

The beliefs that underlie autonomy-supportive and controlling teaching: A multinational investigation

Johnmarshall Reeve · Maarten Vansteenkiste · Avi Assor · Ikhlas Ahmad ·
Sung Hyeon Cheon · Hyungshim Jang · Haya Kaplan · Jennifer D. Moss ·
Bodil Stokke Olaussen · C. K. John Wang

Published online: 20 June 2013
© Springer Science+Business Media New York 2013

Abstract We investigated the role of three beliefs in predicting teachers' motivating style toward students—namely, how effective, how normative, and how easy-to-implement autonomy-supportive and controlling teaching were each believed to be. We further examined national collectivism–individualism as a predictor of individual teachers' motivating style and beliefs about motivating style, as we expected that a collectivistic perspective would tend teachers toward the controlling style and toward positive beliefs about that style. Participants were 815 full-time PreK–12 public school teachers from eight different nations that varied in collectivism–individualism. All three teacher beliefs explained independent and substantial variance in teachers' self-described motivating styles.

Believed effectiveness was a particularly strong predictor of self-described motivating style. Collectivism–individualism predicted which teachers were most likely to self-describe a controlling motivating style, and a mediation analysis showed that teachers in collectivistic nations self-described a controlling style because they believed it to be culturally normative classroom practice. These findings enhance the literature on the antecedents of teachers' motivating styles by showing that teacher beliefs strongly predict motivating style, and that culture informs one of these beliefs—namely, normalcy.

Keywords Motivating style · Teacher beliefs · Collectivism · Autonomy support · Antecedents of motivating style

Except for the three lead authors, authors' names are listed in alphabetical order to reflect that all authors contributed equally to the completion of the study.

J. Reeve (✉)
Department of Education, Korea University, 633 Uncho-Useon Hall, Anam-Dong Seongbuk-Gu, Seoul 136-701, Korea
e-mail: reeve@korea.ac.kr

M. Vansteenkiste
Department of Developmental, Personality, and Social Psychology, Ghent University, Ghent, Belgium

A. Assor
Department of Education, Ben-Gurion University, Beersheba, Israel

I. Ahmad
Counseling and Educational Psychology Department, University of Jordan, Amman, Jordan

S. H. Cheon
Department of Physical Education, Korea University, Seoul, Korea

H. Jang
Department of Education, Hanyang University, Seoul, Korea

H. Kaplan
Center for Motivation and Self-Determination, Kaye Academic College of Education, Beersheba, Israel

J. D. Moss
Department of Educational Studies, Purdue University, West Lafayette, IN, USA

B. S. Olaussen
Institute of Educational Research, University of Oslo, Oslo, Norway

C. K. J. Wang
National Institute of Education, Nanyang Technological University, Singapore, Singapore

Introduction

All teachers face the instructional challenge to motivate their students to engage in and benefit from the learning activities they provide. For some teachers the controlling aspect of what they say and do is particularly salient as they try to motivate and engage their students, whereas for other teachers their effort to support students' autonomy is more salient. When these differences take on a recurring and enduring pattern, they represent a teacher's "orientation toward control versus autonomy" (Deci et al. 1981) or, more simply, "motivating style" (Reeve 2009). Such a classroom style can range from one that is strongly prescriptive over and insistent about what students should think, feel, and do during instruction through a neutral style to one that is highly respectful of students' perspectives and supportive of their initiatives (Deci et al. 1981). A teacher's motivating style is an important classroom feature because students of autonomy-supportive teachers, compared to those of controlling teachers, benefit in important and multiple ways, including greater classroom engagement, achievement, and psychological well-being (e.g., Assor et al. 2002; Reeve 2009; Vansteenkiste et al. 2004).

Teacher-provided autonomy support benefits students because it promotes autonomy need satisfaction (Reeve and Jang 2006) which, in turn, fosters greater engagement, self-regulation, learning, achievement, and well-being (e.g., Cheon et al. 2012; Vansteenkiste et al. 2005a). A controlling motivating style, on the other hand, harms students because it frustrates their autonomy while simultaneously arousing negative emotions such as anger and anxiety (Assor et al. 2002; Reeve and Tseng 2011) which, in turn, foster amotivation and restrict engagement, self-regulation, learning, achievement, and well-being (e.g., Soenens et al. 2012). The research that discovered these benefits of autonomy support and costs of control was conducted largely with teachers and students in the West, but cross-cultural research has since confirmed that these findings extend to samples from China (Zhou et al. 2009), Singapore (Lim and Wang 2009), Korea (Jang et al. 2009), Taiwan (Hardre et al. 2006), Israel (Assor et al. 2005), Brazil (Chirkov et al. 2005), Russia (Chirkov and Ryan 2001), and Nigeria and India (Sheldon et al. 2009). In some of these studies, students from different cultures report different mean levels of perceived autonomy support and perceived teacher control, but they nevertheless still show the same benefits from autonomy support and costs from control (Chirkov and Ryan 2001).

Nature and assessment of a teacher's motivating style

Conceptually defined, motivating style is the interpersonal sentiment and behavior a teacher uses to motivate his or her

students to engage in learning activities (Deci et al. 1981; Reeve 2009). What autonomy-supportive teachers generally say and do during instruction is qualitatively different from, and often the opposite of, what controlling teachers generally say and do during instruction. For instance, autonomy-supportive teachers tend to adopt their students' perspectives, welcome their students' thoughts, feelings, and actions into the flow of the lesson, and support their students' developing capacity for autonomous self-regulation, while controlling teachers tend to adopt only their own perspective, intrude into their students' thoughts, feelings, and actions, and pressure their students to think, feel, and behave in a teacher-prescribed way (Reeve 2009). Further, during instruction, autonomy-supportive teachers motivate students by nurturing inner motivational resources, providing explanatory rationales, using informational language, displaying patience, and acknowledging and accepting expressions of negative affect, while controlling teachers motivate students by offering extrinsic incentives, uttering pressuring language, displaying impatience for students to produce the right answer or the desired behavior, and asserting power to counter complaints (Reeve 2009).

The above notwithstanding, some self-determination theory researchers have begun to study autonomy-supportive and controlling instructional behaviors as two separate approaches to motivating students (Bartholomew et al. 2011a; Tessier et al. 2008). This trend began because some earlier classroom-based investigations found that autonomy-supportive (choice, rationales) and controlling (directives, impatience) instructional behaviors had negative—but not highly negative—intercorrelations (Assor et al. 2002). In these empirical investigations, teachers were scored on how autonomy supportive they were toward students but also, separately, on how controlling they were. The observed low negative intercorrelations suggested that autonomy support and teacher control may be two somewhat independent aspects of motivating style, rather than opposites. Some of the discrepancy between the findings in these studies versus those from earlier studies can be explained by key methodological differences. For instance, the former cluster of studies routinely scored general categories of instructional behavior (e.g., "uses informational versus pressuring language") averaged over a relatively long period of time (e.g., a 50 min class period) while the later studies scored specific acts of instruction (e.g., number of times the teacher says "you should", number of times the teacher "shouts or yells") for briefer (e.g., 5 min) episodes. In addition, researchers came to recognize that while some autonomy-supportive instructional behaviors had logical controlling opposites (e.g., accept negative affect vs. assert power), others did not (e.g., provide explanatory rationales). Further, autonomy-supportive

behaviors tended to more strongly predict need satisfaction and positive affect while controlling behaviors tended to more strongly predict need thwarting and negative affect (Bartholomew et al. 2011b).

To make progress on understanding teachers' autonomy supportive versus controlling motivating styles requires an appropriate assessment strategy. To date, motivating style has been assessed in three ways: (1) objective ratings of teachers' instructional behavior (as in the preceding paragraph); (2) students' self-reported perceptions of their teachers' instructional behavior; and (3) teachers' self-report of their own instructional behavior (Su and Reeve 2011). Because our study planned to involve almost 1,000 teachers located across eight different nations, the first two assessment strategies were not feasible. It was not feasible to use objective raters because each individual teacher would need to be scored one-at-a-time in his or her own classroom and because eight geographically separated groups of objective raters would need to be trained and coordinated. It was not feasible to use students' self-reports because that would require the collection of at least 30,000 data points (30 students rating 1,000 different teachers). Because of these limitations, we chose to use teachers' self-reported motivating style. One problem with this assessment strategy, however, is that no previously validated and easy-to-administer self-report measure of motivating style exists. One option would be to employ the Problems in Schools questionnaire (Deci et al. 1981), but this measure is very long and may have some validity concerns (Reeve et al. 1999).

