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**The characteristics, predictors, and outcomes of (de)motivating teaching styles: A cross-cultural  
investigation**

**Coordinator:** Prof. Giovanni Galfano

**Supervisor:** Prof. Angelica Moè

**Co-Supervisor:** Prof. Qiang Xing

**Ph.D. student:** Jiawei Wang

## Abstract

Grounded on the self-determination theory (SDT), the researcher conducted four studies to compare the preferred (de)motivating teaching styles in Italy and China (Studies 1 and 2) and to further investigate these teaching styles in the Chinese educational context (Studies 3 and 4). Moreover, the predictors and outcomes of these teaching styles on students were also assessed.

The results of Studies 1 and 2 showed that Italian teachers self-reported adopting more motivating styles than Chinese teachers. However, compared with Italian students, Chinese students perceived more motivating styles. Moreover, self-compassion was positively related to need satisfaction which contributed to the adoption of motivating styles (i.e., autonomy-supportive and structuring), partly mediated by reappraisal, personal accomplishment, and teacher enthusiasm. On the other hand, self-derogation enhanced the need for frustration, leading to using demotivating styles (i.e., controlling and chaotic), partly mediated by suppression and emotional exhaustion. At last, instead of teacher-reported, student-perceived (de)motivating styles have significant relationships with students' need satisfaction/frustration. Specifically, students' perceived autonomy-supportive and structuring styles were positively related to their need satisfaction and perceived controlling and chaotic styles were positively associated with their need frustration.

The results of Study 3 showed that perceived motivating teaching styles strengthened need satisfaction and autonomous motivation, mediating by need satisfaction. On the contrary, perceived chaotic style positively predicted need frustration and amotivation with the mediating effect of need frustration. Perceived controlling style predicted controlled motivation, while its impact on need frustration was only found in girls.

The results of Study 4 revealed that need satisfaction and motivation were predictors of (de)motivating teaching styles. Also, the students, grades, subjects that teachers taught, and their competence influenced their adoption of these teaching styles. Besides, these teaching styles impacted students' need satisfaction, motivation, and engagement. Moreover, students reported that their interests, academic performance, emotions, study habits, self-control, and relationships with teachers were also affected. At last, although the controlling teaching style was demotivating, teachers and students in China were optimistic that it was effective and expected to use it to improve students' academic performance.

In sum, the findings were similar in Italy and China. Teachers tended to adopt more motivating teaching styles. Besides, regardless of the culture, encouraging self-compassion, enhancing need satisfaction, reducing need frustration, preventing burnout, and developing the ability to reappraisal and enthusiasm (especially felt enthusiasm) will make teachers more supportive. Furthermore, motivating teaching styles triggered desired student outcomes (e.g., need satisfaction, autonomous motivation, and engagement), while demotivating teaching styles resulted in maladaptive student outcomes (e.g., need frustration and amotivation). These results emphasized the importance of fulfilling three basic psychological needs of teachers and students, regardless of their cultural background.

**Keywords:** self-determination theory; (de)motivating teaching styles; need satisfaction and frustration; teacher enthusiasm; motivation; cross-cultural investigation

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# Foreword

## General introduction

In recent years, Self-Determination Theory (SDT) has been widely used in classroom practice to explain what kind of teaching and learning environment can better meet students' basic psychological needs and thus facilitate their academic development (e.g., Aibar et al., 2021; Chen et al., 2020; Cheon, Reeve & Vansteenkiste, 2020). SDT suggests that there are three basic psychological needs (i.e., autonomy, competence, and relatedness) and that only when the social environment satisfies these three needs will students be motivated and engaged and achieve better academic success (Ryan & Deci, 2000, 2017). As significant others for students, teachers have a critical role to play in satisfying students' basic psychological needs (Hein, 2012; Wentzel, 2009).

Numerous studies have confirmed the positive effects of motivating teaching styles (i.e., autonomy-supportive and structuring) and their mechanisms. That is, autonomy-supportive and structuring teaching styles can facilitate students' motivation and engagement by satisfying their basic psychological needs (e.g., Amoura et al., 2015; Cheon & Reeve, 2013, 2015; Cheon, Reeve & Moon, 2012; Cheon, Reeve & Vansteenkiste, 2020; Jang, Kim & Reeve, 2016). However, the roles of demotivating teaching styles (i.e., controlling and chaotic) are less well studied, especially for the chaotic style (e.g., Amoura et al., 2015; Jang, Kim & Reeve, 2016). Notably, low levels of autonomy support and structure do not necessarily imply the presence of controlling and chaotic styles, and low levels of students' need satisfaction do not equate with the presence of need frustration (Aelterman et al., 2019; Jang, Kim & Reeve, 2016). Motivating and demotivating teaching styles (and need satisfaction and frustration) have different predictors and consequences, making it necessary to examine their mechanisms separately. Need satisfaction and need frustration are critical mechanisms for optimal and non-optimal functioning, corresponding to two paths (Vansteenkiste & Ryan, 2013). One goes from the need-supporting context to increasing need satisfaction and then increasing growth and well-being. The other is from the need-blocking context to increasing need frustration and non-optimal functioning or even ill-being. Basic psychological need satisfaction and need frustration models can explain both the "bright" and "dark" side of human functioning (Vansteenkiste & Ryan, 2013; Jang, Kim & Reeve, 2016). Previous studies have confirmed the divergence of the brighter and darker sides (Bartholomew et al., 2011; Costa, Ntoumanis & Bartholomew, 2015; Haerens et al., 2015; Moè & Katz, 2020).

In order to promote teachers' adoption of autonomy-supportive and structuring teaching styles and to avoid the use of controlling and chaotic teaching styles, the first thing to do is to understand the reasons for teachers' preference for particular styles. The factors influencing teachers' adoption of (de)motivating teaching styles can be divided into three categories: pressure from above, pressure from within, and pressure from below (Reeve, 2009; Soenens et al., 2012). Social contextual factors include pressures from above (e.g., performance evaluations) and pressures from below (e.g., students' destructive behaviors). Cultural differences are also included in the social contextual factors; however, their role has received less attention (Reeve et al., 2014). In addition, the pressure from within is about teacher personal factors, such as teachers' own beliefs, values, and individual

tendencies (Reeve, 2009). Researchers have put forward some variables to explain why teachers prefer an autonomy-supportive and a structuring teaching style or a controlling and a chaotic teaching style, including traits (Reeve, Jang & Jang, 2018), beliefs (Reeve et al., 2014), burnout or personal accomplishment (e.g., Aelterman et al., 2019; Campos, 2015; Jennings, 2015; Moè & Katz, 2020; Shen et al., 2015; Soenens et al., 2012; Van den Berghe et al., 2014), need satisfaction or need frustration (e.g., Aelterman et al., 2019; Cheon et al., 2014; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021), self-compassion (Moè & Katz, 2020), emotion regulation (Moè & Katz, 2021), and teacher enthusiasm (Moè & Katz, 2022). However, some of these variables (e.g., teacher enthusiasm) have only been investigated once. At the same time, it remains unclear whether these relationships are consistent across cultures. Hence, the relationships between these variables and the adoption of (de)motivating teaching styles require further investigation.

## **Statement of Problem**

Teachers are significant others to students, and their behaviors and teaching styles impact students. However, previous studies have ignored demotivating teaching styles, especially chaotic ones. Hence, the results are not comprehensive enough.

Furthermore, to optimize the impact of teachers' teaching styles, it is vital to understand how to facilitate teachers to use autonomy-supportive and structuring teaching styles and reduce their adoption of controlling and chaotic styles. Some studies have investigated this issue but are also not comprehensive enough. Moreover, cultural background is a potential influencing factor that has been ignored in previous studies.

## **Purposes of this research**

Therefore, the purposes of this research include:

- (1) to compare the preferred (de)motivating teaching styles in Italy and China,
- (2) to explore the predictors of (de)motivating teaching styles in Italy and China,
- (3) to investigate the impacts of (de)motivating teaching style on students in Italy and China.

## **Significance of this research**

Teachers are significant others for students, and their behaviors and teaching styles affect students' need satisfaction, motivation, and engagement, affecting their academic outcomes. In this research, the researcher compares the preferred (de)motivating teaching styles in different cultures and investigates the predictors and the outcomes of (de)motivating teaching styles. It helps teachers, school administrators, and local boards of education to create a better teaching environment promoting teachers' adoption of motivating (and reducing their use of demotivating) teaching styles. In addition, these studies will help to enrich the research on (de)motivating teaching styles and provide a theoretical basis for how to promote teachers' adoption of motivating styles and enhance students' motivation and engagement (or reduce their use of demotivating teaching and avoid students' need frustration and amotivation). Also, this research supports the newly proposed teacher teaching style model by Aelterman et al. (2019).

# Chapter 1 Literature reviews

## 1.1 Self-determination theory

Self-determination theory (SDT) is a theory related to motivation, which differs from the previous theories that divide motivation into intrinsic and extrinsic motivation. It believes that motivation is a continuum from nonautonomous to autonomous and that human beings have the potential for self-development and integration. However, this development and integration will be restricted by the external environment. For instance, studies from different countries have shown that intrinsic motivation, at least in school-related activities, declined over time since schools did not create a supportive environment for nurturing such internal resources (e.g., Gillet, Vallerand, & Lafreniere, 2012; Gnambs & Hanfstingl, 2016; Gottfried, Marcoulides, Gottfried & Oliver, 2013; Guzmán & Kingston, 2012). Therefore, SDT does not pay attention to what issues cause intrinsic motivation since SDT considers intrinsic motivation an evolutionary tendency; instead, it examines the conditions that elicit and maintain, versus undermine and impair, this innate tendency.

### 1.1.1 The continuum of motivation

People’s motivation for behavior can range from amotivation to passive obedience and positive personal commitment. Figure 1 illustrates the motivation types. As moving from left to right along the continuum, behaviors become increasingly internalized, and the perceived attribution shifts from the environment to the self (Ryan & Deci, 2017).

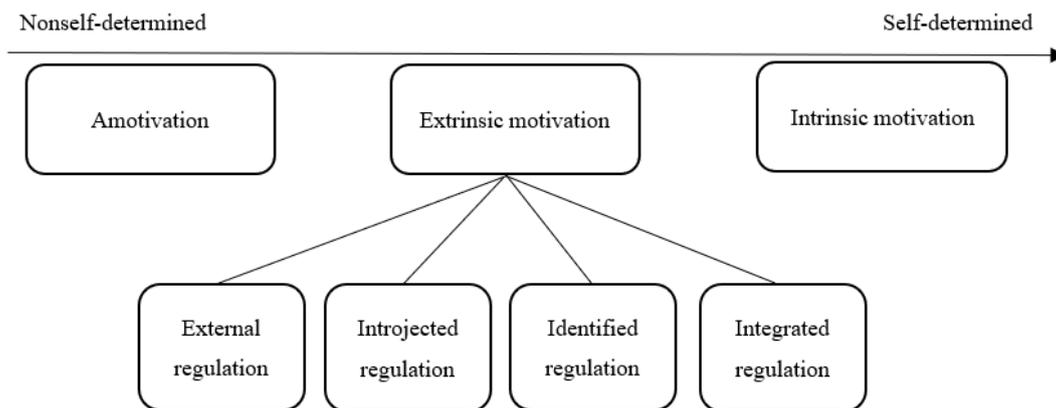


Figure 1 The continuum of motivation

At the far left of the self-determination continuum is amotivation, which means “without motivation.” It is a state of indifference to motivation, in which the individual has little or no reason (motivation) to invest the effort to learn or accomplish something (Cheon & Reeve, 2015). On the far right side of the continuum is intrinsic motivation, a state of carrying out an activity for a person’s interest or inner satisfaction, which is highly autonomous. Contrary to intrinsic motivation, extrinsic

motivation, involves achieving specific separable results, such as getting rewards (Ünlü & Dettweiler, 2015). The extrinsically motivated behaviors (i.e., external regulation, introjected regulation, identified regulation, and integrated regulation), covering the continuum between amotivation and intrinsic motivation, vary in the degree of self-determination (Ryan & Deci, 2020).

External regulation, the least autonomous extrinsic motivation, occurs when doing something to obtain a reward or avoid being punished. When individuals do something to avoid feelings of guilt or anxiety or gain a sense of self-affirmation (e.g., a sense of pride), introjected regulation occurs. Identified regulation refers to freely treating goals as essential and reflecting one's real interests. It involves a conscious valuing of behavioral purposes; thus, people will accept these behaviors and consider them necessary. Integration occurs when a person completely assimilates the identified regulation to the self; that is, when the individual thinks that the behavior is helpful and takes it into the self-values. Integrated regulation is the complete form of internalization because the reasons for an individual's actions are meaningful to the individual and consistent with the individual's broader and more entrenched values, commitment, and interests (Vansteenkiste et al., 2018). However, researchers have suggested that it is unnecessary to assess integrated regulation in adolescents since they have not yet developed this type of regulation (e.g., Chen, 2014). According to SDT, autonomous motivation includes intrinsic motivation and identified regulation, while introjected regulation and external regulation are controlled motivation.

According to SDT, these different motivations reflect different degrees of internalization and integration of the behaviors. Internalization refers to people's acceptance of a value or rule, and integration involves further transforming it into their own rules. Internalization and integration are almost throughout a person's life span. Wang and colleagues (Wang & Wind, 2020; Wang, 2021) developed the Internalization of Learning Motivation (ILM) scale to evaluate the various internalization stages as a continuum.

Previous studies have found that greater internalization was positively related to more interest and enjoyment (Yli-Piipari et al., 2012), positive affect (Gagné, 2003), performance (Guay, Ratelle, Roy, & Litalien, 2010), engagement (Gairns, Whipp & Jackson, 2015; Leo et al., 2022), physical activity (Chen et al., 2020), happiness (Nowell, 2017), lower dropout (Alivernini & Lucidi, 2011), and less procrastination (Katz, Eilot, & Nevo, 2014). In contrast, amotivation was related to negative outcomes, such as need frustration, negative affect, and less physical activity (e.g., Chen et al., 2020; Gagné, 2003; Leo et al., 2022). Notably, the results regarding controlled motivation are mixed. For example, Vasconcellos et al. (2020) found that introjected regulation was negatively associated with adaptive outcomes (i.e., enjoyment, intention, and leisure physical activity), while external regulation was positively associated with these adaptive outcomes. In contrast, Behzadnia and Ryan (2018) reported that introjected regulations were positively associated with indicators of well-being and intrinsic life goals in physical education (PE), while external regulation was not. Similarly, Leo et al. (2022) found that controlled motivation was positively related to both need satisfaction and need frustration.

Moreover, researcher found that external and introjected regulation can improve behavioral outcomes, especially in the short term. However, the behaviors with the controlled form of regulation will not last over time. For example, Pelletier et al. (2001) found that although both external and introjected regulation were significant predictors of exercise persistence at Time 2 (after 10 months), these effects disappeared at Time 3 (after 22 months). In contrast, the individuals with autonomous motivation showed more persistence over time.

Students' motivation is one of the most important predictors of their academic performance (e.g., Froiland & Worrell, 2016; Khalaila, 2015). Motivated students not only learn more but also persist longer, do higher quality work, and score higher on academic tests, especially if they do so for relatively intrinsic rather than extrinsic motivation (e.g., Fredericks et al., 2011). In addition, meta-analyses have shown that the relationships between the general outcomes in the fields of education and physical education and various motivation are different (Howard et al., 2020, 2021; Toste et al., 2020; Vasconcellos et al., 2020). For example, intrinsic and identified motivation (i.e., autonomous motivation) were found to be strong positive predictors of student achievement, engagement, positive emotion, and self-esteem. Introjected regulation exhibited mixed effects—positively associated with desirable and undesirable outcomes. In comparison, external regulation either showed insignificant relationships with student outcomes or was positively associated with maladaptive outcomes. Amotivation was positively related to undesirable results. However, although motivation is critical to student learning, motivation declines with the school year (from elementary to high school; Lazowski & Hulleman, 2016). For instance, in a poll of students from elementary to high school (Gallup, Inc., 2014), 8 out of 10 students in the elementary school reported they learn with positive emotions and persevere in the face of challenges. This ratio dropped to 6 out of 10 in middle school and 4 out of 10 in high school.

### **1.1.2 The basic psychological needs**

According to SDT, the needs for autonomy, competency, and relatedness are basic psychological needs, and fulfilling these needs is essential for personal well-being and constructive social development (Chen et al., 2015; Cronin et al., 2019; Ryan & Deci, 2000, 2017). SDT considers both the satisfaction and frustration of these psychological needs. When these basic psychological needs are frustrated, it increases the individual's risk of being negative, unhealthy, and defensive. Autonomy need refers to the experience of an individual's will and volition. When individuals' autonomy needs are met, they experience a sense of integration, and their behaviors, thoughts, and feeling are self-recognized and authentic. However, when the need for autonomy is frustrated, the individual feels stressed, conflicted, and pushed in an unwanted direction. Regarding competence needs, it involves the experience of being effective and proficient. Competence needs are satisfied when individuals experience opportunities to complete challenging tasks and achieve desired outcomes. When competence needs are hindered, individuals feel incompetent and even feel defeated and helpless. Relatedness need refers to individuals' experience of warmth, closeness, and caring, which is satisfied by being connected to and meaningful to others. Need frustration for relatedness can lead to feelings of social alienation, exclusion, and loneliness.

SDT holds a belief that these needs are innate and universal psychological needs. However, some researchers have questioned whether autonomy is universal. In their view, autonomy applies to cultures that promote individualism, whereas autonomy does not seem essential in cultures that espouse collectivism (e.g., Iyengar & Lepper, 1999; Uchida & Kitayama, 2009). Notably, autonomy is not the same as independence. According to SDT, individuals can experience autonomy, even when behavior is influenced by external sources, as long as the individual is acting without pressure. Therefore, these basic psychological needs exist among people from all different cultures and backgrounds (Chen et al., 2015). Nevertheless, these needs are satisfied in different ways in different cultural backgrounds.

Previous studies revealed that need satisfaction was related to positive student outcomes, such as autonomous motivation (e.g., Amoura et al., 2015; Cheon, Reeve & Moon, 2012), engagement (e.g., Cheon, Reeve & Moon, 2012; Jang, Kim & Reeve, 2012, 2016; Leo et al., 2022), intention to physical activity (e.g., Cheon, Reeve & Moon, 2012; Leo et al., 2022), life satisfaction, and vitality (e.g., Chen et al., 2015). In contrast, need frustration was associated with negative student outcomes, such as depressive symptoms (e.g., Chen et al., 2015), disengagement (e.g., Jang, Kim & Reeve, 2016), and psychological maladjustment (e.g., Rodríguez-Meirinhos et al., 2020). Moreover, researchers found that teachers' need satisfaction/frustration was the predictor of adopting (de)motivating teaching styles (e.g., Aelterman et al., 2019; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022). Specifically, when teachers' basic needs are satisfied, they tend to use autonomy-supportive and structuring styles. In contrast, if their basic needs are frustrated, they prefer to adopt controlling and chaotic styles.

## 1.2 (De)motivating teaching styles

### 1.2.1 The characteristics of (de)motivating teaching styles

In the two-dimensional configuration proposed by Aelterman et al. (2019), autonomy-supportive, controlling, structuring, and chaotic teaching styles vary regarding need support and directiveness (Figure 2). This model's horizontal axis represents the teaching practice that supports or frustrates students' basic psychological needs. At the same time, the vertical axis reflects teachers' high degree of guidance or practice leaving more leadership space for students. Autonomy-supportive and structuring styles are motivating styles that promote students' motivation, while controlling and chaotic styles, two demotivating teaching styles, hinder students' autonomous motivation and have a negative impact on their learning process (Aelterman et al., 2019).

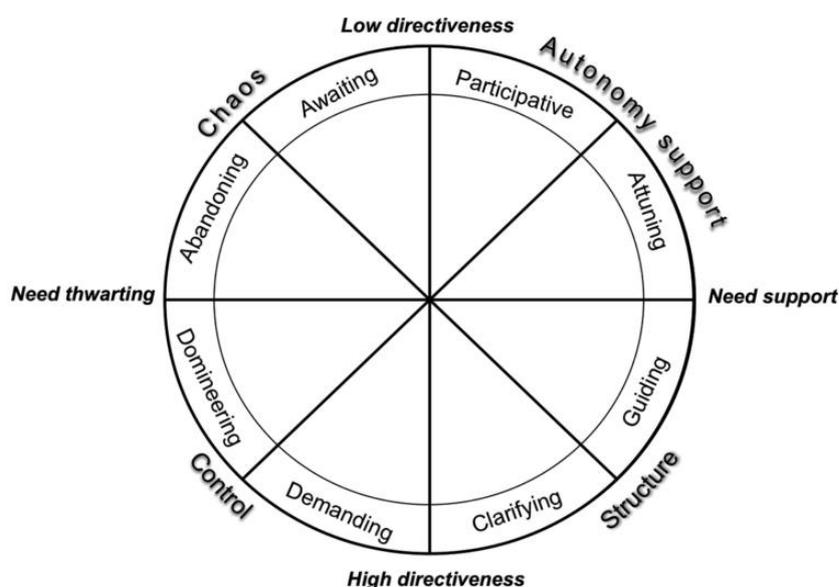


Figure 2 Graphical representation of the circumplex model

Autonomy Support refers to teachers acknowledging and respecting students' thoughts, opinions, and feelings, exercising less intervention and control over students, providing students with opportunities for choice and giving students meaningful reasons when choices are limited, and not using controlling language (e.g., you should, you must) (Assor, 2012; Guay et al., 2016; Reeve 2009). Teachers adopting an autonomy-supportive style usually encourage students to pursue autonomy and support their intrinsic motivation. This style is autonomous because the teachers aim to strengthen students' autonomy and self-discipline.

The opposite of teacher autonomy support is teacher control, where teachers who adopt a controlling teaching style hinder student autonomy by being dismissive of students' perspectives and forcing students to think, act, or feel in a particular way, using controlling language (e.g., you should, you must), and assigning tasks that seem meaningless or uninteresting (Reeve, 2009; Soenens et al., 2012). Teachers adopting a controlling style usually set a schedule for students to follow and then use instructions and external motivating factors to encourage students to move on to this agenda.

In addition to autonomy support, the structuring style has a critical impact on students' academic development. Structure refers to the achievement of desired outcomes by students under the guidance of a teacher who can communicate future expectations, provide clear guidance, informative feedback, support, and encouragement to students. Structuring teaching behaviors can help students accomplish straightforward tasks and avoid confusion (Leenknecht et al., 2017).

The antithesis of structure is chaos, which is reflected in teachers' lack of clear instructional goals and plans, and teachers' tendency to let students off the hook, leaving them unclear about what they should do, how to do it, and how to develop their skills (Aelterman et al., 2019).

These four teaching styles can be divided into more specific sub-areas. Teachers who use an autonomy-supportive style can adopt *participative* and *attuning* teaching strategies (Table 1). When being *participative*, teachers allow students to have a voice and make decisions. For example, teachers offer choices for students, listen to students' opinions, and welcome their suggestions (Aelterman et al., 2019; Cheon, Reeve & Vansteenkiste, 2020; Patall et al., 2013). Being *attuning*, teachers try to understand how students view things, accept students' negative expressions, cultivate students' interests by making teaching activities more interesting, and allow students to study at their own pace and provide students with meaningful explanations (Aelterman et al., 2019; De Meyer et al., 2016; Reeve, 2009). The structuring teaching style can be divided into *clarifying* and *guiding* (Table 1). Being *clarifying*, teachers set clear expectations and goals and build scaffolding for students' progress (Cheon, Reeve & Song, 2019; Jang, Reeve & Deci, 2010). Being *guiding*, teachers express confidence in students' abilities. They constructively encourage students, providing helpful information and suggestions (e.g., constructive feedback) to support students' progress (Jang, Reeve & Deci, 2010; Mouratidis, Vansteenkiste, Lens & Sideridis, 2008). Teachers adopting a controlling style can use *demanding* and *domineering* strategies (Table 1). Teachers who use *demanding* strategies emphasize students' obligations and responsibilities, thereby using command language and providing punishment or conditional rewards to stimulate students to comply with discipline (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011). *Domineering* teaching strategies involve more internal control, such as putting pressure on students to force them to obey teachers' requirements and suppressing students by inducing the feeling of guilt or humiliation (Soenens & Vansteenkiste, 2010). These strategies seem invasive, manipulative, and domineering because they are students' "personal attacks." At last,

teachers using a chaotic style are indifferent to students' progress. Teachers, adopting an *abandoning* teaching strategy, let students fend for themselves because teachers feel unable or they have given up helping students. Awaiting teaching strategy may be related to a "laissez-faire" attitude: teachers cannot provide clear expectations, guidelines, or rules. They want students to be independent so that they can take action on their initiative. Therefore, teachers do nothing but wait and see what will happen (Aelterman et al., 2019).

Aelterman et al. (2019) also developed a new vignette-based questionnaire – the Situation-in-School (SIS), which presents the responders with 15 typical situations that occur in schools and depicts four different responses of teachers to each case. These responses respectively represent the four (de)motivating teaching styles: teacher autonomy support, structure, control, and chaos. This questionnaire was originally developed to measure the (de)motivating style of middle 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) and physical education teaching (the Situation-in-School Questionnaire—Physical Education, SISQ-PE; Escriva-Boulley et al., 2021).

Concerning teacher autonomy support and control, in recent years, researchers have begun to separately explore their impacts on students and their mechanisms. Some researchers have argued that a lack of teacher autonomy support does not mean the presence of a controlling teaching style. Also, a lack of teacher control does not imply that teachers use 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 believe autonomy support and control may impact student academic outcomes via different mechanisms. Thus, they have proposed a dual-process model. They found that on the "bright" side of the model, the perceived autonomy-supportive style indirectly predicts motivation and engagement through the mediating role of need satisfaction, while on the "dark" side, the perceived controlling style indirectly influences controlled motivation, amotivation, and disengagement via need frustration (Haerens et al., 2015; Jang, Kim & Reeve, 2016; Leo et al., 2022). Similarly, structuring and chaotic styles should correspond separately to the "bright" and "dark" sides of the dual-process model. In other words, structure affects students' desired outcomes through their need satisfaction, whereas chaos predicts maladjusted outcomes via the mediating role of need frustration. However, no research has yet explored how these four teaching styles work together on students in a dual-process model.

Table 1 Conceptual definitions of the four teaching styles and description of the eight identified teaching approaches (Aelterman et al. 2019)

| Teaching style   | Conceptual definition  | Subarea       | Description  |
|------------------|--|---------------|--|
| Autonomy support | The teacher's teaching goal and the tone of interpersonal are <b><i>understanding</i></b> . The teacher identifies and cultivates students' interests, preferences, and emotions to the greatest extent to make students voluntarily participate in classroom learning activities. | Participative | A teacher known as <b><i>participative</i></b> determines students' interests and preferences through having a dialogue with students and inviting them to offer opinions and suggestions. Besides, the teacher tries to provide meaningful choices so that students feel free to deal with learning activities when possible.   |
|                  |  | Attuning      | A teacher with the characteristic of <b><i>attuning</i></b> cultivates students' interests by trying to make the classes and the exercises more interesting and enjoyable, acknowledging and accepting students' negative emotions, and trying to see things on the side of students. In addition, the teacher allows students to learn at their own pace and provides meaningful rationales to students when assigning tasks. |
| Structure        | The teacher's teaching goal and the tone of interpersonal are <b><i>guidance</i></b> . According to students' abilities and competence, the teacher offers strategies, help, and assistance to make students feel capable of mastering classroom learning activities.              | Guiding       | A <b><i>guiding</i></b> teacher offers appropriate help and assistance when needed to foster students' progress. The teacher shows students the steps required to finish the task so that they can complete the task independently. When the results are not good, the teacher will constructively, together with students, reflect on their mistakes and discuss what can be improved and how they can achieve.               |
|                  |  | Clarifying    | A teacher with the characteristic of <b><i>clarifying</i></b> will express clearly their expectations to students at the beginning. The teacher outlines what students can learn from the course and supervises students' learning conditions to meet the communicated expectations.   |
| Control          | The teacher's teaching goal and the tone of interpersonal are <b><i>pressure</i></b> . The teacher prescribes how students think, feel, and behave and privileges their agendas without considering students' feelings.  | Demanding     | A <b><i>demanding</i></b> teacher orders students to obey discipline and uses powerful and commanding language to clarify the things students have to do. The teacher indicates to students their responsibilities, does not tolerate any participation or conflict, and threatens that they will be punished if students don't comply.  |
|                  |  | Domineering   | A teacher known as <b><i>domineering</i></b> exerts power on students, forcing them to obey their  |

| Teaching style | Conceptual definition   | Subarea    | Description   |
|----------------|---|------------|---|
| Chaos          | The teacher's teaching goal and the tone of interpersonal are <i>laissez-faire</i> . The teacher leaves the leadership space for students, making it difficult for students to figure out what they should do, how they should behave, and how they can develop their skills. | Abandoning | demands. The teacher suppresses students by inducing students' sense of guilt and shame. Unlike the demanding teacher who tries to order students to think, feel, and behave in a specific way to make them more acceptable to the teacher, a domineering style is characterized by a 'personal attack' on students.<br>The teacher with the characteristic of <i>abandoning</i> gives up students. Students are allowed to do their things because, in the teacher's opinion, students have to learn to be responsible for their actions in the end. |
|                |   | Awaiting   | An <i>awaiting</i> teacher provides a laissez-faire learning environment where the initiative is entirely in the students' hands. The teacher tends to wait to see the development of the situation, not to make too many plans but let the flow go.  |

## 1.2.2 Cultural differences in teaching styles

Teachers' teaching practices vary across cultures (e.g., Leung, 2006; Santagata, 2004). The difference between East Asian and Western cultures is reflected in high power distance (PD) and high collectivism (Littlewood, 1999). According to Hofstede (2011), PD is defined as how less powerful members of organizations or institutions accept and expect power to be unevenly distributed. In a high PD culture, teachers have much authority, and they are considered the only "professional," "experienced," and "trustworthy" people in the classroom (Yang, Badger & Yu, 2006). Students respect the teacher; they appreciate the teacher telling them what to do; they only speak up when invited; they don't contradict the teacher. Students won't be unhappy with teachers' autocracy, and they even are upset if teachers are not playing their traditional role. In the low PD society, students have less respect for teachers and are more likely to challenge teachers' authority and instead rely on their own experience (Findyartini et al., 2016; Harshbarger et al., 1986; Holtbrügge & Mohr, 2010; Joy & Kolb, 2009; Thanh Pham & Renshaw, 2015; Woodrow & Sham, 2001).

*Collectivism* is the norm and practice that puts the group's goals and interests first. In contrast, *individualism* refers to norms and practices that put personal goals and interests first (Hofstede 2001; Hofstede, Hofstede & Minkov, 2010). From the perspective of collectivism, the group is the core unit of society, and individuals should serve the group. In contrast, from the perspective of individualism, the individual is the core unit of society, and why the community exists is to promote individuals' well-being (Oyserman, Coon & Kemmelmeier, 2002).

Generally, the collectivist culture is related to the controlling style, and the individualist culture is associated with the autonomy-supportive style. Specifically, the things emphasized by the collectivist cultural perspective and the controlling style are similar. Teachers in collectivism tend to put group priorities above personal interests. They use command and authoritarian communication styles to teach around their own needs and goals. The collectivist culture's teaching practice is considered teacher-centered and disseminated (Staub & Stern, 2002). It is based on their cultural belief that knowledge is always transferred from experts (teachers) to learners (students) (Hofstede, 2001). When making requests to students, teachers rely more on students' sense of shame than on explaining reasons (Reeve et al., 2014). At the same time, both teachers (Kaur & Noman, 2015) and students (Hargreaves & Elhawary, 2021) stated that teachers in collectivist cultures do not like to be interrupted by students' questions during class. Sometimes teachers even feel angry because it influences the class's progress, reflecting collectivism's emphasis on the interests of the whole rather than the interests of individuals (Hargreaves & Elhawary, 2021). Studies of the typical collectivist cultural state, the Bedouin, found that teachers' teaching style was controlling, characterized by delivering information to students with few opportunities for choice and without adequate consideration of students' willingness (e.g., Kaplan, 2018).

On the contrary, the things emphasized by the individualistic culture and the autonomy-supportive style have some things in common. Teachers in the individualist culture tend to put students' interests and values first. Teachers are more concerned about students developing their interests than getting higher scores in the examinations. Teachers adopt a receptive and open attitude; listen to students' opinions and suggestions; acknowledge and accept students' negative; provide explanations while uttering requirements (Reeve et al., 2014). In individualistic cultures, teaching is student-centered. Teachers encourage students to become independent thinkers concerned with

personal needs, express their opinions freely, and are confident (Cothran et al., 2005; Kaur & Noman, 2015).

Providing choice is a significant feature of the autonomy-supportive style, but it plays different roles in collectivist and individualistic cultures. Specifically, when a social agent from collectivist culture or social group makes choices for individuals, their intrinsic motivation to participate in the activity is more robust than self-chosen. In contrast, the reverse is true for individuals with an individualistic cultural background. Researchers investigated the impact of social agent choice and self-selection on motivation through individual differences in different cultural orientations (Iyengar & Lepper, 1999) and situational manipulation in the laboratory (Hagger, Rentzelas & Chatzisarantis, 2014), and the results are consistent with the above hypothesis. Individualism tends to favor independence and emphasize the value of personal development when making decisions. Therefore, the environment supporting individualistic principles and personal choices leads to higher intrinsic motivation and better task performance. Similarly, the collectivist orientation emphasizes the value of interdependence among group members. Compared with self-chosen tasks (which may not achieve group goals) and the assignment of activities by a member outside the group, the social agent of the group making choices for the individuals results in more autonomous motivation.

Reeve et al. (2014) compared teachers' teaching styles from kindergarten to 12th grade in 8 countries. They found that collectivism was associated with the controlling style since teachers in collectivism believed that it was normal in their culture. In addition, collectivism had two more subtle effects. Although the belief that the motivating styles are effective or easy to implement could also predict the motivating style teachers adopted, they were less predictive of teachers in collectivism than those in individualism. It suggested that for teachers in individualistic countries, the relationship between personal beliefs and self-reported motivating style was more direct, while the culture alleviated this relationship to a certain extent for teachers in collectivism.

However, although culture affects teachers' motivating teaching styles, different teaching styles similarly impact students of various cultures. The autonomy-supportive teaching style is positively related to students' need satisfaction, autonomous motivation, and classroom engagement, while the controlling teaching style is associated with students' need frustration, and amotivation (Cheon & Reeve, 2013; Cheon, Reeve & Ntoumanis, 2018; Taylor & Lonsdale, 2010). These effects will also migrate from the classroom to the outside-classroom environment (Abula et al., 2020).

Researchers seldom pay attention to the structuring and chaotic teaching style (Aelterman et al., 2019; Moè & Katz, 2020, 2021, 2022), and there is no research investigating the impact of culture on these two teaching styles.

### **1.3 Favoring the adoption of (de)motivating teaching styles**

The factors influencing teachers' adoption of a (de)motivating style can be divided into three types: pressure from above, pressure from within, and pressure from below (Reeve, 2009; Soenens et al., 2012).

The pressure from above may come directly from the school administration or indirectly from school boards and parents who demand results. They may put forward some requirements, such as time limits or deadlines (e.g., requiring teachers to complete a specific course within a particular time), performance evaluation, requiring teachers to use specific teaching methods, or requiring teachers to be responsible for students' academic performance (Pelletier & Sharp, 2009). When

teachers feel stressed, they usually respond by applying pressure (i.e., exerting control over their students). For example, when other people (e.g., administrators, experimenters) impose restrictions on teachers, teachers will be more controlling (Deci et al., 1982; Pelletier, Séguin-Lévesque & Legault, 2002).

The pressure from below is related to the student's lack of motivation, negative attitude towards school, or destructive behaviors. Teachers' teaching practices will be influenced by their students (e.g., Cents-Boonstra et al., 2021; Jang, Kim & Reeve, 2016; Matos et al., 2018; Van den Berghe et al., 2015, 2016). When teachers perceive their students' external motivation, amotivation, or low classroom engagement, they are usually more likely to adopt a controlling style (e.g., Cents-Boonstra et al. 2021; Jang, Kim & Reeve 2016; Matos et al. 2018; Pelletier et al., 2002; Van den Berghe et al. 2015, 2016). Moreover, when teachers think that students are destructive or misbehaving, they will also establish contact with students more controllingly (Reeve, 2009).

The pressure from within is the pressure of teachers' beliefs, values, and personal tendencies (Reeve, 2009). Previous studies found that causality orientation (Reeve, Jang & Jang, 2018), beliefs (Reeve et al., 2014), burnout (Aelterman et al., 2019; Campos, 2015; Jennings, 2015; Moè & Katz, 2020; Shen et al., 2015; Soenens et al., 2012; Van den Berghe et al., 2014), need satisfaction/frustration (Aelterman et al., 2019; Cheon et al., 2014; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022), self-compassion (Moè & Katz, 2020), emotion regulation (Moè & Katz, 2021), and teacher enthusiasm (Moè & Katz, 2022) were the predictors of teachers' adoption of (de)motivating teaching styles. Specifically, when teachers hold autonomy causality orientation, experience personal accomplishment, need satisfaction, self-compassion, felt enthusiasm and use reappraisal to regulate emotion, they tend to use autonomy-supportive and structuring styles. On the contrary, if teachers hold control causality orientation, experience burnout, need frustration, self-derogation, and use suppression, they will be more likely to adopt controlling and chaotic styles.

The relationships between teacher-related factors and adopting (de)motivating teaching styles are detailed below.

### **1.3.1 Teacher's need satisfaction and adoption of (de)motivating styles**

Recent studies have examined the impact of teachers' experience of need satisfaction and need frustration. Findings have shown that need satisfaction or need frustration are core factors that lead teachers to adopt motivating or demotivating teaching styles (Aelterman et al., 2019; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022). These findings suggest that when teachers' basic psychological needs are met, they have more mental resources to support their students. Specifically, satisfied teachers tend to adopt two motivating styles: an autonomy-supportive style characterized by understanding and coordination and a structuring style characterized by guiding and clarifying. In contrast, when teachers feel need frustration, they tend to adopt two demotivating styles: a controlling style characterized by demanding and domineering, such as imposing goals or threats; or a chaotic style, leaving students on their own with no support, guidelines, clear rules or expectation (e.g., Aelterman et al., 2019; Cheon et al., 2014; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022).

