)motivating teaching styles within the model of Aelterman (Aelterman et al., 2019) in the Chinese context. Thus, further investigation is needed in future research for a more comprehensive understanding of the relationships among teaching styles and need satisfaction/frustration.

Second, previous research conducted in other countries has consistently indicated that the controlling teaching style relates negatively with student need satisfaction (Aelterman et al., 2019; De Meyer et al., 2014; Haerens et al., 2015), resulting in demotivation. However, the findings of this study indicate that in China the controlling style is not completely maladaptive. In the student perspective a positive correlation between the experience of need satisfaction and their perception of

a controlling teaching style was found. Due to the correlational design, this relationship can mean that the perceived controlling teaching style influences student need satisfaction or, on the opposite, that student need satisfaction shapes the student perception of controlling teaching behaviours. This result can also be explained by the unique characteristics of the Chinese educational context, where the controlling style is widely accepted and even expected by students, who may feel uneasy if teachers do not take on an authoritative role (Thanh Pham & Renshaw, 2015). Some teachers may also think that their controlling behaviours are necessary to guide their young and inexperienced students. However, it is crucial to recognize that some aspects of the controlling style, such as using pressure to force students to comply with teacher demands or inducing guilt or humiliation to supress student autonomy, can be harmful to student motivation (Soenens & Vansteenkiste, 2010). These controlling teaching strategies are invasive, manipulative, and can undermine student intrinsic motivation. Moreover, cultural nuances play a significant role in shaping perceptions of control. In China, when control is perceived to be based on love and acceptance rather than a desire to control the child, participants view parental control more positively (Chen-Bouck & Patterson, 2017). Similarly, studies have revealed that students with higher teacher-student relatedness tend to perceive less control and more warmth from their teachers compared to students with lower teacher-student relatedness (Zhou et al., 2012), highlighting the impact of teacher-student relationships on students' perceptions of teacher control behavior. Chinese middle and high school students do not change classes throughout the day as in American schools but stay in the same class with the same teachers for multiple subjects, and as observed by Jia et al. (2009), many Chinese students have the same teachers for more than a year, providing more opportunities for teacher-student bonding (Yang et al., 2013). Therefore, it is reasonable to believe that the positive teacher-student relationships in China mitigate the negative effects of perceived controlling styles. The teacher-student relationship is important because it constitutes a vital component of students' relatedness needs (Ryan & Deci, 2017, 2020). It can help explain the results concerning the influence of teachers on students, such as the correlation between perceived controlling style and students need satisfaction in this study. However, it's essential to note that we did not measure teacher-student relationships in this study. Acknowledging this limitation, our research lays the groundwork for future investigations to delve deeper into the relationship between students' need satisfaction, perceived controlling styles, and the quality of teacher-student relationships in the Chinese educational context.

At last, it is interesting to find that the relationship between the chaotic and motivating styles was positive according to teacher-reported results but negative based on student perceptions. Previous studies performed in other countries have found that a negative association between the chaotic style and the motivating teaching styles (e.g., Aelterman et al., 2019; Moè, Consiglio, & Katz, 2022; Escriva-Boulley et al., 2021; Vermote et al., 2020). This departure from findings in other countries prompts an examination of the unique characteristics of the Chinese educational system. In the high-pressure context of Chinese education system, teachers may find themselves navigating a delicate balance between motivating and chaotic teaching styles. The emphasis on exam results (Liu & Dunne, 2009; Pelletier & Sharp, 2009) and the need for timely coverage of textbook (Wang, 2011), influenced by large class sizes and limited resources, can create a challenging environment for educators. On the one hand, this pressure may lead some teachers to adopt motivating teaching styles in an effort to enhance student performance. On the other hand, this same pressure might be perceived as an overwhelming burden, potentially leading teachers to adopt a chaotic teaching style as a way of coping (Wang, 2011).

This unique adaptation sheds light on a complex interplay of teaching styles in the Chinese educational setting, warranting further exploration into the motivations and outcomes associated with this dual approach.