Given the lack of a suitable self-report measure of motivating style, we elected to create a new measure. This measure appears in Table 1. We designed the measure to produce two parallel scores—one for autonomy-supportive teaching (left side of the table) and a second for controlling teaching (right side of the table). By parallel, we mean that the 263-word (in English) autonomy-supportive teaching scenario presented an approach to instruction that featured adopting the students' perspective, inviting and welcoming students' thoughts, feelings, and actions into the flow of instruction, and supporting autonomous self-regulation, while also nurturing inner motivational resources, providing explanatory rationales, using informational language, displaying patience, and accepting negative affect, while the 262-word controlling scenario presented an approach to instruction that featured adopting only the teacher's perspective, intruding into and trying to change students' thoughts, feelings, and actions, and pressuring students to think, feel, and behave in a teacher-prescribed way, while also offering extrinsic incentives, neglecting explanatory rationales, relying on pressuring language, pushing students toward prescribed courses of action, and asserting power to overcome complaints. Both teaching scenarios

were followed by the same single question to assess self-described motivating style: "Does this approach to teaching describe what *you* do on a daily basis to motivate and engage your students?" We asked teachers to answer this question twice—once each with respect to the two scenarios. We address the measure's validity in the "Measures" section.

Teacher beliefs about motivating style

Many factors help explain why teachers orient themselves toward one motivating style rather than another, including the beliefs that teachers hold (Roth and Weinstock 2013), the social context in which they teach (Taylor et al. 2009), the characteristics of the students they teach (Pelletier et al. 2002), their pre-service and in-service training experiences (Su and Reeve 2011; Woolfolk and Hoy 1990), administrative supports versus pressures (Pelletier and Sharp 2009), their own personality disposition (Van den Berghe et al. 2013), and the culture in which they live and teach (Downie et al. 2004). In this paper, we investigated the two least understood of these influences—namely, teachers' beliefs and the national culture in which their classrooms are situated. We focused on both beliefs and culture because recent theoretical work suggested that these two influences need to be studied in tandem, as teachers' beliefs are likely to be influenced by culture (Oyserman and Lee 2008).

To identify candidate beliefs that underlie a teacher's motivating style, we read the literature closely for explanations as to why teachers tend to adopt an autonomy-supportive or a controlling style (e.g., Taylor et al. 2009), and we borrowed from the theory of planned behavior that suggested the starting points of the ease of performing the instructional behavior, a positive attitude toward that act of instruction, and the social norms about that course of action (Ajzen 1991; Hagger et al. 2005). Using these two sources, the first teacher belief we expected may explain a teacher's tendency to motivate students with autonomy-supportive or controlling instructional behaviors was the belief about how effective versus ineffective these instructional behaviors were believed to be. The reason why some teachers might tend toward a controlling style is because they believe that such a style is effective, or that autonomy support is ineffective, or that teacher control is relatively more effective than is autonomy support. Some teachers, for instance, believe that controlling motivating strategies (e.g., offer incentives) are more able to "turn on" students' motivation (Boggiano et al. 1987). Of course, teachers might believe that the reverse is true in that they may believe that supporting autonomy is an effective way to motivate and engage students.

Table 1 Teaching scenarios to assess self-described autonomy support (left side) and teacher control (right side)

| Autonomy-supportive teaching scenario | Controlling teaching scenario |
|--|---|
| <p>As you plan and prepare for an upcoming lesson, you think about what your students want and need. You wonder if students will find the lesson interesting and relevant to their lives. To support their interest and valuing of the lesson, you prepare some resources in advance so that they can see how interesting and how important the lesson truly is. To better engage students in the lesson, you create a challenging activity for students to do, and you create some engaging questions to pique their interest. As the class period begins, you invite your students' input and suggestions before finalizing the day's lesson plan, letting your students know that you welcome and value their thoughts, ideas, and suggestions. To motivate students, you take the time to explain why the lesson is important, how it aligns with their personal goals, and why it is a truly worthwhile thing to do. When students encounter difficulties and setbacks, you display patience—giving them the time and space they need to figure out the problem for themselves. When students complain and show little or no initiative, you acknowledge and accept their negative feelings, telling them that you understand why they might feel that way, given the difficulty and complexity of the lesson. As you talk with your students, you resist any pressuring language such as “you should”, “you must”, and “you have to.” Instead, you communicate your understanding and encouragement. Overall, you take your students' perspective, welcome their thoughts, feelings, and actions into the flow of the lesson, and support their developing capacity for autonomous self-regulation</p> | <p>As you plan and prepare for an upcoming lesson, you think about what needs to be covered. You make a step-by-step plan of what students are supposed to do and when they are supposed to do it. As the class period begins, you tell students what to do, monitor their compliance closely, and when needed make it clear that there is no time to waste. To keep students on-task, you make sure they follow your directions, obey their assignments, and basically do what they are supposed to do while not doing what they are not supposed to do. When students stray off task, you correct them saying, “You should be working now”, “act responsibly”, and “there is a time for work and there is a time for play—now is a time for work.” To motivate students, you offer little incentives and privileges. When students encounter difficulties and setbacks, you intervene quickly to show and tell them the right way to do it. When they do what you tell them to do and when they produce right answers, you smile and give your praise. When they don't do what you tell them to do and when they misbehave, you make it clear that you are in charge and that it is your responsibility to make sure that they act responsibly and complete their work. Overall, you take a “no-nonsense” attitude and make sure students do what you tell them to do, even if it means you need to push and pressure them into doing what they are supposed and required to do</p> |
| <p>Does this approach to teaching describe what <i>you</i> do on a daily basis to motivate and engage your students?</p> | <p>Does this approach to teaching describe what <i>you</i> do on a daily basis to motivate and engage your students?</p> |

A second teacher belief we expected may explain a teacher's tendency to motivate students with autonomy-supportive or controlling instructional behaviors was the belief about how easy, rather than difficult, it is to implement a particular style during everyday instruction. We included this teacher belief because some teachers believe that controlling approaches (e.g., offer rewards, apply pressure) are direct, fast-acting, and highly practiced ways of motivating students, while autonomy-supportive approaches (e.g., provide rationales, take perspective) are more indirect, may appear to be more time-consuming, and may be experienced as more “foreign” (Newby 1991; Skinner and Belmont 1993). Some teachers, especially those in the first few years of the profession, may see the controlling style as more “realistic” (Lamote and Engels 2010; Woolfolk and Hoy 1990). Direct, fast-acting, practiced, and realistic strategies would seemingly be thought of as easier to implement during the flow of instruction than would indirect, time-consuming, unfamiliar, and idealistic strategies. To the extent that teachers held this belief, they may orient themselves toward the relatively easier-to-enact style.

A third teacher belief we expected may explain a teacher's tendency toward an autonomy-supportive or a controlling style was the belief about how normative these instructional behaviors were believed to be in the setting in

which that teacher taught. School-wide norms inform teachers as to which approaches to instruction are most common, most accepted, and most expected. For instance, a school climate characterized by competition, high-stakes testing, external evaluation, adult surveillance, and extrinsic incentives can communicate that a controlling style is both accepted and expected from teachers (Barrett and Boggiano 1988). The opposite can be true as well, as a school climate characterized by individualized programs for learning, freedom within limits, respect for each student's individuality, and an emphasis on promoting the “joy of learning” can communicate that an autonomy-supportive style is both accepted and expected (Lillard and Else-Quest 2006; Montessori 1964).

Cultural influence on motivating style and beliefs about motivating style

Culture influences what is believed to be true (Oyserman and Lee 2008). Applied to the present study, culture may influence teachers' beliefs about motivating style. To operationalize culture, we focused on collectivism–individualism (Hofstede 2001; Oyserman et al. 2002; Triandis 2007). Collectivism pertains to a cultural perspective in which individuals are integrated into cohesive in-groups that protect them in exchange for their loyalty, and it refers

to norms and practices that give priority to the group's goals and interests; its conceptual opposite is individualism, which pertains to a cultural perspective in which the ties between individuals are looser, and it refers to norms and practices that give priority to the individual's goals and interests (Hofstede 2001; Hofstede et al. 2010; Oyserman et al. 2002). Within a collectivistic perspective, the group is the core unit of society and individuals are expected to fit into the group; within an individualistic perspective, the individual is the core unit of society and the society exists to promote the individual's well-being (Oyserman et al. 2002).