### **1.3.2 Teachers' need satisfaction and self-compassion**

Self-compassion is derived from Buddhist thought and is defined as a positive attitude towards oneself, characterized by an unjudgmental attitude of understanding, openness, and accepting one's pain, shortcomings, and deficiencies (Neff, 2003). Self-compassion refers to thinking about events with a caring attitude, showing self-kind behavior, realizing that everyone makes mistakes, being passionate about themselves, and not identifying with their failures. In contrast, self-derogation involves being self-judgmental, adopting a critical attitude, and considering themselves a loser compared to others.

Previous studies have shown that self-compassion is positively correlated with work engagement, intrinsic motivation, life satisfaction, well-being, positive affect, personal initiative, curiosity, and exploratory nature. Conversely, it was negatively associated with depression, anxiety, negative affect, and thought inhibition (Neff, 2003; Neff, Rude & Kirkpatrick, 2007; Kotera, Green & Sheffield, 2021; Kotera & Ting, 2021; Kotera, Van Laethem & Ohshima, 2020). These studies indicated that self-compassion played a significant role in individuals' well-being. Moreover, researchers (Ghorbani, Watson, Chen & Norballa, 2012; Moè & Katz, 2020) have investigated the relation between self-compassion and need satisfaction. They found that self-compassion was positively associated with need satisfaction.

### **1.3.3 The mediating role of emotion regulation, burnout and teacher enthusiasm**

The common emotion regulation strategies include (a) reappraisal and (b) suppression (Gross & John, 2003). Reappraisal involves reconceptualizing potential emotion-inducing situations more positively or less emotionally. The suppression strategy refers to correcting the expression of emotional behavior (Haga, Kraft & Corby, 2009). The former is considered a healthy way of emotion regulation, whereas the latter is deemed unhealthy and ineffective (Braun, Schonert-Reichl & Roeser, 2020).

The typical characteristics of burnout, defined as "the long-term response to chronic emotions and interpersonal stress at work," are emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach, Schaufeli & Leiter, 2001). According to Maslach et al. (2001), emotional exhaustion is the central feature of burnout, representing the feeling of excessive emotional tension and exhaustion. Depersonalization refers to adopting a negative, cold and cynical attitude toward the person receiving the service. At last, Maslach et al. (2001) pointed out that the decrease in personal accomplishment is more likely due to lack of relevant resources or low efficiency, while emotional exhaustion and depersonalization are caused by the overburden of work and social conflict. When experiencing burnout, teachers can no longer concentrate on participating in the work and have a meaningful impact on the job (Schaufeli, Leiter & Maslach, 2009).

Teacher enthusiasm can be divided into expressed enthusiasm (or displayed enthusiasm) and felt enthusiasm (or experienced enthusiasm) (Keller et al., 2016). Expressed enthusiasm consists of nonverbal expressiveness and instructional behavior, such as vocal animation, body movements, and meaningful and significant facial expressions (Collins, 1978; Kunter et al., 2008; Patrick, Hisley & Kempler, 2000). Felt enthusiasm is a relatively stable emotional orientation, reflecting the degree

of enjoyment, excitement, and joy teachers usually experience in their professional activities (Kunter et al., 2008). Kunter and colleagues (2008, 2011, 2013) found that teachers with higher enthusiasm have higher work and life satisfaction and lower emotional exhaustion. In particular, Kunter et al. (2008) reported that teacher enthusiasm was related to higher-quality teaching behavior, especially supervising student behaviors and providing social support.

Teachers who use the reappraisal strategy and are with more personal accomplishment and enthusiasm have more emotional resources than those who adopt the suppression strategy and feel burnout. Therefore, reappraisal, personal accomplishment, and teacher enthusiasm are associated with the adoption of motivating teaching styles (Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022). By contrast, suppression and burnout consumed more these emotional resources, which will lead to the adoption of demotivating teaching styles (e.g., Aelterman et al., 2019; Campos, 2015; Jennings, 2015; Moè & Katz, 2020; Shen et al., 2015; Soenens et al., 2012; Van den Berghe et al., 2014).

Since the experience of need satisfaction is considered an emotional resource (Chen et al., 2015), the more need satisfaction teachers feel, the more these resources they have to appraisal and deal with the classroom situations. On the contrary, it's more likely for them to suppress their emotions if their basic psychological needs are not satisfied as fewer mental resources are available for coping with emotion regulation (Moè & Katz, 2020).

Besides, need satisfaction was related to well-being and autonomous motivation (Chen et al., 2015; Cronin et al., 2019; Ryan & Deci, 2000, 2017). Teachers will have more emotional resources to deal with the emotional and interpersonal stress at work when their basic psychological needs are met. At the same time, autonomous motivation enhances career investment, which favors job performance. Thus, teachers may experience personal accomplishment. In contrast, need frustration impairs teachers' motivation and enthusiasm, which will lead to burnout.

Similarly, when teachers' basic psychological needs are met, they likely display enthusiasm with nonverbal expressiveness and instructional behavior (e.g., Collins, 1978; Murray, 1983) and experience the enjoyment, excitement, and joy during teaching (i.e., felt enthusiasm) (e.g., Kunter et al., 2008).

### **1.3.4 Teachers' motivation and adoption of (de)motivating teaching styles**

According to SDT, motivation is a continuum from nonautonomous to autonomous. One side of the continuum is acting out of gaining rewards or avoiding shame (i.e., controlled motivation), while the other is behaving out of pleasure, enjoyment, and self-identification with the value of the action (i.e., autonomous motivation). Also, amotivation is a state without motivation. In light of SDT's hypotheses, the satisfaction of the three basic psychological needs tends to lead to internalizing the initially externalized behavior, making motivation more autonomous (Ryan & Deci, 2017). Thus, it is reasonable to assume that teachers' motivation is also a predictor variable for the use of (de)motivating teaching styles, and research findings support it (Katz & Shahar, 2015; Robertson & Jones, 2013; Vermote et al., 2020). For example, Vermote et al. (2020) investigated the relationships between higher education teachers' motivation and (de)motivating teaching styles. The results revealed that autonomous motivation was positively related to motivating teaching (i.e.,

autonomy-supportive and structuring), whereas controlled motivation and amotivation were positively related to demotivating teaching (i.e., controlling and chaotic).

## **1.4 The impacts of (de)motivating teaching styles on students**

Autonomy-supportive and structuring teaching styles are motivating and associated with desired student outcomes, such as need satisfaction, autonomous motivation, greater engagement, self-regulated learning, positive emotions, vitality, optimal social functioning, and greater conceptual learning (e.g., Abula et al., 2020; Aelterman et al., 2019; Assor et al. 2002, 2018; Behzadnia, Mohammadzadeh & Ahmadi, 2019; Cheon, Reeve & Vansteenkiste, 2020; Diseth, Breidablik & Meland, 2018; Jang, Reeve & Halusic, 2016; Jang, Reeve & Deci, 2010; Reeve, Cheon & Yu, 2020; Taylor & Lonsdale, 2010; Van Doren et al., 2021; Vansteenkiste et al., 2012; Wang et al., 2016).

On the contrary, controlling and chaotic teaching styles are demotivating and associated with maladaptive student outcomes, such as need frustration, controlled motivation, amotivation, oppositional defiance, bullying perpetration, and victimization (e.g., Aelterman et al., 2019; Amoura et al., 2015; De Meyer et al., 2014; Haerens et al., 2015; Montero-Carretero, Barbado & Cervelló, 2020; Van Doren et al., 2021).

However, teachers in collectivist cultures seem to adopt more demotivating teaching styles than those in individualistic cultures, especially for the controlling style. Thus, it seems reasonable to believe that students with a collectivist background report more negative results than those with individualism. However, it should be noted that culture shapes people's thoughts and actions. For example, researchers investigated whether parents making choices for children has the same effect on children's motivation in different cultures. They found that children from a Chinese or Indian background have more autonomous motivation to participate in the activity when the activity was chosen by parents rather than self-chosen. However, the opposite results were found for the children from a European American background (Iyengar, & Lepper, 1999; Rudy et al., 2015).

The influence of culture occurs in not only the parenting context but also the educational settings. For example, students' reactions to mistake-based feedback are different. In the high PD culture (e.g., the United Arab Emirates), students are more receptive to them, which they view as an opportunity to improve themselves. In contrast, students may feel embarrassed in a low PD culture (e.g., the United States) (Eriksson et al., 2020). Moreover, previous studies revealed that students in East Asia wouldn't be unhappy with teachers' autocracy and are even upset if teachers are not playing their traditional role. However, in a low PD society, students have less respect for teachers and are more likely to challenge teachers' authority (Findyartini et al., 2016; Harshbarger et al., 1986; Holtbrügge & Mohr, 2010; Joy & Kolb, 2009; Thanh Pham & Renshaw, 2015; Woodrow & Sham, 2001). Therefore, the relationships between students' need satisfaction/frustration and (de)motivating teaching styles could be variant across cultures, especially for the controlling style. It needs further investigation.

### **1.4.1 (De)motivating teaching styles and student motivation, and engagement**

Students' motivation will be influenced by teacher practices (e.g., Bureau et al., 2022). By

implementing need-supportive teaching styles, teachers foster student interest and encourage students to engage in learning out of willingness rather than feeling pressured (Jang, Reeve & Deci, 2010; Stroet, Opdenakker & Minnaert, 2015). Thus, need-supportive teaching triggers high-quality motivation and engagement. Conversely, if teachers adopt a need-thwarting teaching style, it will lead to low-quality motivation and engagement (e.g., Abula et al., 2020; Aelterman et al., 2019; Montero-Carretero, Barbadov & Cervelló, 2020; Van Doren et al., 2021; Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019). For example, Cheon and colleagues conducted a series of Autonomy Support Intervention Programs (ASIP) with physical education teachers in Korea to investigate its effects on teachers and students. They found that students of teachers in the ASIP group reported higher perceived autonomy-supportive style and autonomy motivation and lower perceived controlling style and amotivation compared to the control group (Cheon & Reeve, 2013, 2015; Cheon, Reeve & Moon, 2012).

The effects of (de)motivating teaching styles on student motivation have been well-documented (e.g., Abula et al., 2020; Aelterman et al., 2019; Montero-Carretero, Barbadov & Cervelló, 2020; Van Doren et al., 2021; Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019). For instance, Cheon and colleagues conducted a series of autonomy-support intervention programs (ASIP) on PE teachers in South Korea to explore its effects on teachers and their students. They found that compared with the control group, students of the teachers in the ASIP group reported higher perceived autonomy-supportive style and autonomous motivation, lower perceived controlling style and amotivation (Cheon & Reeve, 2013, 2015; Cheon, Reeve & Moon, 2012). Similarly, a correlational study in France revealed that students' autonomous motivation was positively associated with perceived autonomy-supportive style but negatively related to perceived controlling style (Amoura et al., 2015).

However, to date, there is a lack of research based on the SDT to examine the effects of four (de)motivating teaching styles on student motivation. Previous studies have mainly focused on the roles of autonomy-supportive and controlling styles (e.g., Amoura et al., 2015; Cheon & Reeve, 2013, 2015; Cheon, Reeve & Moon, 2012; Jang et al., 2009; Montero-Carretero, Barbadov & Cervelló, 2020), while a few have explored the structuring style's effects (Ahn, 2014; Tessier, Sarrazin & Ntoumanis, 2010; Van Doren et al., 2021). However, the chaotic style has been ignored. Although Aelterman et al. (2019) examined the relationships between four (de)motivating teaching styles (i.e., autonomy-supportive, structuring, controlling, and controlling) and student motivation (i.e., autonomous motivation, controlled motivation, and amotivation), it was a correlational study and could not conclude causality. This problem could be addressed in the present study. It is a 3-wave longitudinal study investigating the influences of (de)motivating teaching styles on student motivation.

Furthermore, the impacts of (de)motivating teaching styles on student engagement have also been well-documented (e.g., Jang, Kim & Reeve, 2016; Jang, Reeve & Deci, 2010; Van den Berghe et al., 2015, 2016). Engagement is the extent to which students actively participate in learning activities (Van Uden, Ritzen & Pieters, 2014). It is a multidimensional structure with four distinct but interrelated dimensions: behavioral, emotional, agentic, and cognitive engagement. Behavioral engagement refers to the extent to which students are committed to learning activities in terms of attention and effort (i.e., working hard). Emotional engagement involves positive emotions in classroom learning activities, such as enjoyment (i.e., working enthusiastically). Agentic engagement refers to students' conscious, active, and constructive contributions to the process of

receiving instruction, such as offering suggestions or expressing preferences (i.e., working actively). Cognitive engagement involves how students try to use complex learning strategies, such as critical thinking (i.e., working intelligently) (Reeve & Tseng, 2011). Studies have shown that motivating teaching styles are positively correlated with student engagement (e.g., Jang, Reeve & Deci, 2010; Matos et al., 2018; Reeve et al., 2004; Reeve, Cheon & Yu, 2020; Stroet, Opdenakker & Minnaert, 2013; Van den Berghe et al., 2016). However, demotivating teaching styles are associated with less student engagement (e.g., Soenens et al., 2012; Van den Berghe et al., 2016). Notably, these studies still ignore the exploration of the impacts of the chaotic style.

#### **1.4.2 The mediating role of need satisfaction/frustration**

One of the core assumptions of SDT is that meeting students' three basic psychological needs—autonomy, competence, and relatedness—leads to positive student development (Ryan & Deci, 2017). Students with autonomy think they engage in learning activities freely and voluntarily, rather than being forced to do so. Competent students believe they can complete challenging learning tasks and achieve satisfactory results. Students experiencing relatedness satisfaction feel a close and genuine connection with important others in school (e.g., teachers, classmates). In contrast, the experience of need frustration will lead to nonoptimal functions and even ill-being (Ryan & Deci, 2000, 2017).

Researchers have begun to separately explore the impacts of autonomy-supportive and controlling styles on students and their mechanisms in recent years. Some researchers have argued that a lack of teacher autonomy support does not mean the presence of a controlling teaching style. Also, a lack of teacher control does not imply that teachers use 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 believe autonomy support and control may impact student academic outcomes via different mechanisms. Thus, they have proposed a dual-process model. They found that on the "bright" side of the model, the perceived autonomy-supportive style indirectly predicts motivation and engagement through the mediating role of need satisfaction, while on the "dark" side, the perceived controlling style indirectly influences controlled motivation, amotivation, and disengagement via need frustration (Haerens et al., 2015; Jang, Kim & Reeve, 2016; Leo et al., 2022).

An ample of studies in education (including PE) have shown that need satisfaction has a positive effect on autonomous motivation. In contrast, need frustration is positively associated with controlled motivation and amotivation (e.g., Ahn, 2014; Amoura et al., 2015; Cheon, Reeve & Moon, 2012; Jang et al., 2009; Kaplan, 2018; Montero-Carretero, Barbadov & Cervelló, 2020). In addition, need satisfaction/frustration mediate the relationship between (de)motivating teaching styles and student motivation. For example, in the context of PE, Haerens et al. (2015) found that perceived autonomy-supportive style was positively related to autonomous motivation through need satisfaction. In contrast, perceived controlling style was positively associated with controlled motivation and amotivation, with the mediating role of need frustration in these relationships. Bartholomew et al. (2018) conducted a longitudinal study throughout a school year. They revealed that need frustration plays the mediating role in the direct and positive relationship between perceived controlling style and controlled motivation and amotivation.

However, there are few studies on structure and chaos, especially chaos. Cheon et al. (2019)

conducted a longitudinal study. They found that the positive effect of structure in PE class on students' engagement was mediated by the fulfillment of students' basic psychological needs. Curran et al. (2013) also found that the perceived structure provided by the coaches was positively related to athletes' behavioral engagement, and students' need satisfaction was mediating in this positive relationship. There is no relevant research on the impact mechanism regarding the chaotic style. However, considering the opposite of chaos—the structure will affect students' need satisfaction, thereby promoting desired outcomes, such as autonomous motivation and engagement; thus, it is reasonable to speculate that perceived chaotic teaching is likely to impact student outcomes through the mediating effect of need frustration.

## **1.5 Educational situation in China**

China is heavily influenced by Confucianism, which emphasizes hierarchy. Teachers are highly respected in this culture, while students are expected to be humble and obedient and are not allowed to question authority (Ho & Ho, 2008). Chinese education is primarily teacher-centered and test-oriented. Chinese classrooms are typically structured, rely on rote memorization skills, and classroom discussions are rare. Thus, the traditional Chinese classroom is characterized by controlling and structuring teaching.

In order to improve its international academic ranking and meet the challenges of globalization, the Chinese government has undertaken a series of educational reforms since 1985 and launched a new curriculum reform in 2001 (Liu & Dunne, 2009). China's education reform is carried out under the banner of quality-oriented education, which aims to fundamentally change the long-standing teacher-centered, transmission-based model of teaching and learning (Li, 2019). The ultimate goal is to develop student's creativity, problem-solving skills, and lifelong learning attitudes and improve the quality of education nationwide (Little, 2000). In this vein, autonomy-supportive teaching was introduced into Chinese classrooms.

However, educational reform in China has taken place in a highly centralized top-down system in which only the Ministry of Education can set educational policy. The lack of communication between policymakers and teachers makes implementing the principles and practices of the reform a challenge for teachers accustomed to traditional teaching (Li, 2019). In addition, the reform does not propose any fundamental change to examinations, and entrance examinations remain the most important entrance requirement, which is the main resistance to this educational reform (Liu & Dunne, 2009). As a result of these factors, educational reform in China has only made a superficial change (Yan, 2012).

# Chapter 2: What predicts the adoption of (de)motivating teaching styles: a cross-culture investigation

## 2.1 Aims and hypotheses

This study aims to (1) explore the difference in (de)motivating teaching styles in Italy and China; (2) assess how the teacher personal factors (i.e., self-compassion, burnout or personal accomplishment, emotion regulation, and teacher enthusiasm) shape the relationships between need satisfaction/frustration and (de)motivating teaching styles.

The hypotheses of this study were put forward in the following:

**H1:** Teachers tend to adopt rather motivating (i.e., autonomy-supportive and structuring) than demotivating teaching styles (i.e., controlling and chaotic) and this trend will be higher in Italian teachers than in Chinese teachers (H1).

**H2:** Need satisfaction will be positively related to motivating teaching styles (i.e., autonomy-supportive and structuring) (H2a), whereas need frustration will be positively related to demotivating teaching styles (i.e., controlling and chaotic) (H2b).

**H3:** Self-compassion will be positively correlated with need satisfaction (H3a), while self-derogation will be positively correlated with need frustration (H3b).

**H4:** Reappraisal, personal accomplishment, expressed enthusiasm and felt enthusiasm mediate the relationship between need satisfaction and motivating teaching styles (i.e., autonomy-supportive and structuring) (H4a); while suppression and emotional exhaustion mediate the relationship between need frustration and demotivating teaching styles (i.e., controlling and chaotic) (H4b).

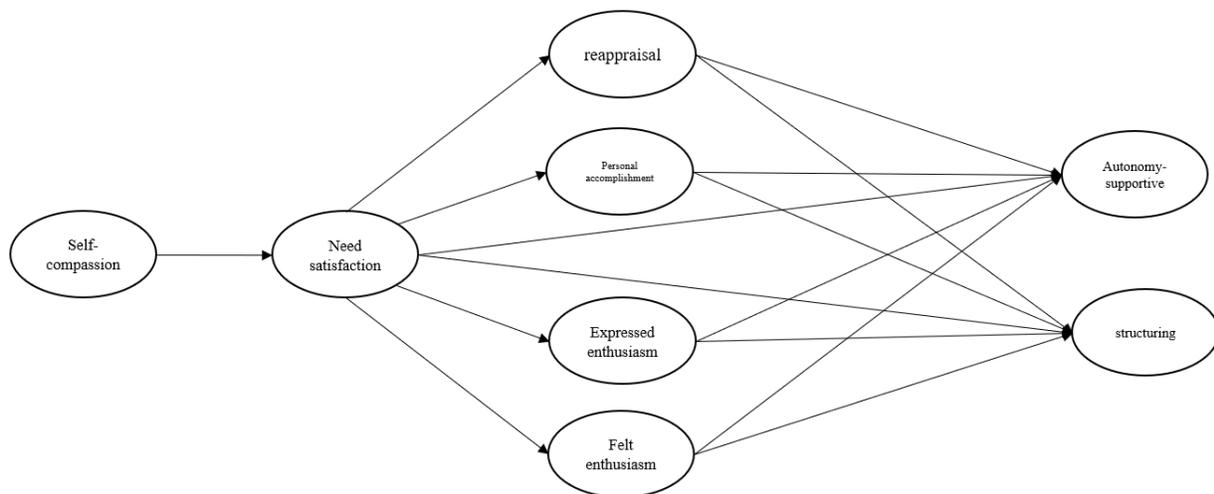


Figure 3 The proposed bright-side model

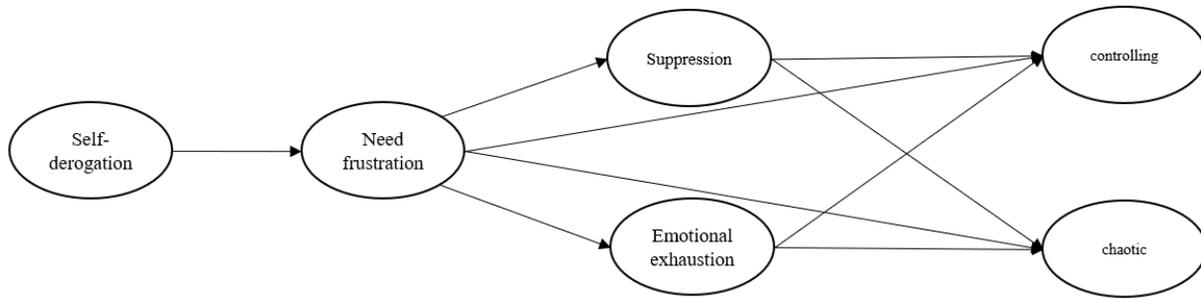


Figure 4 The proposed dark-side model

## 2.2 Method

### 2.2.1 Participants

341 Italian teachers and 382 Chinese teachers teaching different subjects participated in Study 1. Table 2 shows the socio-demographic characteristics of these two samples.

Table 2 Socio-demographics characteristics of the two samples in Study 1

| Sample                | Italy          | China          |
|-----------------------|----------------|----------------|
| N                     | 341            | 382            |
| Gender                |                |                |
| Male (%)              | 31.67%         | 41.10%         |
| Female (%)            | 68.33%         | 58.90%         |
| Age                   |                |                |
| Range(years)          | 24-66          | 22-58          |
| Mean(years)           | 49.60          | 38.64          |
| <i>SD</i> (years)     | 10.14          | 8.66           |
| Years of teaching     |                |                |
| Range(years)          | Less than 1-43 | Less than 1-38 |
| Mean(years)           | 20.33          | 15.31          |
| <i>SD</i> (years)     | 11.67          | 9.81           |
| Middle or high school |                |                |
| Middle (%)            | 15.54%         | 28.27%         |
| High (%)              | 84.46%         | 71.73%         |

## 2.2.2 Measures

We had the previously used and validated Italian and Chinese versions of almost all the questionnaires available. However, we used Brislin's (1980) back-translation procedure for those we did not have (i.e., those measuring the expressed enthusiasm and felt enthusiasm in both Italian and Chinese and the one assessing teaching styles in Chinese). The items were translated from English to Italian (or Chinese) by a researcher fluent in English and Italian (or Chinese) and were back-translated by another researcher also fluent in English and Italian (or Chinese). A third researcher, fluent in English, compared the back-translations with the original questionnaire. Discrepancies were discussed until the complete agreement was reached.

### *Need satisfaction and need frustration*

Teachers' need satisfaction and frustration were assessed with the Italian adapted version (Costa et al., 2018) and the Chinese version (Chen et al., 2015) of the Basic Psychological Need Satisfaction and Frustration scale (BPNSNF: Chen et al., 2015). BPNSNF consists of 24 items, measuring satisfaction or frustration of three basic psychological needs: autonomy (e.g., "I feel a sense of choice and freedom in the things I undertake" or "I feel forced to do many things I wouldn't choose to do"), relatedness (e.g., "I feel close and connected with other people who are important to me" or "I have the impression that people I spend time with dislike me"), and competence (e.g., "I feel confident that I can do things well" or "I have serious doubts about whether I can do things well"). Participants were asked to rate each item on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). For the aims of the present study, "at school" was added in the stem to reflect the teaching context better.

### *Self-compassion*

To measure self-compassion, the Italian validated version (Petrocchi, Ottaviani, & Couyoumdjian, 2014) and the Chinese adapted version (Chen, Yan, & Zhou, 2011) of the Self-Compassion Scale (SCS: Neff, 2003) were used. SCS is a 26-item scale, including six subscales: Self-Kindness Subscale (5 items, e.g., "I try to be understanding and patient towards those aspects of my personality I don't like."), Self-Judgment Subscale (5 items, e.g., "When I see aspects of myself that I don't like, I get down on myself."), Common Humanity Subscale (4 items, e.g., "When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people."), Isolation Subscale (4 items, e.g., "When I fail at something that's important to me, I tend to feel alone in my failure."), Mindfulness Subscale (4 items, e.g., "When something upsets me, I try to keep my emotions in balance."), Over-Identification Subscale (4 items, e.g., "When something upsets me, I get carried away with my feelings."). These subscales can be divided into Self-compassion (i.e., Self-Kindness, Common Humanity, Mindfulness) and Self-derogation (i.e., Self-Judgment, Isolation, Over-Identification). Participants were instructed to indicate how often they act like the items described on a 5-point Likert scale, ranging from 1 (almost never) to 5 (almost always).

### *Emotion regulation*

The emotion regulation was assessed with the Italian (Balzarotti, John, & Gross, 2010) and Chinese (Wang et al., 2007) validation of the Emotion Regulation Questionnaire (ERQ: Gross, & John, 2003). ERQ is a 10-item questionnaire, assessing two different emotion regulation strategies: expressive suppression (4 items, e.g., "I keep my emotions to myself.") and cognitive reappraisal (6 items, e.g., "When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about."). Participants were asked to rate on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

### *Expressed enthusiasm*

We devised a measure based on Collins (1978), which includes the following items with the stem "When I teach": (a) "I gesticulate"; (b) "I move around the classroom"; (c) "I change my voice"; (d) "I change my facial expressions"; (e) "I'm overall alive". Teachers were asked to rate how much typically they act like these descriptions during teaching on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

### *Burn-out*

It was assessed with Maslach Burnout Inventory (MBI: Maslach, & Jackson, 1981) in the Italian validation by Sirigatti, Stefanile, and Menoni (1988) and the Chinese validation by Wu, Qi, Yu, and Zang (2016). It consists of 22 items, assessing emotional exhaustion (9 items, e.g., "I feel emotionally drained from my work."), personal accomplishment (8 items, e.g., "I can easily understand how my recipients feel about things."), and depersonalization (5 items, e.g., "I feel I treat some recipients as if they were impersonal 'objects.'"). In the Chinese validation (Wu et al., 2016), although it also includes 22 items, 12 are old items, and 10 are new. And the number of the items of each factor is also different: 8, 8, 6 for emotional exhaustion, personal accomplishment, and depersonalization, respectively. Participants were asked to rate each item on a 7-point Likert scale, ranging from 0 (never) to 6 (every day).

### *Felt enthusiasm*

To measure teachers' felt enthusiasm, four items from Kunter et al. (2008) were used: "I am still enthusiastic about the subject I teach," "I find the subject I teach exciting and try to convey my enthusiasm to the students," "I teach my subject with great enthusiasm" and "I really enjoy teaching the subject I teach." The first two items were used to measure enthusiasm for the subject, while the latter two were used to measure enthusiasm for teaching. All items were answered on a 4-point Likert ranging from 1 (strongly disagree) to 4 (strongly agree).

### *Teaching styles*

It was measured with the Situations-in-School (SIS) questionnaire (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:") and four possible reactions teachers may have in each of these vignettes, corresponding to the (de)motivating teaching styles: 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."), and chaotic (e.g., "Don't worry about it—let it pass on its own."). Teachers are asked to rate how much each possible reaction of each teaching condition describes their response to these situations on a 7-point Likert scale, ranging from 1 (does not describe me at all) to 7 (describes me extremely well). The Italian version of SIS has been proven to have good reliability and validity (Moè & Katz, 2020, 2021, 2022). The Chinese version of SIS was translated from English to Chinese by a researcher fluent in English and Chinese and was back-translated by another researcher also fluent in English and Chinese. A third researcher, fluent in English, compared the back-translations with the original version of SIS. Discrepancies were discussed until the complete agreement was reached.

The reliabilities of these instruments for the current samples are shown in Table 3.

### **2.2.3 Procedure**

This study has been approved by the local Ethics Committee and the researcher's university. Italian teachers from a wide range of schools were invited to fill in the questionnaires online in April 2020. The front page described the study's purpose, which is to investigate the relationship between teacher motivation and well-being. Teachers were told that there were no correct answers and were asked to answer the questions based on their situations. In addition, they were informed that they could quit anytime they wanted, and their information and answers would be confidential. They can email the researcher if they have any questions about this study. After signing the informed consent, participants completed the questionnaires described above in the order they are described and several demographic questions (i.e., age, gender, years of teaching, grade taught, subject taught, school type). It took about 30 minutes to complete the survey. In return, if they would like, they could leave their email address and receive a brief report on the average results of this study and tips to motivate themselves and their students.

The procedures of collecting Chinese teachers' data were the same as those used in Italy, with the following difference: first, the researcher contacted Chinese teachers indirectly via their headteachers; second, Chinese

teachers completed the online survey in November 2020.

## 2.3 Analyses and results

### 2.3.1 Preliminary analyses

First, normal distribution was assessed using histograms, skewness, and kurtosis. Except for one item in the Italian sample: depersonalization item 1 (i.e., "I feel I treat some students as if they were impersonal 'objects'"; skew=3.756, kurtosis= 17.997), other items were normally distributed according to the following criteria:  $|\text{skew}| < 3$ ,  $|\text{kurtosis}| < 10$  (Kline, 2005). Therefore, this item was not included in the subsequent analysis.

I further examined the instrument's factor structure that was not validated yet by performing the confirmatory factor analysis (CFA). Finally, after the factor structures were established, the internal reliabilities, Cronbach's  $\alpha$  of each subscale was calculated.

#### *Confirmatory Factor Analyses*

A CFA was conducted using IBM SPSS AMOS 23.0 to verify the measurement structure of those instruments that were not validated yet. The results of CFA show the degree to which the model fits the data. Multiple indicators were assessed to evaluate model fit. First, the chi-square value is the main index of assessing model fit. It reveals a good model fit if the chi-square test statistic is insignificant (Brown, 2006). However, since the chi-square value is susceptible to the sample size, it is natural that there will be significant chi-square values in practical studies (Brown, 2006). Unlike the chi-square value,  $\chi^2/\text{df}$  is not influenced by sample size. It is also used to evaluate model fit, and it is considered acceptable if the value is below 5 (Byrne, 2001). In addition, I count on multiple fit indicators, including the comparative fit index (CFI), the Incremental Fit Index (IFI), and the root mean square error of approximation (RMSEA). The values of CFI and IFI range from 0 to 1. If CFI and IFI values are above 0.90, it indicates a good model fit; if they are above 0.95, it shows an excellent model fit (Hu & Bentler, 1999). RESEA suggests a good fit if the value is below 0.08, and it is considered an excellent model fit if the value is below 0.05 (Hu & Bentler, 1999; Kline, 2011). A significant test ( $t$ -test) for factor loading was also used. Significant factor loadings and standard coefficients above 0.30 (or 0.40) are considered good items for underlying structure (Brown, 2006).

#### (1) *Expressed enthusiasm*

The 5-item structure of expressed enthusiasm was analyzed using CFA. The Goodness-of-fit of the initial CFA model of the Italian sample indicated that there is scope for improvement ( $\chi^2(5) = 39.323$ ,  $\chi^2/\text{df} = 7.865$ ,  $p < .001$ ; CFI = .928; IFI = .929; RESEA = .142). Post-hoc model modification indices proposed the estimation of error covariances between items 1 and 2. This covariance was not considered problematic since it is common for items on the same subscale to have errors. After adding the estimation of the error covariance, the model fit improved and became good ( $\chi^2(4) = 11.680$ ,  $\chi^2/\text{df} = 2.920$ ,  $p = .020$ ; CFI = .984; IFI = .984; RESEA = .075). The range of  $t$ -value for factor loadings was from 6.55 to 7.98, which indicated that all items were significant ( $p < .001$ ). As presented in Figure 5, the completely standardized loadings ranged from .45 to .82. In conclusion, the results of the CFA suggest a good fit between the proposed model and the observed data.

Similarly, the Goodness-of-fit of the initial CFA model of the Chinese sample indicated that there is scope for improvement ( $\chi^2(5) = 37.111$ ,  $\chi^2/\text{df} = 7.422$ ,  $p < .001$ ; CFI = .969; IFI = .969; RESEA = .130). Post-hoc model modification indices proposed the estimation of error covariances between items 1 and 2. After adding the estimation of the error covariance, the model fit improved and became good ( $\chi^2(4) = 13.472$ ,  $\chi^2/\text{df} = 3.368$ ,  $p = .009$ ; CFI = .991; IFI = .991; RESEA = .079). The range of  $t$ -value for factor loadings was from 12.78 to 15.50, which indicated that all items were significant ( $p < .001$ ). As presented in Figure 5, the completely standardized loadings ranged from .70 to .89. In conclusion, the results of the CFA suggest a good fit between the proposed model and the observed data.

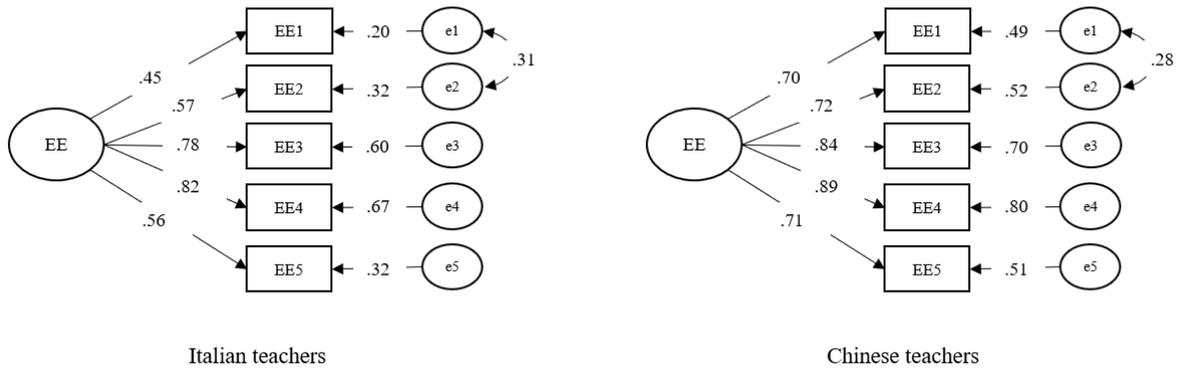


Figure 5 Latent factor solution of Italian (N=341) and Chinese teachers (N=382) for the Expressed Enthusiasm (EE).

All factor loadings are completely standardized.

(2) *Felt enthusiasm*

The 4-item structure of felt enthusiasm was analyzed using CFA. The Goodness-of-fit of the initial CFA model of the Italian sample indicated that there is scope for improvement ( $\chi^2(2) = 13.237, \chi^2/df = 6.619, p = .001$ ; CFI = .987; IFI = .987; RESEA = .129). Post-hoc model modification indices proposed the estimation of error covariances between items 1 and 4. After adding the estimation of the error covariance, the model fit improved and became good ( $\chi^2(1) = 3.392, \chi^2/df = 3.392, p = .066$ ; CFI = .997; IFI = .997; RESEA = .084). The range of t-value for factor loadings was from 15.27 to 17.68, which indicated that all items were significant ( $p < .001$ ). As presented in Figure 6, the completely standardized loadings ranged from .80 to .88. In conclusion, the results of the CFA suggest a good fit between the proposed model and the observed data.

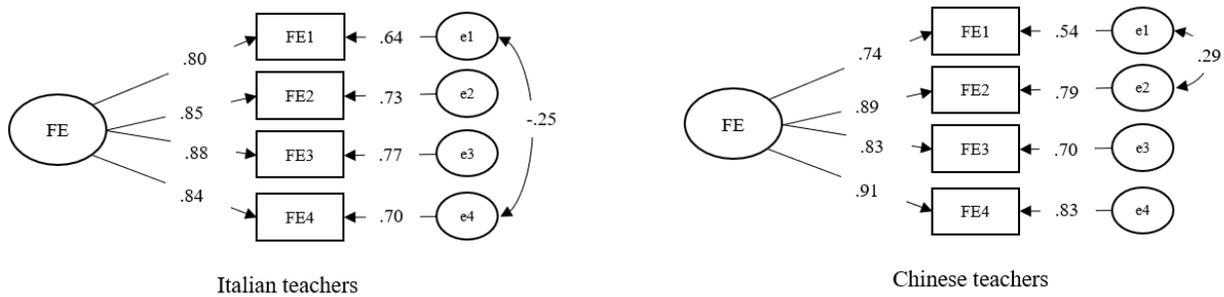


Figure 6 Latent factor solution of Italian (N=341) and Chinese teachers (N=382) for the Felt Enthusiasm (FE).

All factor loadings are completely standardized.

Similarly, the goodness-of-fit of the initial CFA model of the Chinese sample indicated that there is scope for improvement ( $\chi^2(2) = 14.938, \chi^2/df = 7.469, p = .001$ ; CFI = .988; IFI = .988; RESEA = .130). Post-hoc model modification indices proposed the estimation of error covariances between items 1 and 2. After adding the estimation of the error covariance, the model fit improved and became good ( $\chi^2(1) = .011, \chi^2/df = .011, p = .918$ ; CFI = 1.000; IFI = 1.000; RESEA = .000). The range of t-value for factor loadings was from 15.98 to 20.02, which

indicated that all items were significant ( $p < .001$ ). As presented in Figure 6, the completely standardized loadings ranged from .74 to .91. In conclusion, the results of the CFA suggest a good fit between the proposed model and the observed data.