4.2. Students perceived teaching styles and need satisfaction/frustration

Aligned with existing literature (e.g., Aelterman et al., 2019; Haerens et al., 2015), the findings of this study revealed that perceived motivating teaching styles were positively correlated with need satisfaction, while perceived controlling and chaotic teaching styles were positively associated with need frustration, suggesting that motivating teaching styles are motivating while controlling and chaotic teaching styles are demotivating. In addition, this study also found negative correlations between perceived motivating teaching styles and need frustration. Additionally, need satisfaction related positively with student perception of a controlling teaching style, thus providing further evidence that the controlling teaching style is not fully demotivating, or even motivating in China.

Given the unexpected results in this study concerning the positive perception of controlling teaching styles in relation to students' satisfaction of needs, it is imperative to delve deeper into the pedagogical and practical implications of these findings. Future research endeavors should focus on gaining a nuanced understanding of how pedagogical strategies can effectively incorporate elements of controlling teaching styles within the Chinese context, ensuring they contribute positively to the educational experience without compromising student motivation.

4.3. Limitations and future avenues

This study provided important results about the relationships between perceived (de)motivating teaching styles and students need satisfaction/frustration in the Chinese educational context. However, it is not exempt of limitations. First, the reliance on self-report measures, though common in (de)motivating teaching styles research, introduces the potential for biases related to inaccurate recall or self-enhancement. In future research, the incorporation of objective measures, such as video recordings, could enhance the robustness of the findings and provide a more nuanced understanding of motivating and demotivating teaching styles. Second, while this study collected data from both teachers and students, the student sample consisted of students who were not taught by the teacher sample in the current study. As a result, we were unable to investigate the relationship between teacher and student perceptions of (de)motivating teaching styles, which could have further strengthened the validity of the scale. Future research could benefit from incorporating both teacher and student data from the same classrooms to further validate the (de)motivating teaching styles scale. Third, only the relationships between (de)motivating teaching styles and need satisfaction/frustration were examined in this study to assess the external validity of the Chinese version of the SIS. The relationship between these teaching styles and other variables, such as motivation, teacher burnout, and student engagement, could also be explored in future studies. Forth, since we only collected data from teachers and students from middle and high schools in the southern and northwestern regions of China, the representativeness could be questioned. Future research could further explore these relationships using different samples, such as participants from universities or primary schools. This would help to develop effective interventions that promote the adoption of motivating teaching strategies and reduce the use of demotivating teaching strategies. Fifth, we only collected a few demographic information, other demographic information, such as teachers' educational level and the average monthly family income of students, did not collect. We recognize the importance of such information for a comprehensive understanding of our participant characteristics. Future research could collect more comprehensive demographic information. Sixth, given the collectivistic nature of Chinese culture and the relatively less emphasized value of autonomy, it becomes crucial to understand the role of valuation, that is how important each of the needs are in the Chinese culture where the study was conducted, in the relationships between (de)motivating teaching styles and need satisfaction. However, valuation of the three needs including autonomy was not assessed in the

present study. Recognizing the significance of this aspect, future research endeavors will incorporate a comprehensive examination of valuation of the three needs to further elucidate the cultural dynamics influencing the observed relationships. Finally, while our study has provided valuable insights into the relationships between the adoption of (de)motivating teaching styles and students need satisfaction/frustration in the Chinese educational context, we acknowledge the need for further exploration of specific cultural and contextual influences. The observed differences in these relationships between China and Western countries highlight the importance of a more in-depth analysis of the peculiarities of the Chinese education system. Our future research endeavors will include more detailed investigations into how specific features of Chinese education, such as extrinsic instructional goals and the emphasis on exams and teacher authority, influence teaching perceptions and practices. We recognize the significance of considering how these influences may evolve over time, potentially due to educational reforms or other contextual factors.