We expected that teachers who taught within a collectivistic cultural context would tend toward a relatively controlling style than would teachers who taught within an individualistic culture, because they would, on average, tend to weigh group priorities over personal interests, utilize a directive and authoritarian communication style, pace instruction around their own needs and goals, rely on shaming more than on explanatory rationales when making requests, and push students toward societal consensus but away from individual choice. That is, we found a parallel between what a collectivistic cultural perspective emphasizes and what a controlling style emphasizes. We further expected that a collectivistic context would prioritize controlling aspects of teaching and therefore orient teachers toward relatively positive beliefs about how effective, normative, and easy-to-implement it was believed to be.

To operationally define collectivism–individualism, we measured the nation or country in which each teacher's classroom was situated, a strategy often used in multinational studies to differentiate samples of participants who are generally oriented toward collectivism versus other samples who are generally oriented toward individualism (House et al. 2004; Inglehart 1997; Inglehart and Baker 2000; Schwartz and Bilsky 1987; Triandis 1995). Accordingly, we sampled a culturally-diverse range of full-time PreK-12 public school teachers from East Asia (Korea, Singapore), the Middle East (Jordan, Israel, Bedouins living in Israel), Northern Europe (Belgium, Norway), and North America (United States). We selected these eight nations in particular because Geert Hofstede's work had shown that these nations represented the full range of societal collectivism–individualism (Hofstede 2001; Hofstede et al. 2010). Specifically, Hofstede scored 76 nations on a 0–100 scale in terms of collectivism–individualism. These scores were derived from the combined findings from eight large multinational studies conducted between 1973 and 2010 that involved matched samples of students, employees, civil service managers, commercial airline pilots and others as cultural informants.

These data were combined into a comprehensive “dimensions of national culture” and published in the 2010 edition of *Culture and organizations: Software of the mind*. Other national indices of collectivism–individualism exist, such as the Global Leadership and Organizational Behavior (GLOBE) project (House et al. 2004), but we used Hofstede's index because it is the most comprehensive of these data sets (e.g., the 62 nation GLOBE project is the second most comprehensive data set but it failed to include three of our eight participating nations), and because it has been related specifically to teaching (Hofstede 1986). The only nation in our study that was missing from Hofstede's index was Jordan, but Alkailani et al. (2012) used Hofstede's methodology to collect the national data necessary to calculate a Jordanian collectivism–individualism score, which we used. The national collectivism–individualism scores for the nations included in the present study were as follows (reverse-scored from most to least collectivistic): Korea, 82; Singapore, 80; Jordan, 72; Bedouin in Israel, 62; Israel, 46; Norway, 31; Belgium, 25; and United States, 9.

Hypotheses

The outcome measure in the present study was teachers' self-described motivating style, which we assessed and analyzed in three ways. Consistent with Deci et al.'s (1981) pioneering work, we looked at teachers' overall (or “net”) motivating style by subtracting their responses on the controlling style from their responses on the autonomy-supportive style. Yet, we also looked at the two separate component scores (i.e., autonomy support only, controlling only) because the two scores might not be negatively correlated in all teacher samples and because important information might be obscured by looking only at the net score. For instance, even if teachers in different nations were found to differ on their overall motivating style, it would not be clear if these differences were carried by differences in autonomy-supportive teaching, controlling teaching, or both. The predictor variables were (1) the three teacher beliefs about each motivating style—namely, believed effectiveness, believed normalcy, and believed ease-of-implementation and (2) national collectivism–individualism (as scored by Hofstede's index).

Hypothesis 1: *Autonomy support and teacher control will be negatively correlated.* When looking at teachers in aggregate, we hypothesized that teachers' self-described autonomy-supportive style would be negatively correlated with their self-described controlling style. This hypothesis was based on both theoretical statements (Deci et al. 1981; Reeve 2009) and past empirical findings (Assor et al. 2002; Bartholomew et al. 2011a, b; Jang et al. 2009; Reeve and Jang 2006).

Hypothesis 2: *National collectivism–individualism will predict teachers’ beliefs.* As reviewed earlier, we predicted that teachers situated in collectivistic nations, compared to those situated in individualistic nations, would believe controlling teaching to be relatively more effective, more normative, and easier to implement.

Hypothesis 3: *Teachers’ beliefs will predict motivating style.* As reviewed earlier, we predicted that each teacher belief—believed effectiveness, believed normalcy, and believed ease of implementation—would explain individual (i.e., unique) variance in each measure of motivating style (i.e., overall, autonomy support only, controlling only).

Hypothesis 4: *National collectivism–individualism will predict motivating style.* As reviewed earlier, we predicted that teachers situated in collectivistic nations, compared to teachers situated in individualistic nations, would self-describe a more controlling motivating style. This prediction was based on the expectation (from Hypothesis 2) that teachers in collectivistic societies would be more likely to believe the controlling style was relatively more effective, more normative, and easier to implement. If both Hypothesis 2 and Hypothesis 4 were supported, we also planned to conduct a series of mediation analyses to test if the teacher beliefs mediated and explained the otherwise direct effect that collectivism–individualism had on motivating style.

Hypothesis 5: *The three belief \times collectivism interaction terms will predict motivating style.* While we expected each of the three beliefs to predict motivating style (as per Hypothesis 3), we explored for the possibility that these effects may be moderated by national collectivism–individualism. Specifically, for teachers in individualistic societies, we predicted that the beliefs-to-motivating style relation would be relatively strong and unqualified (not moderated) by societal priorities; that is, motivating style would strongly reflect personal beliefs. For teachers in collectivistic societies, however, we predicted that the beliefs-to-motivating style relation would be less strong and somewhat qualified (moderated) by societal priorities; that is, motivating style would partly reflect personal beliefs but also partly reflect cultural priorities.

Method

Participants

Participants were 815 experienced public school teachers who collectively taught across the full range of PreK–12 grade levels—preschool programs to high school—in one

of eight different nations: 74 from Korea, 106 from Singapore, 99 from Jordan, 123 Bedouins¹ living in Israel, 111 from Israel, 124 from Norway, 98 from Belgium, and 80 from the United States. These eight samples of teachers varied on more than just their nationality, as they also varied to some degree in terms of their self-reported age, years of teaching experience, gender, grade level taught, geographical school location, and ethnicity. So, we assessed each of these six demographic characteristics to function as potential statistical controls in the analyses. Descriptive statistics for each national sample of teachers appear in Table 2.

Procedure

We used convenience samples of teachers from a range of public schools across each nation. Participating teachers in Belgium, Norway, Bedouin living in Israel, Israel, and Singapore were volunteers who attended a regularly-scheduled 1-day in-service workshop and who agreed to complete the two-page questionnaire for 5–10 min. None of these teachers received financial compensation, and response rates were uniformly high, averaging about 90 %. The teachers in Belgium did not complete the survey during the workshop; instead, they completed it within an internet survey about 1 month later. Participating teachers in Korea, Jordan, and the United States were approached in meetings or individually in their schools and agreed to complete the questionnaire after being told that it would take 5–10 min to do so. All of these teachers received financial compensation equal to \$20, and response rates were about 50 %. Korean teachers all came from schools located in either Seoul or Incheon. Jordanian teachers came from schools located in Amman. United States teachers were mostly from the Midwestern states of Wisconsin and Illinois.

Measures

The questionnaire’s coversheet informed teachers of the general purpose of the study, requested their consent to participate, and assessed the demographic variables. The questionnaire itself consisted of two pages with one page providing the highly autonomy-supportive teaching scenario shown on the left side of Table 1 followed by 10 questions that referenced that teaching scenario with the other page providing the highly controlling teaching

¹ The Bedouin society is a predominately desert-dwelling Arab ethnic group organized more by tribal affiliation than by nationality. Bedouins generally live a semi-nomadic lifestyle and populate mostly the nations of Jordan, Saudi Arabia, Israel, and Syria. The tribal society included in the present study consisted of settled citizens living in the southern part of Israel.