### (3) Teaching styles

The results of the Chinese sample showed that the model fit was poor ( $\chi^2(1704) = 4303.042$ ,  $\chi^2/df = 2.525$ ,  $p < .001$ ; CFI = .736; IFI = .737; RESEA = .063). The following items were not included in the following analyses since the factor loadings lowered the recommended minimum of 0.40 (Brown, 2006): items 1 (controlling 1: .37, and chaotic 1: .12), 2 (chaotic 2: .36); 3 (chaotic 3: .37), 4 (chaotic 4: .16), 5 (controlling 5: .39), 6 (autonomy-supportive 6: .31), 7 (chaotic 7: .39), 11 (autonomy-supportive 11: .38), and 15 (autonomy-supportive 15: .32). Besides, although the factor loading of item 14 was higher than .40, deleting it improved the model fit. Moreover, post-hoc model modification indices proposed the estimation of error covariances between controlling items 9 and 10, and between chaotic items 8 and 9. With these modifications, the model fit improved and became acceptable ( $\chi^2(162) = 490.274$ ,  $\chi^2/df = 3.026$ ,  $p < .001$ ; CFI = .890; IFI = .891; RESEA = .073). The range of t-value for factor loadings was from 8.37 to 13.88, which indicate that all items were significant ( $p < .001$ ). As presented in Figure 7, the completely standardized loadings ranged from .47 to .74. Therefore, the results of the CFA suggest a good fit between the proposed model and the observed data.

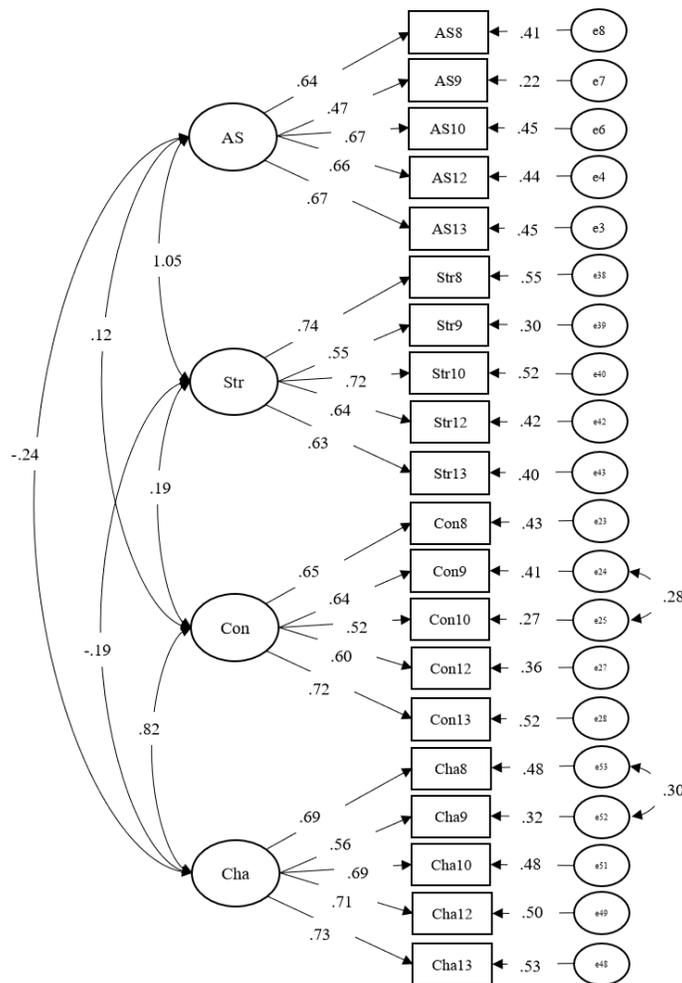


Figure 7 Latent factor solution of Chinese teachers (N=382) for the SIS

All factor loadings are completely standardized. AS= autonomy-supportive; Con= controlling; Str= structuring; Cha= chaotic.

### *Teachers' demographic characteristics*

Before the primary analyses, the possible associations between years of teaching and research variables were calculated. For the Italian sample, teaching experience was significantly associated with self-compassion and the adoption of the structuring style. For Chinese teachers, teaching experience was significantly positively related to personal accomplishment and adoption of the structuring, controlling, and chaotic styles and negatively associated with self-derogation, and emotional exhaustion. Since years of teaching was not correlated with most variables, it was not controlled for in the following analysis.

### **2.3.2 Descriptive Statistics**

Descriptive statistics and Pearson correlations among all the variables were calculated by IBM SPSS Statistics 25.0. The item number, means, standard deviations, skewness, kurtosis, and Cronbach's alphas for both Italian and Chinese teacher samples were presented in Table 3. Both  $|\text{skewness}|$  and  $|\text{kurtosis}|$  were  $<3$ ; therefore, the data were normally distributed across variables.

In general, teachers reported moderate need satisfaction and self-compassion and low need frustration and self-derogation levels. Compared with Chinese teachers, Italian teachers' need satisfaction is slightly higher. In terms of emotion regulation, teachers reported moderately high cognitive reappraisal and relatively low expressive suppression. Compared with expressive suppression, teachers preferred using the cognitive reappraisal strategy to regulate their emotions. Both teachers' expressed enthusiasm and felt enthusiasm were high. Concerning burnout, teachers reported a reasonably high level of personal accomplishment, a low level of depersonalization, and a moderately low level of emotional exhaustion. For teaching styles, teachers reported reasonably high levels of autonomy-supportive and structuring teaching styles moderately a high level of the controlling style. But for the chaotic teaching style, Italian teachers reported a low level while Chinese teachers reported a moderate level. Compared with Italian teachers, Chinese teachers seemed to adopt more demotivating teaching styles.

The Cronbach's alphas ranged from high to moderate. Since the Cronbach's alphas of depersonalization lowered than .70, it was not included in the following analysis.

Table 3 Descriptive Statistics of all variables for both Italian and Chinese teacher samples

| Variable                        | Italian teachers (N=341) |          |           |          |          |                  | Chinese teachers (N=382) |          |           |          |          |                  | Comparison |          |
|---------------------------------|--------------------------|----------|-----------|----------|----------|------------------|--------------------------|----------|-----------|----------|----------|------------------|------------|----------|
|                                 | item number              | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | item number              | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | <i>t</i>   | <i>p</i> |
| Need Satisfaction               | 12                       | 3.75     | .53       | -.16     | -.19     | .84              | 12                       | 3.63     | .55       | -.78     | 1.34     | .84              | 3.05       | .002**   |
| Need Frustration                | 12                       | 2.20     | .63       | .68      | .47      | .84              | 12                       | 2.38     | .57       | .42      | -.02     | .85              | -3.83      | <.001*** |
| Self-compassion                 | 13                       | 3.49     | .75       | -.24     | -.25     | .89              | 13                       | 3.48     | .56       | -.07     | .34      | .91              | 0.15       | .884     |
| Self-derogation                 | 13                       | 2.48     | .85       | .66      | -.09     | .91              | 13                       | 2.68     | .51       | .16      | .15      | .86              | -3.83      | <.001*** |
| Reappraisal                     | 6                        | 5.20     | 1.15      | -.62     | .19      | .86              | 6                        | 5.12     | 1.06      | -.74     | .54      | .86              | 0.95       | .343     |
| Suppression                     | 4                        | 3.81     | 1.30      | .17      | -.45     | .70              | 4                        | 3.35     | 1.21      | .30      | -.54     | .76              | 4.94       | <.001*** |
| Personal Accomplishment         | 8                        | 4.52     | .87       | -.90     | 2.44     | .83              | 8                        | 4.18     | .94       | -.21     | .09      | .90              | 5.00       | <.001*** |
| Depersonalization               | 4                        | .81      | .91       | 1.37     | 1.68     | .55              | 6                        | 1.52     | .78       | .42      | -.09     | .64              | -11.06     | <.001*** |
| Emotional Exhaustion            | 9                        | 2.18     | 1.29      | .59      | -.18     | .90              | 8                        | 2.60     | 1.28      | .45      | -.10     | .92              | -4.35      | <.001*** |
| Expressed enthusiasm            | 5                        | 5.94     | .94       | -1.30    | 2.06     | .78              | 5                        | 5.89     | 1.03      | -1.43    | 2.47     | .89              | 0.66       | .508     |
| Felt enthusiasm                 | 4                        | 3.60     | .54       | -1.53    | 2.17     | .90              | 4                        | 3.29     | .57       | -.53     | .84      | .91              | 7.54       | <.001*** |
| Autonomy-supportive structuring | 15                       | 5.11     | .86       | -.31     | -.30     | .83              | 5                        | 5.48     | .83       | -.93     | 1.78     | .76              | -5.88      | <.001*** |
| controlling                     | 15                       | 5.60     | .77       | -.32     | -.39     | .86              | 5                        | 5.55     | .83       | -.84     | 1.18     | .78              | .908       | .36      |
| chaotic                         | 15                       | 3.38     | .97       | .24      | -.41     | .83              | 5                        | 4.16     | 1.23      | -.08     | -.48     | .78              | -9.43      | <.001*** |
|                                 | 15                       | 2.19     | .71       | .99      | 1.61     | .79              | 5                        | 3.27     | 1.32      | .56      | -.26     | .82              | -14.00     | <.001*** |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $P < .001$ .

Table 4 Correlations across the research variables

| Variables                 | 1       | 2       | 3       | 4       | 5       | 6      | 7       | 8       | 9       | 10      | 11      | 12      | 13     | 14      |
|---------------------------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|--------|---------|
| 1.Need Satisfaction       | —       | -.55*** | .49***  | -.32*** | .42***  | -.04   | .42***  | -.36*** | .29***  | .45***  | .24***  | .23***  | -.10   | -.16**  |
| 2.Need Frustration        | -.52*** | —       | -.41*** | .64***  | -.35*** | .21*** | -.36*** | .54***  | -.21*** | -.33*** | -.17**  | -.19*** | .19*** | .23***  |
| 3.Self-compassion         | .39***  | -.33*** | —       | -.44*** | .61***  | -.00   | .45***  | -.16**  | .40***  | .34***  | .32***  | .33***  | -.04   | -.19*** |
| 4.Self-derogation         | -.34*** | .55***  | -.55*** | —       | -.30*** | .22*** | -.26*** | .43***  | -.10*   | -.18*** | -.15**  | -.15**  | .17**  | .18***  |
| 5.Reappraisal             | .25***  | -.22*** | .58***  | -.29*** | —       | .09    | .38***  | -.19*** | .52***  | .31***  | .41***  | .46***  | -.11*  | -.30*** |
| 6.Suppression             | -.08    | .16**   | -.09    | .17**   | .08     | —      | -.09    | .13*    | -.03    | -.02    | -.03    | .01     | .27*** | .29***  |
| 7.Personal Accomplishment | .53***  | -.40*** | .44***  | -.33*** | .33***  | -.10   | —       | -.20*** | .53***  | .56***  | .38***  | .40***  | -.14** | -.32*** |
| 8.Emotional Exhaustion    | -.43*** | .58***  | -.27*** | .42***  | -.08    | .06    | -.36*** | —       | -.11*   | -.32*** | -.18*** | -.16**  | .13*   | .11*    |
| 9.Expressed enthusiasm    | .24***  | -.25*** | .17**   | -.14*   | .17**   | -.07   | .39***  | -.14**  | —       | .42***  | .42***  | .45***  | -.07   | -.28*** |
| 10.Felt enthusiasm        | .41***  | -.18**  | .14**   | -.13*   | .10     | -.06   | .47***  | -.27*** | .23***  | —       | .30***  | .26***  | -.17** | -.31*** |
| 11.Autonomy-supportive    | .34***  | -.02    | .29***  | -.05    | .28***  | -.05   | .37***  | -.04    | .14**   | .28***  | —       | .81***  | .13*   | -.12*   |
| 12.structuring            | .38***  | -.07    | .30***  | -.07    | .28***  | -.01   | .43***  | -.03    | .12*    | .36***  | .76***  | —       | .19*** | -.09    |
| 13.controlling            | -.08    | .24***  | -.14**  | .21***  | -.11*   | .20*** | -.19**  | .14*    | -.10    | -.12*   | -.11*   | .00     | —      | .66***  |
| 14.chaotic                | -.16**  | .27***  | -.19*** | .20***  | -.19*** | .21*** | -.33*** | .14*    | -.20*** | -.25*** | -.17**  | -.32*** | .40*** | —       |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $P < .001$ . The Italian results are below diagonal, and the Chinese results are above diagonal.

### 2.3.3 The differences between Italian and Chinese teachers

The means comparisons between Italian and Chinese teachers were presented in Table 3. Compared with Chinese teachers, Italian teachers reported more need satisfaction, more suppression, more personal accomplishment, more felt enthusiasm, less need frustration, less self-derogation, less emotional exhaustion. Overall, except for suppression, Italian teachers rated higher on the variables related to well-being and lower on the variables associated with ill-being.

Regarding (de)motivating teaching styles, compared with Chinese teachers, Italian teachers self-reported adopting a less autonomy-supportive teaching style, a less controlling teaching style, a less chaotic teaching style. However, there was no significant difference for structuring teaching style between Italian and Chinese teachers.

To investigate H1, I calculated a relative motivating style index.

$$\text{Relative motivating style index} = (\text{autonomy-supportive} + \text{structuring}) - (\text{controlling} + \text{chaotic}) \quad (1)$$

The results of the independent samples t-test showed that Italian teachers' relative motivating style index ( $M=5.14$ ,  $SD=2.26$ ) was significantly higher than that of Chinese teachers ( $M=3.60$ ,  $SD=2.78$ ),  $t(715)=8.23$ ,  $p<.001$ . It suggested that even though Italian and Chinese teachers tend to use somewhat motivating than demotivating teaching styles (both relative motivating style indexes were higher than 0), this trend was higher for Italian teachers, confirming H1.

### 2.3.4 Correlations across variables

Pearson's correlations for all variables were presented in Table 4.

The relationships between need satisfaction and motivating teaching styles (i.e., autonomy-supportive and structuring) and between need frustration and demotivating teaching styles (i.e., controlling and chaotic) for Italian and Chinese teachers were positive and significant, confirming H2.

Self-compassion was positively associated with need satisfaction; self-derogation was positively associated with need frustration for Italian and Chinese teachers, confirming H3.

Both need satisfaction and motivating teaching styles were significantly positively associated with reappraisal, personal accomplishment, expressed enthusiasm and felt enthusiasm for Italian and Chinese teachers. Moreover, relationships between need frustration, demotivating teaching styles, and suppression and emotional exhaustion were positive and significant. These associations suggested it was feasible to investigate the mediating roles of emotion regulation, burnout, and teacher enthusiasm (H4).

### 2.3.5 Path Analyses

To investigate H4, path analyses were performed with IBM SPSS AMOS 23.0. If all items are

used as indicators of latent variables, lengthy scales pose a challenge to structural equation modeling (SEM). To obtain a more accurate and stable assessment of structural relationships, the items were collapsed (i.e., item parcel; Landis, Beal & Tesluk, 2000; Yang, Nay & Hoyle, 2010). Some latent variables contained multiple dimensions (e.g., self-compassion included self-kindness, common humanity, and mindfulness), and each dimension was involved with various items. A single parcel was created for each facet by taking the means of all indicators of each facet. Also, some latent variables contained only one factor with over five items (e.g., the appraisal was measured with six items). Three (or four) random parcels were created by randomly selecting indicators of these latent variables without replacement.

The multicollinearity issues (e.g., the standardized path coefficient was contrary to theory) occurred while running the "bright-side" and "dark-side" models for both Italian and Chinese samples. According to Marsh et al. (2004), constraining these paths to be equal can solve the issue of multicollinearity. As shown in Table 5, the model fit results were still unsatisfactory after these modifications.

An alternative model was tested for both "bright-side" and "dark-side" models. Instead of autonomy-supportive and structuring (or controlling and chaotic) styles in this alternative model, (de)motivating styles were entered as outcome variables. This model was tested since autonomy-supportive and structuring styles are motivating styles; controlling and chaotic styles are demotivating (Aelterman et al., 2019). Except for the multicollinearity issues, another problem emerged when performing the "bright-side" model for the Chinese sample—the error variances of autonomy-supportive and structuring styles were negative, offending the criteria for evaluating SEM. One solution may fix the problem parameter to a very small positive value (Bagozzi & Yi, 1988). Therefore, in this model, these error variances were fixed to be 0.0001. To compare non-nested models, the Akaike Information Criterion (AIC; Akaike, 1987) and the Bayesian Information Criterion (BIC; Schwarz, 1978) were used, with smaller value indicating a better model fit. As shown in Table 5, the model fit results for the alternative model were better and acceptable. Thus, the hypothesized model was taken place by the alternative model as the final model.

For the final results of the “bright-side” model, please see Table 6 and Figure 8. Teachers’ need satisfaction was significantly associated with increased reappraisal, personal accomplishment, expressed enthusiasm, and felt enthusiasm, respectively, which, in turn, was significantly associated with motivating teaching styles. It confirmed that reappraisal, personal accomplishment, expressed enthusiasm, and felt enthusiasm partly mediated the direct positive relationship between need satisfaction and motivating teaching styles (confirming H4a).

For the final results of the “dark-side” model, please see Table 7 and Figure 9. Teachers’ need frustration was significantly associated with increased suppression and emotional exhaustion, respectively, which, in turn, was significantly related to demotivating teaching styles. It confirmed that suppression and emotional exhaustion partly mediated the direct positive relationship between need frustration and demotivating teaching styles (confirming H4b).

Table 5 The model fit results for “bright-side” and “dark-side” for Italian and Chinese samples

|                    |               |         | $\chi^2$ | df  | $\chi^2/df$ | <i>p</i> | CFI  | IFI  | RESEA | AIC      | BIC      |
|--------------------|---------------|---------|----------|-----|-------------|----------|------|------|-------|----------|----------|
| Hypothesized model | “bright-side” | Italian | 974.748  | 245 | 3.979       | <.001    | .810 | .812 | .094  | 1084.748 | 1295.501 |
|                    |               | Chinese | 908.386  | 245 | 3.708       | <.001    | .881 | .882 | .084  | 1018.386 | 1235.384 |
|                    | “dark-side”   | Italian | 317.752  | 114 | 2.787       | <.001    | .906 | .907 | .073  | 395.752  | 545.196  |
|                    |               | Chinese | 454.319  | 114 | 3.985       | <.001    | .888 | .888 | .089  | 532.319  | 686.191  |
| Alternative model  | “bright-side” | Italian | 737.788  | 245 | 3.011       | <.001    | .872 | .873 | .077  | 847.788  | 1058.541 |
|                    |               | Chinese | 623.988  | 247 | 2.526       | <.001    | .933 | .933 | .063  | 729.988  | 939.095  |
|                    | “dark-side”   | Italian | 259.050  | 114 | 2.272       | <.001    | .933 | .934 | .061  | 337.050  | 486.494  |
|                    |               | Chinese | 263.640  | 113 | 2.333       | <.001    | .950 | .951 | .059  | 343.640  | 501.456  |

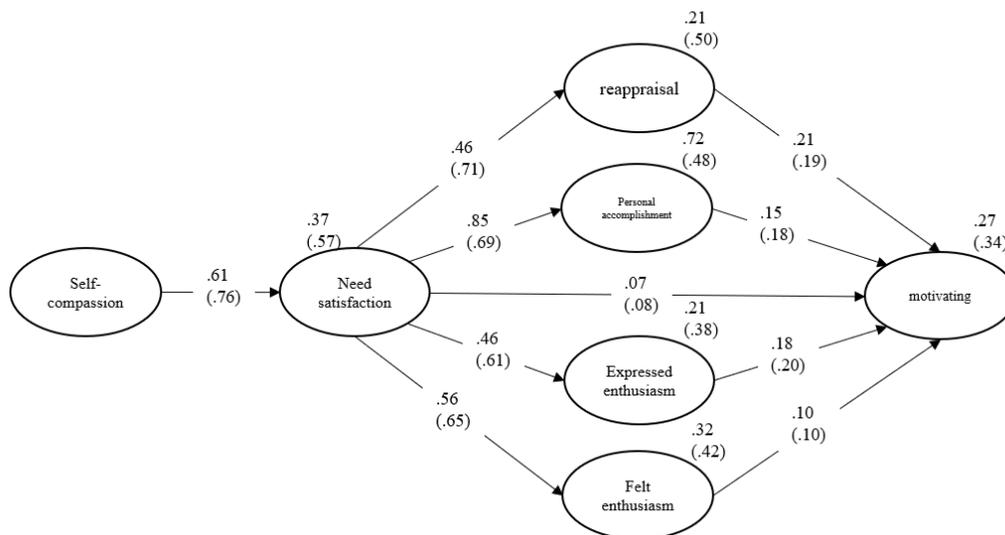


Figure 8 The final standardized estimates of self-compassion, need satisfaction, reappraisal, personal accomplishment, expressed enthusiasm, felt enthusiasm, and motivating teaching styles, with regression weight presenting over the lines, and the explained variance over the variables.

Top values= Italy, bottom values in brackets= China.

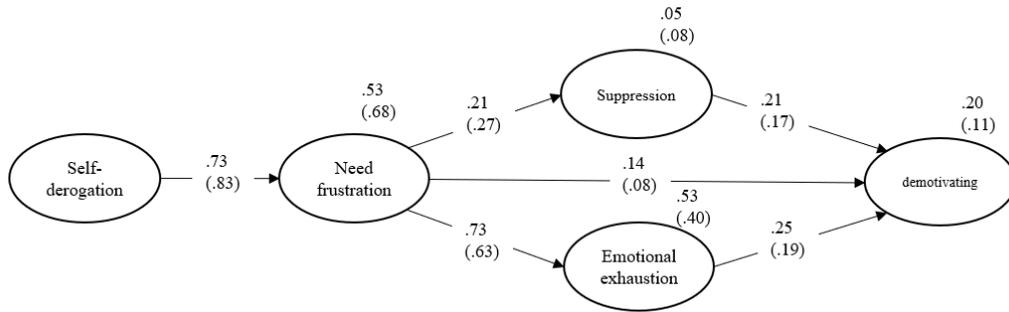


Figure 9 The final standardized estimates of the self-derogation, need frustration, suppression, emotional exhaustion, and demotivating teaching styles, with regression weight presenting over the lines, and the explained variance over the variables. Top values= Italy, bottom values in brackets= China.

Table 6 The path coefficients of the bright-side model for Italian and Chinese samples

|                         |   |                         | Italian(N=341) |          |      |       |       | Chinese(N=382) |          |      |        |       |
|-------------------------|---|-------------------------|----------------|----------|------|-------|-------|----------------|----------|------|--------|-------|
|                         |   |                         | St.            | Unst.    |      |       | P     | St.            | Unst.    |      |        | P     |
|                         |   |                         | estimate       | estimate | S.E. | C.R.  |       | estimate       | estimate | S.E. | C.R.   |       |
| self-compassion         | → | need satisfaction       | .612           | .311     | .041 | 7.495 | <.001 | .756           | .548     | .047 | 11.563 | <.001 |
| need satisfaction       | → | personal accomplishment | .846           | 1.77     | .213 | 8.294 | <.001 | .693           | 1.588    | .146 | 10.841 | <.001 |
| need satisfaction       | → | reappraisal             | .461           | 1.378    | .221 | 6.249 | <.001 | .708           | 1.682    | .160 | 10.506 | <.001 |
| need satisfaction       | → | expressed enthusiasm    | .461           | 1.163    | .193 | 6.028 | <.001 | .613           | 1.541    | .162 | 9.516  | <.001 |
| need satisfaction       | → | felt enthusiasm         | .564           | .815     | .107 | 7.617 | <.001 | .651           | .818     | .082 | 9.937  | <.001 |
| need satisfaction       | → | motivating              | .071           | .138     | .015 | 9.274 | <.001 | .079           | .145     | .013 | 11.471 | <.001 |
| personal accomplishment | → | motivating              | .149           | .138     | .015 | 9.274 | <.001 | .180           | .145     | .013 | 11.471 | <.001 |
| Reappraisal             | → | motivating              | .213           | .138     | .015 | 9.274 | <.001 | .186           | .145     | .013 | 11.471 | <.001 |
| felt enthusiasm         | → | motivating              | .103           | .138     | .015 | 9.274 | <.001 | .099           | .145     | .013 | 11.471 | <.001 |
| expressed enthusiasm    | → | motivating              | .180           | .138     | .015 | 9.274 | <.001 | .197           | .145     | .013 | 11.471 | <.001 |

Table 7 The path coefficients of the dark-side model for Italian and Chinese samples

|                      |   |                      | Italian(N=341)  |                   |      |       |       | Chinese(N=382)  |                   |      |        |       |
|----------------------|---|----------------------|-----------------|-------------------|------|-------|-------|-----------------|-------------------|------|--------|-------|
|                      |   |                      | St.<br>Estimate | Unst.<br>Estimate | S.E. | C.R.  | P     | St.<br>Estimate | Unst.<br>Estimate | S.E. | C.R.   | P     |
| self-derogation      | → | need frustration     | .726            | .634              | .070 | 9.010 | <.001 | .826            | 1.031             | .092 | 11.159 | <.001 |
| need frustration     | → | emotional exhaustion | .727            | 1.287             | .149 | 8.612 | <.001 | .630            | 1.564             | .158 | 9.876  | <.001 |
| need frustration     | → | suppression          | .214            | .311              | .109 | 2.841 | .004  | .274            | .616              | .147 | 4.198  | <.001 |
| need frustration     | → | demotivating         | .141            | .120              | .025 | 4.879 | <.001 | .076            | .147              | .029 | 5.081  | <.001 |
| emotional exhaustion | → | demotivating         | .250            | .120              | .025 | 4.879 | <.001 | .189            | .147              | .029 | 5.081  | <.001 |
| Suppression          | → | demotivating         | .206            | .120              | .025 | 4.879 | <.001 | .171            | .147              | .029 | 5.081  | <.001 |

## 2.4 Discussion

This study compared the (de)motivating teaching styles in Italy and China and assessed a "bright-side" and a "dark-side" models. These two models, from the brighter and darker aspect, respectively, evaluated the relationship between self-compassion/ self-derogation and need satisfaction/frustration and the mediating roles of emotion regulation, burnout, and teacher enthusiasm in the relationships between need satisfaction/need frustration and the adoption of (de)motivating teaching styles.

### 2.4.1 Adoption of motivating and demotivating styles differs across cultures

Teachers' teaching practices vary across cultures (e.g., Leung, 2006; Santagata, 2004). In the high PD and collectivist cultures, teaching practices are conducted with teacher-centered characteristics (Hofstede, 2011; Staub & Stern, 2002). On the contrary, student-centered is the mainstream in the low PD and individualist cultures (Cothran et al., 2005; Kaur & Noman, 2015; Tavakol & Dennick, 2010). Previous studies reported that teachers in the high PD and collectivist cultures have much authority, and they tend to use the controlling teaching styles (Kaplan, 2018; Reeve et al., 2014).

Consistent with previous studies (e.g., Aelterman et al., 2019; Moè & Katz, 2021), the results of this study showed that teachers tended to adopt rather motivating than demotivating teaching styles. Moreover, this trend was higher in Italian teachers than in Chinese teachers, suggesting that Italian teachers use more motivating teaching styles than Chinese teachers. Specifically, in this study, compared with Chinese teachers, Italian teachers self-reported adopting less controlling, chaotic, and autonomy-supportive teaching styles than Chinese teachers. There was no significant difference between these two cultures in the structuring style. The founding of the difference in the controlling style strengthens the previous finding (Reeve et al., 2014). However, it was unexpected that Italian teacher adopted a less autonomy-supportive style than Chinese teacher. Besides, for the first time, this study revealed the results of the differences in the chaotic and structuring styles across cultures. The result for the chaotic style was consistent with the hypothesis, whereas the result for the structuring style was the opposite.

The result of the structuring style was surprising but reasonable. There are two typical characteristics of China's education: one is teacher-centered (Hofstede, 2011), and the other is excessive worship of scores (Ma, Zhao & Jiao, 2018). Scores are essential and are the ticket for students to enter famous universities. Therefore, teachers have to play a leading role in teaching and ensure that students score high to ensure their success. The structuring style can satisfy both. The structuring style emphasizes the high directiveness of teachers (Aelterman et al., 2019) while it meets students' competence needs which benefits students' academic achievement (Mouratidis et al., 2013). Hence, this is the reason why there was no significant difference in the structuring style between Chinese and Italian teachers.

However, it was unexpected that Chinese teachers self-reported adopting a more autonomy-supportive style than Italian teachers because teachers have much authority and privilege their

agendas without concerning students' feelings in high PD and collectivist culture (Hofstede, 2011; Yang, Badger & Yu, 2006). However, this is not entirely impossible. First, autonomy is not the same as independence. When people depend on others, they can experience autonomy, too, as long as they value doing so (Chen et al., 2015). For instance, researchers investigated whether parents' choices for their children had the same effect on children's motivation in different cultures. They found that children with Chinese or Indian backgrounds were more autonomous to participate in the activity chosen by their parents instead of themselves. However, the opposite was true for children with European and American backgrounds (Iyengar, & Lepper, 1999; Rudy et al., 2015). Therefore, culture affects how people think and behave. The same behavior would be considered "controlling" in one culture but not in another. In China, students worship and trust their teachers; thus, they don't feel frustrated; instead, they are happy to do what teachers say. Likewise, teachers do not perceive their teaching practices as "controlling" but "supportive." In their view, they are helping their young, inexperienced students master learning as quickly as possible, not controlling them. Second, since the new curriculum reform, China's teaching styles have gradually shifted from the traditional controlling style to an autonomy-supportive style. At the same time, it was found that the teacher autonomy support in western China was significantly lower than that in eastern and central regions (Ma, Zhao & Jiao, 2018). In this study, 75.9% of the teachers were from the east area, and 24.1% were from the western region. Thus, the autonomy-supportive style reported in this study was higher than the national average. It may be why the autonomy-supportive style reported by Chinese teachers was higher than that of Italian teachers in this study.

Moreover, this study suggested that Chinese teachers tended to adopt more demotivating teaching styles (i.e., controlling and chaotic) compared with Italian teachers. It can be explained by the differences in the factors related to well-being/ill-being between Chinese and Italian teachers. In this study, Chinese teachers rated higher on the variables associated with ill-being (i.e., need frustration, self-derogation, emotion exhaustion) and lower on the factors related to well-being (i.e., need satisfaction, personal accomplishment, felt enthusiasm). Previous studies have shown that when teachers are in a state of well-being, they have more motivational and emotional resources to support students and tend to adopt motivating styles (i.e., autonomy-supportive and structuring). On the contrary, they tend to use demotivating styles (i.e., controlling and chaotic) if they feel ill-being (Aelterman et al., 2019; Moè & Katz, 2020, 2021, 2022). However, it should be noted that there was one exception in this study—suppression, related to ill-being, rated lower by Chinese teachers. Studies revealed that culture affects emotion regulation. Western values, such as independence, may encourage open expression of emotions, whereas Asian values of interdependence and relational harmony may lead to suppression (MatSumoto, Yoo & Nakagawa, 2008). However, Chinese teachers are aware of the importance of expressing their emotions authentically. In their opinion, not only positive emotions but also negative emotions benefit teaching (Gong et al., 2013; Yin, 2016). For example, when facing students' misbehavior, teachers expressing anger will stop students' behavior and correct them; otherwise, students assume that teachers acquiesced to their behavior. Therefore, Chinese teachers did not rate suppression higher than Italian teachers in this study, and they even scored lower.

#### **2.4.2 Association between need satisfaction/frustration and the adoption of (de)motivating styles**

Need satisfaction/frustration is one of the variables influencing the adoption of (de)motivating styles. When teachers' basic psychological needs (i.e., autonomy, competence, and relatedness) are satisfied, they have more emotional resources to support students. They tend to adopt motivating styles (i.e., autonomy-supportive and structuring). However, demotivating styles (i.e., controlling and chaotic) commonly are their choice if these needs are frustrated (e.g., Aelterman et al., 2019; Moè & Katz, 2020, 2021, 2022).

In this study, need satisfaction was significantly positively associated with motivating styles, whereas need frustration was positively related to demotivating styles, strengthening previous findings. What's more, these findings were equivalent in Italian and Chinese teacher samples, expanding the previous conclusions. It suggested that these associations are consistent in different cultures. Also, it provided evidence for the Basic Psychological Need Theory (Ryan & Deci, 2000, 2017) which stated that the satisfaction of basic psychological needs for autonomy, competence, and relatedness is essential for human well-being across cultures (Chen et al., 2015; Ryan & Deci, 2000, 2017).

These findings revealed that need satisfaction/frustration plays a significant role in adopting (de)motivating styles. Need satisfaction contributed to motivating styles, whereas need frustration resulted in adopting demotivating styles. Therefore, it's essential to ensure teachers' need satisfaction for autonomy, competence, and relatedness. This study's other results— self-compassion was positively associated with need satisfaction, while self-derogation was positively related to need frustration—provided a simple way to achieve it. In other words, self-compassion/self-derogation affected need satisfaction/frustration, consistent with previous findings (Moè & Katz, 2020). Moreover, Jennings (2015) reported that teachers' self-compassion is related to their greater emotional support for students. Wiklund Gustin and Wagner (2013) investigated nursing teachers and found that being sensitive to oneself, non-judgmental and respectful helps to adopt a compassionate attitude towards others. These results suggested that high self-compassion and low self-derogation are the possible resources benefiting teachers' well-being and supportive behaviors toward students. Thus, the practices favor self-compassion and reduce self-derogation should be encouraged added in the training program in the future (Moè & Katz, 2020).

#### **2.4.3 Emotion regulation, burnout and teacher enthusiasm as mediating factors**

Reappraisal, personal accomplishment, expressed enthusiasm and felt enthusiasm partly mediated the direct positive relationship between need satisfaction and motivating styles. However, suppression and emotional exhaustion partly mediated the direct positive relationship between need frustration and demotivating styles. These findings were equivalent for Italian and Chinese teachers, suggesting that these mediation patterns were not moderated by culture.

A “bright-side” and a “dark-side” model were hypothesized in this study. Regarding the “bright-side” model, self-compassion was the need-supporting factor enhancing need satisfaction.

Reappraisal, personal accomplishment, and teacher enthusiasm were the key factors making need-satisfied teachers use more motivating styles. Need satisfaction is considered an emotional resource (Chen et al., 2015), and it is associated with well-being and autonomous motivation (Chen et al., 2015; Cronin et al., 2019; Ryan & Deci, 2000, 2017). Therefore, when teachers' basic psychological needs are satisfied, they have more psychological resources to reappraise. At the same time, they have more autonomous motivation, more enthusiasm, and passion for work, leading to higher personal accomplishment. Previous studies have reported the mediating role of reappraisal and personal accomplishment in the relationship between need satisfaction and motivating styles (Moè & Katz, 2020, 2021, 2022). The results showed that both expressed and felt enthusiasm partly mediated the positive relationship between need satisfaction and motivating styles, differing from Moè and Katz (2022). They found that felt but not expressed enthusiasm mediated these relationships. Regardless, both studies found the mediating role of felt enthusiasm, emphasizing the importance of felt enthusiasm.

However, the level of expressed enthusiasm is not always consistent with the extent of felt enthusiasm (Taxer & Frenzel, 2015). Sometimes teachers pretend to be passionate to increase students' interest and motivation, and researchers found it works (e.g., Keller, Becker, Frenzel & Taxer, 2018; Patrick, Hisley & Kempler, 2000). These results can be explained by the finding in this study that expressed enthusiasm was positively associated with the adoption of motivating styles. However, it should be noted that this inauthentic enthusiasm expression threatens teachers' professional well-being (Taxer & Frenzel, 2018). To avoid this situation, it's crucial to meet teachers' basic needs, positively related to expressed enthusiasm and felt enthusiasm.

Concerning the "dark-side" model, self-derogation was the need-frustrating factor leading to need frustration. Suppression and emotional exhaustion were the significant factors letting teachers whose basic needs were frustrated tend to adopt more demotivating styles. Moreover, the mediation patterns revealed that need frustration had a direct and indirect influence on making teachers use demotivating styles, making it more explicit about the harmful effect of need frustration. Therefore, it should create an environment reducing need frustration and increasing need satisfaction for teachers.

#### **2.4.4 Limitations and future research**

This study is the first attempt to compare the difference in (de)motivating styles adopted by Italian teachers and Chinese teachers and the differences in the factors influencing their adoption of these (de)motivating styles. Even though the results are inspiring, this study has some limitations. First, each variable was measured simultaneously in this study, making it challenging to effectively reduce the common method bias and reveal the stable causal relationship between the variables. A longitudinal study can be considered, with multiple measurements of independent and dependent variables, to explore the causal relationships between variables deeply.

A second limitation is that this study only collected data from the teacher's perspective (single informant). Thus, it can't verify that teachers indeed use the (de)motivating styles they self-reported. At the same time, teachers rated fairly high on motivating styles (i.e., autonomy-supportive and structuring), which may be exaggerated by self-report bias (Aelterman et al., 2019). Therefore,

asking more objective informants, such as students, trained raters, principals, etc., would be informative to rate teachers' adoption of (de)motivating styles.

A third limitation is the unknown generalizability of this study's results. The dataset for this study involves teachers in Italy and China. It is unclear how possible to apply the observed hypothetical effects to teachers in other countries. Future study is encouraged to assess the generalizability of the findings of this study.

## **2.5 Conclusion**

Italian teachers tend to adopt less controlling, chaotic, and autonomy-supportive styles than Chinese teachers. Moreover, Italian teachers rated higher in the variables related to well-being and lower in the variables related to ill-being than Chinese teachers. The results suggested that the more teachers embraced self-compassion, the more their basic needs were satisfied, which is associated with reappraisal, personal accomplishment, teacher enthusiasm, and the adoption of motivating styles. However, the more teachers embraced self-derogation, the more their basic needs frustrated, which contributes to suppression, burnout, and the implementation of demotivating styles. These findings are consistent across cultures. Results of this study contribute to uncovering differences in the preferred (de)motivating styles and the factors influencing using of these (de)motivating styles in different cultures. No matter in which culture, encouraging self-compassion, enhancing need satisfaction, reducing need frustration, preventing burnout, and developing the ability to reappraisal and expressed/felt enthusiasm will make teachers more supportive. Thus then, they adopt a more motivating teaching style.

# **Chapter 3: Linking (de)motivating styles with teachers' need satisfaction, enthusiasm and students' need satisfaction: a cross-cultural study**

## **3.1 Aims and hypotheses**

This study aims to (1) investigate the difference in (de)motivating teaching styles in Italy and China; (2) assess the relationships between teacher need satisfaction and the use of (de)motivating teaching styles, and the mediating effect of teacher enthusiasm in this relationship; and (3) explore the relationships between (de)motivating teaching styles and students' need satisfaction in Italy and China.