4.4. Educational implications

In line with previous research (e.g., Cheon, Reeve, & Ntoumanis, 2018; Cronin et al., 2019; Diseth, Breidablik, & Meland, 2018; Tilga, Hein & Koka, 2019), this study found that student need satisfaction is positively related to perceived motivating teaching styles, while there was a positive relationship between student need frustration and perceived demotivating teaching styles. Therefore, interventions directed towards teachers should focus on promoting the use of motivating teaching styles an reduce adoption of demotivating ones. To attain this objective, according to prior (e.g., Aelterman et al., 2019; Moè & Katz, 2020, Moè & Katz, 2021, Moè & Katz, 2022) and this study's findings, it is advisable to provide support for teacher need satisfaction while mitigating instances of need frustration, which can be accomplished through structured interventions, such as the Autonomy Supportive Intervention Program (ASIP: Cheon, Reeve, Marsh, & Song, 2022; Cheon et al., 2020; Tilga, Kalajas-Tilga, Hein, & Koka, 2021; Tilga, Kalajas-Tilga, Hein, Raudsepp, & Koka, 2021) and/or by encouraging teachers to better regulate their emotions (Moè & Katz, 2021) and/or be more self-compassionate instead of self-derogating (Moè & Katz, 2020). At last, using the controlling style in education can be beneficial or harmful depending on various factors, such as the educational system and cultural aspects. While the controlling style typically relates to student need frustration, this study revealed a positive relationship between student-perceived controlling style and their need satisfaction. Therefore, it may not be necessary to suppress teacher use of the controlling style in China. However, interventions for teachers are still needed to ensure that teachers use the controlling style in moderation and are aware of its benefits and drawbacks to fully support student achievement motivation and achievement.

5. Conclusions

The results confirm that also in the Chinese context the student-perceived motivating teaching style is positively associated with their need satisfaction, while perceived demotivating styles are related to need frustration. Interestingly, in China, it seems that also the student perceived controlling style is related with need satisfaction, suggesting that cultural aspects and peculiarities in the educational system can mitigate the potential impact of a controlling style on student motivation. Additionally, the findings suggest that the Chinese version of the SIS, which includes the three subscales motivating, controlling, and chaotic, is a reliable and valid measure.

CRediT authorship contribution statement

Jiawei Wang: Data curation, Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Qiang Xing:** Funding acquisition, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Angelica Moè:** Writing – original draft, Writing – review & editing, Conceptualization, Methodology, Supervision.

Declaration of competing interest

The Authors declare none.

Data availability

Data will be made available on request.

References

Aelterman, N., Vansteenkiste, M., Haerens, L., Soenens, B., Fontaine, J. R. J., & Reeve, J. (2019). Toward an integrative and fine-grained insight in motivating and demotivating teaching styles: The merits of a circumplex approach. *Journal of Educational Psychology, 111*(3), 497–521. https://doi.org/10.1037/edu0000293

Amoura, C., Berjot, S., Gillet, N., Caruana, S., Cohen, J., & Finez, L. (2015). Autonomy-supportive and controlling styles of teaching. *Swiss Journal of Psychology, 74*(3), 141–158. https://doi.org/10.1024/1421-0185/a000156

Assor, A., Feinberg, O., Kanat-Maymon, Y., & Kaplan, H. (2018). Reducing violence in non-controlling ways: A change program based on self determination theory. *The Journal of Experimental Education, 86*(2), 195–213. https://doi.org/10.1080/00220973.2016.1277336

Bao, Z., & Zhang, X. (2008). Chuzhongsheng Waizai Xuexi Dongji Neihua De Xinli Jizhi Yanjiu [the mental mechanisms of junior high school students' internalization of extrinsic learning motivation]. *Psychological Science, 31*, 580–583. https://doi.org/10.16719/j.cnki.1671-6981.2008.03.051

Bartholomew, K. J., Ntoumanis, N., Mouratidis, A., Katartzi, E., Thøgersen-Ntoumani, C., & Vlachopoulos, S. (2018). Beware of your teaching style: A school-year long investigation of controlling teaching and student motivational experiences. *Learning and Instruction, 53*, 50–63. https://doi.org/10.1016/j.learninstruc.2017.07.006

Brislin, R. W. (1980). Translation and content analysis of oral and written material. In H. C. Triandis, & W. Lonner (Eds.), *Methodology. Handbook of cross-cultural psychology* (pp. 389–444). Allyn & Bacon.