Table 2 Descriptive statistics for each national sample

| Demographic | Korea (n = 74) | | Singapore (n = 106) | | Jordan (n = 99) | | Bedouin (n = 123) | | Israel (n = 111) | | Norway (n = 124) | | Belgium (n = 98) | | United States (n = 80) | |
|-----------------------------|--------------------|----|--|----|-----------------------|----|-------------------|----|---------------------|----|---|----|------------------------------|----|--|----|
| | M | % | M | % | M | % | M | % | M | % | M | % | M | % | M | % |
| Age (years) | 34.5 | | 36.4 | | 32.6 | | 28.1 | | 37.3 | | 40.8 | | 40.7 | | 41.4 | |
| Teaching experience (years) | 8.3 | | 11.3 | | 8.5 | | 5.8 | | 11.9 | | 10.7 | | 17.3 | | 13.8 | |
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Gender | | | | | | | | | | | | | | | | |
| Females | 42 | 57 | 74 | 70 | 74 | 75 | 70 | 57 | 105 | 95 | 68 | 73 | 74 | 73 | 91 | 91 |
| Males | 32 | 43 | 32 | 30 | 25 | 25 | 53 | 43 | 6.5 | 59 | 32 | 25 | 26 | 7 | 9 | 9 |
| Grade level taught | | | | | | | | | | | | | | | | |
| Preschool | 0 | 0 | 0 | 0 | 4 | 4 | 4 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 23 | 29 |
| Elementary | 36 | 49 | 54 | 51 | 27 | 27 | 72 | 59 | 63 | 57 | 70 | 0 | 0 | 39 | 49 | 49 |
| Secondary | 38 | 51 | 52 | 49 | 68 | 69 | 47 | 68 | 44 | 39 | 54 | 98 | 100 | 18 | 22 | 22 |
| Geography | | | | | | | | | | | | | | | | |
| Urban | 73 | 99 | 84 | 79 | 77 | 78 | 7 | 6 | 93 | 84 | 64 | 9 | 9 | 70 | 88 | 88 |
| Suburban | 1 | 1 | 22 | 21 | 20 | 20 | 116 | 94 | 18 | 16 | 19 | 15 | 54 | 55 | 9 | 11 |
| Rural | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 41 | 33 | 35 | 36 | 1 | 1 |
| Ethnicity | Korean, 74 (100 %) | | Chinese, 92 (87 %) Malays, 6 (6 %) Indian, 6 (6 %) | | Caucasian, 99 (100 %) | | Arab, 123 (100 %) | | Jewish, 111 (100 %) | | Norwegian, 118 (95 %) Other, 6 (5 %) | | Dutch, (Flemish), 98 (100 %) | | Caucasian, 73 (91 %) Native-Amer., 2 (2 %) Asian, 2 (2 %) African-Amer., 1 (1 %) Hispanic, 1 (1 %) Other, 1 (2 %) | |
| Questionnaire language | Korean | | English | | Arabic | | Arabic | | Hebrew | | Norwegian | | Dutch | | English | |

scenario shown on the right side of Table 1 followed by the same 10 questions that referenced that scenario. The order of the two teaching scenarios was counterbalanced within nation. As shown in the last row of Table 2, the questionnaire was presented in six different languages—English, Dutch, Norwegian, Korean, Hebrew, and Arabic. Following the guidelines recommended by Brislin (1980), we translated the English measure into Dutch, Norwegian, Korean, Hebrew, and Arabic through, respectively, professional Dutch–English, Norwegian–English, Korean–English, Hebrew–English, and Arabic–English translators. In each case, separate English back-translations were then carried out by two graduate students who were fluent in both languages and were native Dutch, Norwegian, Korean, Jewish, and Arab, respectively. Any discrepancies that emerged between the translators were discussed until a consensus translation was reached.

Motivating style

We assessed teachers' self-described autonomy-supportive and controlling motivating styles by presenting the teaching scenarios shown in Table 1 with each scenario followed by the same question: "Does this approach to teaching describe what *you* do on a daily basis to motivate and engage your students?" with a 1–7 response scale that ranged from "No, not at all" to "Yes, very much". The validity of assessing motivating style in this fashion was established in a pilot test. Transcripts of the two teaching scenarios were sent to seven experts in self-determination theory from four different nations, with expertise operationally defined by inclusion on the "Faculty" page at www.selfdeterminationtheory.org and by engagement in a current program of research on motivating style. The experts rated each scenario on a 7-point Likert scale that ranged from 1 (highly controlling) to 7 (highly autonomy supportive). The average rating for the autonomy-supportive teaching scenario was 6.86 (individual ratings were 6, 7, 7, 7, 7, 7, 7), while the average rating for the controlling teaching scenario was 1.43 (individual ratings were 1, 1, 1, 1, 1, 2, 3), $t(6) = 18.26$, $p < .01$. To establish ecological validity, we created scenarios that featured commonly-encountered daily teaching tasks—namely, planning and preparing a lesson, starting the class, vitalizing motivation, keeping students on-task, providing help when students encountered difficulties, dealing with complaints, and relying on a communication style (as per the scenarios in Table 1).

Beliefs about motivating style

Questions 2–10 featured nine items asking for participants' beliefs associated with the described approach to teaching

(three items assessing each belief). Preliminary confirmatory factor analyses to explore each scale's internal structure and possible cross-loadings with the other two scales showed that one item on each scale exhibited some psychometric concern (i.e., a cross-loading) on either the autonomy-supportive or controlling teaching scenario. We therefore retained only two highly intercorrelated and conceptually-centric items to represent each teacher belief scale.²

The two items assessing the Effectiveness belief were: (1) "How effective would this approach to teaching be in terms of motivating and engaging your students?" with a 1–7 response scale that ranged from "Extremely ineffective; it would not work at all" to "Extremely effective; it would certainly work"; and (2) "If you taught in this way, how much would your students benefit in terms of learning and achievement?" ["No benefit at all" to "A great deal of benefit"]. The two items were strongly intercorrelated on both the autonomy-supportive [$r(815) = .74$, $p < .01$, $\alpha = .85$] and controlling [$r(815) = .77$, $p < .01$, $\alpha = .87$] scenarios, so we averaged the two scores for each teaching scenario—one believed effectiveness score for autonomy-supportive teaching and one believed effectiveness score for controlling teaching.

The two items assessing the Normalcy belief were: (1) "Does this teaching scenario describe what the other teachers you know and work with do as teachers?" ["No, not at all" to "Yes, very much"]; and (2) "How typical or common is this approach to teaching for the teachers you know and work with?" ["Extremely atypical, uncommon" to "Extremely typical, common"]. The two items were strongly intercorrelated on both the autonomy-supportive [$r(815) = .68$, $p < .01$, $\alpha = .82$] and controlling [$r(815) = .62$, $p < .01$, $\alpha = .77$] scenarios, so we averaged the two scores for each teaching scenario—one believed normalcy score for autonomy-supportive teaching and one believed normalcy score for controlling teaching.

The two items assessing the Ease of Implementation belief were: (1) "How easy and simple (vs. hard and difficult) is this approach to teaching?" ["Extremely hard, difficult to do" to "Extremely easy, simple to do"]; and (2) "Can most teachers teach this way, or is this approach to teaching simply asking too much of teachers?" ["No, this

² The three excluded items were (from the Believed Effectiveness scale), "Do you like and think positively of this approach to teaching, or do you dislike and think negatively of it?" ["Dislike it: think negatively of it" to "Like it; think positively of it"], (from the Believed Normalcy scale), "Does this teaching scenario describe what others (fellow teachers, parents, students) expect you to do as a teacher?" ["No, it is not what they expect of me" to "Yes, it is what they expected of me"], and (from the Believed Ease-of-Implementation scale), "How realistic and practical (vs. naive and impractical) is this approach to teaching for your teaching situation?" ["Extremely naive, impractical" to "Extremely realistic, practical"].