The hypotheses of this study were put forward in the following:

**H1:** Teachers tend to adopt rather motivating (i.e., autonomy-supportive and structuring) than demotivating teaching styles (i.e., controlling and chaotic). Regarding teacher-reported results, this trend will be higher in Italian teachers than in Chinese teachers (H1a). However, teachers self-reported using more need-supportive and less need-frustrating styles to teach than students perceived (Aelterman et al., 2019). Moreover, Chinese students are less sensitive to the controlling style than Italian students. Therefore, regarding student-reported results, this trend will be smaller, not differ significantly between Italian and Chinese teachers, and is even higher in Chinese teachers (H1b).

**H2:** Teachers' need satisfaction will be positively related to motivating teaching styles (i.e., autonomy-supportive and structuring) (H2a) and negatively associated with demotivating teaching styles (i.e., controlling and chaotic) (H2b).

**H3:** Felt enthusiasm and expressed enthusiasm mediate the relationship between need satisfaction and (de)motivating teaching styles (H3).

**H4:** When teachers use motivating teaching styles (i.e., autonomy-supportive and structuring), both Italian and Chinese students report the need satisfaction (H4a). If teachers adopt demotivating teaching styles (i.e., controlling and chaotic), Italian and Chinese students or only Italian students tend to experience the need frustration since Chinese students are accustomed to the controlling style (H4b).

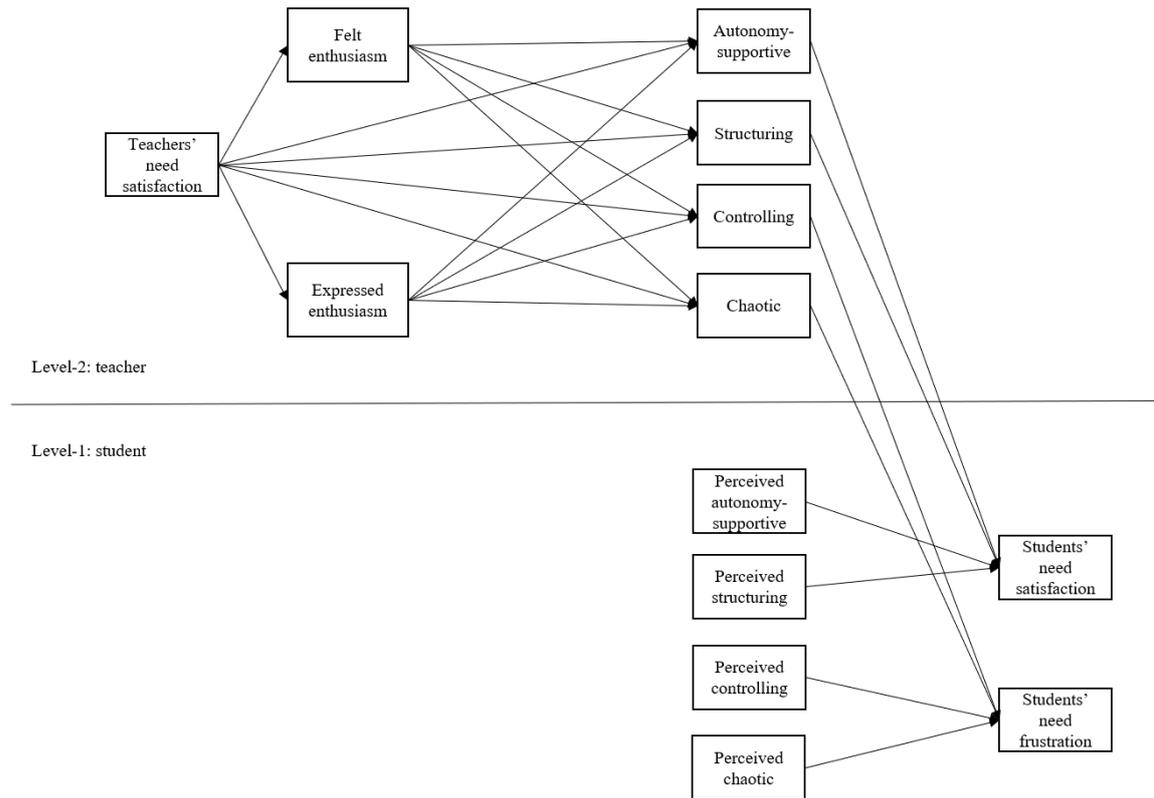


Figure 10 Hypothesized structural model for Study 2

## 3.2 Method

### 3.2.1 Participants

Teachers and their students from several middle and high schools in Italy and China participated in this study.

#### *Teacher participants*

78 Italian teachers (22 males, 28.20%) teaching different subjects in middle and high schools participated, on a voluntary basis:  $M_{\text{age}}=49.27$ ,  $SD_{\text{age}}=10.08$  (range 26-64);  $M_{\text{years of teaching}}=19.14$ ,  $SD_{\text{years of teaching}}=10.64$  (range 1-39). Also, teacher-participants included 77 Chinese middle and high school teachers, 24 males and 49 females (4 chose “other”). They averaged 32.01 ( $SD=6.97$ ) years of age and 7.98 ( $SD=7.01$ ) years of teaching experience.

#### *Student participants*

Student-participants included 1010 Italian student (367 boys,  $M_{\text{age}}=16.44$ ,  $SD_{\text{age}}=1.63$ ) and 1715 Chinese students (852 boys,  $M_{\text{age}}=15.57$ ,  $SD_{\text{age}}=1.57$ )

### 3.2.2 Measures

We had the previously used and validated Italian and Chinese versions of most questionnaires available. However, we used Brislin’s (1980) back-translation procedure for those we did not have

(i.e., those measuring the expressed enthusiasm and felt enthusiasm in both Italian and Chinese; and those assessing the work-related basic need satisfaction, and teaching styles in Chinese). The items were translated from English to Italian (or Chinese) by a researcher fluent in English and Italian (or Chinese) and were back-translated by another researcher also fluent in English and Italian (or Chinese). The third researcher, fluent in English, compared the back-translations with the original questionnaire. Discrepancies were discussed until a complete agreement was reached.

### ***Teacher measures:***

#### *Need satisfaction*

It was assessed with the Work-related Basic Need satisfaction scale (W-BNS: Van den Broeck et al., 2010). The W-BNS scale consists of 18 items (six items for each need), measuring satisfaction of three basic psychological needs: autonomy (e.g., “The tasks I have to do at work are in line with what I really want to do”), competence (e.g., “I have the feeling that I can even accomplish the most difficult tasks at work”), and relatedness (e.g., “At work, I can talk with people about things that really matter to me”). Participants were asked to answer on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). The Italian version of W-BNS has been proven to have good reliability and validity (Colledani, Capozza, Falvo & Di Bernardo, 2018). The Chinese version was created through the back-translation procedure (Brislin, 1980).

#### *Felt enthusiasm*

Ten items from Kunter et al. (2011) were used to assess teachers' enthusiasm. These items were used to measure teaching enthusiasm (e.g., "I always enjoy teaching students new things") and measure enthusiasm for teaching (e.g., "Engaging in my subject is one of my favorite activities"). Participants were asked to answer on a 5-Likert scale ranging from 1 (completely disagree) to 5 (completely agree).

#### *Expressed enthusiasm*

We devised a measure based on Murray (1983), which includes the following items with the stem “When I teach”: (a) “uses humor”; (b) “speaks expressively or emphatically”; (c) “shows facial expressions”; (d) “moves about while lecturing”; (e) “reads lecture verbatim from notes” (negative factor loading); (f) “shows energy and excitement”; (g) “smiles or laughs”; (h) “gestures with hands and arms”; (i) “shows strong interest in subject” (negative factor loading)<sup>1</sup>; (j) “avoids eye contact with students” (negative factor loading); and (k) “speaks softly” (negative factor loading). Teachers were asked to rate the frequency of occurrence of each of these behaviors on a 5-point Likert scale, ranging from 1(almost never) to 5(almost always).

#### *Teaching styles*

It was measured with the Situations-in-School (SIS) questionnaire (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:”) and four possible reactions teachers may have in each of these vignettes, corresponding to the (de)motivating teaching styles: 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

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<sup>1</sup> In Murray (1983), it was found that showing strong interest in subject was significantly negatively correlated with the overall teacher enthusiasm scores. The authors did not provide any explanation. However, the negative relationship between this item and overall teacher enthusiasm was counterintuitive and conflict with the findings of Feldman (2007) and Kunter et al., (2008) directly.

a more mature way.”), and chaotic (e.g., “Don’t worry about it—let it pass on its own.”). Teachers are asked to rate how much each possible reaction of each teaching condition describes their response to these situations on a 7-point Likert scale, ranging from 1 (does not describe me at all) to 7 (describes me extremely well). The Italian version of SIS has been proven to have good reliability and validity (Moè & Katz, 2020, 2021, 2022). The Chinese version of SIS was translated from English to Chinese by a researcher fluent in English and Chinese and was back-translated by another researcher also fluent in English and Chinese. The third research, fluent in English, compared the back-translations with the original version of SIS. Discrepancies were discussed until the complete agreement was reached.

The reliabilities of these instruments for the current samples are shown in Table 8.

### ***Student measures:***

#### *Need satisfaction and need frustration*

Students’ need satisfaction and frustration were assessed with the Italian adapted version (Costa et al., 2018) and the Chinese version (Chen et al., 2015) of the Basic Psychological Need Satisfaction and Frustration scale (BPNSNF: Chen et al., 2015). BPNSNF consists of 24 items, measuring satisfaction or frustration of three basic psychological needs: autonomy (e.g., “I feel a sense of choice and freedom in the things I undertake” or “I feel forced to do many things I wouldn’t choose to do”), relatedness (e.g., “I feel close and connected with other people who are important to me” or “I have the impression that people I spend time with dislike me”), and competence (e.g., “I feel confident that I can do things well” or “I have serious doubts about whether I can do things well”). Participants were asked to rate on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). For the aims of the present study, “at school” was added in the stem to slightly adjust the scale to reflect the learning context better.

#### *Teaching styles*

To measure students’ perception of teachers’ teaching styles, the 15 typical vignettes of the teacher-based SIS were slightly adjusted from students’ perspectives. Students were asked to rate how much each possible reaction of each teaching condition describes their teachers’ responses to these situations on a 7-point Likert scale.

The reliabilities of these instruments for the current samples are shown in Table 9.

### **3.2.3 Procedure**

This study has been approved by the local Ethics Committee and the researcher’s university. Italian teachers and their students from a wide range of schools were invited to fill in the questionnaires online in November 2020. The front page described the purpose of the study. That is to investigate the impact of (de)motivating teaching styles on students’ need satisfaction. They were told that there were no correct answers and were asked to answer the questions based on their authentic situations. In addition, they were informed that they could quit anytime they wanted, and their information and answers would be confidential. They can email the researcher if they have any questions about this study. After reading these messages, all participants signed and provided informed consent before they started filling in the questionnaires. For students, the researcher distributed a letter to students’ parents explaining the purpose of the study and providing a method for withdrawing permission. All parents gave their consent for their children to take part in this study. Afterward, the questionnaires described above were presented in the order they are described,

followed by several demographic questions (e.g., age, gender, and school type) and the thanks message. It took about 20 minutes to complete the survey. Moreover, if they would like, teachers could leave their email addresses and receive a brief report on the average results of this study and tips to motivate themselves and their students in return.

The procedures of collecting Chinese data were the same as those used in Italy, with the following difference: first, the researcher contacted Chinese teachers and their students indirectly via their headteachers; second, they completed the online survey in December 2020.

### 3.3 Analyses and results

#### 3.3.1 Preliminary analyses

First, normal distribution was assessed using histograms, skewness, and kurtosis. Except for two items in the Italian teacher sample: expressed enthusiasm item 10 (i.e., “avoids eye contact with students”; skew=-4.161, kurtosis= 19.609), chaotic teaching style item 10 (i.e., “A couple of students have been rude and disruptive. To cope, you let it go, because it is too much of a pain to intervene”; skew=3.366, kurtosis= 15.994), other items were normally distributed according to the following criteria:  $|\text{skew}| < 3$ ,  $|\text{kurtosis}| < 10$  (Kline, 2005). Therefore, these items were not included in the subsequent analysis.

I further examined the instrument's factor structure that was not validated yet by performing the confirmatory factor analysis (CFA). Finally, after the factor structures were established, the internal reliabilities, Cronbach's  $\alpha$  of each subscale, was calculated.

##### *Confirmatory Factor Analyses*

A CFA was conducted using IBM SPSS AMOS 23.0 to verify the measurement structure of those instruments that were not validated yet. The results of CFA show the degree to which the model fits the data. Multiple indicators were assessed to evaluate model fit. First, the chi-square value is the main index for assessing model fit. It reveals a good model fit if the chi-square test statistic is insignificant (Brown, 2006). However, since the chi-square value is susceptible to the sample size, it is natural that there will be significant chi-square values in practical studies (Brown, 2006). Unlike the chi-square value,  $\chi^2/\text{df}$  is not influenced by sample size. It is also used to evaluate model fit, and it is considered acceptable if the value is below 5 (Byrne, 2001). In addition, I count on multiple fit indicators, including the comparative fit index (CFI), the Incremental Fit Index (IFI), and the root mean square error of approximation (RMSEA). The values of CFI and IFI range from 0 to 1. If CFI and IFI values are above 0.90, it indicates a good model fit; if they are above 0.95, it shows an excellent model fit (Hu & Bentler, 1999). RESEA suggests a good fit if the value is below 0.08, and it is considered an ideal model fit if the value is below 0.05 (Hu & Bentler, 1999; Kline, 2011). A significant test ( $t$ -test) for factor loading was also used. Significant factor loadings and standard coefficients above 0.30 (or 0.40) are considered good items for underlying structure (Brown, 2006).

##### *(1) Work-related basic need satisfaction*

The 18-item structure of the W-BNS was analyzed using CFA. The results of the Chinese teachers showed that the model fit was poor ( $\chi^2 (126) = 243.688$ ,  $\chi^2/\text{df} = 1.934$ ,  $p < .001$ ; CFI= .757; IFI= .770; RESEA= .111). The following items were not included in the following analyses since

the factor loadings lowered the recommended minimum of 0.40 (Brown, 2006): autonomy need frustration item 2 (.05, i.e., “If I could choose, I would do things at work differently”), and relatedness need satisfaction item 3 (.26, i.e., “At work, I feel part of a group”). Besides, although the factor loading of competence need satisfaction item 1 (.48, i.e., “I really master my tasks at my job”) was higher than .40, deleting it improved the model fit ( $\chi^2(84) = 134.962$ ,  $\chi^2/df = 1.607$ ,  $p < .001$ ; CFI= .871; IFI= .878; RESEA= .089). The range of t-value for factor loadings was from 2.88 to 5.69, which indicated that all items were significant ( $p < .01$ ). As presented in Figure 11, the completely standardized loadings ranged from .42 to .83. Therefore, the proposed model fits well with the observed data.

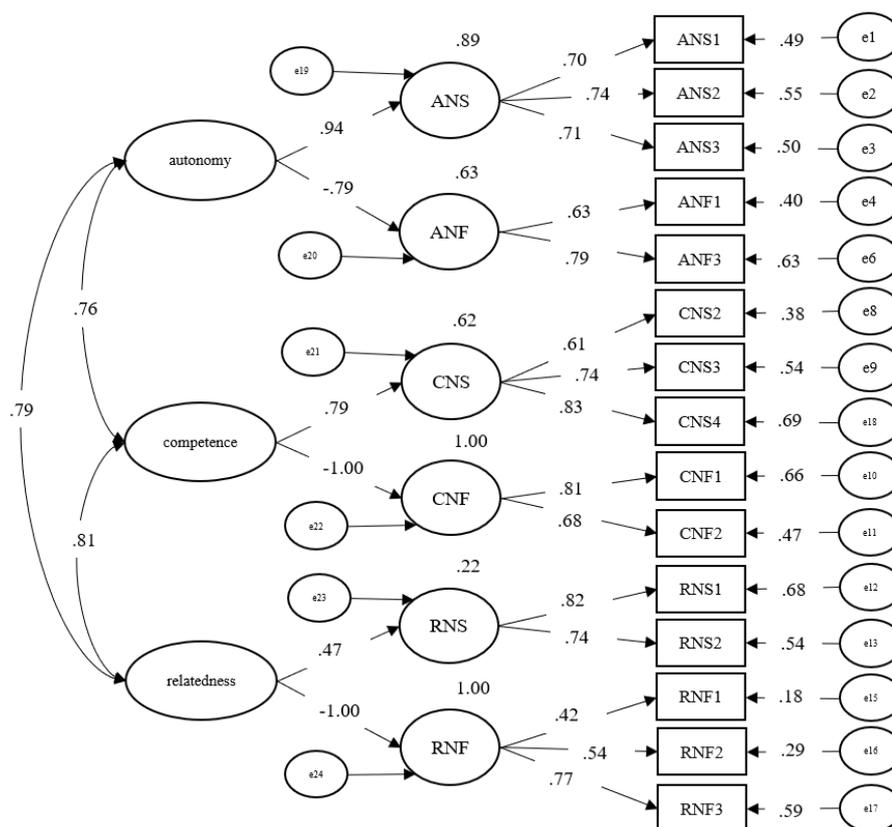


Figure 11 Latent factor solution of Chinese teachers (N=77) for the work-related basic need satisfaction

All factor loadings are completely standardized. ANS=autonomy need satisfaction; ANF=autonomy need frustration; CNS=competence need satisfaction; CNF=competence need frustration; RNS=relatedness need satisfaction; RNF=relatedness need frustration.

## (2) *felt enthusiasm*

The 10-item structure of felt enthusiasm was analyzed using CFA. The results of the Italian teachers showed that the model did not provide a good fit for the data ( $\chi^2(35) = 111.154$ ,  $\chi^2/df = 3.176$ ,  $p < .001$ ; CFI= .853; IFI= .856; RESEA= .168). Post-hoc model modification indices proposed the estimation of error covariances between items 1 and 6 and items 2 and 9. Moreover, although the factor loadings of items 4 (.82, i.e., “I really enjoy teaching”) and 7 (.71, i.e., “I enjoy interacting with students”) were higher than the recommended minimum of 0.40 (Brown, 2006), the model fit improved and became acceptable ( $\chi^2(18) = 25.105$ ,  $\chi^2/df = 1.395$ ,  $p = .122$ ; CFI= .980; IFI= .981;

RESEA= .072). The range of t-value for factor loadings was from 5.07 to 7.85, which indicated that all items were significant ( $p < .001$ ). Figure 12(a) shows that the completely standardized loadings ranged from .59 to .90. In conclusion, the proposed model fits well with the observed data.

The Goodness-of-fit of the initial CFA model of the Chinese teachers indicated that there is scope for improvement ( $\chi^2(35) = 127.792$ ,  $\chi^2/df = 3.651$ ,  $p < .001$ ; CFI= .868; IFI= .869; RESEA= .187). Post-hoc model modification indices proposed the estimation of error covariances between items 2 and 3. Besides, the factor loadings of item 1 (.74, i.e., “Engaging in my subject is one of my favourite activities”) and 9 (.76, i.e., “It is a pleasure to teach”) higher than the recommended minimum of 0.40 (Brown, 2006), deleting them improved the model fit ( $\chi^2(19) = 29.340$ ,  $\chi^2/df = 1.544$ ,  $p = .061$ ; CFI= .980; IFI= .981; RESEA= .085). The range of t-value for factor loadings was from 6.13 to 13.68, which indicated that all items were significant ( $p < .001$ ). Figure 12(b) shows that the completely standardized loadings ranged from .65 to .92. Thus, the results of the CFA suggest a good fit between the proposed model and the observed data.

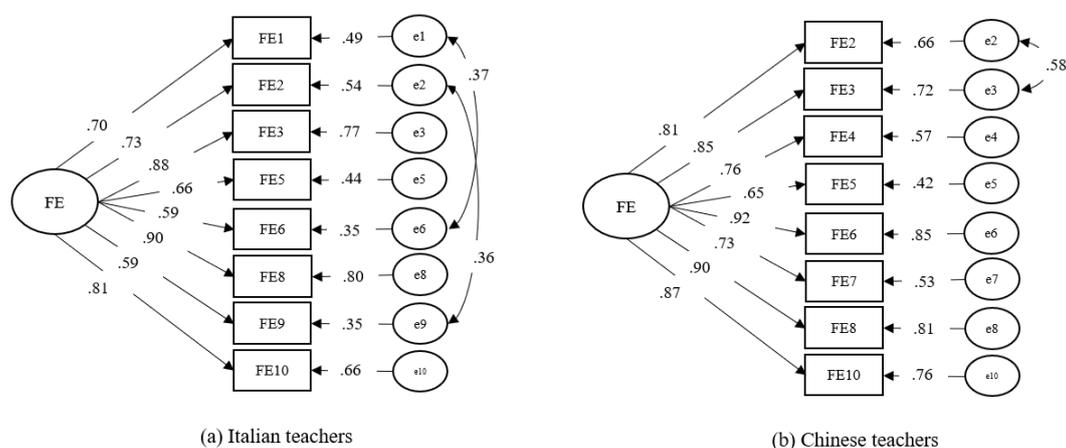


Figure 12 Latent factor solution of Italian teachers (N=78) and Chinese teachers (N=77) for the felt enthusiasm

All factor loadings are completely standardized. FE=felt enthusiasm.

### (3) expressed enthusiasm

The 11-item structure of expressed enthusiasm was analyzed using CFA. The results of the Italian teachers showed that there is scope for improvement ( $\chi^2(35) = 48.714$ ,  $\chi^2/df = 1.392$ ,  $p = .062$ ; CFI= .935; IFI= .938; RESEA= .071). The following items were not included in the following analyses since the factor loading lowered the recommended minimum of 0.40 (Brown, 2006): items 4(.39), 5(-.14), and 11(.27). Post-hoc model modification indices proposed the estimation of error covariances between items 2 and 6. With these modifications, the model fit improved and became satisfactory ( $\chi^2(13) = 19.189$ ,  $\chi^2/df = 1.476$ ,  $p = .117$ ; CFI= .968; IFI= .969; RESEA= .079). The range of t-value for factor loadings was from 4.33 to 6.37, which indicated that all items were significant ( $p < .001$ ). As presented in Figure 13(a), the completely standardized loadings ranged from .53 to .80. Therefore, the results of the CFA suggest a good fit between the proposed model and the observed data.

Similarly, the results of the Chinese teachers showed that the model fit was poor ( $\chi^2(44) = 113.754$ ,  $\chi^2/df = 2.585$ ,  $p < .001$ ; CFI= .802; IFI= .808; RESEA= .144). The following items were not included in the following analyses since the factor loading lowered the recommended minimum

of 0.40 (Brown, 2006): items 5 (.17), 10(.33), and 11(.37). Besides, item 9 was also deleted since it was contrary to the proposed model (-.62). Moreover, post-hoc model modification indices proposed the estimation of error covariances between items 1 and 2 and between items 1 and 3. With these modifications, the model fit improved ( $\chi^2(12) = 19.184$ ,  $\chi^2/df = 1.599$ ,  $p = .084$ ; CFI = .972; IFI = .973; RESEA = .089). The range of t-value for factor loadings was from 4.15 to 7.70, which indicated that all items were significant ( $p < .001$ ). As presented in Figure 13(b), the completely standardized loadings ranged from .49 to .87. In conclusion, the results of the CFA suggest a good fit between the proposed model and the observed data.

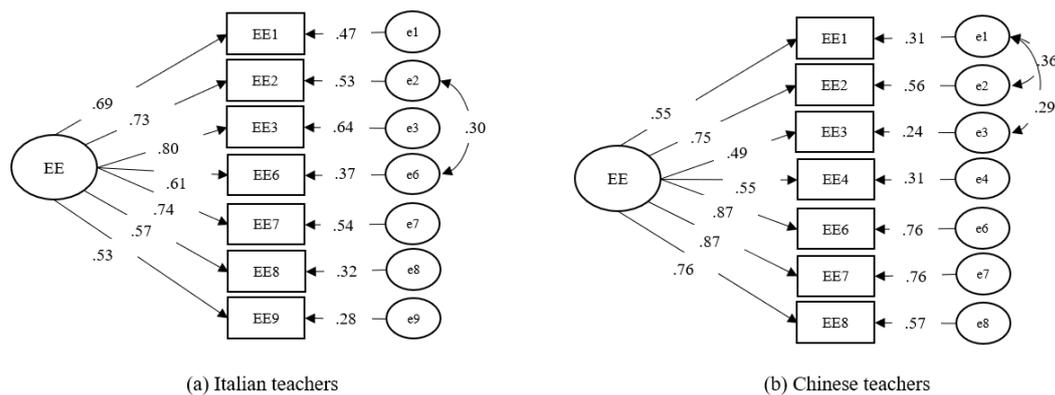


Figure 13 Latent factor solution of Italian teachers (N=78) and Chinese teachers (N=77) for the expressed enthusiasm

All factor loadings are completely standardized. EE=expressed enthusiasm.

#### (4) teaching styles

The results of the Chinese teachers showed that the model fit was poor ( $\chi^2(1704) = 3424.007$ ,  $\chi^2/df = 2.009$ ,  $p < .001$ ; CFI = .616; IFI = .622; RESEA = .115). The following items were not included in the following analyses since the factor loadings lowered the recommended minimum of 0.40 (Brown, 2006): items 1 (structuring 1: .34, and chaotic 1: .05), 2 (chaotic 2: .28), 4 (chaotic 4: -.04), 5 (controlling 5: .37), and 14 (autonomy-supportive 15: .22). Besides, although the factor loadings of the following items were higher than .40, deleting them improved the model fit: items 3, 7, 8, 9, 11, and 15. With these modifications, the model fit improved and became acceptable ( $\chi^2(98) = 151.780$ ,  $\chi^2/df = 1.549$ ,  $p < .001$ ; CFI = .939; IFI = .940; RESEA = .085). The range of t-value for factor loadings was from 3.77 to 10.75, which indicated that all items were significant ( $p < .001$ ). Figure 14(a) shows that the completely standardized loadings ranged from .49 to .92. Therefore, the results of the CFA suggest a good fit between the proposed model and the observed data.

The results of the Chinese students showed that the model fit was poor ( $\chi^2(1704) = 11948.151$ ,  $\chi^2/df = 7.012$ ,  $p < .001$ ; CFI = .766; IFI = .767; RESEA = .059). The following items were not included in the following analyses since the factor loadings lowered the recommended minimum of 0.40 (Brown, 2006): items 1 (controlling 1: .34, and chaotic 1: .16), 2 (chaotic 2: .20), 3 (chaotic 3: .31), 4 (chaotic 4: -.06), 5 (controlling 5: .34), 7 (chaotic 7: .28), 9 (structuring 9: .31), 14 (controlling 14: .38), and 15 (autonomy-supportive 15: .27). Moreover, post-hoc model modification indices proposed the estimation of error covariances between autonomy-supportive items 6 and 8, 6 and 11, and 8 and 11; structuring items 6 and 8, 6 and 11, and chaotic items 6 and 8. With these modifications, the model fit improved ( $\chi^2(239) = 1847.715$ ,  $\chi^2/df = 7.731$ ,  $p < .001$ ; CFI = .903; IFI = .903; RESEA = .063). The range of t-value for factor loadings was from 12.59 to 31.04, which indicate

that all items were significant ( $p < .001$ ). As presented in Figure 14(b), the completely standardized loadings ranged from .41 to .82. Therefore, the results of the CFA suggest a good fit between the proposed model and the observed data.

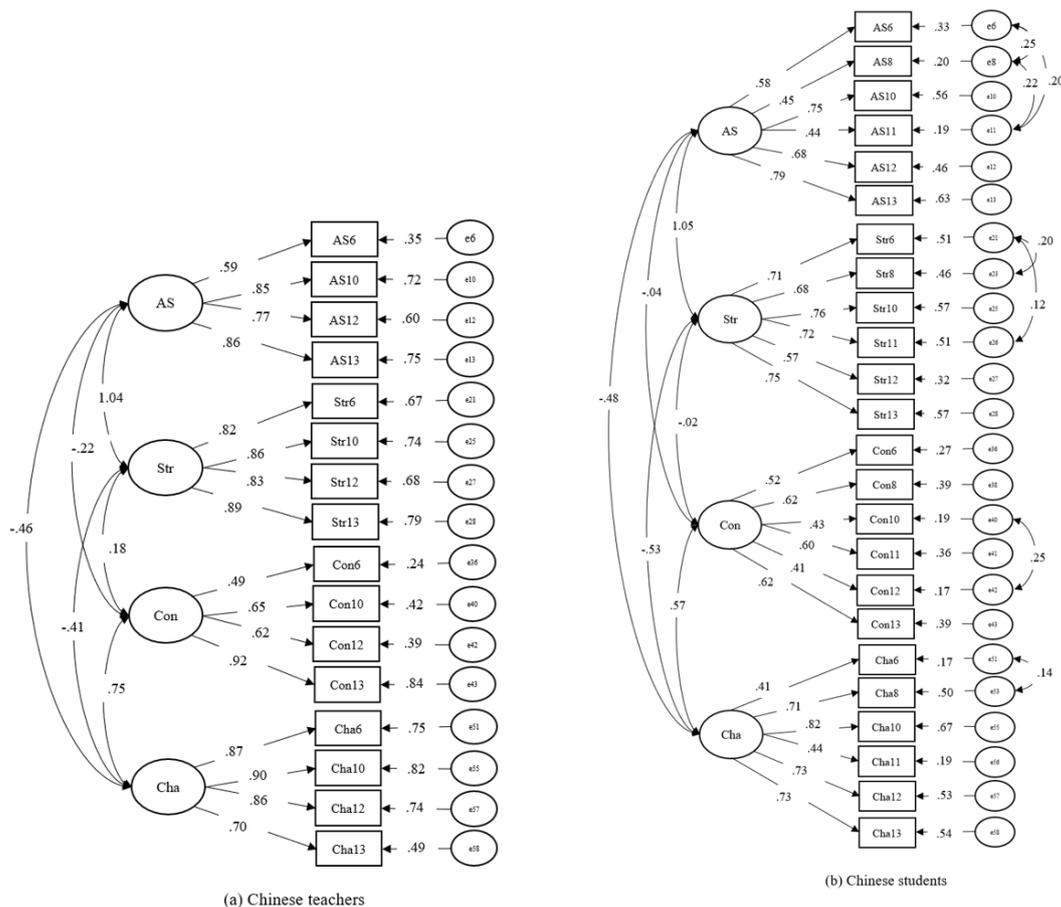


Figure 14 Latent factor solution of Chinese teachers (N=77), and their students (N=1715) for teaching styles

All factor loadings are completely standardized. AS=autonomy-supportive; Str=structuring; Con=controlling; Cha=chaotic.

#### Teachers' and student's demographics characteristics

Before the primary analyses, I analyzed the possible associations between age, gender, and 7 teacher-reported dependent variables and 6 student-reported dependent variables to see if there is any need to control these demographics characteristics in the following analyses.

For teachers' demographic characteristics, Italian teachers' age was associated with 3 of the 7 dependent variables, while Chinese teachers' age was associated with 1 of the 7 dependent variables. Neither Italian nor Chinese teachers' gender was associated with these dependent variables. Since age and gender were not associated with most teacher-reported dependent variables, they were not controlled as covariates in the analyses of teacher-reported dependent measures.

For students' demographic characteristics, Italian students' age was related to 2 of the 6 dependent variables, with older students reporting lower need satisfaction ( $r = -.11, p < .001$ ) and higher need frustration ( $r = .10, p = .002$ ). Also, gender was associated with 4 of the 6 dependent

variables, with girls reporting higher need frustration ( $r=.19, p<.001$ ), lower need satisfaction ( $r=-.08, p=.01$ ), perceived controlling ( $r=-.10, p=.002$ ), and chaotic styles ( $r=-.08, p=.02$ ) than male students. Chinese students' age was related to 5 of the 6 dependent variables. Older students scored lower in need frustration ( $r=-.09, p<.001$ ) and higher in need satisfaction ( $r=.18, p<.001$ ), autonomy-supportive style ( $r=.17, p<.001$ ), structuring style ( $r=.11, p<.001$ ), and controlling style ( $r=.08, p=.001$ ). Gender was associated with 3 of the 6 dependent variables, with girls reporting lower need satisfaction ( $r=-.10, p<.001$ ), perceived controlling ( $r=-.22, p<.001$ ), and chaotic styles ( $r=-.18, p<.001$ ) than boys. Age and gender were controlled as covariates in all subsequent analyses given these associations.

### 3.3.2 Descriptive Statistics

Descriptive statistics and Pearson correlations among all the variables were calculated by IBM SPSS Statistics 25.0. The item number, means, standard deviations, skewness, kurtosis, and Cronbach's alphas for teachers and their students were presented in Tables 8 and 9. The data were normally distributed across variables based on the following criteria:  $|\text{skew}|<3$ ,  $|\text{kurtosis}|<10$  (Kline, 2005).

In general, teachers reported moderate need satisfaction. Compared with Chinese teachers, Italian teachers' need satisfaction was slightly higher. Both teachers' expressed enthusiasm and felt enthusiasm was high, and the Italian teachers reported a little higher than the Chinese teachers did. In terms of (de)motivating teaching styles, teachers reported reasonably high levels of autonomy-supportive and structuring styles. Italian teachers reported reasonably low controlling and chaotic styles, whereas Chinese teachers reported moderate controlling and chaotic styles. Both Italian and Chinese teachers reported higher autonomy-supportive and structuring styles than controlling and chaotic styles. Therefore, teachers tend to adopt motivating rather than demotivating teaching styles.

Students reported moderately high need satisfaction and relatively low need frustration. Italian students' need satisfaction was slightly higher, and need frustration was somewhat lower than Chinese students. Concerning (de)motivating teaching styles, students perceived high structuring style, moderate autonomy-supportive and controlling styles, and low chaotic style. As teachers reported, students perceived higher motivating teaching styles than demotivating ones.

### 3.3.3 The differences between Italian and Chinese teachers and students

The means comparisons between Italian and Chinese teachers and students are presented in Table 8 and Table 9, respectively. Italian teachers self-reported more need satisfaction and more felt and expressed enthusiasm than Chinese teachers. Regarding (de)motivating teaching styles, Italian teachers reported adopting a less autonomy-supportive teaching style, a less structuring teaching style, a less controlling teaching style, and a less chaotic teaching style than Chinese teachers.

Italian students reported more need frustration, and less need satisfaction than Chinese students. In terms of (de)motivating teaching styles, Italian students self-reported they perceived a less autonomy-supportive, less structuring, and less controlling teaching style. However, there was no significant difference in perceived chaotic teaching style between Italian and Chinese

students.

To investigate H1, I calculated a relative motivating style index.

$$\text{Relative motivating style index} = (\text{autonomy-supportive} + \text{structuring}) - (\text{controlling} + \text{chaotic}) \quad (1)$$

The results of the independent samples t-test showed that Italian teachers' relative motivating style index ( $M=4.91$ ,  $SD=1.87$ ) was significantly higher than that of Chinese teachers ( $M=3.95$ ,  $SD=3.29$ ),  $t(120)=2.22$ ,  $p=.03$ . It suggested that even though Italian and Chinese teachers tend to use somewhat motivating than demotivating teaching styles (both relative motivating style indexes were higher than 0), this trend was higher for Italian teachers, confirming H1a.

The results of the analysis of covariance (ANCOVA) showed that Italian students perceived relative motivating style index ( $M=1.60$ ,  $SD=2.97$ ) was significantly lower than that of Chinese students ( $M=3.71$ ,  $SD=2.90$ ),  $F(1, 2721)=368.27$ ,  $p<.001$ ,  $\eta_p^2=.12$ . Just like teachers reported, students perceived somewhat motivating than demotivating teaching styles. However, instead Italian students, this trend was significantly higher for Chinese students perceived. Thus, H1b was supported.

### 3.3.4 Correlations across variables

Pearson's correlations for all variables were presented in Tables 10 and 11.

The relationships between teachers' need satisfaction and motivating teaching styles (i.e., autonomy-supportive and structuring) were positively significant, confirming H2a. Chinese teachers' need satisfaction was negatively associated with the adoption of controlling and chaotic teaching styles. However, the relationships between Italian teachers' need satisfaction and demotivating teaching styles were insignificant. Therefore, H2b was confirmed in Chinese teachers but not in Italian teachers.