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., … Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Chen-Bouck, L., & Patterson, M. M. (2017). Perceptions of parental control in China: Effects of cultural values, cultural normativeness, and perceived parental acceptance. *Journal of Family Issues, 38*(9), 1288–1312. https://doi.org/10.1177/0192513X15590687

Cheon, S. H., Reeve, J., Marsh, H. W., & Song, Y. G. (2022). Intervention-enabled autonomy-supportive teaching improves the PE classroom climate to reduce antisocial behavior. *Psychology of Sport and Exercise, 60*, Article 102174. https://doi.org/10.1016/j.psychsport.2022.102174

Cheon, S. H., Reeve, J., & Ntoumanis, N. (2018). A needs-supportive intervention to help PE teachers enhance students' prosocial behavior and diminish antisocial behavior. *Psychology of Sport and Exercise, 35*, 74–88. https://psycnet.apa.org/doi/10.1016/j.psychsport.2017.11.010.

Cheon, S. H., Reeve, J., & Ntoumanis, N. (2019). An intervention to help teachers establish a prosocial peer climate in physical education. *Learning and Instruction, 64*, Article 101223. https://psycnet.apa.org/doi/10.1016/j.learninstruc.2019.101223.

Cheon, S. H., Reeve, J., & Vansteenkiste, M. (2020). When teachers learn how to provide classroom structure in an autonomy-supportive way: Benefits to teachers and their students. *Teaching and Teacher Education, 90*, Article 103004. https://doi.org/10.1016/j.tate.2019.103004

Cronin, L., Marchant, D., Allen, J., Mulvenna, C., Cullen, D., Williams, G., et al. (2019). Students' perceptions of autonomy-supportive versus controlling teaching and basic need satisfaction versus frustration in relation to life skills development in PE. *Psychology of Sport and Exercise, 44*, 79–89. https://doi.org/10.1016/j.psychsport.2019.05.003

De Loof, H., Struyf, A., Boeve-de Pauw, J., & Van Petegem, P. (2021). Teachers' motivating style and students' motivation and engagement in STEM: The relationship between three key educational concepts. *Research in Science Education, 51*, 109–127. https://doi.org/10.1007/s11165-019-9830-3

De Meyer, J., Tallir, I. B., Soenens, B., Vansteenkiste, M., Aelterman, N., Van den Berghe, L., et al. (2014). Does observed controlling teaching behavior relate to students' motivation in physical education? *Journal of Educational Psychology, 106*(2), 541–554. https://doi.org/10.1037/a0034399

Diseth, Å., Breidablik, H. J., & Meland, E. (2018). Longitudinal relations between perceived autonomy support and basic need satisfaction in two student cohorts. *Educational Psychology, 38*(1), 99–115. https://doi.org/10.1080/01443410.2017.1356448

Duprez, V., Vansteenkiste, M., Beeckman, D., Verhaeghe, S., & Van Hecke, A. (2021). Capturing motivating versus demotivating self-management support: Development and validation of a vignette-based tool grounded in Self-determination Theory. *International Journal of Nursing Studies, 116*, Article 103354. https://doi.org/10.1016/j.ijnurstu.2019.04.019

Escriva-Boulley, G., Guillet-Descas, E., Aelterman, N., Vansteenkiste, M., Van Doren, N., Lentillon-Kaestner, V., et al. (2021). Adopting the situation in school questionnaire to examine physical education teachers' motivating and demotivating styles using a circumplex approach. *International Journal of Environmental Research and Public Health, 18*(14), 7342. https://doi.org/10.3390/ijerph18147342

Fabris, M. A., Lin, S., & Longobardi, C. (2023). A cross-cultural comparison of teacher-student relationship quality in Chinese and Italian teachers and students. *Journal of School Psychology, 99*, Article 101227. https://doi.org/10.1016/j.jsp.2023.101227

Gabrialavičiūtė, I., Raižienė, S., & Garckija, R. (2022). Towards the effective motivation: Adaptation of the situations in school questionnaire (SISQ) to Lithuanian educational context. *Psichologija, 66*, 79–94. https://doi.org/10.15388/Psichol.2022.53

Gerique-Rubira, N., & García González, L. (2020). *Análisis de los estilos y conductas motivacionales docentes en Educación Física y sus consecuencias sobre el alumnado*. Recuperado de. https://zaguan.unizar.es/record/97698/files/TAZ-TFG-2020-5100.pdf.