Table 3 Model fit statistics for the CFA baseline models for the two versions of the teacher beliefs questionnaire for each nation

| | X^2 | <i>df</i> | <i>p</i> | <i>SRMR</i> | <i>RMSEA</i> | <i>CFI</i> | ΔX^2 (Δdf) |
|---|--------|-----------|----------|-------------|--------------|------------|------------------------------|
| <i>Autonomy-supportive teaching questionnaire</i> | | | | | | | |
| Three factor beliefs about autonomy support | | | | | | | |
| Korea (<i>n</i> = 74) | 4.30 | 6 | .64 | .033 | .000 | .98 | |
| Singapore (<i>n</i> = 106) | 7.47 | 6 | .28 | .031 | .052 | .98 | |
| Jordan (<i>n</i> = 99) | 2.70 | 6 | .85 | .023 | .000 | .99 | |
| Bedouin (<i>n</i> = 98) | 7.32 | 6 | .29 | .032 | .034 | .98 | |
| Israel (<i>n</i> = 111) | 3.73 | 6 | .71 | 0.17 | .000 | .99 | |
| Norway (<i>n</i> = 124) | 8.77 | 6 | .19 | .032 | .068 | .96 | |
| Belgium (<i>n</i> = 98) | 15.15 | 6 | .04 | .044 | .10 | .96 | |
| United States (<i>n</i> = 80) | 6.65 | 6 | .35 | 0.30 | .009 | .97 | |
| Combined groups (<i>n</i> = 815) | 56.08 | 48 | .20 | | .034 | 1.00 | |
| Eight group CFAs | | | | | | | |
| Baseline 8-nation model, no constraints | 56.08 | 48 | .20 | | .034 | .997 | n/a |
| Factor loadings constrained to be equal across nations | 72.20 | 69 | .37 | | .005 | .999 | 16.12 (21), <i>ns</i> |
| Factor variances constrained to be equal across nations | 97.24 | 90 | .28 | | .025 | .997 | 25.04 (21), <i>ns</i> |
| Factor covariances constrained to be equal across nations | 140.45 | 111 | .05 | | .048 | .987 | 43.21 (21), <i>p</i> < .05 |
| <i>Controlling teaching questionnaire</i> | | | | | | | |
| Three factor beliefs about teacher control | | | | | | | |
| Korea (<i>n</i> = 74) | 10.13 | 6 | .14 | .066 | .10 | .95 | |
| Singapore (<i>n</i> = 106) | 12.87 | 6 | .05 | .054 | .11 | .96 | |
| Jordan (<i>n</i> = 99) | 10.91 | 6 | .10 | .051 | .092 | .96 | |
| Bedouin (<i>n</i> = 98) | 12.03 | 6 | .07 | .046 | .082 | .97 | |
| Israel (<i>n</i> = 111) | 10.11 | 6 | .12 | .033 | .074 | .97 | |
| Norway (<i>n</i> = 124) | 9.93 | 6 | .13 | .033 | .074 | .95 | |
| Belgium (<i>n</i> = 98) | 14.87 | 6 | .03 | .068 | .13 | .95 | |
| United States (<i>n</i> = 80) | 14.73 | 6 | .02 | .074 | .13 | .97 | |
| Combined groups (<i>n</i> = 815) | 95.59 | 48 | .00 | | .098 | .98 | |
| Eight group CFAs | | | | | | | |
| Baseline 8-nation model, no constraints | 95.59 | 48 | .00 | | .098 | .976 | n/a |
| Factor loadings constrained to be equal across nations | 132.11 | 69 | .00 | | .091 | .968 | 36.52 (21), <i>p</i> < .01 |
| Factor variances constrained to be equal across nations | 168.60 | 90 | .00 | | .087 | .960 | 36.49 (21), <i>p</i> < .01 |
| Factor covariances constrained to be equal across nations | 273.76 | 111 | .00 | | .11 | .917 | 105.16 (21), <i>p</i> < .01 |

asks too much of teachers” to “Yes, most teachers can do this”). The two items were strongly intercorrelated on both the autonomy-supportive [$r(815) = .50, p < .01, \alpha = .66$] and controlling [$r(815) = .49, p < .01, \alpha = .66$] scenarios, so we averaged the two scores for each teaching scenario—one believed ease-of-implementation score for autonomy-supportive teaching and one believed ease-of-implementation score for controlling teaching.

We also calculated three overall (“net”) belief scores by subtracting the believed effectiveness score of the controlling scenario from the believed effectiveness score of the autonomy supportive scenario. A positive net score indicated a belief that autonomy support was more effective than teacher control, while a negative score indicate a

belief that teacher control was more effective than autonomy support. We calculated similar net belief scores for believed normalcy and believed ease of implementation.

Measurement invariance

To test for the measurement invariance of the teacher beliefs questionnaire across the eight samples of teachers, we examined a series of nested models to assess configural invariance (factor loadings constrained to be equal across nations), metric invariance (factor variances constrained to be equal across nations), and scalar invariance (factor covariances constrained to be equal across nations), using multi-group confirmatory factor analysis (CFA; LISREL

8.8; Joreskog and Sorbom 1996). For each test of model invariance, we followed Cheung and Rensvold's (2002) recommended criterion of a ΔCFI of less than .01. The upper half of Table 3 shows the X^2 statistic and goodness-of-fit indices associated with each nation's CFA related to the beliefs about autonomy-supportive teaching questionnaire (under the heading "Three Factor Beliefs about Autonomy Support") and the four sequential tests for measurement invariance (under the heading "Eight Group CFAs"), while the lower half of Table 3 shows these same statistics related to the beliefs about controlling teaching questionnaire.

The eight-group analysis with no constraints resulted in an overall good fit for the 8-nation baseline model, and this was true both for the beliefs about autonomy-supportive teaching, $X^2(48) = 56.08$, *ns*, $RMSEA = .034$, $CFI = 1.00$, and for the beliefs about the controlling teaching, $X^2(48) = 95.59$, $p < .01$, $RMSEA = .098$, $CFI = .98$. As shown in the right-most column of Table 3, constraining the factor loadings to be equal across all eight samples (to show similar measurement models) yielded good fitting models. Constraining the factor variances to be equal also yielded good fitting models (i.e., $\Delta CFI < .01$). Constraining the factor covariances to be equal produced reasonably well fitting models but ones that fit the data worse than did the previous model: for beliefs about autonomy-supportive teaching, $\Delta X^2(\Delta df = 21) = 43.21$, $p < .01$ and $\Delta CFI = .010$; and for beliefs about controlling teaching, $\Delta X^2(\Delta df = 21) = 105.16$, $p < .01$ and $\Delta CFI = .043$. An inspection of the interfactor intercorrelations explained this result, as teachers from individualistic nations showed consistently high covariances (high intercorrelations) between the Believed Effectiveness and Believed Normalcy factors while teachers from collectivistic nations showed lower covariances (lower intercorrelations) between these same two factors. In investigating this result, we found that this cultural difference was not measurement error (i.e., could not be explained by a poorly designed questionnaire) but, rather, was a systematic cultural difference.³

³ Specifically, national individualism correlated significantly with the magnitude of the factor intercorrelation between the Believed Effectiveness and Believed Normalcy beliefs on both the autonomy-supportive, $r(8) = .74$, $p < .05$, and controlling, $r(8) = .68$, $p = .06$, teaching questionnaires. This means that teachers in collectivistic societies generally did not conceptualize what was normative to be the same as what was effective, while teachers in individualistic societies teachers did (i.e., the two beliefs were strongly positively correlated such that what was believed to be normative was also what was believed to be effective).

Results

Preliminary analyses

Missing values

Missing data were rare (23 of the 16,300 possible responses, or 0.14 %, were missing), and Little's MCAR test showed that the data were missing at random, $X^2(282) = 274.23$, *ns*. Based on these results, we used the Expectation–Maximization (EM) algorithm for imputing missing values (Schafer and Graham 2002). We further explored whether the distribution of scores for each assessed variable deviated from normality and found that all values for skewness and kurtosis were less than |1.2|, indicating little deviation from normality.

Demographic variables

Two demographic variables were associated with teachers' responses to at least one of the three measures of motivating style. Gender was associated with overall motivating style, with females scoring higher on the composite measure, $t(813) = 3.78$, $p < .01$ (M_s , 0.68_{females} vs. -0.02_{males}). This overall gender effect was due to female's higher scores on the autonomy-supportive style, $t(813) = 2.59$, $p < .01$ (M_s , 5.02_{females} vs. 4.74_{males}) and lower scores on the controlling style, $t(813) = 3.20$, $p < .01$ (M_s , 4.34_{females} vs. 4.75_{males}). Grade level taught was associated with overall motivating style, $F(2, 812) = 4.68$, $p < .01$ (M_s , $1.43 > 0.62 > 0.30$), respectively for preschool, elementary, and secondary teachers, using Bonferroni post hoc tests), and with the controlling style in particular, $F(2, 812) = 10.20$, $p < .01$ (M_s , $3.46 < 4.33 < 4.64$, respectively). Neither years of teaching experience nor the school's geographical location (urban, suburban, or rural) was associated with any motivating style score. We could not evaluate the potential effect of ethnicity, because it was extremely confounded with nationality (e.g., all 74 Korean teachers were ethnic Korean while 0 of the 741 teachers from the other cultural groups were ethnic Korean) and because 5 of the 8 nations had no ethnic variability (Korea, Belgium, Jordan, Bedouin, and Israel).⁴ We also tested if the payment provided to some participants might have affected any measure of motivating style, but it did not. Given these results, we included gender (females = 1; males = 0) and grade level taught (preschool = 1; elementary = 2; secondary = 3) as covariates in all subsequent analyses.