Table 8 Descriptive Statistics of all variables for Italian and Chinese teachers

| Variable                        | Italian teachers (N=78) |          |           |          |          |                  | Chinese teachers (N=77) |          |           |          |          |                  | Comparison |          |
|---------------------------------|-------------------------|----------|-----------|----------|----------|------------------|-------------------------|----------|-----------|----------|----------|------------------|------------|----------|
|                                 | item number             | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | item number             | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | <i>t</i>   | <i>p</i> |
| Need Satisfaction               | 18                      | 3.88     | .46       | -.71     | .71      | .85              | 15                      | 3.69     | .56       | .20      | -.66     | .86              | 2.36       | .020     |
| Felt enthusiasm                 | 8                       | 4.39     | .57       | -1.60    | 4.83     | .89              | 8                       | 4.19     | .57       | -.01     | -.40     | .94              | 2.17       | .032     |
| Expressed enthusiasm            | 7                       | 4.11     | .56       | -1.18    | 3.99     | .85              | 7                       | 3.86     | .58       | .40      | -.60     | .87              | 2.79       | .006     |
| Autonomy-supportive structuring | 14                      | 4.63     | .83       | -.09     | -.48     | .86              | 4                       | 5.46     | .94       | -.22     | -.56     | .85              | -5.86      | <.001    |
| controlling chaotic             | 14                      | 5.08     | .79       | -.14     | .02      | .88              | 4                       | 5.60     | .90       | -.19     | -.76     | .91              | -3.80      | <.001    |
|                                 | 14                      | 2.86     | .72       | .43      | .81      | .79              | 4                       | 4.12     | 1.17      | -.14     | -.16     | .77              | -8.02      | <.001    |
|                                 | 14                      | 1.94     | .52       | .88      | 1.12     | .77              | 4                       | 2.99     | 1.42      | .48      | -.54     | .90              | -6.10      | <.001    |

Table 9 Descriptive Statistics of all variables for Italian and Chinese students, with age and gender as covariates

| Variable                      | Italian students (N=1010) |          |           |          |          |                  | Chinese students (N=1715) |          |           |          |          |                  | Comparison |          |            |
|-------------------------------|---------------------------|----------|-----------|----------|----------|------------------|---------------------------|----------|-----------|----------|----------|------------------|------------|----------|------------|
|                               | item number               | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | item number               | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | Cronbach's alpha | <i>F</i>   | <i>p</i> | $\eta_p^2$ |
| Need Satisfaction             | 12                        | 3.52     | .53       | -.55     | .71      | .82              | 12                        | 3.80     | .60       | -.27     | 1.02     | .89              | 149.31     | <.001    | .05        |
| Need Frustration              | 12                        | 2.76     | .62       | .25      | -.13     | .81              | 12                        | 2.42     | .76       | .13      | -.16     | .91              | 127.37     | <.001    | .05        |
| Perceived autonomy-supportive | 15                        | 3.78     | 1.02      | -.10     | .21      | .91              | 6                         | 5.21     | 1.00      | -.31     | .20      | .80              | 1293.35    | <.001    | .32        |
| Perceived structuring         | 15                        | 4.14     | 1.02      | -.16     | .40      | .92              | 6                         | 5.57     | .95       | -.56     | .66      | .86              | 1261.13    | <.001    | .33        |
| Perceived controlling         | 15                        | 3.47     | .91       | .11      | .28      | .86              | 6                         | 4.20     | 1.09      | -.19     | .35      | .72              | 276.36     | <.001    | .09        |
| Perceived chaotic             | 15                        | 2.85     | .93       | .50      | .35      | .87              | 6                         | 2.87     | 1.13      | .57      | .32      | .80              | .97        | .330     | .00        |

Table 10 Correlations across the research variables for Italian and Chinese teachers

| variables              | 1      | 2      | 3      | 4      | 5      | 6     | 7       |
|------------------------|--------|--------|--------|--------|--------|-------|---------|
| 1.need satisfaction    | —      | .71*** | .46*** | .64*** | .58*** | -.24* | -.38**  |
| 2.felt enthusiasm      | .50*** | —      | .54*** | .70*** | .65*** | -.03  | -.32**  |
| 3.expressed enthusiasm | .37**  | .59*** | —      | .45*** | .42*** | -.05  | -.28*   |
| 4.autonomy-supportive  | .33**  | .51*** | .57*** | —      | .91*** | -.03  | -.40*** |
| 5.structuring          | .41*** | .55*** | .63*** | .75*** | —      | -.01  | -.41*** |
| 6.controlling          | -.03   | .11    | .05    | .01    | .19    | —     | .59***  |
| 7.chaotic              | -.05   | -.36** | -.20   | -.24*  | -.27*  | .30** | —       |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $P < .001$ . The Italian teachers' results are below diagonal, and the Chinese teachers' results are above diagonal.

Table 11 Correlations across the research variables for Italian and Chinese students, with age and gender as covariates

|                                 | 1       | 2       | 3       | 4       | 5      | 6       |
|---------------------------------|---------|---------|---------|---------|--------|---------|
| 1.need satisfaction             | —       | -.57*** | .40***  | .38***  | -.04   | -.18*** |
| 2.need frustration              | -.65*** | —       | -.35*** | -.37*** | .20*** | .30***  |
| 3.perceived autonomy-supportive | .31***  | -.21*** | —       | .81***  | .03    | -.27*** |
| 4.perceived structuring         | .35***  | -.22*** | .90***  | —       | .02    | -.39*** |
| 5.perceived controlling         | -.11*** | .22***  | -.20*** | -.17*** | —      | .44***  |
| 6.perceived chaotic             | -.26*** | .26***  | -.38*** | -.48*** | .54*** | —       |

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $P < .001$ . The Italian students' results are below diagonal, and the Chinese students' results are above diagonal.

### 3.3.5 The mediating effects of teacher enthusiasm

The least squares regression analysis (ordinary least squares, OLS) was used to analyze the relationships among teachers' need satisfaction, teacher enthusiasm, and (de)motivating teaching styles at the teacher level (level 2). Moreover, to test the mediation hypothesis (H3)—whether felt enthusiasm and expressed enthusiasm mediated the direct effect of teacher need satisfaction on the adoption of (de)motivating teaching styles, maximum likelihood estimation with bootstrapping was used. The new samples (with replacement) were extracted with 10000 resamples with 95% Bias-corrected confidence interval bootstrap (Preacher & Hayes, 2004). Teachers' need satisfaction was treated as an exogenous variable, the adoptions of (de)motivating teaching styles as endogenous variables, and felt enthusiasm and expressed enthusiasm as parallel mediators.

The direct and indirect effects are shown in Tables 12 and 13. For Italian teachers, teachers' need satisfaction did not have a direct impact on the adoption of (de)motivating teaching styles ( $\beta = .063$ ,  $\beta = .136$ ,  $\beta = -.107$ , and  $\beta = .176$ , ns, autonomy-supportive, structured, controlled, and chaotic, respectively). However, it via felt enthusiasm to predict the adoption of autonomy-supportive ( $\beta = .122$ , 95% biased CI [.004, .283]), structuring ( $\beta = .112$ , 95% biased CI [.016, .254]), and chaotic

styles ( $\beta = -.221$ , 95% biased CI  $[-.443, -.073]$ ), and via expressed enthusiasm to predict the adoption of autonomy-supportive ( $\beta = .160$ , 95% biased CI  $[.045, .332]$ ) and structuring styles ( $\beta = .177$ , 95% biased CI  $[.048, .353]$ ).

For Chinese teachers, teachers' need satisfaction directly affected autonomy-supportive ( $\beta = .266$ ,  $p = .019$ ), structuring ( $\beta = .222$ ,  $p = .070$ ), controlling ( $\beta = -.447$ ,  $p = .004$ ), and chaotic styles ( $\beta = -.289$ ,  $p = .055$ ). At the same time, need satisfaction via felt enthusiasm to predict the adoption of autonomy-supportive ( $\beta = .341$ , 95% biased CI  $[.179, .545]$ ) and structuring styles ( $\beta = .329$ , 95% biased CI  $[.147, .546]$ ).

For the final results of the mediating effects of teacher enthusiasm, please see Figure 15 (Italian teachers) and 7 (Chinese teachers). In conclusion, Italian teachers felt enthusiasm only mediated the relationships between need satisfaction and autonomy-supportive, structuring, and chaotic styles, while expressed enthusiasm only mediated the relationships between need satisfaction and autonomy-supportive and structuring styles. Chinese teachers felt enthusiasm only mediated the relationship between need satisfaction and motivating styles. However, expressed enthusiasm did not mediate the relationship between need satisfaction and the adoption of (de)motivating teaching styles. Thus, H3 was partly supported.

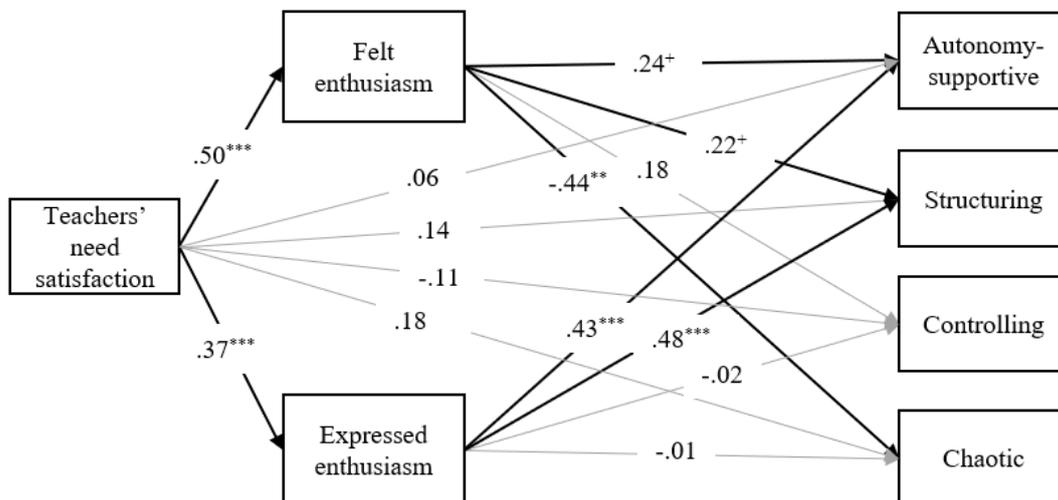


Figure 15 The final results of the mediating effects of teacher enthusiasm for Italian teachers. Black bolded lines indicate a significant relation, while gray lines indicate that no significant associations were found.  $^+ p < .1$ ,  $* p < .05$ ,  $** p < .01$ ,  $*** p < .001$ .

Table 12 The results of direct effects

| Path                 |   | Italian teachers (N=78) |       |              |          |          | Chinese teachers (N=77) |       |              |          |          |       |
|----------------------|---|-------------------------|-------|--------------|----------|----------|-------------------------|-------|--------------|----------|----------|-------|
|                      |   | Unst. Estimate          | S.E.  | St. Estimate | <i>t</i> | <i>P</i> | Unst. Estimate          | S.E.  | St. Estimate | <i>t</i> | <i>P</i> |       |
| need satisfaction    | → | felt enthusiasm         | .617  | .122         | .501     | 5.077    | <.001                   | .718  | .082         | .710     | 8.800    | <.001 |
| need satisfaction    | → | expressed enthusiasm    | .450  | .128         | .372     | 3.515    | <.001                   | .475  | .105         | .462     | 4.539    | <.001 |
| need satisfaction    | → | autonomy supportive     | .108  | .187         | .063     | .575     | .565                    | .444  | .189         | .266     | 2.352    | .019  |
| need satisfaction    | → | structuring             | .223  | .166         | .136     | 1.344    | .179                    | .353  | .194         | .222     | 1.815    | .070  |
| need satisfaction    | → | controlling             | -.167 | .204         | -.107    | -.822    | .411                    | -.934 | .326         | -.447    | -2.866   | .004  |
| need satisfaction    | → | chaotic                 | .200  | .139         | .176     | 1.438    | .150                    | -.731 | .381         | -.289    | -1.916   | .055  |
| felt enthusiasm      | → | autonomy supportive     | .339  | .175         | .243     | 1.936    | .053                    | .793  | .197         | .480     | 4.028    | <.001 |
| felt enthusiasm      | → | structuring             | .297  | .155         | .224     | 1.914    | .056                    | .731  | .203         | .464     | 3.605    | <.001 |
| felt enthusiasm      | → | controlling             | .229  | .190         | .181     | 1.202    | .230                    | .600  | .340         | .290     | 1.766    | .077  |
| felt enthusiasm      | → | chaotic                 | -.406 | .130         | -.441    | -3.132   | .002                    | -.129 | .398         | -.052    | -3.26    | .745  |
| expressed enthusiasm | → | autonomy supportive     | .610  | .166         | .430     | 3.670    | <.001                   | .115  | .153         | .071     | .751     | .453  |
| expressed enthusiasm | → | structuring             | .642  | .147         | .475     | 4.357    | <.001                   | .104  | .158         | .067     | .658     | .510  |
| expressed enthusiasm | → | controlling             | -.029 | .181         | -.023    | -.162    | .871                    | -.007 | .265         | -.004    | -.028    | .978  |
| expressed enthusiasm | → | chaotic                 | -.006 | .123         | -.006    | -.047    | .962                    | -.285 | .310         | -.116    | -.919    | .358  |

Table 13 The results of indirect effects

| Path              |   |  | Italian teachers (N=78) |      |                       |       |          | Chinese teachers (N=77) |      |                       |       |          |
|-------------------|---|--|-------------------------|------|-----------------------|-------|----------|-------------------------|------|-----------------------|-------|----------|
|                   |   |  | Estimate                | SE   | Bias-corrected 95% CI |       |          | Estimate                | SE   | Bias-corrected 95% CI |       |          |
|                   |   |  |                         |      | Lower                 | Upper | <i>P</i> |                         |      | Lower                 | Upper | <i>P</i> |
| need satisfaction | → | felt enthusiasm → autonomy-supportive      | .122                    | .126 | .004                  | .283  | .042     | .341                    | .159 | .179                  | .545  | <.001    |
| need satisfaction | → | felt enthusiasm → structuring              | .112                    | .103 | .016                  | .254  | .022     | .329                    | .166 | .147                  | .546  | .001     |
| need satisfaction | → | felt enthusiasm → controlling              | .091                    | .116 | -.039                 | .241  | .149     | .206                    | .257 | -.010                 | .465  | .062     |
| need satisfaction | → | felt enthusiasm → chaotic                  | -.221                   | .113 | -.443                 | -.073 | .002     | -.037                   | .252 | -.236                 | .161  | .697     |
| need satisfaction | → | expressed enthusiasm → autonomy-supportive | .160                    | .127 | .045                  | .332  | .007     | .033                    | .077 | -.047                 | .140  | .382     |
| need satisfaction | → | expressed enthusiasm → structuring         | .177                    | .134 | .048                  | .353  | .007     | .031                    | .074 | -.048                 | .141  | .386     |
| need satisfaction | → | expressed enthusiasm → controlling         | -.008                   | .085 | -.149                 | .082  | .732     | -.002                   | .136 | -.127                 | .137  | .940     |
| need satisfaction | → | expressed enthusiasm → chaotic             | -.002                   | .050 | -.110                 | .077  | .878     | -.054                   | .166 | -.207                 | .064  | .292     |

Entries are standardized coefficient estimates (95% confidence interval).

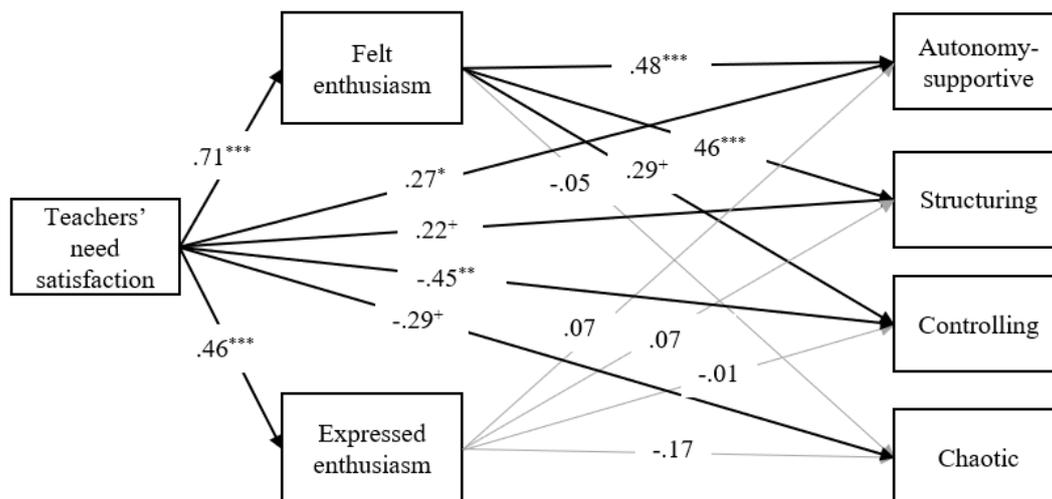


Figure 16 The final results of the mediating effects of teacher enthusiasm for Chinese teachers. Black bolded lines indicate a significant relation, while gray lines indicate that no significant associations were found.  $^+ p < .1$ ,  $^* p < .05$ ,  $^{**} p < .01$ ,  $^{***} p < .001$ .

### 3.3.6 (De)motivating teaching styles and students' need satisfaction/frustration

Since student data were nested within the teacher (or classroom), before testing H4, I calculated the intra-class correlation coefficients (ICCs) using hierarchical linear modeling (HLM 6.08) to estimate how much of the total variance in the dependent measures could be attributed to teachers. The ICCs associated with student-assessed dependent measures calculated from unconditional models (null models) were as follows: Italian students' need satisfaction, 5.0%; Italian students' need frustration, 9.1%; Chinese students' need satisfaction, 9.7%; Chinese students' need frustration, 5.6%. Concerning these meaningful between-teacher effects (MICCs=7.4%), I used multilevel modeling to represent the data's nested nature and attempted to eliminate "between-teacher" effects partially.

The data had a two-level hierarchical structure, with students (level 1) nested within teachers (level 2). At level 1 (between students), students' age and gender were entered as group-centered and uncentered covariates, respectively. All the Predictor variables (level 1 and level 2) were entered as uncentered to test the impact on students' need satisfaction/frustration.

#### (1) Italian students' need satisfaction as outcome variable

First, include students' age and gender. Results revealed that the relationship between students' age and need satisfaction was insignificant ( $\beta = -.05$ ,  $p = .11$ ). However, the results showed that the girls ( $M = 3.49$ ,  $SD = .53$ ) reported lower need satisfaction than the boys ( $M = 3.57$ ,  $SD = .53$ ),  $\beta = -.07$ ,  $p = .04$ .

Next, the relationships between teachers' autonomy-supportive and structuring styles (at both student and teacher levels) and students' need satisfaction were tested (controlling for students' age and gender). Neither teacher-reported autonomy-supportive nor structuring styles had a significant relationship with students' need satisfaction (autonomy-supportive:  $\beta = -.00$ ,  $p = .99$ ; structuring:  $\beta = .03$ ,  $p = .44$ ). The relation between students' perceived autonomy-supportive style and need

satisfaction was insignificant ( $\beta=.01, p=.89$ ). However, the relationship between students' perceived structuring style and need satisfaction was significant ( $\beta=.17, p<.001$ ).

(2) *Italian students' need frustration as outcome variable*

First, include students' age and gender. Results indicated that students' age was not associated with need frustration ( $\beta=.05, p=.12$ ). However, the relationship between students' gender and need frustration was significant ( $\beta=.25, p<.001$ ). Notably, compared with the boys ( $M= 2.60, SD=.58$ ), girls reported higher need frustration ( $M= 2.85, SD=.62$ ).

Next, controlling and chaotic styles (at both levels) were included in the multilevel model to investigate the relationship between teachers' demotivating teaching styles and students' need frustration. Results revealed that both teacher-report controlling and chaotic styles were not significantly related to students' need frustration (controlling:  $\beta=.03, p=.46$ ; chaotic:  $\beta=.00, p=.96$ ). On the contrary, both students' perceived controlling and chaotic styles had a positive and significant relationship with their need frustration (controlling:  $\beta=.07, p=.004$ ; chaotic:  $\beta=.13, p<.001$ ).

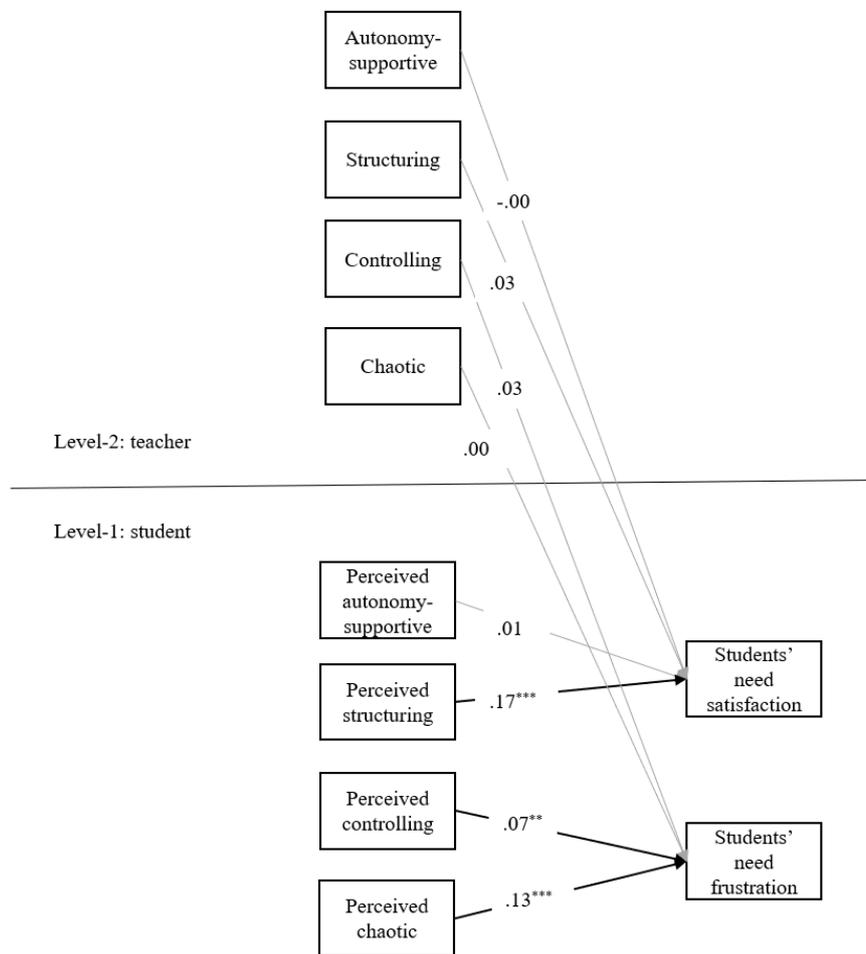


Figure 17 The final results of Italian samples with controlling students' age and gender. Black bolded lines indicate a significant relation, while gray lines indicate that no significant associations were found. \*\*  $p<.01$ , \*\*\*  $p<.001$ .

(3) *Chinese students' need satisfaction as outcome variable*

First, include students' age and gender. Inclusion of students' age revealed that there wasn't a

significant relationship between students' age and need satisfaction ( $\beta=.01, p=.99$ ). However, results indicated that the girls' need satisfaction ( $M= 3.74, SD=.60$ ) was lower than boys ( $M= 3.86, SD=.61$ ),  $\beta=-.12, p<.001$ .

Next, the relationships between teachers' autonomy-supportive and structuring styles (at both student and teacher levels) and students' need satisfaction were tested (controlling for students' age and gender). Neither teacher-reported autonomy-supportive nor structuring styles significantly correlated with students' need satisfaction (autonomy-supportive:  $\beta=.03, p=.52$ ; structuring:  $\beta=-.04, p=.35$ ). However, both students' perceived autonomy-supportive and structuring styles were significantly and positively related to students' need satisfaction (autonomy-supportive:  $\beta=.18, p<.001$ ; structuring:  $\beta=.09, p=.003$ ).

#### *(4) Chinese students' need frustration as outcome variable*

First, include students' age and gender in the model. Results indicated that students' age was not significantly associated with students' need frustration (age:  $\beta=.01, p<.87$ ). However, results revealed that girls' need frustration ( $M= 2.42, SD=.76$ ) was higher than boys ( $M= 2.41, SD=.77$ ),  $\beta=.12, p=004$ .

Next, controlling and chaotic styles (at both levels) were included in the multilevel model to investigate the relationship between teachers' demotivating teaching styles and students' need frustration. Results revealed that both teacher-report controlling and chaotic styles were not significantly related to students' need frustration (controlling:  $\beta=.01, p=.52$ ; chaotic:  $\beta=-.02, p=.35$ ). On the contrary, both students' perceived controlling and chaotic styles had a positive and significant relationship with their need frustration (controlling:  $\beta=.05, p=.007$ ; chaotic:  $\beta=.18, p<.001$ ).

In conclusion, on the one hand, none of the teacher-reported (de)motivating styles affected students' need satisfaction/frustration. On the other hand, there were significant correlations between students' perceived (de)motivating teaching styles and need satisfaction/frustration, except for the insignificant correlation between Italian students' perceived autonomy-supportive style and need satisfaction. Specifically, students' perceived autonomy-supportive and structuring styles were positively related to their need satisfaction, and perceived controlling and chaotic styles were positively associated with their need frustration. Thus, only when (de)motivating teaching styles were perceived by the students and not reported by the teachers, H4a was partly supported and H4b was confirmed.

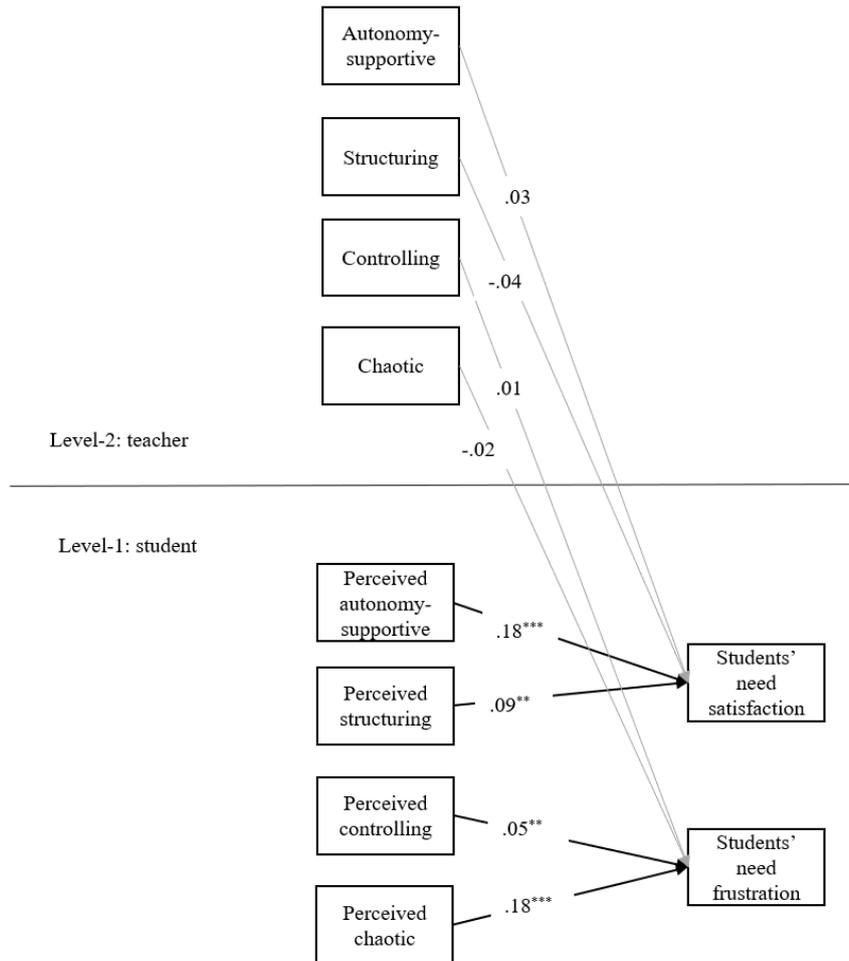


Figure 18 The final results of Chinese samples with controlling students' age and gender. Black bolded lines indicate a significant relation, while gray lines indicate that no significant associations were found. \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### 3.4 Discussion

This study compared (de)motivating teaching styles in Italy and China in terms of teacher reported as well as students reported and assessed the mediating role of teacher enthusiasm in the relationship between teacher need satisfaction and the adoption of (de)motivating teaching styles. Moreover, it investigated the impact of (de)motivating teaching styles on student need satisfaction/frustration.

#### 3.4.1 Adoption of motivating and demotivating styles differs across culture

As expected, and as previous studies (e.g., Aelterman et al., 2019; Moè & Katz, 2021) found, both teacher-reported and student-perceived results showed that teachers preferred motivating styles (i.e., autonomy-supportive and structuring) over demotivating styles (i.e., controlling and chaotic). Specifically, according to teacher reports, this trend was more significant for Italian teachers,

supporting H1a, while based on students' information, it was more evident for Chinese teachers. These results suggested that (de)motivating styles vary across cultures and that the results differ between teachers and students reported.

Although Chinese teachers rated higher than Italian teachers in all four (de)motivating styles, the main differences were found in controlling and chaotic styles. On the one hand, this is because traditional Eastern cultures emphasize submissiveness and obedience (Kaplan, 2018). At the same time, previous studies showed that psychological control was more prevalent in Asia compared to Western societies (Wu et al., 2002). Reeve et al. (2014) also revealed that collectivism was related to the controlling style since teachers in collectivist cultures think it is common in their culture. On the other hand, class size is large in China (about 50 students per class). Thus, it seems impossible for Chinese teachers to care for every student. Also, in a collectivist culture, the collective interest takes precedence over the individual interest (e.g., Hofstede, 2011; Kaplan, 2018). If some students cannot keep up with the learning process, the Chinese teachers will most likely choose to abandon that small group of students for the sake of the majority of other students. It explains why the chaotic style is more prevalent in China than in Italy.

However, different from the results of teachers reported, Italian teachers seemed to use more demotivating styles, according to students said. Specifically, Italian students perceived less need-supportive and more need-thwarting teaching styles than reported by Italian teachers, which replicates previous findings (e.g., Aelterman et al., 2019). In comparison, it can be found that Chinese students' perceptions were comparable to Chinese teachers' self-reports. Due to the effect of culture, teachers are the authority figure for students, and they must respect this figure, which they cannot evaluate negatively (Kaplan, 2018). Hence, it could be why Chinese students' feelings did not differ from the teachers' reports.

### **3.4.2 Associations between the use of (de)motivating styles with teachers' need satisfaction/frustration and enthusiasm**

One of the purposes of this study was to replicate the relationship between teachers' need satisfaction and the adoption of (de)motivating teaching styles in two cultures: Italy and China. Supporting previous studies, the results identified significant relationships between need satisfaction and the use of motivating teaching styles. These findings add to the cross-cultural literature on the relationships between need satisfaction and motivating teaching styles, suggesting that need satisfaction is the predictor of the adoption of motivating styles, regardless of teachers' cultural background.

However, the relationships between need frustration and demotivating styles differed in the two countries: in Italy, there was no correlation between these two variables, while in China, need satisfaction was negatively correlated with demotivating styles. In fact, both results are reasonable. Need satisfaction and frustration are critical mechanisms for optimal and non-optimal functioning, corresponding to two paths (Vansteenkiste & Ryan, 2013). One goes from the need-supporting context to increasing need satisfaction and then increasing growth and well-being. The other is from the need-blocking context to increasing need frustration and non-optimal functioning or even ill-being. Hence, there should be relationships between demotivating styles and need frustration instead of satisfaction. However, W-BNS (Van den Broeck et al., 2010) was used in this study, and previous

studies (Colledani et al., 2018; Van den Broeck et al., 2010) revealed that it is more reasonable to calculate only need satisfaction for this instrument. Therefore, the present study did not evaluate the relationships between need frustration and demotivating styles.

Consistent with Moè and Katz (2022), the results of the mediating effect showed that in China, need satisfaction can directly predict and indirectly enhance the use of motivating styles through felt enthusiasm. However, the results of the mediating effect showed the full mediation of expressed enthusiasm and felt enthusiasm in the relationships between teacher need satisfaction and motivating styles in Italy. Differences in these results may be due to differences in samples or questionnaires. Notably, however, these findings consistently showed that felt enthusiasm mediated the positive relationships between teachers' experience of need satisfaction and their tendency to use autonomy-supportive and structuring styles.

Besides, the results revealed that the role of expressed enthusiasm varied in Italy and China in this study. It may be because Chinese teachers are consistently trained (e.g., when they are teacher trainees or pre-service teachers) to use some instructional behaviors related to expressed enthusiasm, such as showing facial expressions. These behaviors are also part of the assessment criteria for teachers. Thus, Chinese teachers subconsciously display some enthusiasm behaviors, but this does not mean they authentically feel enthusiasm. This situation is possible since teacher enthusiasm's behavioral and affective components are interrelated and decoupled from each other: teachers can—and do—regulate their emotional expression independently of their emotional experience. Teachers often report that their enthusiasm is fake (Taxer & Frenzel, 2015). In this case, expressed enthusiasm does not promote using motivating styles.

### **3.4.3 The predictors of students' need satisfaction**

The results showed that student-perceived (de)motivating styles correlate significantly with students' need satisfaction/frustration instead of teacher-reported. Specifically, students' perceived autonomy-supportive and structuring styles were positively related to their need satisfaction and perceived controlling and chaotic styles were positively associated with their need frustration. It suggests that students enjoy the benefits of learning in the need-supportive environment but suffer in the environment where they experience demotivating teaching styles, irrespective of their cultural background.

Also, the results again showed that the results reported by teachers and students are different. Hence, future studies need to be aware that if they investigate associations between teachers' instructional behaviors and student outcomes, they need to focus on the results from both the teachers' and students' perspectives. Otherwise, even if the teacher-reported results show a significant correlation, this may not be accurate.

Finally, gender also appears to predict students' need satisfaction/frustration. Specifically, female students reported lower need satisfaction and higher need frustration compared to male students, regardless of cultural background. Similar to our findings, Diseth et al. (2018) revealed that Norwegian female students reported a lower average level of perceived autonomy support and need satisfaction compared to Norwegian male students, and both variables showed a consistent downward trend for female students between the two years. Similarly, Jang, Kim, and Reeve (2012) found higher levels of basic need satisfaction among Korean boys than girls, although the overall effect of gender was small in their study. However, the gender difference in need

satisfaction/frustration has received little attention, and there is no possible explanation for this difference. Thus, more research is needed to explore this point in the future.

#### **3.4.4 Limitations and future research**

This study has several limitations. First, this study is a correlational study based on a self-reported one-time investigation. In order to bring more robust evidence of the relationships between variables, a longitudinal study and an experimental design are necessary. Second, in previous studies (e.g., Cheon et al., 2014, 2018), (de)motivating styles have been assessed in three different ways: (1) trained raters rating teachers' actual teaching behaviors in the classroom; (2) students' perceived (de)motivating styles; and (3) teachers' self-reports. Although rater ratings are an objective way to assess (de)motivating styles, unfortunately, researchers are not allowed to enter schools to observe classrooms due to COVID-19. Hence, only student ratings and teachers' self-reports were used in this study. When the results of students' perceptions and teachers' self-reports are inconsistent, there is a lack of another source of information to draw objective conclusions. At last, the participants in the present study were many middle and high school teachers and their students in Italy and China. Therefore, the results of this study cannot be generalized beyond this population. Future replication of this study with other populations will be needed. In conclusion, despite the above limitations, the results of this study are very inspiring and encouraging.

#### **3.5 Conclusion**

There is a difference in the (de)motivating style reported by the teacher and perceived by the students. Italian teachers reported they adopt more motivating styles than Chinese teachers. However, compared with Italian students, Chinese students perceived more motivating styles. Moreover, Italian teachers felt and expressed enthusiasm mediated the positive relationship between need satisfaction and motivating styles, whereas Chinese teachers only felt enthusiasm mediated these relationships. At last, instead of teacher-reported, student-perceived (de)motivating styles have significant relationships with students' need satisfaction/frustration. Specifically, students' perceived autonomy-supportive and structuring styles were positively related to their need satisfaction and perceived controlling and chaotic styles were positively associated with their need frustration. This study's results not only help explain the predictors of using (de)motivating styles in different cultures but also reveal the relationship between (de)motivating styles and students' need satisfaction/frustration. In Italy and China, the increasing teacher need satisfaction and developing teacher enthusiasm can make teachers more supportive. At the same time, creating a learning environment in which students feel need-supportive rather than need-thwarting benefits students' need satisfaction and prevents students from need frustration.

## **Chapter 4: Why students become more or less motivated during the school year: A dual-process model of Self-determination Theory**

### **4.1 Contributions and hypotheses of the present study**

This study focuses on the “bright side” and “dark side” of the SDT to explore the relationships between (de)motivating teaching styles and student motivation and the mediating role of need satisfaction/frustration in these relationships. The present study expands on the existing literature in three ways.

First, this study is longitudinal and examines the associations between four (de)motivating teaching styles and student motivation simultaneously. It extends the previous studies that have investigated the impact of only some of (de)motivating teaching styles, or did not consider the mediating role of need satisfaction/frustration, or only examined the correlational relationships, not the causality among these variables.

Second, the participants in this study were middle school students in China, which were rarely investigated in SDT-based research. Western countries with individualistic cultures emphasize the self, while collectivistic Asian countries value social obligations (Hofstede, 2011). Hence, some researchers have argued that the accumulated evidence from SDT studies obtained from Western cultures may not apply to Eastern cultures (e.g., Wu, Lai & Chan, 2014). Although there are already studies supporting the SDT conducted in Asian countries, such as South Korea and Thailand (e.g., Cheon & Reeve, 2013, 2015; Cheon, Reeve & Moon, 2012; Jang et al., 2009; Kaur, Hashim & Noman, 2014, 2015), it is valuable to conduct SDT-based research among Chinese students since China has unique characteristics.

Third, the gender differences in the relationships among the study variables will be examined in this study. According to SDT, the process linking (de)motivating teaching styles, need satisfaction/frustration, and student outcomes is invariant across gender and other personal characteristics (Ryan & Deci, 2017). Previous studies have validated this hypothesis. For instance, a study conducted in China showed that the pattern of associations among perceptions of autonomy support for three social agents (i.e., parents, teachers, and peers), student need satisfaction, student motivation, and classroom engagement was invariant across gender (Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019). However, previous studies have not assessed the gender invariance of the relationships among perceived (de)motivating teaching styles, need satisfaction/frustration, and student motivation. Therefore, it's meaningful to test gender differences in these relationships.

The following hypotheses were proposed:

**H1:** motivating teaching styles (i.e., autonomy-supportive and structuring) are positively associated with students' need satisfaction (H1a). On the contrary, demotivating teaching styles (i.e., controlling and chaotic) are positively associated with students' need frustration (H1b).

**H2:** need satisfaction is positively related to autonomous motivation (H2a), whereas need frustration has positive and significant relationships with controlled motivation and amotivation (H2b).

**H3:** need satisfaction/frustration mediate the direct relationships between (de)motivating teaching styles and student motivation.

## 4.2 Method

### 4.2.1 Participants

Participants were ethnic Chinese middle school students who consented to complete questionnaires during three waves of data collection. At T1, 1394 students completed the questionnaires. At T2, 1125 students completed the questionnaire for a second time, while 269 (151 boys and 118 girls) dropped out. Students who persisted did not differ significantly from dropouts in the age, need satisfaction, controlled motivation, perceived autonomy-supportive teaching, perceived structuring teaching, and perceived controlling teaching. However, compared with the dropout students, the T2 persisting students did include more girls, participants who scored higher on T1 autonomous motivation, and participants who reported lower on T1 need frustration, amotivation, and the perceived chaotic style. At T3, 739 of the 1125 students persisting in the first two waves' data collection agreed to complete the questionnaires for the third time, while 386 students dropped out (205 boys and 181 girls). Those dropouts at T3 did not differ significantly from the 739 persisting students in T1 age, T1 and T2 controlled motivation, perceived autonomy-supportive and perceived controlling styles, and T2 perceived structuring style. However, the dropouts did include fewer girls and younger students at T2. They scored lower on T1, and T2 need satisfaction, autonomous motivation, and T1 perceived structuring style and reported higher on T1, and T2 need frustration, amotivation, and perceived chaotic style than those persisting participants. Therefore, the retention rate of students' data was 53.01% (739/1394), with a bias with under-representation of students who reported high levels of need frustration and amotivation (or over-representation of students who reported low levels of need satisfaction and autonomous motivation). The final analyzed sample included 335 boys (45.33%), on a voluntary basis:  $M_{\text{age}} = 12.97$ ,  $SD_{\text{age}} = .71$  (range 11-15).