Gordeeva, T. O., & Sychev, O. A. (2021). Diagnostics of motivating and demotivating styles of teachers: "Situations-in-School" questionnaire. *Psychological Science and Education, 26*(1), 51–65. https://doi.org/10.17759/pse.2021260103

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*(3), 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Hart, C. M., Ritchie, T. D., Hepper, E. G., & Gebauer, J. E. (2015). The balanced inventory of desirable responding short form (BIDR-16). *Sage Open, 5*(4), Article 2158244015621113. https://doi.org/10.1177/2158244015621113

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, C. Y., & Lamb, M. E. (2014). Are Chinese children more compliant? Examination of the cultural difference in observed maternal control and child compliance. *Journal of Cross-Cultural Psychology, 45*(4), 507–533. https://doi.org/10.1177/0022022113513652

IBM Corp. (2017). *IBM SPSS statistics for Windows (version 25.0)*. Armonk, NY: IBM Corp.

Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction, 43*, 27–38. https://doi.org/10.1016/j.learninstruc.2016.01.002

Jia, Y. M., Way, N., Ling, G. M., Yoshikawa, H., Chen, X. Y., Hughes, D., et al. (2009). The influence of student perceptions of school climate on socioemotional and academic adjustment: A comparison of Chinese and American adolescents. *Child Development, 80*, 1514–1530. https://doi.org/10.1111/j.1467-8624.2009.01348.x

Jöreskog, K. G., & Sörbom, D. (2006). *Lisrel 8.80*. Lincolnwood, IL: Scientific Software International Inc.

Lau, K. L. (2014). Within-year changes in Chinese secondary school students' perceived reading instruction and intrinsic reading motivation. *Journal of Research in Reading, 39*(2), 153–170. https://doi.org/10.1111/1467-9817.12035

Lee, J. C. K., & Yin, H. B. (2011). Teachers' emotions and professional identity in curriculum reform: A Chinese perspective. *Journal of Educational Change, 12*(1), 25–46. https://doi.org/10.1007/s10833-010-9149-3

Leo, F. M., Mouratidis, A., Pulido, J. J., López-Gajardo, M. A., & Sánchez-Oliva, D. (2022). Perceived teachers' behavior and students' engagement in physical education: The mediating role of basic psychological needs and self-determined motivation. *Physical Education and Sport Pedagogy, 27*(1), 59–76. https://doi.org/10.1080/17408989.2020.1850667

Lewis, R., Romi, S., Katz, Y. J., & Qui, X. (2005). Students' reaction to classroom discipline in Australia, Israel, and China. *Teacher and Teacher Education, 24*, 715–724. https://doi.org/10.1016/j.tate.2007.05.003

Liu, Y., & Dunne, M. (2009). Educational reform in China: Tensions in national policy and local practice. *Comparative Education, 45*(4), 461–476. https://doi.org/10.1080/03050060903391594

Liu, S., & Meng, L. (2009). Perceptions of teachers, students and parents of the characteristics of good teachers: A cross-cultural comparison of China and the United States. *Educational Assessment, Evaluation and Accountability, 21*(4), 313–328. https://doi.org/10.1007/s11092-009-9077-z

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*(3), 320–341. https://doi.org/10.1207/s15328007sem1103_2

Minkov, M. (2018). A revision of Hofstede's model of national culture: Old evidence and new data from 56 countries. *Cross Cultural & Strategic Management, 25*(2), 231–256. https://doi.org/10.1108/CCSM-03-2017-0033

Moè, A., Consiglio, P., & Katz, I. (2022). Exploring the circumplex model of motivating and demotivating teaching styles: The role of teacher need satisfaction and need frustration. *Teaching and Teacher Education, 118*, Article 103823. https://doi.org/10.1016/j.tate.2022.103823.