⁴ For the three samples that did include within-culture ethnic variability, one-way ANOVAs showed that ethnicity did not relate to any of the three measures of motivating style.

Table 4 Descriptive statistics and intercorrelations for the measures associated with overall motivating style, autonomy support, and teacher control

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 |
|--|----------|-----------|---|-----|-----|-----|
| Overall (net) autonomy-supportive motivating style | | | | | | |
| 1. Overall motivating style | 0.49 | 2.36 | – | .65 | .50 | .39 |
| 2. Believed effectiveness | 1.24 | 2.16 | | – | .33 | .26 |
| 3. Believed normalcy | –0.66 | 2.11 | | | – | .44 |
| 4. Believed ease-of-implementation | –0.64 | 1.78 | | | | – |
| Autonomy-supportive style only | | | | | | |
| 1. Autonomy-supportive style | 4.94 | 1.39 | – | .56 | .50 | .46 |
| 2. Believed effectiveness | 5.48 | 1.26 | | – | .35 | .34 |
| 3. Believed normalcy | 4.07 | 1.34 | | | – | .51 |
| 4. Believed ease-of-implementation | 4.25 | 1.29 | | | | – |
| Controlling style only | | | | | | |
| 1. Controlling style | 4.45 | 1.65 | – | .69 | .47 | .25 |
| 2. Believed effectiveness | 4.23 | 1.54 | | – | .38 | .19 |
| 3. Believed normalcy | 4.73 | 1.30 | | | – | .40 |
| 4. Believed ease-of-implementation | 4.89 | 1.26 | | | | – |

N = 815. Possible range for each measure was 1–7. All correlations are *p* < .001

Multilevel analyses

Before testing our hypotheses, we first conducted multi-level analyses using hierarchical linear modeling (HLM, version 7; Raudenbush et al. 2011) to determine whether or not meaningful between-nation differences affected teachers’ self-described motivating styles and their beliefs about motivating style (and hence to determine whether multilevel analyses were warranted). The hierarchical structure of the data was that teachers’ self-reports (level 1) were nested within nationality (level 2). To estimate how much of the variance in each dependent measure was attributable to nationality, we calculated ICCs from unconditional models. ICCs for the three motivating styles (overall, autonomy-supportive, and controlling) were 4.6, 3.1, and 8.4 %, respectively. ICCs for the three Effectiveness beliefs (overall, autonomy-supportive, and controlling styles), were 9.0, 2.7, and 10.0 %, respectively. ICCs for the three Normalcy beliefs were 7.3, 4.1, and 6.2 %, respectively. ICCs for the three Ease of Implementation beliefs were 5.6, 1.8, and 9.2 %, respectively. When taken as a whole, these results suggest that nationality accounted for more variance in the dependent measures associated with controlling teaching ($ICC_M = 8.5\%$) than with autonomy-supportive ($ICC_M = 2.9\%$) teaching.

Descriptive statistics and intercorrelations

The descriptive statistics and intercorrelation matrix for the four dependent measures appear in Table 4 with statistics for the overall motivating style in the upper third of the table, statistics for the autonomy-supportive style in the middle third, and statistics for the controlling style in the lower third. Each correlation matrix shows that the three beliefs were positively intercorrelated and that each belief correlated positively (*p* < .001) with its corresponding motivating style. Teachers in aggregate (*N* = 815) described their style as more autonomy supportive than controlling (*M*s, 4.94 vs. 4.45; paired-groups $t(814) = 5.96$, *p* < .001, *d* = 0.42). Further, they believed that autonomy support was relatively more effective than was teacher control (*M*s, 5.48 vs. 4.23; $t(814) = 16.42$, *p* < .001, *d* = 1.15). Contrariwise, teachers believed that controlling was relatively more normative than was autonomy support (*M*s, 4.73 vs. 4.07; $t(814) = 8.87$, *p* < .001, *d* = 0.62), and that controlling was relatively easier to implement than was autonomy support (*M*s, 4.89 vs. 4.25; $t(814) = 10.21$, *p* < .001, *d* = 0.72).⁵

Primary analyses

Autonomy support and teacher control will be negatively correlated (Hypothesis 1)

The extent to which teachers in aggregate self-described their motivating style as autonomy supportive was negatively, significantly, but only modestly correlated with the extent to which they self-described their style as controlling, $r(815) = -.20$, *p* < .01. The separate correlations broken down by individual nation were as follows (in descending order of magnitude): United States, $r(80) = -.51$, *p* < .01; Norway, $r(124) = -.32$, *p* < .01; Singapore, $r(106) = -.30$, *p* < .01; Bedouin, $r(123) = -.28$, *p* < .01; Korea, $r(74) = -.16$, *ns*; Israel, $r(111) = -.14$, *ns*; Belgium, $r(98) = -.11$, *ns*.; and Jordan, $r(99) = .01$, *ns*. These within-nation correlations emerged as important because the extent of the negative correlation between the two motivating styles correlated with the tendency of teachers within that nation to self-describe a controlling motivating style: $r(8) = .78$, *p* < .05.

National collectivism–individualism will predict teachers’ beliefs (Hypothesis 2)

To test whether national collectivism–individualism predicted the three teacher beliefs, we used hierarchical

⁵ To calculate these effect sizes, we used $d = 2t/\sqrt{N}$ (Hunter and Schmidt 2004).

Table 5 Hierarchical linear modeling results showing the predictive effects of the three teacher beliefs, national collectivism–individualism, and the three beliefs × collectivism interactions on the three measures of motivating style

| | Overall (net) motivating style (autonomy support vs. controlling) | | | | Autonomy-supportive style | | | | Controlling style | | | | | | | |
|---|---|-----|--------------|--------------------|---------------------------|-------------|-----|--------------------|--------------------|------|-------------|--------------------|--------------|------|------|--|
| | Coefficient | SE | t-ratio (df) | p | d | Coefficient | SE | t-ratio (df) | p | d | Coefficient | SE | t-ratio (df) | p | d | |
| | Variance component | | | | Variance component | | | | Variance component | | | | | | | |
| Fixed effects | | | | | | | | | | | | | | | | |
| Intercept | .52 | .16 | 3.33 (6) | .016 | | 4.96 | .11 | 45.88 (6) | .001 | | 4.44 | .14 | 32.80 (6) | .001 | | |
| Hypothesized predictors | | | | | | | | | | | | | | | | |
| Is effective belief | .58 | .03 | 19.24 (799) | .001 | 1.35 | .44 | .03 | 13.76 (799) | .001 | 0.96 | .62 | .03 | 20.72 (799) | .001 | 1.45 | |
| Is normative belief | .29 | .03 | 8.85 (799) | .001 | 0.62 | .25 | .03 | 7.63 (799) | .001 | 0.53 | .25 | .04 | 6.87 (799) | .001 | 0.48 | |
| Is easy-to-implement belief | .19 | .04 | 5.15 (799) | .001 | 0.36 | .24 | .03 | 6.98 (799) | .001 | 0.49 | .10 | .04 | 2.78 (799) | .006 | 0.20 | |
| Collectivism/individualism ^a | -.01 | .01 | 2.26 (6) | .064 | 1.60 | -.00 | .00 | 0.36 (6) | .733 | 0.25 | .01 | .01 | 2.32 (6) | .059 | 1.64 | |
| Collectivism × effective | -.00 | .00 | 2.88 (799) | .004 | 0.20 | -.00 | .00 | 0.89 (799) | .377 | 0.06 | -.00 | .00 | 1.61 (799) | .109 | 0.11 | |
| Collectivism × normative | .00 | .00 | 1.25 (799) | .210 | 0.09 | .00 | .00 | 0.76 (799) | .446 | 0.05 | .00 | .00 | 1.07 (799) | .286 | 0.07 | |
| Collectivism × easy | -.00 | .00 | 0.90 (799) | .367 | 0.06 | -.00 | .00 | 2.34 (799) | .020 | 0.16 | .00 | .00 | 1.66 (799) | .098 | 0.12 | |
| Statistical controls | | | | | | | | | | | | | | | | |
| Gender (0 = males, 1 = females) | .21 | .14 | 1.57 (799) | .117 | | .17 | .09 | 2.01 (799) | .045 | | -.04 | .09 | 0.49 (799) | .622 | | |
| Grade level taught | .02 | .11 | 0.21 (799) | .838 | | .11 | .07 | 1.52 (799) | .129 | | .10 | .08 | 1.24 (799) | .215 | | |
| | | | | Variance component | | | | Variance component | | | | Variance component | | | | |
| Random effects | | | | | | | | | | | | | | | | |
| Level 2 intercept: u_0 | | | | | | | | | | | | | | | | |
| Level 1 variance: r | | | | | | | | | | | | | | | | |