Table 14 Comparison of all variables between persisting students and dropouts ( $M \pm SD$ )

| variables | Comparison of variables at T1 |                   |          |          | Comparison of variables at T2 |                   |          |          |           |                   |          |          |
|-----------|-------------------------------|-------------------|----------|----------|-------------------------------|-------------------|----------|----------|-----------|-------------------|----------|----------|
|           | persisted                     | dropped out at T2 | <i>t</i> | <i>p</i> | persisted                     | dropped out at T3 | <i>t</i> | <i>p</i> | persisted | dropped out at T3 | <i>t</i> | <i>p</i> |
| PAS       | 4.65±.93                      | 4.67±.89          | -.19     | .85      | 4.69±.92                      | 4.62±.92          | 1.50     | .13      | 4.82±1.00 | 4.76±1.04         | .99      | .32      |
| PStr      | 5.17±.90                      | 5.09±.84          | 1.20     | .23      | 5.21±.90                      | 5.09±.87          | 2.61     | .009     | 5.20±.94  | 5.09±1.01         | 1.77     | .08      |
| PCon      | 4.49±.89                      | 4.50±.81          | -.31     | .76      | 4.47±.90                      | 4.51±.85          | -.95     | .34      | 4.59±.89  | 4.58±.86          | .19      | .85      |
| PCha      | 3.37±.88                      | 3.63±.93          | -4.24    | <.001    | 3.34±.87                      | 3.51±.91          | -3.73    | <.001    | 3.54±.91  | 3.67±.93          | -2.33    | .02      |
| NS        | 3.56±.60                      | 3.49±.59          | 1.64     | .10      | 3.58±.60                      | 3.51±.59          | .198     | .05      | 3.66±.61  | 3.54±.69          | 3.01     | .003     |
| NF        | 2.54±.75                      | 2.71±.79          | -3.33    | .001     | 2.49±.76                      | 2.66±.75          | -3.99    | <.001    | 2.51±.79  | 2.64±.81          | -2.49    | .01      |
| AM        | 4.05±.66                      | 3.86±.67          | 4.23     | <.001    | 4.07±.64                      | 3.94±.69          | 3.67     | <.001    | 4.07±.59  | 3.97±.69          | 2.48     | .01      |
| CM        | 3.38±.62                      | 3.32±.56          | 1.45     | .15      | 3.38±.62                      | 3.35±.60          | .96      | .34      | 3.50±.62  | 3.47±.62          | .82      | .41      |
| Amo       | 1.99±.82                      | 2.31±.86          | -5.60    | <.001    | 1.96±.81                      | 2.15±.86          | -4.18    | <.001    | 2.03±.84  | 2.19±.90          | -2.97    | .003     |
| age       | 13.01±.71                     | 12.93±.70         | 1.81     | .07      | 12.97±.71                     | 13.03±.70         | -1.50    | .13      | 13.21±.70 | 13.34±.73         | -3.04    | .002     |
| gender    | 1.52±.50                      | 1.44±.50          | 2.40     | .02      | 1.55±.50                      | 1.46±.50          | 3.37     | .001     | 1.55±.50  | 1.47±.50          | 2.57     | .01      |

Note. PAS=perceived autonomy-supportive; PStr=perceived structuring; PCon=perceived controlling; PCha=perceived chaotic; NS=need satisfaction; NF=need frustration; AM=autonomous motivation; CM=controlled motivation; Amo=amotivation; gender (1=boys; 2=girls).

## 4.2.2 Measures

### *Need satisfaction and need frustration*

Students' need satisfaction and frustration were assessed with the Basic Psychological Need Satisfaction and Frustration scale (BPNSNF: Chen et al., 2015). This 24-item scale measures satisfaction or frustration of three basic psychological needs: autonomy (e.g., "I feel a sense of choice and freedom in the things I undertake" or "I feel forced to do many things I wouldn't choose to do"), relatedness (e.g., "I feel close and connected with other people who are important to me" or "I have the impression that people I spend time with dislike me"), and competence (e.g., "I feel confident that I can do things well" or "I have serious doubts about whether I can do things well"). Each item is answered on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). For the aims of the present study, "at school" was added in the stem to slightly adjust the scale to reflect the teaching context better.

### *Autonomous/controlled motivation*

To measure students' motivation, the Chinese validated version (Zhang et al., 2016) of the Academic Motivation Scale (AMS: Vallerand et al., 1992) were used. The original version of the AMS is composed of 28 items subdivided into seven subscales. However, more studies (e.g., Grouzet et al., 2006) considered only one dimension instead of three to measure intrinsic motivation (i.e., intrinsic motivation to know). Therefore, the AMS in this study consists of 20 items, four items per subscale, assessing: amotivation (e.g., "Honestly, I don't know; I really feel that I am wasting my time in school"), external regulation (e.g., "In order to obtain a more prestigious job later on"); introjected regulation (e.g., "Because of the fact that when I succeed in school I feel important"); identified regulation (e.g., "Because this will help me make a better choice regarding my career orientation"); intrinsic regulation (e.g., "Because I experience pleasure and satisfaction while learning new things"). Students were asked to answer "why do you go to high/middle school?" on a 5-Likert scale, ranging from 1 (not at all true) to 5 (absolutely true).

### *Teaching styles*

The teacher-based Situations-in-School (SIS) questionnaire (Aelterman et al., 2019) was slightly adjusted from students' perspectives to measure students' perception of teachers' teaching styles. The SIS presents 15 typical teaching vignettes (e.g., "During a class assignment, your teacher notice that some students are showing signs of anxiety. Sensing that anxiety, your teacher:") and provides four possible teachers' reactions to these vignettes, corresponding to the (de)motivating teaching styles: 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."), and chaotic (e.g., "Don't worry about it—let it pass on its own."). Students were asked to rate how much each possible reaction to each teaching condition describes their teachers' 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).

The reliabilities of these instruments for the current samples are shown in Table 15.

### 4.2.3 Procedure

This study has been approved by the local Ethics Committee and the researcher's university. Students' data were collected in three waves via WenJuanXing (a data collection platform like Qualtrics, commonly used in China), in which they completed the questionnaires on December 2020 (T1), March 2021(T2), and June 2021(T3). Students completed questionnaires regarding the specific teacher and class. The questionnaires began with the purpose of the study and a consent form. They were asked to answer the questions based on their real situations or feelings and were ensured their information and answer would be confidential. After obtaining informed consent from parents and adolescents, students completed the above questionnaires, which took approximately 15 minutes.

## 4.3 Analyses and results

### 4.3.1 Preliminary analyses

First, normal distribution was assessed using histograms, skewness, and kurtosis. Values for skewness and kurtosis for each item were all less than  $|2.60|$ , suggesting items were normally distributed.

I further examined the instrument's factor structure that was not validated yet by performing the confirmatory factor analysis (CFA). Finally, after the factor structures were established, the internal reliabilities, Cronbach's  $\alpha$  of each subscale, was calculated.

#### *Confirmatory Factor Analyses*

A CFA was conducted using IBM SPSS AMOS 23.0 to verify the measurement structure of those instruments that were not validated yet. The results of CFA show the degree to which the model fits the data. Multiple indicators were assessed to evaluate model fit. First, the chi-square value is the main index for assessing model fit. It reveals a good model fit if the chi-square test statistic is insignificant (Brown, 2006). However, since the chi-square value is susceptible to the sample size, it is natural that there will be significant chi-square values in practical studies (Brown, 2006). Unlike the chi-square value,  $\chi^2/df$  is not influenced by sample size. It is also used to evaluate model fit, and it is considered acceptable if the value is below 5 (Byrne, 2001). In addition, I count on multiple fit indicators, including the comparative fit index (CFI), the Incremental Fit Index (IFI), and the root mean square error of approximation (RMSEA). The values of CFI and IFI range from 0 to 1. If CFI and IFI values are above 0.90, it indicates a good model fit; if they are above 0.95, it shows an excellent model fit (Hu & Bentler, 1999). RESEA suggests a good fit if the value is below 0.08 and is considered an ideal model fit below 0.05 (Hu & Bentler, 1999; Kline, 2011). A significant test ( $t$ -test) for factor loading was also used. Significant factor loadings and standard coefficients above 0.30 (or 0.40) are considered good items for underlying structure (Brown, 2006).

The Goodness-of-fit of the initial CFA model of T3 data indicated that the model did not provide a good fit for the data ( $\chi^2(1704) = 7883.610$ ,  $\chi^2/df = 4.627$ ,  $p < .001$ ; CFI = .744; IFI = .745; RESEA = .070). The following items were not included in the following analyses since the factor loading lowered the recommended minimum (Brown, 2006): items 1 (chaotic item 1: .29), 4 (chaotic item 4: .03), and 15 (autonomy-supportive item 15: .27). Besides, although the factor loadings of

the following items reached the standard, deleting them improved the model fit: items 2, 3, 5, 7, 9, 11, 13, and 14. Moreover, post-hoc model modification indices proposed the estimation of error covariances between autonomy-supportive items 6 and 8; structuring items 6 and 8; controlling items 10 and 12; and chaotic items 10 and 12. With these modifications, the model fit improved ( $\chi^2(94) = 586.081$ ,  $\chi^2/df = 6.235$ ,  $p < .001$ ; CFI = .903; IFI = .903; RESEA = .084). The range of t-value for factor loadings was from 7.82 to 25.82, which indicates that all items were significant ( $p < .001$ ). As presented in Figure 19, the completely standardized loadings ranged from .36 to .82. Therefore, the results of the CFA suggest a good fit between the proposed model and the observed data.

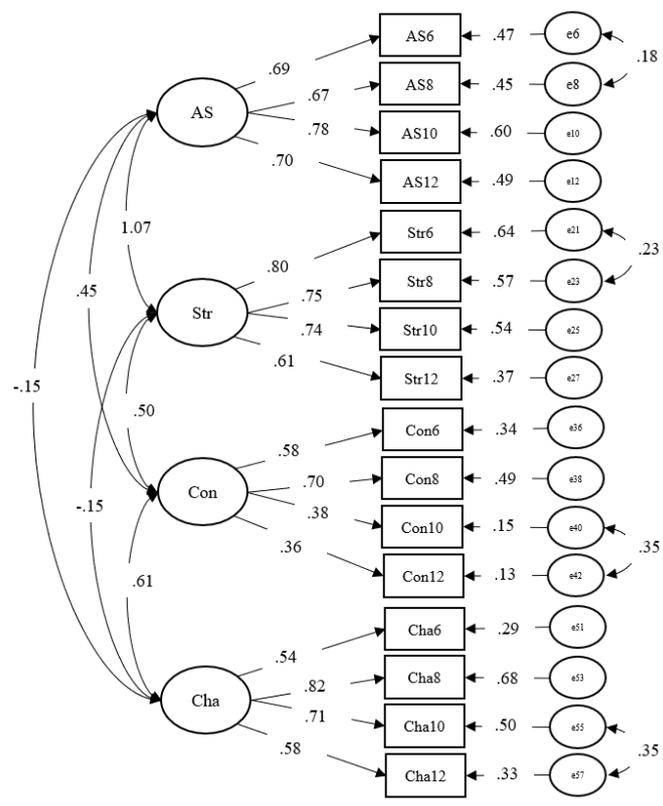


Figure 19 Latent factor solution for teaching styles

All factor loadings are completely standardized. AS=autonomy-supportive; Str=structuring; Con=controlling; Cha=chaotic.

*Developmental characteristics and gender differences of each research variable*

Descriptive statistics and Pearson correlations among all the variables were calculated by IBM SPSS Statistics 25.0. The item number, means, standard deviations, skewness, kurtosis, and Cronbach’s alphas are presented in Table 15. Values for skewness and kurtosis for each variable were all less than |1.20|, suggesting they were normally distributed.

A 3 (time: T1, T2, T3) × 2 (gender: boy, girl) repeated measures ANOVA was conducted with each research variable as the dependent variable, time as a within-subjects factor, and gender as a between-subjects factor, respectively. The results showed that perceived autonomy-supportive, structuring, controlling, and chaotic styles, need satisfaction, controlled motivation, and amotivation increased with time, suggesting that T3 was significantly higher than T1 and T2. Boys rated higher on perceived controlling, chaotic styles, and amotivation and reported lower autonomous motivation

than girls. Moreover, the interaction results for perceived structuring style revealed that at T1, girls rated higher than boys. However, there was no significant difference between boys and girls in the perceived structuring style at T2 and T3.

#### **4.3.2 Correlations across variables**

Pearson's correlations for all variables were presented in Table 16.

Regarding the stability of the variables, the results of perceived autonomy-supportive at T1, T2, and T3 showed significantly positive correlations. The results of perceived structuring, perceived controlling, perceived chaotic styles, need satisfaction, need frustration, autonomous motivation, controlled motivation, and amotivation at three waves also each showed significant positive correlations. These positive correlations indicated good temporal stability of student-reported outcomes.

Regarding the relationships across variables at different time points, the results showed that both T1 perceived autonomy-supportive and T1 perceived structuring styles were positively correlated with T2 need satisfaction and T3 autonomous motivation. T2 need satisfaction was positively associated with T3 autonomous motivation. On the contrary, T1 perceived controlling style was positively related to T2 need frustration, T3 controlled motivation, and T3 amotivation. T1 perceived chaotic style was positively associated with T2 need frustration, and T3 amotivation, but wasn't associated with T3 controlled motivation. T2 need frustration was positively correlated with T3 amotivation but wasn't associated with T3 controlled motivation.

Besides, gender was associated with 12 of the 27 dependent variables.

Table 15 Descriptive Statistics of all variables for Chinese students

| Variable                      | item number | Time 1   |           |          | Time 2   |          |          | Time 3    |          |          | The main effect of time |          |           | The main effect of gender |          |          | Interaction |          |          |          |          |          |          |          |          |      |
|-------------------------------|-------------|----------|-----------|----------|----------|----------|----------|-----------|----------|----------|-------------------------|----------|-----------|---------------------------|----------|----------|-------------|----------|----------|----------|----------|----------|----------|----------|----------|------|
|                               |             | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | $\alpha$ | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | $\alpha$                | <i>M</i> | <i>SD</i> | Skewness                  | Kurtosis | $\alpha$ | <i>F</i>    | <i>P</i> | $\eta^2$ | <i>F</i> | <i>P</i> | $\eta^2$ | <i>F</i> | <i>P</i> | $\eta^2$ |      |
| Perceived autonomy-supportive | Boy         | 4        | 4.87      | 1.11     | -.23     | .37      | .65      | 4.92      | 1.18     | -.34     | .43                     | .75      | 5.11      | 1.24                      | -.52     | .83      | .81         | 12.73    | <.001    | .017     | .73      | .39      | .001     | .46      | .63      | .001 |
|                               | Girl        |          | 4.96      | 1.03     |          |          |          | 4.99      | 1.04     |          |                         |          | 5.12      | 1.06                      |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 4.92      | 1.07     |          |          |          | 4.96      | 1.11     |          |                         |          | 5.12      | 1.15                      |          |          |             |          |          |          |          |          |          |          |          |      |
| Perceived structuring         | Boy         | 4        | 5.17      | 1.14     | -.41     | .48      | .77      | 5.17      | 1.07     | -.43     | .72                     | .79      | 5.32      | 1.12                      | -.39     | .40      | .83         | 2.79     | .06      | .004     | .65      | .42      | .001     | 3.93     | .02      | .005 |
|                               | Girl        |          | 5.33      | 1.00     |          |          |          | 5.22      | 1.04     |          |                         |          | 5.26      | 1.03                      |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 5.26      | 1.06     |          |          |          | 5.20      | 1.05     |          |                         |          | 5.29      | 1.07                      |          |          |             |          |          |          |          |          |          |          |          |      |
| Perceived controlling         | Boy         | 4        | 4.37      | 1.06     | -.10     | .31      | .53      | 4.61      | 1.06     | -.07     | .19                     | .61      | 4.79      | 1.16                      | -.10     | .30      | .65         | 37.64    | <.001    | .049     | 38.70    | <.001    | .050     | .09      | .92      | .000 |
|                               | Girl        |          | 4.02      | 1.08     |          |          |          | 4.24      | 1.06     |          |                         |          | 4.40      | 1.05                      |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 4.18      | 1.09     |          |          |          | 4.41      | 1.08     |          |                         |          | 4.58      | 1.12                      |          |          |             |          |          |          |          |          |          |          |          |      |
| Perceived chaotic             | Boy         | 4        | 3.08      | 1.35     | .44      | -.11     | .73      | 3.33      | 1.32     | .32      | -.31                    | .74      | 3.46      | 1.38                      | .31      | -.22     | .78         | 24.32    | <.001    | .033     | 28.15    | <.001    | .037     | 1.17     | .31      | .002 |
|                               | Girl        |          | 2.76      | 1.11     |          |          |          | 2.86      | 1.14     |          |                         |          | 3.11      | 1.28                      |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 2.90      | 1.24     |          |          |          | 3.07      | 1.25     |          |                         |          | 3.27      | 1.34                      |          |          |             |          |          |          |          |          |          |          |          |      |
| Need Satisfaction             | Boy         | 12       | 3.58      | .62      | -.25     | .70      | .83      | 3.67      | .64      | -.41     | 1.19                    | .87      | 3.73      | .71                       | -.32     | .77      | .92         | 27.39    | <.001    | .036     | .00      | .98      | .000     | .24      | .79      | .000 |
|                               | Girl        |          | 3.58      | .59      |          |          |          | 3.66      | .59      |          |                         |          | 3.75      | .65                       |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 3.58      | .60      |          |          |          | 3.66      | .61      |          |                         |          | 3.74      | .68                       |          |          |             |          |          |          |          |          |          |          |          |      |
| Need Frustration              | Boy         | 12       | 2.44      | .76      | .15      | -.52     | .88      | 2.48      | .80      | .14      | -.38                    | .91      | 2.50      | .87                       | .04      | -.52     | .93         | .40      | .67      | .001     | .78      | .38      | .001     | 2.84     | .06      | .004 |
|                               | Girl        |          | 2.54      | .76      |          |          |          | 2.53      | .78      |          |                         |          | 2.48      | .84                       |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 2.49      | .76      |          |          |          | 2.51      | .79      |          |                         |          | 2.49      | .85                       |          |          |             |          |          |          |          |          |          |          |          |      |
| Autonomous motivation         | Boy         | 8        | 4.01      | .68      | -.82     | 1.20     | .86      | 4.03      | .61      | -.28     | -.32                    | .86      | 4.01      | .70                       | -.57     | .75      | .91         | .01      | .99      | .000     | 6.23     | .01      | .008     | .70      | .50      | .001 |
|                               | Girl        |          | 4.12      | .61      |          |          |          | 4.10      | .58      |          |                         |          | 4.12      | .63                       |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 4.07      | .64      |          |          |          | 4.07      | .59      |          |                         |          | 4.07      | .66                       |          |          |             |          |          |          |          |          |          |          |          |      |
| Controlled motivation         | Boy         | 8        | 3.41      | .62      | -.27     | .22      | .71      | 3.54      | .63      | -.23     | .30                     | .74      | 3.54      | .65                       | -.27     | .68      | .76         | 25.55    | <.001    | .034     | 1.17     | .28      | .002     | 1.59     | .20      | .002 |
|                               | Girl        |          | 3.35      | .61      |          |          |          | 3.47      | .60      |          |                         |          | 3.55      | .62                       |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 3.38      | .62      |          |          |          | 3.50      | .62      |          |                         |          | 3.54      | .63                       |          |          |             |          |          |          |          |          |          |          |          |      |
| Amotivation                   | Boy         | 4        | 2.06      | .86      | .66      | -.26     | .80      | 2.13      | .90      | .69      | -.03                    | .82      | 2.26      | .94                       | .53      | -.25     | .84         | 15.43    | <.001    | .021     | 15.47    | <.001    | .021     | .30      | .74      | .000 |
|                               | Girl        |          | 1.88      | .76      |          |          |          | 1.94      | .79      |          |                         |          | 2.03      | .83                       |          |          |             |          |          |          |          |          |          |          |          |      |
|                               | Total       |          | 1.96      | .81      |          |          |          | 2.03      | .84      |          |                         |          | 2.13      | .89                       |          |          |             |          |          |          |          |          |          |          |          |      |

Table 16 Correlations across the research variables for Chinese students

|             | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8      | 9       | 10      | 11      | 12      | 13      | 14      | 15      | 16      | 17     | 18      | 19      | 20      | 21      | 22      | 23      | 24      | 25      | 26  | 27     | 28 |
|-------------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|-----|--------|----|
| 1. T1-PAS   | —       |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 2. T1-PStr  | .72***  | —       |         |         |         |         |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 3. T1-PCon  | .13**   | .10**   | —       |         |         |         |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 4. T1-PCha  | -.15*** | -.25*** | .38***  | —       |         |         |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 5. T1-NS    | .27***  | .34***  | .01     | -.16*** | —       |         |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 6. T1-NF    | -.12**  | -.19*** | .14***  | .22***  | -.47*** | —       |         |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 7. T1-AM    | .36***  | .45***  | .07     | -.26*** | .57***  | -.34*** | —       |        |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 8. T1-CM    | .14***  | .18***  | .27***  | .04     | .24***  | .10**   | .39***  | —      |         |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 9. T1-Amo   | -.14*** | -.25*** | .12**   | .40***  | -.30*** | .57***  | -.48*** | .10**  | —       |         |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 10. T2-PAS  | .47***  | .43***  | -.06    | -.17*** | .23***  | -.18*** | .24***  | .05    | -.14*** | —       |         |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 11. T2-PStr | .44***  | .50***  | -.02    | -.24*** | .26***  | -.19*** | .32***  | .08    | -.21*** | .75***  | —       |         |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 12. T2-PCon | .05     | .04     | .41***  | .21***  | .01     | .04     | .05     | .23*** | .08*    | .12**   | .14***  | —       |         |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 13. T2-PCha | -.10**  | -.20*** | .21***  | .47***  | -.15*** | .17***  | -.19*** | .09*   | .35***  | -.21*** | -.30*** | .33***  | —       |         |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 14. T2-NS   | .18***  | .24***  | -.05    | -.17*** | .57***  | -.41*** | .37***  | .10**  | -.29*** | .29***  | .34***  | .03     | -.18*** | —       |         |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 15. T2-NF   | -.18*** | -.21*** | .12**   | .20***  | -.44*** | .61***  | -.36*** | .03    | .44***  | -.28*** | -.33*** | .07*    | .29***  | -.48*** | —       |         |        |         |         |         |         |         |         |         |         |     |        |    |
| 16. T2-AM   | .26***  | .36***  | .02     | -.22*** | .39***  | -.29*** | .50***  | .18*** | -.34*** | .41***  | .49***  | .11**   | -.25*** | .57***  | -.42*** | —       |        |         |         |         |         |         |         |         |         |     |        |    |
| 17. T2-CM   | .05     | .09*    | .16***  | -.02    | .11**   | .07     | .18***  | .49*** | .07     | .10**   | .13***  | .24***  | .05     | .19***  | .10**   | .40***  | —      |         |         |         |         |         |         |         |         |     |        |    |
| 18. T2-Amo  | -.17*** | -.28*** | .08*    | .32***  | -.25*** | .35***  | -.37*** | .05    | .55***  | -.26*** | -.34*** | .08*    | .46***  | -.35*** | .55***  | -.50*** | .08*   | —       |         |         |         |         |         |         |         |     |        |    |
| 19. T3-PAS  | .42***  | .40***  | -.10**  | -.16*** | .31***  | -.20*** | .31***  | .11**  | -.18*** | .52***  | .48***  | .05     | -.16*** | .32***  | -.28*** | .36***  | .08*   | -.25*** | —       |         |         |         |         |         |         |     |        |    |
| 20. T3-PStr | .41***  | .41***  | -.05    | -.16*** | .26***  | -.20*** | .30***  | .10**  | -.18*** | .51***  | .55***  | .08*    | -.22*** | .32***  | -.30*** | .39***  | .09*   | -.29*** | .84***  | —       |         |         |         |         |         |     |        |    |
| 21. T3-PCon | .12**   | .12**   | .24***  | .10**   | -.01    | .03     | .05     | .18*** | .08*    | .05     | .08*    | .38***  | .08*    | .02     | .07*    | .08*    | .20*** | .04     | .28***  | .33***  | —       |         |         |         |         |     |        |    |
| 22. T3-PCha | -.07*   | -.10**  | .14***  | .33***  | -.17*** | .16***  | -.13**  | .05    | .25***  | -.15*** | -.17*** | .14***  | .41***  | -.20*** | .24***  | -.18*** | .01    | .27***  | -.09*   | -.11**  | .39***  | —       |         |         |         |     |        |    |
| 23. T3-NS   | .23***  | .25***  | -.09*   | -.17*** | .49***  | -.42*** | .38***  | .08*   | -.31*** | .32***  | .39***  | .08*    | -.14*** | .59***  | -.48*** | .42***  | .05    | -.32*** | .48***  | .50***  | .07     | -.20*** | —       |         |         |     |        |    |
| 24. T3-NF   | -.10**  | -.16*** | .18***  | .23***  | -.39*** | .55***  | -.28*** | .09*   | .43***  | -.24*** | -.29*** | .07*    | .27***  | -.44*** | .67***  | -.35*** | .07*   | .40***  | -.26*** | -.30*** | .14***  | .35***  | -.51*** | —       |         |     |        |    |
| 25. T3-AM   | .27***  | .30***  | -.04    | -.20*** | .37***  | -.32*** | .47***  | .14*** | -.35*** | .36***  | .42***  | .13***  | -.21*** | .43***  | -.40*** | .60***  | .21*** | -.41*** | .43***  | .47***  | .10**   | -.24*** | .67***  | -.39*** | —       |     |        |    |
| 26. T3-CM   | .17***  | .17***  | .15***  | -.06    | .20***  | -.03    | .28***  | .42*** | -.06    | .14***  | .16***  | .26***  | -.04    | .14***  | -.02    | .33***  | .51*** | -.07    | .21***  | .22***  | .30***  | .00     | .30***  | .05     | .56***  | —   |        |    |
| 27. T3-Amo  | -.08*   | -.16*** | .13**   | .28***  | -.25*** | .33***  | -.28*** | .07    | .46***  | -.18*** | -.23*** | .12**   | .36***  | -.35*** | .42***  | -.35*** | .04    | .54***  | -.24*** | -.27*** | .14***  | .48***  | -.36*** | .61***  | -.44*** | .03 | —      |    |
| 28. gender  | .04     | .08*    | -.16*** | -.13*** | .00     | .07     | .09*    | -.05   | -.11**  | .03     | .02     | -.17*** | -.19*** | -.01    | .03     | .05     | -.06   | -.12**  | .00     | -.03    | -.17*** | -.13*** | .01     | -.01    | .08*    | .01 | -.13** | —  |

Note. PAS=perceived autonomy-supportive; PStr=perceived structuring; PCon=perceived controlling; PCha=perceived chaotic; NS=need satisfaction; NF=need frustration; AM=autonomous motivation; CM=controlled motivation; Amo=amotivation; gender (1=boys; 2=girls).

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### 4.3.3 The mediating effects of need satisfaction/frustration

The relationships among students' perception of (de)motivating teaching styles, students' need satisfaction/frustration, and motivation were analyzed. Moreover, maximum likelihood estimation with bootstrapping was used to test the mediation hypothesis—whether need satisfaction and frustration mediated the direct effect of perceived (de)motivating styles on students' motivation. The new samples (with replacement) were extracted with 10000 resamples with the 95% Bias-corrected confidence interval bootstrap (Preacher & Hayes, 2004).

Since the autonomy-supportive and structuring styles correlate strongly, making it difficult to assess their separate roles when considering them in the same model, they converge into a unique second-order factor presenting motivating teaching styles. Therefore, in the “bright side” model, T1 perceived motivating styles were treated as the exogenous variable, T3 autonomous motivation as the endogenous variable, and T2 need satisfaction as the mediator. However, in the “dark side” model, T1 perceived controlling and chaotic styles were treated as exogenous variables, T3 controlled motivation and amotivation as endogenous variables, and T2 frustration as the mediator. The latent variable for motivating teaching style was indicated by two indicators: perceived autonomy-supportive and structuring styles. While perceived controlling and chaotic styles were each indicated by four indicators, one for each item. Furthermore, the latent variable for need satisfaction was represented by three indicators, one for each need, so do need frustration. At last, autonomous motivation, controlled motivation, and amotivation were each indicated by four indicators, one for each item.

The results of structural equation modeling showed that the proposed models fit the data well (the “bright side” model:  $\chi^2(11) = 30.709$ ,  $\chi^2/df = 2.792$ ,  $p = .001$ ; CFI = .989; IFI = .989; RESEA = .049; the “dark side” model:  $\chi^2(111) = 390.574$ ,  $\chi^2/df = 3.519$ ,  $p < .001$ ; CFI = .920; IFI = .921; RESEA = .058). Except for the paths from T1 perceived controlling style to T2 need frustration, from T1 perceived controlling style to T3 amotivation, and from T2 need frustration to T3 controlled motivation, other hypothesized paths were significant at the .05 level. T1 perceived motivating teaching styles increased T2 need satisfaction, which in turn longitudinally predicts autonomous motivation. Not T1 perceived controlling style, but T1 perceived chaotic styles was related to T2 need frustration, which in turn leads to T3 amotivation. However, T2 need frustration was positively associated with T3 controlled motivation.

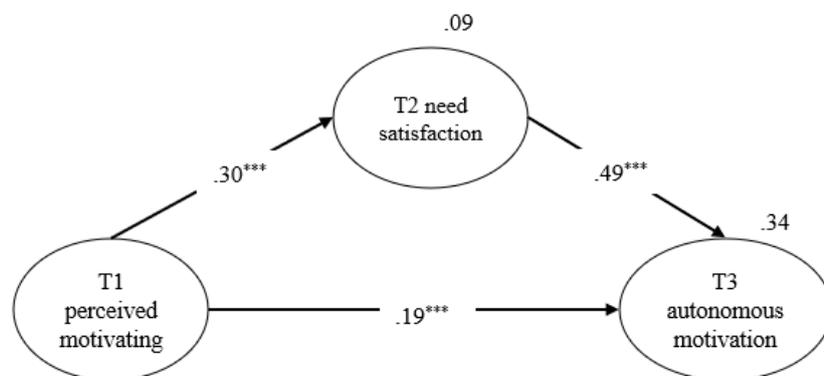


Figure 20 The final standardized estimates of T1 perceived motivating teaching styles, T2 need satisfaction, and T3 autonomous motivation, with regression weight presenting over the lines, and

the explained variance over the variables. \*\*\*  $p < .001$

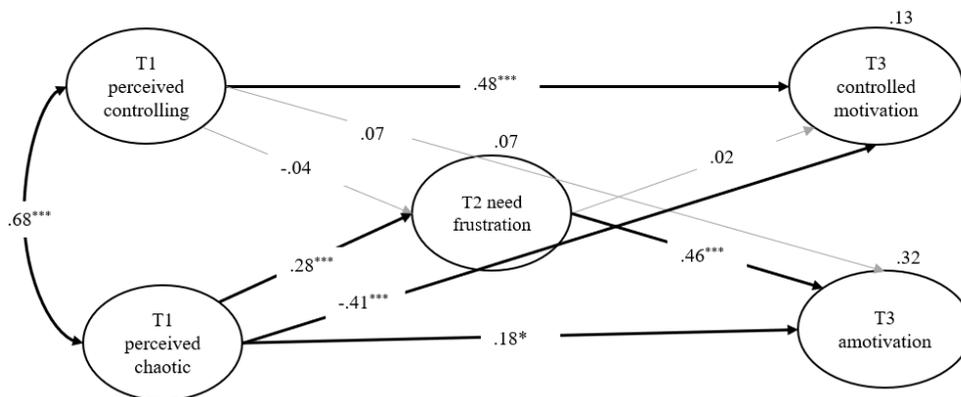


Figure 21 The final standardized estimates of T1 perceived controlling and chaotic styles, T2 need frustration, T3 controlled motivation and T3 autonomous motivation, with regression weight presenting over the lines, and the explained variance over the variables. \*  $p < .05$ , \*\*\*  $p < .001$ .

The indirect effects are shown in Table 17. The results revealed that T2 need satisfaction mediated the direct relationships between T1 perceived motivating teaching styles and T3 autonomous motivation. In contrast, T2 need frustration plays the mediating role in the positive relationship between T1 perceived chaotic style and T3 amotivation.

Table 17 The results of indirect effects

|         | path             | Estimate | SE   | Lower | Upper | <i>P</i> |
|---------|------------------|----------|------|-------|-------|----------|
| T1 PM   | → T2 NS → T3 AM  | .149     | .037 | .085  | .231  | <.001    |
| T1 PCon | → T2 NF → T3 CM  | -.001    | .016 | -.023 | .009  | .850     |
| T1 PCon | → T2 NF → T3 Amo | -.018    | .056 | -.138 | .077  | .706     |
| T1 Pcha | → T2 NF → T3 CM  | .004     | .024 | -.025 | .053  | .767     |
| T1 Pcha | → T2 NF → T3 Amo | .131     | .050 | .054  | .242  | .001     |

Note. PM=perceived motivating; PCon=perceived controlling; PCha=perceived chaotic; NS=need satisfaction; NF=need frustration; AM=autonomous motivation; CM=controlled motivation; Amo=amotivation.

### Gender invariance

We tested gender invariance (boys=1, girls=2) through a series of steps with increasing restrictions (Byrne, 2001). First, the hypothesized models were tested separately for boys and girls. Then, the unconstrained model (model 0) was tested simultaneously in both groups, followed by the measurement weights invariance model (model 1), in which factor loadings were constrained to be equal across sexes. Model 2 (structural weights invariance) constrained the path coefficients. Model 3 (structural covariance invariance) further constrains the covariance. Model 4 (structural residual invariance) and model 5 (measurement residual invariance) were further analyzed. A change in CFI between two nested models ( $\Delta CFI < .01$ ) was considered to be as appropriate for the more constrained model as for the less constrained model (Cheung & Rensvold, 2002). In other words, if the change of CFI is less than .01, indicating that the relationships among the research variables are not moderated by gender; otherwise, these relationships vary across gender.

The results of gender invariance are shown in Table 18. For the “bright side” model, the

separated models for boys and girls fit well. All paths were significant in both groups. In each successive model comparison,  $\Delta CFI < .01$ , suggesting that the proposed “bright side” model is invariant. For the “dark side” model, even though the separated models for boys and girls fit well too, the change of CFI in each successive model comparison was larger than .01. Therefore, the proposed “dark side” model was inconsistent across gender. Specifically, for girls, there were significant positive relationships between T1 perceived controlling style and T2 need frustration, T2 need frustration and T3 controlled motivation, and T1 perceived chaotic style and T3 amotivation. However, these relationships were insignificant for boys (see Figure 22).

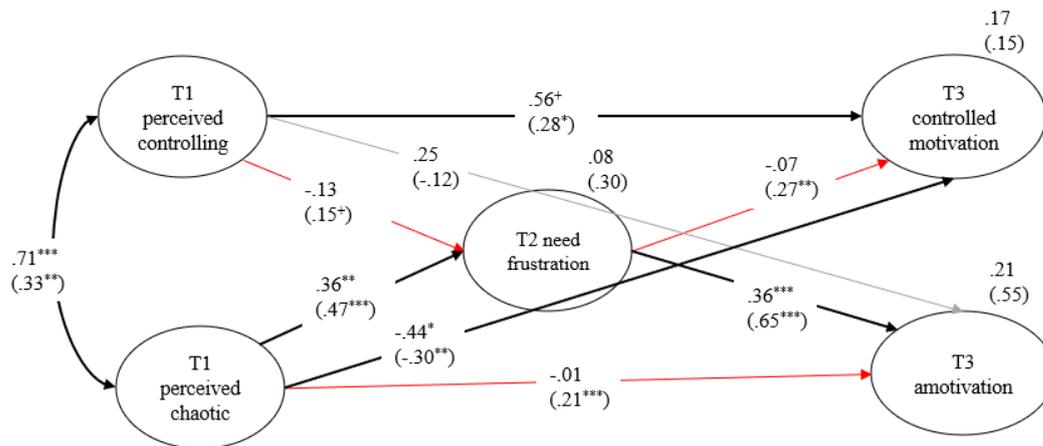


Figure 22 The final standardized estimates of the unconstrained “dark side” model for boys and girls, with regression weight presenting over the lines, and the explained variance over the variables.

Note. Top values= boys, bottom values in brackets= girls. Black bolded lines indicate a significant relationship in boys and girls. In contrast, gray lines indicate no significant associations were found in any gender. Moreover, red lines indicate the relationships were different across gender.

+<math>p < .1</math>, \* <math>p < .05</math>, \*\* <math>p < .01</math>, \*\*\* <math>p < .001</math>.

Table 18 Fit indices of multi-group invariance analysis across gender

|                         | Model                                     | $\chi^2$ | df  | <i>P</i> | $\chi^2/df$ | IFI  | CFI  | RMSEA |
|-------------------------|---|----------|-----|----------|-------------|------|------|-------|
| the "bright side" model | boy                                       | 17.521   | 11  | .093     | 1.593       | .993 | .993 | .042  |
|                         | girl                                      | 24.816   | 11  | .010     | 2.256       | .985 | .985 | .056  |
|                         | Model 0: unconstrained                    | 50.941   | 24  | .001     | 2.123       | .985 | .985 | .039  |
|                         | Model 1: measurement weights invariance   | 53.945   | 28  | .002     | 1.927       | .986 | .986 | .035  |
|                         | Model 2: structural weights invariance    | 53.996   | 29  | .003     | 1.862       | .986 | .986 | .034  |
|                         | Model 3: structural covariance invariance | 60.632   | 30  | .001     | 2.021       | .983 | .983 | .037  |
|                         | Model 4: structural residual invariance   | 69.804   | 32  | .000     | 2.181       | .980 | .979 | .040  |
|                         | Model 5: measurement residual invariance  | 85.084   | 39  | .000     | 2.182       | .975 | .975 | .040  |
| the "dark side" model   | boy                                       | 215.509  | 111 | .000     | 1.942       | .932 | .931 | .053  |
|                         | girl                                      | 277.667  | 111 | .000     | 2.502       | .920 | .919 | .061  |
|                         | Model 0: unconstrained                    | 713.417  | 226 | .000     | 3.157       | .865 | .863 | .054  |
|                         | Model 1: measurement weights invariance   | 802.857  | 237 | .000     | 3.388       | .843 | .841 | .057  |
|                         | Model 2: structural weights invariance    | 988.05   | 245 | .000     | 4.033       | .793 | .792 | .064  |
|                         | Model 3: structural covariance invariance | 994.609  | 248 | .000     | 4.011       | .792 | .791 | .064  |
|                         | Model 4: structural residual invariance   | 1010.194 | 251 | .000     | 4.025       | .788 | .787 | .064  |
|                         | Model 5: measurement residual invariance  | 1145.826 | 268 | .000     | 4.275       | .754 | .754 | .067  |

## 4.4 Discussion

According to SDT, the behavior of significant others is critical to influencing students' motivation through basic psychological need satisfaction/frustration (Ryan & Deci, 2017). In the present study, we tested this proposition by replicating and extending prior research on student motivation. Specifically, we collected data three times among Chinese middle school students to examine the relationships between teachers' (de)motivating teaching styles and student motivation and the mediating role of need satisfaction/frustration in these relationships.