Moè, A., & Katz, I. (2020). Self-compassionate teachers are more autonomy supportive and structuring whereas self-derogating teachers are more controlling and chaotic: The mediating role of need satisfaction and burnout. *Teaching and Teacher Education, 96*, Article 103173. https://doi.org/10.1016/j.tate.2020.103173.

Moè, A., & Katz, I. (2021). Emotion regulation and need satisfaction shape a motivating teaching style. *Teachers and Teaching, 27*(5), 370–387. https://doi.org/10.1080/13540602.2020.1777960.

Moè, A., & Katz, I. (2022). Need satisfied teachers adopt a motivating style: The mediation of teacher enthusiasm. *Learning and Individual Differences, 99*, Article 102203. https://doi.org/10.1016/j.lindif.2022.10220.

Montero-Carretero, C., Barbado, D., & Cervelló, E. (2020). Predicting bullying through motivation and teaching styles in physical education. *International Journal of Environmental Research and Public Health, 17*(1), 87. https://doi.org/10.3390/ijerph17010087

Muthén, L. K., & Muthén, B. (2017). *Mplus user's guide: Statistical analysis with latent variables, user's guide*. Muthén & Muthén.

Ning, B. (2019). Examining the importance of discipline in Chinese schooling: An exploration in Shanghai, Hong Kong, Macao, and Taipei. *Asia Pacific Education Review, 20*(3), 489–501. https://doi.org/10.1007/s12564-018-9563-4

Oberski, D. (2013). Jrule for Mplus-Power of the test score [Computer software]. Retrieved from https://github.com/daob/JruleMplus/wiki.

Park, H. S., Lee, H. E., Kingsley Westerman, C. Y., & Guan, X. (2019). We want a team player: A formative cross-cultural investigation in the United States, China, and South Korea. *Journal of Cross-Cultural Psychology, 50*(10), 1161–1181. https://doi.org/10.1177/0022022119863884

Parr, A., Gladstone, J., Rosenzweig, E., & Wang, M. T. (2021). Why do I teach? A mixed-methods study of in-service teachers' motivations, autonomy-supportive instruction, and emotions. *Teaching and Teacher Education, 98*, Article 103228. https://doi.org/10.1016/j.tate.2020.103228

Paulhus, D. L. (1991). Measurement and control of response bias. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17–59). San Diego, CA: Academic Press.

Pelletier, L. G., & Sharp, E. C. (2009). Administrative pressures and teachers' interpersonal behaviour in the classroom. *Theory and Research in Education, 7*(2), 174–183. https://doi.org/10.1177/1477878509104322

Reeve, J., & Cheon, S. H. (2021). Autonomy-supportive teaching: Its malleability, benefits, and potential to improve educational practice. *Educational Psychologist, 56*(1), 54–77. https://doi.org/10.1080/00461520.2020.1862657

Rhode, A. K., Voyer, B. G., & Gleibs, I. H. (2016). Does language matter? Exploring Chinese–Korean differences in holistic perception. *Frontiers in Psychology, 7*, 1508. https://doi.org/10.3389/fpsyg.2016.01508

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Shen, J. (2008). *Zhongguo zhongxiaoxuesheng xuexi yu xinli fazhan zhuangkuang baogao [Report on Chinese adolescents' learning and psychological development]*. Beijing: Beijing Normal University Publishing Group.

Slemp, G. R., Lee, M. A., & Mossman, L. H. (2021). Interventions to support autonomy, competence, and relatedness needs in organizations: A systematic review with recommendations for research and practice. *Journal of Occupational and Organizational Psychology, 94*(2), 427–457. https://doi.org/10.1111/joop.12338

Soenens, B., & Vansteenkiste, M. (2010). A theoretical upgrade of the concept of parental psychological control: Proposing new insights on the basis of self-determination theory. *Developmental Review, 30*(1), 74–99. https://doi.org/10.1016/j.dr.2009.11.001