N = 815. ** $p < .001$. ^aHigh scores reflect collectivism, while low scores reflect individualism

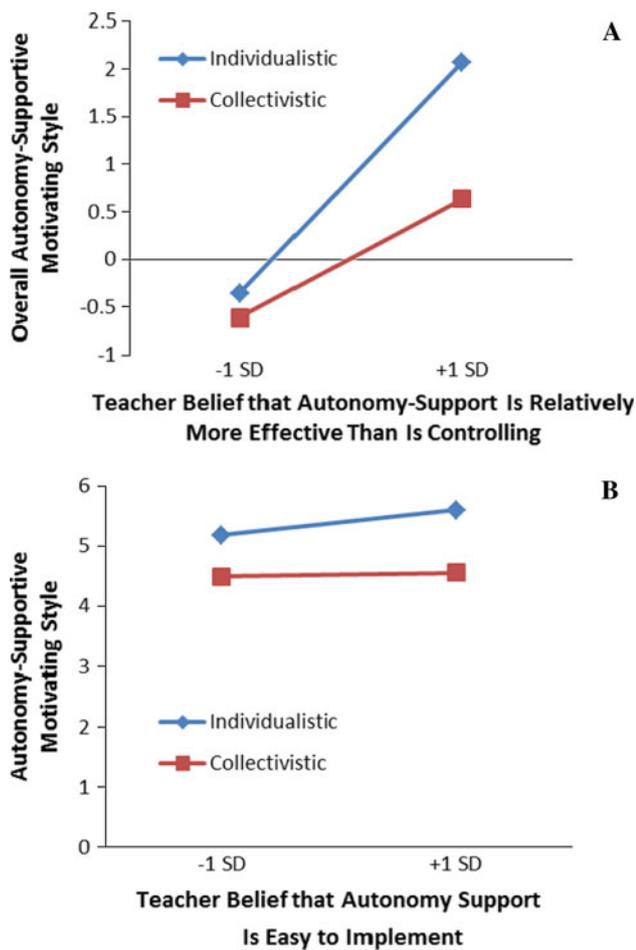


Fig. 1 Significant interactions indicating the moderating role of collectivism on the predictive power of believed effectiveness and the overall (net) autonomy-supportive motivating style (a) and on the predictive power of believed ease of implementation on the autonomy-supportive style (b)

linear modeling to conduct a series of nine analyses in which we regressed national collectivism scores as a group mean centered (level 2) predictor first on the three Effectiveness beliefs, then on the three Normalcy beliefs, and finally on the three Ease of Implementation beliefs. Collectivism did not predict believed effectiveness of the overall motivating style ($t = 1.48, ns$), the autonomy-supportive style ($t = 1.45, ns$), or the controlling style ($t = 1.24, ns$). Collectivism did predict believed normalcy of the overall motivating style ($b = -.02, t(6) = 2.57, p < .05, d = 1.82$) and of the controlling style ($b = .01, t(6) = 3.81, p < .01, d = 2.69$), but not of the autonomy supportive style ($t = 1.35$). Collectivism did not predict believed ease of implementation of the overall motivating style ($t = 0.20, ns$), the autonomy-supportive style ($t = 0.39, ns$), or the controlling style ($t = 0.02, ns$).

Teacher beliefs (Hypothesis 3), national collectivism–individualism (Hypothesis 4), and the beliefs × collectivism interaction terms (Hypothesis 5) will predict motivating style

To test Hypotheses 3, 4, and 5, we again used hierarchical linear modeling to conduct a series of regression analyses to predict the three measures of motivating style—the first equation to predict overall motivating style, the second to predict the autonomy-supportive style, and the third to predict the controlling style. The predictor variables in all three analyses were the same: the three teacher beliefs (to test H3), collectivism–individualism (to test H4), and the three teacher belief × collectivism–individualism interaction terms (to test H5). We group mean centered the three level 1 teacher belief predictors. We grand mean centered gender and grade level at level 1, because we entered these two variables as statistical controls rather than as independent predictors per se (following the centering recommendation of Woltman et al. 2012). We group mean centered the level 2 collectivism–individualism predictor. The three interaction terms were cross-level interactions in which collectivism score (level 2) was multiplied by each teacher belief (level 1). Results from these three analyses appear in Table 5. Table 5 shows the unstandardized coefficient, individual t-ratio, and individual effect size for each individual predictor.

In the test of Hypothesis 3, the fixed effects results from Table 5 showed that all three teacher beliefs independently (uniquely) predicted overall motivating style (left panel), the autonomy-supportive style (center panel), and the controlling style (right panel). Believed effectiveness was a particularly strong individual predictor of each measure of motivating style ($ds = 1.35, 0.96, \text{ and } 1.45$, respectively). Believed normalcy was also a consistent individual predictor ($ds = 0.62, 0.53, \text{ and } 0.48$, respectively), as was believed ease of implementation ($ds = 0.36, 0.49, \text{ and } 0.20$, respectively).

In the test of Hypothesis 4, the fixed effects results from Table 5 showed that national collectivism–individualism tended to predict overall motivating style ($p < .07, d = 1.60$), did not predict the autonomy-supportive style, and tended to predict the controlling style ($p < .06, d = 1.64$). Because collectivism tended to predict both the controlling style and the belief that controlling style was normative and because the observed effect sizes were so large, we tested if Believed Normalcy mediated—and hence explained—these otherwise direct effects, using the Sobel test. The belief that a controlling style was culturally normative did mediate both the direct effect of collectivism on the controlling style ($z = 3.73, p < .01$) and the direct effect of collectivism on overall (net) motivating style ($z = 2.54, p < .05$).

In the test of Hypothesis 5, the fixed effects results from Table 5 showed that two collectivism \times teacher belief interaction terms were statistically significant. In the prediction of overall motivating style, collectivism interacted with believed effectiveness ($p < .01$, $d = 0.20$). To clarify the nature of this interaction, we conducted simple slope analysis (Aiken and West 1991). As depicted in the upper panel (a) of Fig. 1, the effectiveness belief predicted overall (net) autonomy-supportive motivating style more strongly for teachers in individualistic societies than it did for teachers in collectivistic societies. In the prediction of the autonomy supportive style, collectivism interacted with the ease of implementation belief ($p < .05$, $d = 0.16$). As depicted in the lower panel (b) of Fig. 1, the ease of implementation belief predicted autonomy support only for teachers in individualistic nations (while it did not predict autonomy support for teachers in collectivistic nations).

Collectively, the set of seven predictors explained a substantial amount of the variance in each outcome measure: overall (net) motivating style, $R^2 = .52$; autonomy-supportive style, $R^2 = .46$; and controlling style, $R^2 = .51$.

Discussion

The present study sought to advance our understanding of why classroom teachers self-describe the motivating style they do. Given the multinational scope of the present study, we could only assess teachers' self-described motivating styles and not their objectively-scored, in-class motivating styles. But noting this qualification, the principal finding was that all three teacher beliefs independently and rather substantially predicted all three measures of motivating style. Further, the effect sizes for the three Effectiveness beliefs were consistently of a high magnitude, while the effect sizes for Normalcy and Ease-of-Implementation beliefs were of a medium magnitude. Hence, teachers subscribe to the particular motivating style they do because they believe that style to be particularly effective, normative, and easy-to-implement. We believe that this finding adds meaningfully to the growing understanding of why teachers subscribe to the motivating style they do.