### 4.4.1 Gender difference in the relationships between (de)motivating styles and student outcomes

As expected, the results of the hypothesized "bright side" structural model suggest that T1 perceived motivating teaching styles promote students' T2 need satisfaction and enhance T3 autonomous motivation, supporting H1a and H2a. These results replicate and expand the previous findings (e.g., Aelterman et al., 2019; Montero-Carretero, Barbado & Cervelló, 2020; Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019). For instance, Haerens et al. (2015) revealed that perceived teacher autonomy support was primarily associated with higher levels of students' self-determined motivation in PE, mediated by students' experiences of satisfaction with basic psychological needs. Fewer previous studies have investigated the impact of structuring teaching, but it is also a motivating teaching style and facilitates positive student outcomes (e.g., Aelterman et al., 2019). At the same time, despite the benefits of autonomy support for both students and teachers, autonomy-supportive teaching carries the risk of indulgence, and the ideal approach would be to combine autonomy support and structure, allowing teachers to deliver structure in the autonomy-supportive way (Cheon, Reeve & Vansteenkiste, 2020).

However, the results of the "dark side" model are somewhat complex and slightly different from the hypothesis. First, the relationships between perceived chaotic style and student outcomes are mainly consistent across genders. T1 perceived chaotic teaching increases T2 need frustration, and T2 need frustration longitudinally predicts T3 amotivation. In addition, T1 perceived chaos would only directly predict T3 controlled motivation and not indirectly through T2 need frustration. It should be noted that the relationship between perceived chaotic style and controlled motivation is negatively correlated, which is inconsistent with the hypothesis. However, there are cross-gender variabilities regarding the associations between perceived controlling style and student outcomes. Specifically, for girls, the results are broadly consistent with the hypothesis: T1 perceived controlling style longitudinally predicts T2 need for frustration, which in turn, contributes to T3 controlled motivation. Also, although T1 perceived controlling style does not directly contribute to T3 amotivation, it indirectly predicts T3 amotivation via T2 need frustration. However, for boys, except for the relationship between T1 perceived controlling style and T3 controlled motivation, there was no significant association between T1 perceived controlling style and the other variables, which is inconsistent with the hypothesis. In conclusion, the results of the current study partially support the research hypotheses.

Although the effects of autonomy-supportive, controlling, and even structuring styles have

been extensively studied in the educational context (including PE), the impact of the chaotic style has been largely ignored (an exception, Aelterman et al., 2019), which is surprising. Since previous research has shown that need-blocking environments can lead to need frustration, resulting in non-optimal functioning or even ill-being outcomes (Bartholomew et al., 2011; Costa, Ntoumanis & Bartholomew, 2015; Moè & Katz, 2020). Therefore, studying the chaotic teaching style is indispensable to understanding how to maintain or even enhance students' autonomous motivation. The results of this study revealed that the stronger the perceived chaotic teaching style, the stronger the need for frustration and amotivation, but the weaker the controlled motivation. Although the relationship between chaotic teaching style and the need for frustration and amotivation was the same as the hypotheses, the relationship between chaotic teaching and controlled motivation was unexpected. The relationship between controlled motivation and other variables in this study was complex because it was positively correlated with both "bright side" (e.g., autonomy-supportive and structuring styles, need satisfaction, and autonomous motivation) and "dark side" variables (e.g., the controlling style, need frustration, and amotivation). A possible explanation is that introjected regulation is not totally controlled; it appears to be a mixture of autonomous and controlled (Howard, Gagné & Bureau, 2017).

In addition, the results of the current study revealed gender variance in the effects of the controlling teaching. Specifically, the impact of the controlling teaching was more significant for girls than boys. Like the present study, Koka and Sildala (2018) have revealed that gender moderates the relationship between teacher controlling behaviors and amotivation in high school PE. Specifically, they found that girls had a stronger connection between perceived teacher negatively conditioned attention and intimidating behaviors and amotivation than boys, while boys had a stronger relationship between perceived teacher controlling use of praise and amotivation than girls. Since the SIS does not measure teachers' controlling use of praise, this may account for the more significant effect of controlling teaching on girls found in the present study. Furthermore, Rodríguez-Meirinhos and colleagues (2020) found that the relationships between need satisfaction for autonomy and well-being differed across genders, with autonomy satisfaction only contributing to girls' well-being. Moreover, controlling teaching is at the expense of students' need satisfaction for autonomy (e.g., Aelterman et al., 2019). Thus, the results of this study and previous studies suggest that teacher control has a more pronounced negative impact on girls. Possible reasons to explain this result are that girls are more socially dependent, relationship-oriented, closely connected to significant others in their social network, and very reliant on them for self-evaluation. In contrast, boys are more socially independent and achievement-oriented (Tatar, 1998). Also, in this study, students who dropped out of the T2 and T3 data collection included more boys who reported higher need frustration and amotivation than those who consistently participated, which is one of the possible reasons for the gender moderating effect. Future research could replicate this finding and explore the reasons behind it.

#### **4.4.2 Practical implications**

The results showed that perceived autonomy-supportive and structuring teaching styles need support. They help meet students' three basic psychological needs while promoting autonomous motivation. Moreover, these associations were consistent across gender. In other words, boys and girls benefit from teachers' motivating teaching style. Thus, these findings suggest that teaching

with autonomy-supportive and structuring styles is an essential skill for teachers to develop. According to previous studies (e.g., Aelterman et al., 2019; Moè, Consiglio & Katz, 2022), if teachers would like to promote students' perceptions of teachers' autonomy support and structure, they can display the following motivating behaviors in the classroom: (1) taking students' perspectives; (2) providing students with choices; (3) providing explanatory rationales when options are restricted; (4) using inviting language; (5) conveying clear expectations and guidance on desired and undesired behaviors; (6) providing a step-by-step guide to show students how to achieve these expectations; (7) adjusting tasks' difficulty based on students' level; and (8) giving positive and constructive feedback after a learning activity. Notably, there is a risk of leading to a chaotic classroom atmosphere with the autonomy-supportive styles. At the same time, teachers also can provide structure in a controlling way. Therefore, the ideal approach is to combine autonomy support and structure. Researchers have also investigated the advantages of interventions that deliver structure in an autonomy-supportive way (Cheon, Reeve & Vansteenkiste, 2020).

Also, the results revealed gender differences in the relationships between demotivating teaching styles and student outcomes. Specifically, for girls, perceived controlling and chaotic styles longitudinally predicted students' need frustration, which in turn contributed to students' controlled motivation and amotivation. Similarly, for boys, perceived chaotic style also accounted for students' controlled motivation and amotivation. However, the perceived controlling style did not appear to be one of the predictors of their negative outcomes. Thus, these findings suggest that teachers should avoid controlling and chaotic teaching behaviors since these demotivating teaching styles can undermine student need satisfaction and weaken student motivation. Furthermore, since the negative roles of these (de)motivating teaching styles are more pronounced for girls than boys, teachers should also be encouraged to be more careful to teach girls. It may help prevent girls perceive the teaching as controlling and chaotic, which leads girls to experience higher need frustration, controlled motivation, and amotivation. Based on previous studies (e.g., Aelterman et al., 2019; Moè, Consiglio & Katz, 2022), teachers should avoid the following demotivating behaviors: (1) relying on external sources of motivation; (2) using command language; (3) showing an impatient attitude and requiring students to give correct answers; (4) advocating power to deal with students' complains and negative feelings; and (5) leaving students on their own without clear expectations and guidance.

#### **4.4.3 Limitations**

Although the results of this study provide exciting and unique information about the relationships between Chinese middle school boys' and girls' perceptions of teacher (de)motivating teaching and need satisfaction/frustration and motivation, some limitations should be noted. First, this study treated need satisfaction and need frustration as distinct constructs with specific predictors and outcomes, just like the previous studies did (Bartholomew et al., 2011, 2018; Moè, Consiglio & Katz, 2022; Vansteenkiste & Ryan, 2013). However, Cheon, Reeve, and Ntoumanis (2018) reported that a dual-process model predicted slight but significant cross-over effects. Future research could further assess the cross-correlation between these two pathways, i.e., the need-supporting environment preventing need frustration and unsatisfactory outcomes and the need-thwarting environment hindering need satisfaction and positive results.

Second, only self-reported data from a single informant (i.e., students) was used to assess each

dependent measure. By adding an objective rating, this study could become methodologically more robust. For example, instead of (or in addition to) asking students to report perceived (de)motivating teaching styles, well-trained observers could be asked to objectively rate teachers' (de)motivating teaching behaviors in the classroom.

Third, unfortunately, due to COVID-19, the researchers weren't allowed to physically visit the school to collect data and had to collect data via the internet. Ultimately, participants had low retention rates throughout the study (retention rate=53.01%), and those student participants who dropped out of the study due to attrition reported relatively high need frustration and amotivation, with a bias toward underrepresentation of students scoring need frustration and high levels of amotivation.

Fourth, the current study only focuses on teacher-student relationships and ignores student-student relationships. Previous studies have shown that peer influence became increasingly crucial from late childhood (Ntoumanis, Taylor & Thøgersen-Ntoumani, 2012). Therefore, we suggest future investigations assessing both teacher and peer influence in school settings.

Fifth, the positive and negative outcomes measured here were based on student motivation. Future research may conceptualize optimal and non-optimal functioning from a broader socio-ecological perspective (e.g., emotional, cognitive, interpersonal) to gain a more comprehensive understanding of the multiple roles of (de)motivating teaching styles on adolescent development.

## Chapter 5: (De)motivating teaching styles in the Chinese classroom:

### A mixed-method study

#### 5.1 Aims and hypotheses

The goal of this study was to extend previous work in this area by employing a mixed research design, i.e., to explore the predictors of (de)motivating teaching styles in Chinese educational contexts and their outcomes for students. Besides, it was revealed that teachers' (de)motivating behaviors are primarily triggered by situational factors, such as the lesson topic and student behavior (e.g., Cents-Boonstra et al., 2021; Matos et al., 2018; Van den Berghe et al., 2016). Therefore, we intended to understand further the factors that predict teachers' adoption of different (de)motivating teaching styles by comparing planned and adopted (de)motivating teaching styles and exploring the reasons for the changes. Also, the study found low congruence between students' and teachers' perceptions (Hornstra, Stroet & Weijers, 2021). Not every student accepts the behaviors expressed by teachers to support their needs. Furthermore, students' perceptions of interactions depend on the influence of student factors, such as students' past interaction experiences with teachers, in addition to the teacher's behavior. Hence, considering both student and teacher perspectives help to provide a more comprehensive understanding of the impact of (de)motivating teaching styles on students. Specifically, the following research questions were discussed: (1) what factors predict teachers to adopt different teaching styles in China? (2) what are relationships between different teaching styles and student outcomes in China? (3) what are the differences between planned, perceived, and adopted teaching styles?

The hypotheses of the current study were proposed in the following:

**H1:** teachers' autonomous motivation and need satisfaction were positively associated with the adoption of motivating teaching styles (i.e., autonomy-supportive and structuring) (H1a). In contrast, teachers' controlled motivation and need frustration were positively related to the adoption of demotivating teaching styles (i.e., controlling and chaotic) (H1b).

**H2:** motivating teaching styles were positively correlated with students' autonomous motivation, need satisfaction, and engagement (H2a). However, demotivating teaching styles were positively related to students' controlled motivation, amotivation, and need frustration (H2b).

With respect to the results of the focus group interviews, we made no hypotheses.

#### 5.2 Method

A mixed research design was used in this study. Mixed-method research is a combination of quantitative and qualitative research elements. Using this mixed research approach, we believe that the data collected for this study is rich, including data collected through questionnaires and participants' voices collected through focus group interviews.

### 5.2.1 Participants

*Teacher participants* consist of 20 ethnic Chinese certified teachers teaching different subjects. However, one teacher resigned after the first focus group interview; hence he did not participate in the end-of-semester interview and did not fill out the questionnaire at T2. In addition, although two teachers participated in the end-of-semester interview, they did not complete the questionnaires. Except for T1 amotivation, teachers who persisted did not differ significantly from dropouts in other variables. Therefore, the retention rate of teachers' data was 85% (17/20). The final analyzed sample included 17 females (100%). They average 27.47 ( $SD=2.96$ ) years of age and 3.41 ( $SD=2.65$ ) years of teaching experience. In addition, even though these three teachers did not complete questionnaires at T2, we still analyzed their interviews.

*Student participants* were 38 students of these teachers willing to participate in this study (13 boys,  $M_{age}=15.74$ ,  $SD_{age}=1.97$ ).

### 5.2.2 Measures

We had the previously used and validated Chinese versions of most questionnaires available. However, we used Brislin's (1980) back-translation procedure for those we did not have (i.e., those assessing teaching styles and students' classroom engagement). The items were translated from English to Chinese by a researcher fluent in English and Chinese and were back-translated by another researcher also fluent in English and Chinese. The third researcher, fluent in English, compared the back-translations with the original questionnaire. Discrepancies were discussed until a complete agreement was reached.

#### ***Teacher measures:***

##### *Autonomous/controlled motivation*

The Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015) was used to measure amotivation (e.g., "I don't know why I'm doing this job, it's pointless work",  $\alpha=.27$  at T1,  $\alpha=.24$  at T2), external regulation (e.g., "Because I risk losing my job if I don't put enough effort in it",  $\alpha=.29$  at T1,  $\alpha=.48$  at T2), introjected regulation (e.g., "Because it makes me feel proud of myself",  $\alpha=.72$  at T1,  $\alpha=.77$  at T2), identified regulation (e.g., "Because putting efforts in this job aligns with my personal values",  $\alpha=.89$  at T1,  $\alpha=.93$  at T2), and intrinsic motivation (e.g., "Because what I do in my work is exciting",  $\alpha=.91$  at T1,  $\alpha=.94$  at T2). Teachers were asked to answer on a 7-point Likert scale, ranging from 1 (not at all) to 7 (completely/entirely). Since the Cronbach alphas of amotivation and external regulation were poor in this study, these variables were not included in the following analyses. External and introjection regulation represent controlled motivation, whereas identification and intrinsic motivation represent autonomous motivation (Gagné et al., 2010, 2015; Vansteenkiste et al., 2004); thus, two mean scores were computed for controlled and autonomous motivation, respectively.

##### *Need satisfaction*

The Work-related Basic satisfaction scale (W-BNS; Van den Broeck et al., 2010) was used to assess autonomy (e.g., "The tasks I have to do at work are in line with what I really want to do",  $\alpha=.83$  at T1,  $\alpha=.68$  at T2), competence (e.g., "I have the feeling that I can even accomplish the most difficult tasks at work",  $\alpha=.74$  at T1,  $\alpha=.59$  at T2), and relatedness satisfaction (e.g., "At work, I

can talk with people about things that I really matter to me”,  $\alpha=.63$  at T1,  $\alpha=.65$  at T2) in the workplace. It consists of 18 items, using a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree).

#### *Teaching styles*

To measure teachers' teaching styles, we adapted the Situations-in-School (SIS) questionnaire (Aelterman et al., 2019) to the Chinese educational context. It presented 15 typical teaching vignettes (e.g., “You are thinking about classroom rules. So, you:”) and four possible teachers' responses to each vignette, corresponding to (de)motivating teaching styles: autonomy-supportive (e.g., “Invite students to suggest a set of guidelines that will help them to feel comfortable in class”,  $\alpha=.80$  at T1,  $\alpha=.77$  at T2), structuring (e.g., “Make an announcement about your expectations and standards for being a cooperative classmate”,  $\alpha=.67$  at T1,  $\alpha=.77$  at T2), controlling (e.g., “Post your rules. Tell students they have to follow all the rules. Post the sanctions for disobeying the rules”,  $\alpha=.91$  at T1,  $\alpha=.93$  at T2), and chaotic (e.g., “Don't worry too much about the rules and regulations”,  $\alpha=.28$  at T1,  $\alpha=.66$  at T2). Items were rated on a 7-point Likert scale, ranging from 1 (does not describe me at all) to 7 (describes me extremely well). Even though the Cronbach alpha of the chaotic style at T1 was poor, its value was acceptable at T2; thus, we still keep it in the subsequent analyses.

#### ***Student measures:***

##### *Autonomous/controlled motivation*

Students' motivation was assessed using the Chinese validated version (Zhang et al., 2016) of the Academic Motivation Scale (AMS: Vallerand et al., 1992). The original version of the AMS is composed of 28 items subdivided into seven subscales. However, more studies (e.g., Grouzet et al., 2006) considered only one dimension instead of three to measure intrinsic motivation (i.e., intrinsic motivation to know). Hence, 20 items were used in the present study, measuring amotivation (e.g., “I can't see why I go to school and, frankly, I couldn't care less”,  $\alpha=.81$ ), external regulation (e.g., “In order to have a better salary later on”,  $\alpha=.65$ ), introjected regulation (“To show myself that I am an intelligent person”,  $\alpha=.73$ ), identified regulation (“Because this will help me make a better choice regarding my career orientation”,  $\alpha=.59$ ), and intrinsic regulation (e.g., “Because my studies allow me to continue to learn about many things that interest me”,  $\alpha=.85$ ). Items were scored on a 5-Likert scale, ranging from 1 (not at all true) to 5 (absolutely true).

##### *Need satisfaction/need frustration*

To measure students' need satisfaction and frustration, the Basic Psychological Need Satisfaction and Frustration scale (BPNSNF: Chen et al., 2015) was used. It measures the satisfaction and frustration of the needs for autonomy (six items for satisfaction, e.g., “I feel a sense of choice and freedom in the things I undertake”,  $\alpha=.84$ . Six items for frustration, e.g., “I feel forced to do many things I wouldn't choose to do”,  $\alpha=.87$ ), relatedness (six items for satisfaction, e.g., “I feel that the people I care about also care about me”,  $\alpha=.85$ . Six items for frustration, e.g., “I feel excluded from the group I want to belong to”,  $\alpha=.87$ ), and competence (six items for satisfaction, e.g., “I feel confident that I can do things well”,  $\alpha=.93$ . Six items for frustration, e.g., “I have serious doubts about whether I can do things well”,  $\alpha=.94$ ). Items were answered on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). For the aims of the present study, “at school” was added in the stem to slightly adjust the scale to reflect the teaching context better.

#### *Teaching styles*

We assessed students' perceived (de)motivating teaching styles with the SIS (Aelterman et al., 2019). Since this instrument was based on teachers' perspectives, the SIS was slightly adjusted from

students' perspectives. Students were asked to rate how much each possible reaction to each teaching condition describes their teachers' responses to these situations on a 7-point Likert scale. The Cronbach alphas were .83, .84, .88, and .84 for autonomy-supportive, structuring, controlling, and chaotic styles, respectively.

#### *Classroom engagement*

Since students' classroom engagement is a multidimensional construct, we assess behavioral, emotional, cognitive, and agentic engagement (Reeve, 2013). To measure behavioral and emotional engagement, the 5-item behavioral engagement (e.g., "When I'm in this class, I listen very carefully",  $\alpha=.83$ ) and 5-item emotional engagement (e.g., "I enjoy learning new things in this class",  $\alpha=.90$ ) scales from the Engagement Versus Disaffection with Learning measure (Skinner, Kindermann, & Furrer, 2009) were used. To assess cognitive engagement, the learning strategy items from the Metacognitive Strategies Questionnaire (Wolters, 2004). The cognitive engagement scale consists of 4 items (e.g., "When I study for this class, I try to connect what I am learning with my own experiences",  $\alpha=.85$ ). To measure agentic engagement, the 5-item agentic engagement scale (Reeve, 2013) was used (e.g., "I let my teacher know what I need and want",  $\alpha=.91$ ). Students were asked to rate on a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree).

### **5.2.3 Procedure**

This study has been approved by the local Ethics Committee and the researcher's university. The researcher obtained informed consent from all participants before the study. Also, for the student sample, the researcher distributed a letter to the student's parents explaining the purpose of this study and providing a method to withdraw consent. All parents gave their consent for their children to participate in the study.

The Chinese researcher conducted focus group interviews with participants as a moderator. Due to COVID-19, the researcher was not allowed to enter schools to conduct interviews with teachers and students. Therefore, focus group interviews, and questionnaire data collection were conducted online. To create a warm and relaxed atmosphere, the researcher explained the purpose of the interview and asked participants to express their feelings, opinions, and actual conditions at school. Questions were delivered one by one, and participants were asked to take turns answering. Before asking the questions regarding (de)motivating teaching styles, the researcher would first introduce the four teaching styles with some examples to teachers to ensure participants clearly understand the meaning of each teaching style. The researcher would take notes and record the interview throughout the process. At the end of each interview, participants were asked to fill out the questionnaires. In this study, three phases of focus group interviews were conducted.

First, one week before the school year, the researcher conducted focus group interviews with 20 teachers: 7, 7, and 6 teachers in three separate sessions. The interview was designed to understand the teachers' perceptions of what it means to teach, why they teach, their planned (de)motivating teaching styles, and the impact of these (de)motivating teaching styles on their students and the teachers around them. The researcher asked the following questions in Chinese:

(1) Do you think it's difficult to teach your subject to students?

(2) Why are you teaching?

(3) In your opinion, what is more important? To develop students' interests and values or to improve students' academic performance?

(4) Which (de)motivating teaching styles do you plan to adopt in the next school year? And why?

(5) What outcome do you expect after using this teaching style? Moreover, how do you monitor if they are effective?

(6) Do you believe the attitude and behavior of other teachers will change if the teaching style (you adopt) works well?

The first three questions were warm-up questions to ease participants into the critical questions. The fourth item was the key focus group question, while items 5 and 6 were follow-up questions. Each interview lasted between 1 and 1.5 hours.

Second, during the 12th and 13th weeks of the semester, the researcher conducted focus group interviews with 38 students: 6, 6, 6, 6, 7, and 7 in six separate sessions. The interview was designed to investigate students' perceptions of (de)motivating teaching styles and their opinions about the impact of these teaching styles on them. Students were asked the subsequent questions in Chinese:

(1) What do you like the most and the least at school?

(2) How do you get along with the teachers at school?

(3) Which (de)motivating teaching styles do you perceive your teachers use?

(4) How much do you like your teachers' teaching style? And why?

(5) How do you think this teaching style influenced you?

The first two questions were warm-up questions to ease students, and the third question was the important one. The fourth and fifth were follow-up questions. Each focus group interview lasted about 1 hour.

Third, at the end of the semester, the researcher once again conducted focus group interviews with teachers: 7, 6, and 6 in three separate sessions. The purpose of this interview was to find out if teachers actually used the (de)motivating teaching style they planned to adopt before the semester and what factors influenced them to adhere to (or change) their teaching styles. Also, this interview sought to understand teachers' perceptions of the impact of these teaching styles on themselves, their students, and the teachers around them. The following questions were asked in Chinese:

(1) How is your teaching this semester?

(2) Did you succeed in adopting the planned teaching styles, or did you choose another one? If the adopted one differed from the planned one, could you please tell me which one you actually adopted and why you adopted it?

(3) How does the teaching style you adopt influence students and other teachers?

(4) Do you think this teaching style has any effect on you?

(5) If you had a chance to go back to the beginning of the school year, would you choose this teaching style you adopted again, or would you want to change it, and what would you want to change? And why?

The first question was the warm-up question, while items 2, 3, and 4 were the essential questions the researcher wanted to figure out. The last question was the follow-up question. It took about 1 to 1.5 hours to conduct each focus group interview.

## 5.3 Analyses and results

### 5.3.1 Preliminary analyses

Descriptive statistics and Pearson correlations among all the variables were calculated by IBM SPSS Statistics 25.0. The item number, means, standard deviations, skewness, kurtosis, and Cronbach's alphas for teachers and students are presented in Table 19 and Table 20, respectively. Values for skewness and kurtosis for each variable were all less than |1.39|, suggesting they were normally distributed.

Table 19 Descriptive Statistics of all variables for teachers

| variable              | T1       |           |          |          | T2       |           |          |          |
|-----------------------|----------|-----------|----------|----------|----------|-----------|----------|----------|
|                       | <i>M</i> | <i>SD</i> | Skewness | Kurtosis | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
| Autonomous motivation | 5.96     | .91       | -.87     | .30      | 5.91     | .88       | -.69     | -.40     |
| Controlled motivation | 5.44     | 1.09      | -1.10    | .08      | 5.22     | 1.18      | -.28     | -.39     |
| Need satisfaction     | 3.77     | .46       | -.13     | -.76     | 3.83     | .40       | .54      | -.72     |
| Autonomy-supportive   | 5.85     | .58       | .30      | -1.21    | 5.68     | .57       | .46      | -.60     |
| Structuring           | 5.97     | .46       | -.01     | .10      | 5.86     | .56       | .20      | -.66     |
| Controlling           | 4.00     | 1.20      | -.02     | -.77     | 4.06     | 1.29      | -.30     | .50      |
| Chaotic               | 2.99     | .42       | -.26     | -.99     | 3.05     | .60       | -.52     | .60      |

Table 20 Descriptive Statistics of all variables for students

| variable                      | <i>M</i> | <i>SD</i> | Skewness | Kurtosis |
|-------------------------------|----------|-----------|----------|----------|
| autonomous motivation         | 4.18     | .49       | .22      | -.85     |
| controlled motivation         | 3.54     | .62       | .10      | .68      |
| amotivation                   | 1.78     | .74       | .89      | -.22     |
| need satisfaction             | 3.80     | .71       | -.22     | .61      |
| need frustration              | 2.50     | .80       | -.32     | -.49     |
| perceived autonomy-supportive | 5.34     | .75       | .49      | .38      |
| perceived Structuring         | 5.61     | .65       | .35      | -.21     |
| perceived controlling         | 3.84     | 1.11      | -.15     | -.51     |
| perceived chaotic             | 3.14     | .92       | .33      | .22      |
| behavioral engagement         | 5.95     | .94       | -.85     | .12      |
| agentic engagement            | 5.02     | 1.42      | -.42     | -.01     |
| cognitive engagement          | 5.66     | 1.07      | -.01     | -1.39    |
| emotional engagement          | 5.95     | 1.01      | -.44     | -.99     |

Teachers generally reported high autonomous motivation, and moderately high controlled motivation. At the same time, teachers experienced moderately high need satisfaction. Regarding (de)motivating teaching styles, teachers self-reported they adopted high autonomy-supportive and structuring, moderate controlling, and low chaotic teaching styles. Moreover, there was a high degree of consistency between teachers' results before and at the end of the semester.

Similarly, students reported high autonomous motivation, moderately high controlled

motivation, and low amotivation. They rated moderately high need satisfaction and moderately low need frustration. Concerning (de)motivating teaching styles, students perceived high autonomy-supportive and structuring, moderately high controlling, and moderately low chaotic teaching styles. At last, students self-reported that their classroom engagements were high.

Pearson' correlations for all variables were presented in Table 21 and 22.

The results of teachers showed that autonomous motivation was positively associated with adopting autonomy-supportive and structuring teaching styles. Besides, only the autonomy-supportive teaching style was related to need satisfaction, partially supporting H1a. However, only the controlling teaching style positively correlated with controlled motivation. Nether demotivating teaching styles were related to need frustration. Thus, H2b was not confirmed.

As a confirmation of H2a, students' results revealed that perceived autonomy-supportive and structuring teaching styles were positively related to autonomous motivation, need satisfaction, and engagement. On the contrary, students' perception of the controlling and chaotic styles was positively associated with amotivation and need frustration. Moreover, only perceived controlling teaching was related to controlled motivation, partially supporting H2b.

Table 21 Correlations across the research variables for teachers

|                             | 1      | 2                | 3      | 4                 | 5                 | 6                 | 7    | 8    | 9    | 10   | 11   | 12     | 13   | 14   | 15 |
|-----------------------------|--------|------------------|--------|-------------------|-------------------|-------------------|------|------|------|------|------|--------|------|------|----|
| 1. T1-autonomous motivation | —      |                  |        |                   |                   |                   |      |      |      |      |      |        |      |      |    |
| 2. T1-controlled motivation | .63**  | —                |        |                   |                   |                   |      |      |      |      |      |        |      |      |    |
| 3. T1-need satisfaction     | .81*** | .47 <sup>+</sup> | —      |                   |                   |                   |      |      |      |      |      |        |      |      |    |
| 4. T1-autonomy-supportive   | .32    | .09              | .42    | —                 |                   |                   |      |      |      |      |      |        |      |      |    |
| 5. T1-structuring           | .39    | .41              | .20    | .36               | —                 |                   |      |      |      |      |      |        |      |      |    |
| 6. T1-controlling           | -.01   | .27              | -.27   | -.42 <sup>+</sup> | .57*              | —                 |      |      |      |      |      |        |      |      |    |
| 7. T1-chaotic               | -.05   | -.28             | .06    | -.19              | -.14              | -.01              | —    |      |      |      |      |        |      |      |    |
| 8. T2-autonomous motivation | .83*** | .68**            | .73**  | .15               | .33               | .05               | .01  | —    |      |      |      |        |      |      |    |
| 9. T2-controlled motivation | .31    | .49*             | .22    | -.33              | .45 <sup>+</sup>  | .60*              | .24  | .59* | —    |      |      |        |      |      |    |
| 10. T2-need satisfaction    | .56*   | .38              | .77*** | .20               | .09               | -.06              | .16  | .53* | .34  | —    |      |        |      |      |    |
| 11. T2-autonomy-supportive  | .27    | .27              | .26    | .47 <sup>+</sup>  | .32               | .03               | -.16 | .22  | -.03 | .21  | —    |        |      |      |    |
| 12. T2-structuring          | .12    | .60*             | -.11   | -.13              | .41               | .50*              | -.13 | .23  | .30  | -.03 | .38  | —      |      |      |    |
| 13. T2-controlling          | -.30   | .21              | -.49*  | -.53*             | .27               | .76***            | .10  | -.07 | .50* | -.34 | -.18 | .57*   | —    |      |    |
| 14. T2-chaotic              | -.25   | -.36             | -.02   | -.19              | -.45 <sup>+</sup> | -.42 <sup>+</sup> | .20  | -.13 | .01  | -.08 | -.28 | -.61** | -.15 | —    |    |
| 15. years of teaching       | -.49*  | -.07             | -.25   | -.19              | -.12              | .16               | .20  | -.18 | .19  | -.11 | .38  | .31    | .34  | -.02 | —  |

<sup>+</sup>  $P < .1$ , \*  $P < .05$ , \*\*  $P < .01$ , \*\*\*  $P < .001$ .

Table 22 Correlations across the research variables for students

|                               | 1                | 2                | 3                 | 4                 | 5       | 6                 | 7       | 8      | 9      | 10               | 11     | 12     | 13   | 14   | 15 |
|-------------------------------|------------------|------------------|-------------------|-------------------|---------|-------------------|---------|--------|--------|------------------|--------|--------|------|------|----|
| 1. autonomous motivation      | —                |                  |                   |                   |         |                   |         |        |        |                  |        |        |      |      |    |
| 2. controlled motivation      | .23              | —                |                   |                   |         |                   |         |        |        |                  |        |        |      |      |    |
| 3. amotivation                | -.63***          | .03              | —                 |                   |         |                   |         |        |        |                  |        |        |      |      |    |
| 4. need satisfaction          | .46**            | .21              | -.23              | —                 |         |                   |         |        |        |                  |        |        |      |      |    |
| 5. need frustration           | -.54***          | .00              | .52**             | -.73***           | —       |                   |         |        |        |                  |        |        |      |      |    |
| 6. perceived autonomy support | .50**            | .09              | -.33*             | .62***            | -.58*** | —                 |         |        |        |                  |        |        |      |      |    |
| 7. perceived structuring      | .55***           | .06              | -.45**            | .59***            | -.64*** | .74***            | —       |        |        |                  |        |        |      |      |    |
| 8. perceived controlling      | -.24             | .27              | .44**             | -.08              | .35*    | -.21              | -.17    | —      |        |                  |        |        |      |      |    |
| 9. perceived chaotic          | -.39*            | .09              | .62***            | -.28 <sup>+</sup> | .52**   | -.30 <sup>+</sup> | -.61*** | .63*** | —      |                  |        |        |      |      |    |
| 10. behavioral engagement     | .26              | .22              | -.28 <sup>+</sup> | .62***            | -.41*   | .29 <sup>+</sup>  | .57***  | -.20   | -.52** | —                |        |        |      |      |    |
| 11. agentic engagement        | .38*             | .24              | -.05              | .64***            | -.33*   | .61***            | .60***  | -.03   | -.21   | .63***           | —      |        |      |      |    |
| 12. cognitive engagement      | .47**            | .27 <sup>+</sup> | -.36*             | .50**             | -.40*   | .53**             | .53**   | -.15   | -.25   | .56***           | .59*** | —      |      |      |    |
| 13. emotional engagement      | .48**            | .30 <sup>+</sup> | -.38*             | .63***            | -.37*   | .37*              | .55***  | -.17   | -.40*  | .83***           | .71*** | .73*** | —    |      |    |
| 14. age                       | -.07             | .01              | -.04              | .13               | .08     | .16               | -.04    | -.21   | -.06   | .30 <sup>+</sup> | .34*   | .05    | .33* | —    |    |
| 15. gender                    | .30 <sup>+</sup> | -.23             | -.16              | -.14              | -.18    | .01               | .22     | -.41*  | -.32*  | -.10             | -.14   | .01    | -.06 | -.18 | —  |

Note. Gender (1=boys; 2=girls) .

<sup>+</sup>  $P < .1$ , \*  $P < .05$ , \*\*  $P < .01$ , \*\*\*  $P < .001$ .

### 5.3.2 Focus group interview

Data were coded, classified, and clustered using NVivo software. The interview results were interpreted below, according to the questions listed in the focus group interviews.

#### *The first focus group interview with teachers*

For the first question, more than half of the teachers (12/20) did not think it was challenging to teach students the subject they were teaching, but still, nearly half (8/20) thought it was hard. Reasons for their perceived difficulty included their own (e.g., inexperience, lack of competence), their students (e.g., students' misbehaviors), and their schools (e.g., unreasonable school work schedule and few opportunities for learning and training).

The second question was used to ask teachers about their reasons for teaching. Many teachers answered that since they went to Normal Universities, which train students as future teachers, they chose to teach when they graduated and looked for a job. In addition, the teaching profession brings them many benefits, such as higher social status, longer vacations, and higher salaries. Also, some teachers pursue teaching as a career out of interest. They also added that the influence of significant others, their recognition of the value of this profession, and their own experiences growing up were major factors influencing their choice of the profession.

The third question was to determine teachers' opinions on whether it is more important to develop students' interests or improve their academic performance. One-third of the teachers believed that improving students' academic performance was more important because, in China, academic achievement is the only criterion for students to be assessed. The remaining two-thirds of teachers prioritized developing students' interests. However, many of these teachers believed that growing students' interest was conducive to fostering students' academic performance, and their ultimate goal was still to improve student achievement. Some teachers agreed that in the Chinese educational environment, grade is vital. However, because the subjects they teach are not required to be tested in the college entrance exam or because they teach a group of students who are not required to take the college entrance exam, they prefer to develop students' interests. At last, only one teacher prioritized students' interests since she believed it was more important for students' future development.

For the critical questions of the interview, most teachers planned to use autonomy-supportive and structuring styles, and some planned to adopt controlling teaching, while a few decided to adopt more than two teaching styles. However, none of the teachers mentioned that they planned to use the chaotic style. Teachers also explained their reasons for adopting these teaching styles. The researcher categorized these reasons into internal and external factors and translated them from Chinese to English.

For the internal factors, teachers stated the following:

*"I have used the structuring teaching style before, and I think it works well. I like it." (Teacher 1)*

*"Because I am a novice teacher and relatively less competent at teaching. If I were to adopt the autonomy-supportive style, for example, because it is a student-led style, I would be worried that there would be situations in the classroom that I could not control. However, I think I can better control my classroom using the structuring style." (Teacher 3)*

*“I have always used the autonomy-supportive style since I started to teach.” (Teacher 9)*

Moreover, teachers thought that they choose these (de)motivating teaching styles concerning the students, grades, and subject they taught, for example:

*“Because the students studying in our school are pretty good learners. If they do not do well in the subject I am teaching; it may be because they do not master an effective way to learn it. Thus, I will mainly guide them according to their level and provide appropriate help, making them feel capable of learning this subject well too.” (Teacher 1)*

*“Since I teach 10th-grade students, according to the school, these students have to choose their subject at the end of this semester; that is, they decide which subjects they will take for the college entrance exam. Hence, I plan to use the autonomy-supportive style to develop students’ interest this semester.” (Teacher 2)*

*“Because the subject I teach does not require exams, I would not be particularly concerned about students’ academic performance when teaching it. Therefore, I would not favor the controlling or structuring styles; instead, I would favor autonomy-supportive teaching. ....It would be more beneficial for me to teach.” (Teacher 4)*

*“I choose to adopt a controlling style because most of the students in our school do not have good academic performance, and they are not willing to listen if teachers rely on guidance only. Thus, teachers need to make some punishment rules to let them listen; not only punishment, of course, but also rewards.” (Teacher 7)*

*“Because I am going to teach low-achieving students next. .... Because students in this level do not have their ideas, and if the teacher does not supervise them without giving them clear instructions, they do not know what to do in the class. Hence, I will use controlling teaching to make students do what I say.” (Teacher 12)*

For follow-up item 5, teachers replied that using these teaching styles, they hope to achieve the following outcomes: improve students’ academic performance, promote their classroom engagement, grow their ability to master relevant knowledge to solve relevant problems, develop their interests, and build a harmonic teacher-student relationship. They generally assess whether they are achieving these desired outcomes through test and homework completion and scores, student performance in the classroom, and by communication with students about their feelings and situations.