Thanh Pham, T. H., & Renshaw, P. (2015). Formative assessment in confucian heritage culture classrooms: Activity theory analysis of tensions, contradictions and hybrid practices. *Assessment & Evaluation in Higher Education, 40*(1), 45–59. https://doi.org/10.1080/02602938.2014.886325

Tilbe, Y. T., & Gai, X. (2022). Teacher-child interactions in early childhood education and its effects on social and language development. *Early Child Development and Care, 192*(5), 761–774. https://doi.org/10.1080/03004430.2020.1798944

Tilga, H., Hein, V., Koka, A., Hamilton, K., & Hagger, M. S. (2019). The role of teachers' controlling behaviour in physical education on adolescents' health-related quality of life: Test of a conditional process model. *Educational Psychology, 39*(7), 862–880. https://doi.org/10.1080/01443410.2018.1546830

Tilga, H., Kalajas-Tilga, H., Hein, V., & Koka, A. (2021). Web-based and face-to-face autonomy-supportive intervention for physical education teachers and students' experiences. *Journal of Sports Science and Medicine, 20*(4), 672–683. https://doi.org/10.52082/jssm.2021.672

Tilga, H., Kalajas-Tilga, H., Hein, V., Raudsepp, L., & Koka, A. (2021). Effects of a web-based autonomy-supportive intervention on physical education teacher outcomes. *Education Sciences, 11*(7), 316. https://doi.org/10.3390/educsci11070316

Tobin, J., Wu, D., & Davidson, D. (1989). *Preschool in three cultures: Japan, China, and the United States*. New Haven, CT: Yale University Press.

Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., … Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction, 22*(6), 431–439. https://doi.org/10.1016/j.learninstruc.2012.04.002

Vermote, B., Aelterman, N., Beyers, W., Aper, L., Buysschaert, F., & Vansteenkiste, M. (2020). The role of teachers' motivation and mindsets in predicting a (de)motivating teaching style in higher education: A circumplex approach. *Motivation and Emotion, 44*(2), 270–294. https://doi.org/10.1007/s11031-020-09827-5

Wang, D. (2011). The dilemma of time: Student-centered teaching in the rural classroom in China. *Teaching and Teacher Education, 27*(1), 157–164. https://doi.org/10.1016/j.tate.2010.07.012

Wang, J. C. K., Ng, B. L., Liu, W. C., & Ryan, R. M. (2016). Can being autonomy-supportive in teaching improve students' self-regulation and performance?. In

Building autonomous learners (pp. 227–243). Singapore: Springer. https://doi.org/10.1007/978-981-287-630-0_12.

Wu, M. S., Zhou, C., Chen, H., Cai, H., & Sundararajan, L. (2018). Cultural value mismatch in urbanizing China: A large-scale analysis of collectivism and happiness based on social media and nationwide survey. *International Journal of Psychology, 53*, 54–63. https://doi.org/10.1002/ijop.12523

Yan, C. (2012). 'We can only change in a small way': A study of secondary English teachers' implementation of curriculum reform in China. *Journal of Educational Change, 13*(4), 431–447. https://doi.org/10.1007/s10833-012-9186-1

Yang, C., Bear, G. G., Chen, F. F., Zhang, W., Blank, J. C., & Huang, X. (2013). Students' perceptions of school climate in the U.S. and China. *School Psychology Quarterly, 28*(1), 7–24. https://doi.org/10.1037/spq0000002

Zhou, S. A., Hiver, P., & Al-Hoorie, A. H. .(in press-a) Dynamic engagement: A longitudinal dual-process, reciprocal-effects model of teacher motivational practice and L2 student engagement. Language Teaching Research. https://doi.org/10.1177/13621688231158789.

Zhou, N., Lam, S. F., & Chan, K. C. (2012). The Chinese classroom paradox: A cross-cultural comparison of teacher controlling behaviors. *Journal of Educational Psychology, 104*(4), 1162–1174. https://doi.org/10.1037/a0027609

Zhou, M., Ma, W. J., & Deci, E. L. (2009). The importance of autonomy for rural Chinese children's motivation for learning. *Learning and Individual Differences, 19*(4), 492–498. https://doi.org/10.1016/j.lindif.2009.05.003