In response to the last question in the first focus group interview, teachers had different attitudes about whether the teachers around them would be influenced by the teaching style they adopted. Some said yes, some said no, and the rest said, "it is hard to say." They felt that the other teachers' age (or teaching experience) and personality were the main determining factors. Specifically, they thought older (or more experienced) and more stubborn teachers would stick to their usual teaching styles. In contrast, younger (or less experienced) and more open-minded teachers would be more affected. Moreover, they believed whether students were at the same level was also one of the main determinants.

*The second focus group interview with students*

For the first question, most students' answers were related to "learning," whether it was their favorite or least favorite. In addition, entertainment, interaction, and exercise are the things students care about.

The second question was, "how do you get along with teachers at school?" Most students answered that they get along well with teachers, while a few reported that their relationships with teachers were so-so. However, three students replied that they have poor relationships with most teachers at school. Two explained that they were naughty and had poor academic performance; thus, many teachers disliked them and treated them poorly. Another student did not specify the reason.

For the key question of the second focus group interview, most students reported that they perceived motivating teaching styles (i.e., autonomy-supportive and structuring). In contrast, some students perceived demotivating teaching styles (i.e., controlling and chaotic). As shown in Table 23, students' perceived teaching styles were more complex than teachers planned to use.

Table 23 The planned, perceived, and adopted (de)motivating teaching styles

| Teacher | planned  | Perceived                                | adopted                      |
|---------|----------|--|------------------------------|
| 1       | as, str  | as, str, <b>con</b>                      | as, <b>con</b>               |
| 2       | as       | as, str                                  | as, <b>str</b>               |
| 3       | str      | <b>as</b> , str                          | <b>as</b> , str              |
| 4       | as       | <b>con</b>                               | <b>con</b>                   |
| 5       | str      | —  | —                            |
| 6       | as       | as, <b>str</b>                           | as                           |
| 7       | str, con | —  | str, con                     |
| 8       | as, str  | as, str, <b>cha</b>                      | as, str                      |
| 9       | as       | <b>str</b> , <b>con</b>                  | as, <b>str</b> , <b>con</b>  |
| 10      | as       | <b>str</b>                               | <b>str</b>                   |
| 11      | str      | str, <b>con</b>                          | str, <b>con</b>              |
| 12      | con      | —  | con                          |
| 13      | as       | —  | as                           |
| 14      | as, str  | as                                       | as, str                      |
| 15      | as, str  | —  | as, str, <b>cha</b>          |
| 16      | as       | as, <b>str</b>                           | as                           |
| 17      | str, con | —  | str, con                     |
| 18      | str      | <b>as</b> , str, <b>con</b> , <b>cha</b> | <b>as</b> , str              |
| 19      | con      | <b>as</b> , str, <b>cha</b>              | <b>str</b> , con, <b>cha</b> |
| 20      | as       | as, <b>str</b> , <b>cha</b>              | as, <b>str</b> , <b>con</b>  |

Note. The teaching style colored in red differed from the planned. as=autonomy-supportive, str=structuring, con=controlling, cha=chaotic.

For the follow-up question 4, every student liked the perceived teaching styles. For the autonomy-supportive style, for example, "*The teacher is humorous. Her class is interesting, and I feel relaxed in her class.*" For the structuring style, e.g., "*Some learn fast, some learn slow, and my teacher takes care of everyone so everyone can*

*keep up with her as much as possible. My teacher clarifies the teaching objectives so that the students know what to focus on and makes learning more efficient.*” However, even though the controlling style is one of the demotivating teaching styles, the students in this study had a positive view of it. *“It makes me more motivated to study.”* Even some students of the teachers who adopted an autonomy-supportive style expressed that they wished their teachers could be more controlling because they wished that their teachers would keep the classroom more strict and not too relaxed. No students expressed their opinion about the chaotic style since this is generally not targeted at them; they do not feel it as much.

The last question was about the relationships between teaching styles and student outcomes. Students mentioned a range of positive results, including promoting interest, academic performance, engagement, positive emotions, autonomous motivation, good study habits, self-control, and teacher-student relationships. Only one student (of Teacher 2), while affirming the benefits of these teaching styles, noted that it could cause her to develop a dependence on the teacher.

#### *The third focus group interview with teachers*

For the first question, more than half of the teachers felt that their teaching was quite good, mainly regarding students' high classroom engagement and good academic performance. However, a few teachers thought their teaching did not achieve the expected results, partly because of the teachers themselves (e.g., inexperienced teaching) and partly because of the students (e.g., students' misbehavior). Of course, some teachers noted that some aspects of their teaching were achieving the desired results (e.g., good interaction with students), but some aspects were not (e.g., students' performance did not improve). Many teachers in this study replied based on students' academic performance. One teacher even said that she could not judge how her teaching was since her students had not yet taken their final exams and did not know their performance. It suggests that students' academic performance is not only a criterion for assessing students' learning effectiveness but also the main criterion by which teachers judge their teaching effectiveness.

The second question was used to ask teachers whether they adopt what they planned (and if not, why). Around half (8/19) teachers reported that they stuck with the planned teaching styles, but the rest (11/19) said they changed it, as shown in Table 23.

First, as evidenced by these changes in teaching styles, Chinese teachers seemed to favor the teaching styles where teachers are highly directive (i.e., structuring and controlling styles).

*“Since students are very naughty and the class is chaotic and disorderly, I have to manage classroom discipline through some commanding words and punishment so that the class can go on in an orderly way.” (Teacher 4)*

*“I feel that students have less self-control this semester and are not putting their minds to studies. Thus, I cannot let them study on their own. I have to emphasize the discipline, and I also have to give students some commanding guidelines to make them study according to what I say.” (Teacher 11)*

*“Because students in my class have poor academic performance, low motivation, and a scattered learning attitude, I think the controlling style is more suitable for them. However, after considering their pressure, I occasionally use the structuring style to let them relax a little. However, autonomy-supportive is not suitable for the students in our school. Their*

*self-control is poor. If teachers hand the initiative to students and let them lead the class, then the whole class will be difficult to control.” (Teacher 19)*

In addition, although no teacher planned to use the chaotic teaching style, two teachers used this style.

*“Sometimes some students do not listen, but if they do not affect other students, I may just leave them alone.” (Teacher 15)*

*“Some students make it very clear that they will not take the final exam and will not continue to attend school after they finish the compulsory education. Therefore, we do not force them to complete any tasks. They can do whatever they want as long as they do not interfere with other students.” (Teacher 19)*

In their opinion, some students have given up on themselves. Hence, to ensure that other students' interests are not affected, teachers will also give up on these students instead of spending time and energy to encourage or support them.

The third question was to figure out teachers' perceptions about how their teaching styles impact their students and the teachers around them. First, almost all teachers responded that their teaching styles do not affect the teachers around them. In addition to teaching different students and subjects, some teachers noted that experienced teachers do not care how they teach because they are novice teachers. Regarding the impacts on students, teachers replied that these styles contribute to student achievement, motivation, interest, and teacher-student relationships. However, two teachers using the controlling style mentioned that students' creative thinking might be limited.

The fourth question was, “Do you think this teaching style has any effect on you?” most teachers mentioned positive effects, such as better understanding of students, more self-determined motivation, and gaining teaching experience. However, several teachers also noted the negative effects of these teaching styles on them.

*“I feel like I spend too much time managing classroom discipline and controlling students instead of spending time preparing lessons.” (Teacher 1)*

*“Students do not listen, and I use commanding language to control them, which sometimes causes students to rebel and become more mischievous. Therefore, I sometimes feel disrespected and punish them. However, when I do that, they mess with me, and I get angry.” (Teacher 4)*

*“I think the autonomy-supportive teaching style is very demanding for teachers. Since students have plenty of ideas, this causes things to happen in class at any time that I did not anticipate. Therefore, I would be worried that I would be asked weird questions and unable to answer them. Also, this style is low-directed and student-led, which leads to inconsistent pace in each classroom, making me anxious.” (Teacher 6)*

For the follow-up question, every teacher said they would choose the teaching styles they used even if they had a chance to go back to the beginning of the school year. Only one teacher (Teacher 2) intended to add the controlling style.

## 5.4 Discussion

Using questionnaires and focus group interviews with 20 secondary school teachers and their 38 students, this study investigated the predictors and outcomes of (de)motivating teaching styles in China and compared planned, perceived, and adopted (de)motivating teaching styles.

### 5.4.1 The predictors of (de)motivating teaching styles

With respect to the first aim of this study, results showed that motivation and need satisfaction predict teachers' adoption of these teaching styles, consistent with previous studies (Aelterman et al., 2019; Katz & Shahar, 2015; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022; Robertson & Jones, 2013; Vermote et al., 2020). Specifically, autonomous motivation was positively correlated with autonomy-supportive and structuring styles but negatively correlated with controlling and chaotic styles. However, different from previous findings, the results of the present study revealed that controlled motivation was positively associated with structuring and controlling teaching but negatively associated with chaotic teaching. In addition, the interview results suggest that students, grades, subjects they taught, and competence appear to be influential factors. Teachers tended to adopt high directive teaching styles (i.e., structuring and controlling) in the following situations: when students were not performing well (e.g., disengagement, amotivation, disruptive behavior), when the grade taught was at a critical time for advancement, when the subject taught required testing, and when teachers had low self-efficacy. Conversely, they may adopt an autonomy-supportive style. Previous studies also found that teachers' (de)motivating teaching behaviors vary because of teacher and student factors (e.g., Cents-Boonstra et al., 2021; Matos et al., 2018; Van den Berghe et al., 2016). For example, Cents-Boonstra et al. (2021) observed 120 lessons from 43 teachers and found that relatedness support and guidance were higher in lessons in which students showed the highest levels of engagement. On the contrary, in the lessons with the lowest student engagement, teachers exhibited more chaotic teaching behaviors.

### 5.4.2 The outcomes of (de)motivating teaching styles

Regarding to the second aim of the present study, results revealed that autonomy-supportive and structuring styles were motivating while controlling and chaotic styles were demotivating. Specifically, autonomy-supportive and structuring styles were positively related to autonomous motivation, need satisfaction, and engagement but negatively related to amotivation and need frustration. In contrast, controlling and chaotic styles were positively correlated with amotivation, and need frustration, but negatively correlated with autonomous motivation and engagement. It supported previous studies (e.g., Abula et al., 2020; Aelterman et al., 2019; Cheon, Reeve & Ntoumanis, 2018; Cronin et al., 2019; Diseth, Bredablik & Meland, 2018; Jang, Reeve & Deci, 2010; Matos et al., 2018; Montero-Carretero, Barbadov & Cervelló, 2020; Reeve, Cheon & Yu, 2020; Taylor & Lonsdale, 2010; Tilga, Hein & Koka, 2019; Van den Berghe et al., 2016; Van Doren et al., 2021; Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019). Besides, students also mentioned that teachers' teaching styles affect their interests, academic performance, emotions, study habits, self-control, and teacher-student relationships. Notably, although the results of the questionnaire

indicated that the controlling style was demotivating, the results of the interviews did not. In the eyes of students and teachers, controlling was effective. Some students even wanted teachers to become more controlling since they thought controlling teaching could improve their academic performance. However, it is worth noting that the controlling style includes two subareas: demanding and domineering (Aelterman et al., 2019). Demanding refers to ordering students to think, feel, and behave in a specific way to make them more acceptable to the teacher. At the same time, a domineering style is characterized by a ‘personal attack’ on students. The students expect the teacher to use the former, not the latter. It is not surprising that teachers and students trust the controlling style since the traditional Chinese classroom was full of control practices.

Moreover, academic performance is important and are by far the most important, even the only, criterion used to assess students in China. When researchers asked teachers to rate their teaching, the vast majority also used students’ achievement as a criterion for judgment, and some even used it as the only criterion. In the Chinese education system, students’ advancement depends on test scores. Thus, parents, students, teachers, and school administrators place a high value on academic performance, and almost all educational activities are subordinated to test requirements (Lee & Yin, 2011; Liu & Dunne, 2009).

#### **5.4.3 The planned, perceived, and adopted teaching styles**

For the third aim of the current study, we did find differences in the planned, perceived, and adopted teaching styles. First, the results indicated that what students perceived was more demotivating and complex than teachers planned. It seems that the reality of teaching is complex; thus, there is a need to use many different teaching styles to deal with different situations. Second, comparing planned and adopted teaching styles, it seemed that teachers planned to use autonomy-supportive and structuring styles at first. However, they changed to high directive teaching styles (i.e., structuring and controlling) when they encountered some teaching problems (e.g., students’ poor academic performance, disengagement, and amotivation). However, if, after using controlling teaching, some students still did not listen, then teachers might adopt a chaotic style for these students. In addition, what teachers adopted was similar to what students perceived. Some styles were not reported as used by teachers but as felt by students. It may be because teachers used these styles less often, or even teachers were unaware that they used them. Therefore, they did not report them. However, students were more sensitive and felt them; thus, they reported them.

During the interviews, although the teachers recognized the benefits of the autonomy-supportive style, some teachers rarely, even never, used this style: (1) teachers taught the subjects that require exams. They believed that the autonomy-supportive style, even though it fostered independent inquiry, did not address students’ academic problems (Lee & Yin, 2011). (2) some young teachers with less teaching experience. They found it less easy to use this style since they felt that it was more demanding for teachers and were concerned that they would not be able to handle it. (3) teachers taught in rural schools. During the interviews, more than one teacher mentioned that the autonomy-supportive teaching style only applied to urban schools and not rural ones. It is because many rural and remote areas of China are underserved by the Chinese government, resulting in teachers not knowing how to use this style and schools not having the facilities to do so. Although it has been years since the educational reform, students in rural schools are still passive participants, sitting quietly and listening to teachers through reading and rote memorization (Lockette, 2012).

Therefore, it seems it is necessary to conduct interventions for Chinese teachers. Cheon and colleagues found that autonomy-supportive intervention programs (ASIP) can increase teachers' autonomy support and benefit students (e.g., Cheon et al., 2018; Cheon & Reeve, 2015; Cheon, Reeve & Moon, 2012; Cheon, Reeve & Ntoumanis, 2018; Reeve, Cheon & Yu, 2020). A study conducted an ASIP with Chinese teachers and found similar results (Zhang et al., 2020).

Finally, another interesting finding is that in China, in addition to the power inequality between teachers and students, it is also true among teachers. Older and more experienced teachers represent a higher level of power. Also, during the interviews, some teachers stated that older and more experienced teachers were more likely to use the controlling teaching style. Moreover, the results of the Pearson correlation showed that teaching experience was positively related to the controlling teaching styles. It seems that teaching experience (or age) was one predictors of the adoption of the controlling teaching styles. We hypothesize that Chinese teachers have been accustomed to teaching controllingly, and the autonomy-supportive style was introduced into the Chinese educational environment because of educational reform. Therefore, these older teachers may be uncomfortable or even resistant to it (Li, 2019).

#### **5.4.4 Limitations**

This study has some limitations that need to be considered. First, the limitations of the sample size do not allow a clear conclusion to be drawn from the study. Given the diversity of China, it is impossible to comprehensively describe all teachers' adoption of (de)motivating teaching. Otherwise, it will lead to an oversimplification of the Chinese educational context. Second, the teacher participants were almost all females. Although one male teacher was included in the beginning, he dropped out in the middle of the process because of personal reasons, resulting in an all-female final result. Third, the teacher participants were relatively young, and one was even new without any teaching experience at first. Reeve, Jang, and Jang (2018) found that less experienced (or younger) teachers tended to adopt a more autonomy-supportive style. Thus, further study should recruit teachers with a wider range of age. Fourth, the student participants were contacted through the teacher participants. The teachers may likely invite those students with whom they had a good relationship, and students with whom they did not get along well were not included in this study. Although three students stated during the interviews that they did not get along well with most teachers at school, they liked the target teachers. It may be why all the students liked their teachers' teaching styles. The ideal way would be to observe these teachers' classrooms so that more objective results can be obtained.

## **Chapter 6: General discussion**

Grounded on SDT, this research, including four studies, investigated the predictors and impacts of (de)motivating teaching styles. Studies 1 and 2 were cross-culture studies in which the researcher compared the difference between Italy and China. Studies 3 and 4 focused on the Chinese educational context. Specifically, study 1 explored whether need satisfaction/frustration predicted teachers' adoption of (de)motivating teaching styles and whether emotion regulation, burnout, and teacher enthusiasm were mediating variables in these relationships. Since the results of Study 1 differed from Moè and Katz (2022), the relationships between teacher enthusiasm and the adoption of (de)motivating teaching styles need further investigation. Thus, in Study 2, teacher enthusiasm was measured by other instruments. Its mediating role in teachers' need satisfaction/frustration and adoption of (de)motivating was further investigated. In addition, the relationships between (de)motivating teaching styles and students' need satisfaction/frustration were also examined in Study 2. Study 3 was a longitudinal study that assessed the impacts of Chinese middle and high school students' perceived teaching styles on their need satisfaction/frustration and academic motivation. Finally, to further investigate the characteristics, predictors, and impacts of (de)motivating teaching styles on students in the Chinese educational context, a mixed design study, including questionnaire data collection and focus group interviews, was used in Study 4. The researcher will discuss the main findings of this research and its implications for future studies in the following sections.

### **6.1 Comparison between Italian and Chinese (de)motivating teaching styles**

The results showed that Italian and Chinese teachers tend to use more motivating teaching styles (i.e., autonomy-supportive and structuring) rather than demotivating teaching styles (i.e., controlling and chaotic), consistent with previous findings (e.g., Aelterman et al., 2019; Moè, Consiglio & Katz, 2022). According to the results reported by teachers, this trend was more significant in Italy. Nevertheless, the opposite was true based on the results reported by students. One possible explanation is that controlling is common in collectivist cultures and that Chinese education is influenced by the Confucian culture, where students are taught to be humble and obedient (Ho & Ho, 2008). Hence, Chinese students may not be sensitive to some controlling teaching practices or even not feel that it is controlling.

Furthermore, the results for (de)motivating teaching styles' predictors and outcomes were largely consistent in Italy and China. That is, teachers' needs satisfaction was positively related to motivating teaching styles, with reappraisal, personal accomplishment, and teacher enthusiasm mediating these relationships. Conversely, teachers' frustrated needs were positively related to demotivating teaching styles, with suppression and emotional exhaustion mediating these relationships. In addition, motivating teaching styles triggered students' need for satisfaction, whereas demotivating teaching styles were positively associated with students' need for frustration. The only difference was that a positive association between the autonomy-supportive style and students' need satisfaction was found in China but not Italy. It is surprising since previous findings suggested that the autonomy-supportive style predicts experiencing need satisfaction (e.g., Aibar et

al., 2021; Cheon, Reeve & Ntoumanis, 2018; Cheon, Reeve & Vansteenkiste, 2020; Diseth, Breidablik & Meland, 2018; Jang, Kim & Reeve, 2016; Kaplan, 2018; Leo et al., 2022; Zhang et al., 2020). Further studies are needed to investigate it.

The consistency of the Italian and Chinese results supports SDT's core assumption that the basic psychological needs for autonomy, competence, and relatedness are essential and universal. The satisfaction or frustration of these basic needs contributes to individuals' optimal or non-optimal functions, regardless of their cultural background (Chen et al., 2015; Ryan & Deci, 2017). However, some researchers argued for the generality of autonomy (e.g., Iyengar & Lepper, 1999; Uchida & Kitayama, 2009). They argued that autonomy would benefit individualistic societies, such as Europe or the United States. In contrast, in Asia, where collectivism is critical, individuals would benefit from caring, and harmonious relationships; thus, autonomy would not be necessary. However, autonomy is not the same as independence; individuals can also experience satisfaction with autonomy while being dependent on others, as long as they act out of willingness instead of pressure (Chen et al., 2015). The results of the present study suggested that autonomy was also essential in China, supporting and extending the findings of previous studies in Collective cultural contexts, such as Korea (e.g., Cheon & Reeve, 2013, 2015) and Bedouin (e.g., Kaplan, 2018).

## **6.2 The predictors of (de)motivating teaching styles**

Study 1 showed that need satisfaction facilitated the adoption of motivating teaching styles, with reappraisal, personal accomplishment, and teacher enthusiasm mediating these positive relationships. However, need frustration contributed to using demotivating teaching styles, with suppression and emotional exhaustion mediating these relationships. Study 2 replicated the mediating role of teacher enthusiasm in the positive association between need satisfaction and the adoption of motivating teaching styles. However, unlike Study 1, Study 2 only revealed the effect of felt enthusiasm in China, and no effect of expressed enthusiasm was found. It may be due to the difference in the instruments. Thus, both Study 1 and study 2 found the impact of felt enthusiasm in both Italian and Chinese teachers. These results emphasized the importance of felt enthusiasm. Study 4, conducted in the Chinese educational context, complemented the predictive role of motivation. Specifically, autonomous motivation was positively associated with motivating teaching styles and negatively associated with demotivating teaching styles. Also, in the focus group interviews, Chinese teachers mentioned that the students, grade levels, subjects they taught, and their competence also influenced their adoption of (de)motivating teaching styles. Chinese teachers tended to adopt high directive teaching (i.e., structuring and controlling) when confronted with the sequent following situations: when students were not performing well (e.g., disengagement, amotivation, disruptive behavior), when the grade level taught was at a critical time for students to advance to higher education, when the subject taught required examinations, or when teachers' self-efficacy was low).

Reeve (2009) reported that the factors influencing teachers' adoption of a (de)motivating style could be divided into three types: pressure from within, pressure from below, and pressure from above. First, the pressure from within is the pressure of teachers' beliefs, values, and personal tendencies (Reeve, 2009). One of this research's main purposes was to investigate the impact of teacher-related variables (i.e., the pressure from within). The results suggested that teachers' need for satisfaction, emotion regulation, burnout, enthusiasm, motivation, and competence predicted the

adoption of (de)motivating teaching styles. On the one hand, when teachers were in a positive state (i.e., need satisfaction, reappraisal, personal accomplishment, teacher enthusiasm, autonomous motivation), they had more motivational and emotional resources to support students and tended to adopt motivating styles. On the other hand, if they were in a negative state (i.e., need frustration, suppression, emotional exhaustion), they tended to use demotivating styles (e.g., Aelterman et al., 2019; Moè, Consiglio & Katz, 2022; Moè & Katz, 2020, 2021, 2022).

Second, the pressure from below is related to the student's lack of motivation, negative attitude towards school, or destructive behaviors. When teachers perceive their students' external motivation, amotivation, or low classroom engagement, they are usually more likely to adopt a controlling style (Pelletier et al., 2002). Moreover, when teachers think that students are destructive or misbehaving, they will also establish contact with students more controllingly (Reeve, 2009). Previous studies revealed that teachers' teaching behaviors were influenced by their students (e.g., Cents-Boonstra et al., 2021; Jang, Kim & Reeve, 2016; Matos et al., 2018; Van den Berghe et al., 2015, 2016). For instance, Van den Berghe et al. (2015) found that student (dis)engagement influenced teachers' need support teaching style (i.e., autonomy support, structure, involvement). Specifically, engagement was positively related to teacher need support, while disengagement was negatively related to need support. In the focus group interviews, Chinese teachers also mentioned that student performance was indeed a factor influencing their teaching styles. Teachers use a more controlling teaching style when students are disengaged or lack motivation or in situations that teachers refer to as "discipline problems." In these situations, teachers may feel that their basic psychological needs are threatened (Kaplan, 2018).

Third, the pressure from above may come directly from the school administration or indirectly from school boards and parents who demand results. They may put forward some requirements, such as time limits or deadlines, performance evaluation, or requiring teachers to be responsible for students' academic performance (Pelletier & Sharp, 2009). When teachers feel stressed, they usually respond by applying pressure (i.e., exerting control over their students). The teachers who participated in this research did not directly mention that they were affected by the pressure from above. However, testing is prevalent in Chinese education, and almost all teaching activities serve academic performance (Liu & Dunne, 2009). Almost every teacher emphasized the importance of students' academic achievement in this research. Teachers are also expected to achieve with their students, and students' failure is also perceived as teachers' failure (Kaplan, 2018). These are external pressures from schools, policymakers, and parents.

In addition, based on Study 4 (including questionnaire data and focus group interviews), the researcher inferred that teachers' teaching experience was also one determinant. One possible explanation is that these older teachers, who were not used to the autonomy-supportive teaching style introduced by the educational reform, were more accustomed to the traditional controlling style in China. Similarly, Reeve, Jang, and Jang (2018) found that the less experienced teachers tended to adopt a more autonomy-supportive teaching style. Nevertheless, some studies have found a positive correlation between years of teaching and motivating teaching styles (e.g., Moè & Katz, 2020). Therefore, it does not yet allow for consistent conclusions and requires further studies to continue investigating.

### 6.3 The impacts of (de)motivating teaching styles on students

Study 2 revealed that teacher-reported (de)motivating teaching styles were not associated with student outcomes. However, the student-reported results revealed that perceived motivating teaching styles were positively correlated with students' need satisfaction, while perceived demotivating teaching styles were positively associated with students' need frustration. Thus, the results reported by students differed from those reported by teachers. Similarly, in Study 1, although both student- and teacher-reported results showed that teachers preferred motivating teaching styles to demotivating ones, the teacher-reported results showed that this trend was more significant in Italy. In contrast, the student-reported results showed the opposite. Previous studies have also found inconsistencies in teachers' and students' evaluations of teaching practices (e.g., Lauermaun & Berger, 2021). The validity of teacher and student reports of classroom autonomy support (or control) has been confirmed by independent video observation; nevertheless, the strength of these associations is usually modest (De Meyer et al., 2014). It is concluded that the more accessible the instructional behavior is to observe (e.g., disruptive behaviors), the more consistent the ratings are across observers, including teachers and students (e.g., Fauth et al., 2020; Wagner et al., 2016). On the other hand, complex interpersonal behaviors, such as autonomy support and psychological control practices, are less easily observed, leading to less consistency in rating across observers (e.g., Haerens et al., 2013; Lauermaun & Berger, 2021; Wagner et al. 2016). Furthermore, teachers' and students' evaluations are based on their feelings and experiences, which differ from each other (Fauth et al., 2020; Lauermaun & Berger, 2021).

Study 3 revealed that perceived motivating teaching styles were positively associated with autonomous motivation, with need satisfaction mediating this relationship. The perceived chaotic style predicted the need for frustration, contributing to amotivation. However, the researcher found the moderating role of gender in the impact of the controlling style. Specifically, in girls, a positive correlation between perceived controlling style and controlled motivation was found, as well as a mediating role of need frustration. However, in boys, the controlling style did not affect need frustration, and need frustration did not affect controlled motivation, although a positive relationship was found between the controlling style and need frustration. Similarly, Koka and Sildala (2018) also reported gender variance in the relationship between teachers' controlling behavior and amotivation in PE in high school. One possible explanation is that girls are more socially dependent on significant others in their social network and rely heavily on them for self-evaluation. In contrast, boys are more socially independent and achievement-oriented (Tatar, 1998). Another possible explanation should be that teachers may treat boys and girls differently. For example, they use a more external control style for boys while a more implicit one for girls. According to some researchers (Burgueño et al., 2021; De Meyer, Soenens, Aelterman, De Bourdeaudhuij & Haerens, 2016; Diloy-Peña et al., 2021; Soenens & Vansteenkiste, 2010), teachers' control styles may take two different forms: the internally and the externally controlling styles. The former refers to behaviors and attitudes teachers try to provoke anxiety, shame, or embarrassment in their students, such as indifferent eye contact, disappointed gesture, or ignoring. The externally controlling style involves obvious behaviors, such as punishment, threats, or yelling. Previous studies found that the internally controlling style was a negative predictor of student desired outcomes, whereas the externally controlling style was not (e.g., Diloy-Peña et al., 2021).

In addition to need satisfaction/frustration and motivation, Study 4 provided evidence for the

relationships between (de)motivating teaching styles and student engagement. Specifically, motivating teaching styles were positively related to engagement, while demotivating teaching styles were negatively related to engagement. Furthermore, in the focus group interviews, students mentioned that they liked their teachers' teaching styles (i.e., autonomy-supportive, structuring, and controlling). They believed these styles benefited their interest, academic performance, emotion, study habits, self-control, and relationships with teachers.

In conclusion, the results of this research showed that autonomy-supportive and structuring were motivating teaching styles, facilitating students' need satisfaction, motivation, and engagement. In contrast, controlling and chaotic were demotivating teaching styles, contributing to students' need frustration, amotivation, and low engagement. These results supported and extended previous findings (e.g., Abula et al., 2020; Aelterman et al., 2019; Cheon, Reeve & Ntoumanis, 2018; Cronin et al., 2019; Diseth, Bredablik & Meland, 2018; Jang, Reeve & Deci, 2010; Matos et al., 2018; Montero-Carretero, Barbadov & Cervelló, 2020; Reeve, Cheon & Yu, 2020; Taylor & Lonsdale, 2010; Tilga, Hein & Koka, 2019; Van den Berghe et al., 2016; Van Doren et al., 2021; Zhou, Ntoumanis & Thøgersen-Ntoumani, 2019).

Notably, even though the results of the questionnaires showed that the controlling style was demotivating, Chinese teachers and students strongly approve of its effectiveness, which is related to Chinese educational characteristics. First, in China, there are about 40-50 (even 60) students in each class. Thus, to maintain order in the classroom, teachers must use controlling practices to make students do what they are told. At the same time, examinations are prevalent in China, and teachers have a heavy teaching load and are pressured by time constraints. In this case, it is easier to achieve their teaching objectives if teachers use this traditional teacher-centered teaching style.

## **6.4 Practical implications**

The results of these studies indicated that autonomy-supportive and structuring teaching styles were motivating and facilitated students' need satisfaction, autonomous motivation, and engagement. In contrast, controlling and chaotic teaching styles were demotivating and resulted in students experiencing frustrated needs, amotivation, and low engagement. Therefore, it is vital to promote teachers' adoption of autonomy-supportive and structuring and avoid using controlling and chaotic teaching styles. The latter is crucial for Italian teachers since, in China, to some extent, the controlling style is also considered an effective teaching style that can help teachers manage classroom order as well as improve students' academic performance. Based on results found in this research, regardless of the culture, encouraging self-compassion, enhancing need satisfaction, reducing need frustration, preventing burnout, and developing the ability to reappraisal and expressed/felt enthusiasm will make teachers more supportive. In this way, teachers tend to adopt motivating rather than demotivating teaching styles.

Besides, according to previous studies (e.g., Aelterman et al., 2013, 2019; Assor, 2012; Guay et al., 2016; Reeve, 2009), to become more need supportive, teachers can adopt the subsequent behaviors: accept students' opinions and welcome their input; provide students with choices; provide explanatory rationales when options are restricted; use inviting language; take students' perspectives; accept and acknowledge students' negative feelings and affect; show patience; provide clear expectations, precise information, best challenges, constructive feedback; offer appropriate strategies, help, and assistance. Also, teachers need to avoid the following behaviors: rely on

external sources of motivation (e.g., rewards and punishment); ignore rationales; use command language; show an impatient attitude and require students to give correct answers; advocate power to deal with students' complaints and negative feelings; leave student on their own without clear expectation, strategies, or help.

Moreover, similar to previous studies (e.g., Cents-Boonstra et al., 2021; Jang, Kim & Reeve, 2016; Matos et al., 2018; Van den Berghe et al., 2015, 2016), teachers participating in Study 4 reported that students also influenced their teaching behaviors. Hence, if students want their teachers to use a need-supportive teaching style, they can behave positively (e.g., engagement and autonomous motivation) and avoid behaving negatively (e.g., disengagement and amotivation).

Furthermore, teachers can learn how to become more autonomy-supportive through the Autonomy-Supportive Intervention Program (ASIP) (Chatzisarantis & Hagger, 2009; Cheon & Reeve, 2015; Cheon, Reeve & Moon, 2012; Cheon, Reeve & Song, 2016, 2019; Reeve, Jang & Jang, 2018). After participating in ASIP, teachers (e.g., becoming more need supportive, Cheon & Reeve, 2015; Cheon, Reeve & Moon, 2012; Cheon, Reeve & Song, 2016; Cheon et al., 2014) and their students (e.g., improving autonomous motivation, classroom engagement, Cheon & Reeve, 2015; Cheon, Reeve & Moon, 2012; Cheon et al., 2014) can benefit.

## **6.5 Limitations and directions for future research**

Although the results of this research are inspiring, there are still some limitations worth noting.

First, even though this research was cross-cultural, it only compared the situation in Italy and China. Thus, the findings cannot be generalized to other cultures. Besides, it should be noted that only Studies 1 and 2 compared Italy and China. Studies 3 and 4 investigated only China and did not focus on Italy. Therefore, more research is needed in the future to explore further the characteristics, predictors, and impacts of motivating and demotivating teaching styles in different cultural contexts.

Second, the researcher measured the basic psychological need for autonomy, competence, and relatedness; nevertheless, the researcher treated them as a global factor in the analyses (i.e., need satisfaction/frustration). Similarly, the same was true for autonomous motivation, controlled motivation, and amotivation. Therefore, future research could attempt to analyze in more detail the basic psychological needs and the five types of self-regulated motivation (i.e., intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation).

Third, in this research, most of the studies were correlated; therefore, no causal conclusions could be drawn. Although based on previous studies, it can be inferred that teachers' teaching practices would influence students (e.g., students would experience need satisfaction and become motivated when they perceive autonomy-supportive and structuring styles). However, in fact, the opposite direction is possible as well. Teachers will adjust their (de)motivating teaching styles to student behaviors (e.g., Van den Berghe et al., 2015). Nevertheless, in this study, this direction was ignored. Future research could take cross-lagging to explore these relationships further.

Fourth, this research was conducted in secondary schools. Therefore, this research results only apply to teachers and students at this educational level. Future studies may consider other educational levels, such as primary or university education.

Fifth, the researcher was not allowed to enter the schools to collect data due to COVID-19. Therefore, participants could only fill out the questionnaires online, resulting in a high attrition rate. It also led to this research relying only on participants' self-reported results. Although many

previous studies in this area have collected data by having participants self-report, adding other objective data (e.g., observer ratings) would have allowed for more comprehensive and objective results.

Finally, this research was conducted in a new period, the COVID-19 pandemic. These findings should be treated with caution because the COVID-19 pandemic, lockdown, and online instruction may have impacted teachers' teaching styles and the need satisfaction/frustration of teachers and students. Future research should investigate these effects and changes further.

## 6.6 Conclusion

Based on SDT, this research, including four studies, investigated the characteristics, predictors, and outcomes of (de)motivating teaching styles in Italy and China. Studies 1 and 2 were cross-cultural studies where the researcher compared the difference in (de)motivating teaching styles in Italy and China. Also, based on SDT, the researcher used a dual-process model to investigate the predictors of (de)motivating teaching styles and their associations with student outcomes.

Study 1 revealed that Italian teachers tend to adopt less controlling, chaotic, and autonomy-supportive styles than Chinese teachers. Moreover, Italian teachers rated higher in the variables related to well-being and lower in the variables related to ill-being than Chinese teachers. The results suggested that the more teachers embraced self-compassion, the more their basic needs were satisfied, leading to reappraisal, personal accomplishment, teacher enthusiasm, and the adoption of motivating styles. However, the more teachers embraced self-derogation, the more their basic needs frustrated, which contributes to suppression, burnout, and the implementation of demotivating styles. These findings are consistent across cultures.

Since the results regarding teacher enthusiasm were different from Moè and Katz (2022), the mediating role of teacher enthusiasm in the associations between experience of need satisfaction/frustration and adoption of (de)motivating teaching styles was further investigated in Study 2. The relationships between (de)motivating teaching and students' need satisfaction/frustration were assessed as well. The results showed a difference in the (de)motivating style reported by the teacher and perceived by the students. Italian teachers reported that they adopt more motivating styles than Chinese teachers. However, compared with Italian students, Chinese students perceived more motivating styles. Moreover, Italian teachers felt and expressed enthusiasm mediated the positive relationship between need satisfaction and motivating styles, whereas Chinese teachers only felt enthusiasm mediated these relationships. At last, instead of teacher-reported, student-perceived (de)motivating styles have significant relationships with students' need satisfaction/frustration. Specifically, students' perceived autonomy-supportive and structuring styles were positively related to their need satisfaction and perceived controlling and chaotic styles were positively associated with their need frustration.

Study 3 investigated the relationships between these teaching styles, students' need satisfaction, and motivation. Also, gender invariance was assessed. The findings suggest that teachers' motivating teaching constructs a need-supporting learning environment to meet students' basic psychological needs, which is vital for students' motivation. In contrast, teachers' controlling and chaotic teaching created a need-thwarting learning environment that resulted in students experiencing need frustration and weakened motivation. Furthermore, strong gender invariance suggests that student motivation can be promoted by need-supporting learning environments

regardless of gender. However, the negative effects of (de)motivating teaching differed across genders, with controlling teaching, in particular, having a significantly more substantial impact on girls than on boys.

At last, given the unique characteristics of the Chinese educational context, a mixed-method study was conducted to explore the characteristics and predictors of (de)motivating teaching styles and their associations with student outcomes in China. The results revealed that need satisfaction and motivation were predictors of (de)motivating teaching styles. Also, the students, grades, subjects that teachers taught, and their competence influenced their adoption of these teaching styles. Besides, these teaching styles impacted students' need satisfaction, motivation, and engagement. Moreover, students reported that their interests, academic performance, emotions, study habits, self-control, and relationships with teachers were also affected. Most interesting and importantly, although the controlling teaching style was demotivating, it was a popular teaching style in China. Both teachers and students thought it helpful and expected to use it to improve students' academic performance.

In sum, the findings were similar in Italy and China. Italian and Chinese teachers tended to adopt more motivating rather than demotivating teaching styles. Besides, regardless of the culture, encouraging self-compassion, enhancing need satisfaction, reducing need frustration, preventing burnout, and developing the ability to reappraisal and expressed/felt enthusiasm will make teachers more supportive. In this way, teachers tend to adopt motivating rather than demotivating teaching styles. Furthermore, motivating teaching styles triggered desired student outcomes (e.g., need satisfaction, autonomous motivation, and engagement), while demotivating teaching styles resulted in maladaptive student outcomes (e.g., need frustration and amotivation). The results of this research emphasized the importance of fulfilling three basic psychological needs of teachers and students, regardless of their cultural background.

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