National collectivism further explained motivating style. Teachers in collectivistic nations self-described a more controlling style than did teachers in individualistic nations. While the statistical test for this association was only marginally significant ($p < .06$), the observed effect size was notably large ($d = 1.64$). That this effect was only marginally significant may be due to the small size of the sampled nations ($n = 8$). The large observed effect size offers a strong signal to future research to utilize a larger sample of nations (for two examples, see Grouzet et al. 2005; Matsumoto et al. 2008). What the results did not

show, however, was that national independence explained the autonomy-supportive style. National collectivism-independence did not predict the autonomy-supportive style or beliefs about the autonomy-supportive style, presumably because the concept of independence has little or nothing to do with the concept of autonomy (Chen et al. 2013). Hence, the conclusion seems to be that high collectivism tends teachers toward a self-described controlling motivating style.

Motivating style, or motivating styles?

Hypothesis 1 addressed the question of how negatively correlated autonomy support and teacher control are for teachers. Overall, scores on autonomy support and teacher control were negatively intercorrelated. While this negative correlation was statistically significant, it was only modest in its magnitude. This modest correlation suggests the possibility that some teachers view the two styles more as independent ways to motivate students than they see them as mutually exclusive (opposites). The extent to which teachers viewed the two styles as independent predicted the extent to which they reported using a controlling motivating style. Why this is so, we believe, is because thinking about the two styles as being more antithetical (e.g., "if I am controlling, then that necessarily means that I am not supporting autonomy") acts as an inhibitor against an approach to motivating students that teachers rather universally believed to be an ineffective way to motivate students. In contrast, if teachers viewed the two styles as unrelated, this might serve as legitimation to use a controlling style (i.e., no side effects). Indeed, for such teachers a controlling style may function as just another way to motivate their students (i.e., "the more strategies, the better").

This finding has the potential to shed light on a rather fierce debate in the literature about whether or not autonomy support yields cross-culturally universal benefits (Pomerantz and Wang 2009). Those who study teachers' motivating styles from a self-determination theory perspective generally report findings to support the conclusion that the benefits of perceived autonomy support are universal (Ahmad et al. 2012; Chirkov and Ryan 2001; Vansteenkiste et al. 2005b), while cross-cultural theorists counter-argue that only students in individualistic societies benefit from autonomy support (Bond 1988; Markus and Kitayama 2003). Perhaps the extent to which teachers view autonomy support and control as negatively correlated can prove to be a useful moderating variable to help reconcile this controversy. Thus, we recommend that future cross-cultural studies on this controversial question assess and consider this new variable (the magnitude of the negative correlation).

Motivating style and culture

Collectivism predicted motivating style, and the supplemental mediation analysis showed that it did so because it predicted the believed normalcy of teacher control. Collectivism was not associated with either believed effectiveness or believed ease-of-implementation. Hence, collectivism was associated with a controlling motivating style because teachers in collectivistic nations believed that teacher control represented culturally normative practice.

We collected data from teachers in eight different nations because we expected their self-described motivating styles and their beliefs about these motivating styles to vary from nation to nation and because we expected national collectivism to explain this between-nation variability. In addition to collectivism–individualism, cultures vary on other dimensions as well, including hierarchical–egalitarian, masculinity–femininity, uncertainty avoidance, and a few others. Hierarchical–egalitarian may also be related to teachers’ motivating styles and to their beliefs about motivating style. Indeed, some self-determination theory researchers have studied the combined effects of collectivism–individualism and hierarchical–egalitarianism on autonomous motivation (Chirkov et al. 2003, 2005). [In hierarchical societies, what is emphasized and made salient is the legitimacy of authority, social stratification, and the unequal allocation of resources (Schwartz 1994); such a value system seems consistent with the adoption of a relatively controlling motivating style and with the internalization of beliefs about the normalcy of teacher control.] Fortunately, our multilevel analytical strategy allows us to answer the question of how much of the between-nation variance in each dependent measure was explained by collectivism–individualism. Collectivism explained 46 % of the between-nation variance in overall (net) motivating style (i.e., the unconditional model’s *ICC* of 4.6 % was reduced to an *ICC* of 2.5 % after adding collectivism). Collectivism explained 50 % of the between-nation variance in the controlling motivating style but practically no between-nation variance in the autonomy-supportive style. Collectivism also explained 50 % of the between-nation variance in the believed normalcy of an overall controlling motivating style and 76 % of the between-nation variance in the believed normalcy of the controlling style.

Collectivism also had two more subtle effects. While believed effectiveness universally predicted overall (net) motivating style, its predictive power was less potent for teachers in collectivistic nations than it was for teachers in individualistic nations (Fig. 1a). Similarly, believed ease-of-implementation predicted the autonomy-supportive style only for teachers in individualistic nations (Fig. 1b). These interactions suggest that the relation between personal beliefs and self-described motivating style was more straight-forward for teachers in individualistic nations

while it was somewhat tempered by cultural priorities for teachers in collectivistic nations.

Implications for teachers

Previous research had already made progress on explaining why teachers tend toward one motivating style or another by focusing on a multitude of environmental antecedents that push and pull teachers toward a controlling classroom style (e.g., “pressures from above” such as test score accountability and “pressures from below” such as student apathy and misbehavior; Pelletier et al. 2002). Other research had shown that participation in training programs designed to help teachers become more autonomy-supportive were generally effective (Su and Reeve 2011). To extend this literature on the antecedents of autonomy-supportive and controlling teaching, we investigated the predictive power of teachers’ beliefs about the nature and utility of autonomy-supportive and controlling teaching.

Based on our findings, we suggest that teachers’ beliefs about motivating style may function as pivotal mediators between the previously investigated environmental antecedents and teachers’ motivating styles. That is, the reason why social contextual pressures and why autonomy-supportive teacher training programs likely influence teachers’ classroom motivating styles is because these environmental variables first affect teachers’ beliefs in terms of how effective, how normative, and how easy-to-implement autonomy-supportive and controlling teaching are believed to be. For instance, administrative pressures may influence the teacher belief about how normative controlling instructional strategies are, while training programs may influence the teacher belief about how easy-to-implement autonomy-supportive instructional strategies are. These beliefs, in turn, may be the proximal predictors to explain why the distal environmental pressures and supports predict teachers’ motivating style.

Limitations

We note several limitations to the present research. First, our data relied on teachers’ self-reports. Hence, our study had the limitation of a single-source, single-method research design (Holmbeck et al. 2002). The problem with collecting data from a single respondent (teachers) and with a single data collection method (questionnaires) is that one cannot rule out a common method variance interpretation of the findings. The extent to which our findings might have overestimated the predictive power of teachers’ beliefs could be addressed in future studies by assessing teachers’ motivating styles with different respondents and different data collection methods (e.g., have raters or students report on teachers’ motivating styles, as done by Roth and Weinstock 2013).

Second, we assessed motivating style with only a single item. While we did work to establish the construct and ecological validity of our measure, any single-item measure inherently offers disadvantages, such as a lack of measurable internal consistency and limited content validity (i.e., a single item cannot represent the complexity of the assessed construct). We note, however, that we represented the wide range of teaching tasks and the complexity of the motivating style construct not within our single item but, rather, within the complexity of the teaching scenarios. Still, future studies that utilize multi-dimensional measures of teachers' autonomy-supportive and controlling motivating styles are warranted.

Third, our data were correlational. Addressing the causal relations between teachers' beliefs and their motivating styles will require experimental and longitudinal research designs. For instance, intervention programs could be initiated to change teachers' beliefs regarding the effectiveness and difficulty level of the autonomy-supportive style to examine whether changing these beliefs would lead teachers to adopt a more autonomy-supportive style.

Fourth, we used only convenience samples of classroom teachers. This means that our eight samples may or may not represent the teachers in these eight nations. What would be necessary to generalize our findings to the larger population of teachers in each nation would be a random sample of teachers drawn from each nation.

Finally, we conceptually and operationally defined culture at the national level. We recognize, however, that cultural dimensions such as collectivism–individualism exist at two levels—at a national level, but also at an individual level in which members of that culture differ in the extent to which they internalize and personally ascribe to that cultural orientation. When both national- and individual-level effects are assessed and modeled together, it then becomes possible to distinguish the (level 1) effects of internalizing the cultural orientation from the (level 2) effects of living and teaching in that particular culture (Gheorghiu et al. 2009). Adding this individual level of analysis to future studies may afford important advantages, including allowing researchers to account for any non-representativeness in their samples and to examine subcomponents of collectivism within the more general nationally-scored cultural orientation, including filial piety, social harmony, contextualism, familialism (e.g., close family and group relationships), and interdependent self-construals.

Conclusion

The present study sought to explain why teachers subscribe to the motivating style they do. All three beliefs explained substantial variance in teachers' motivating styles, and

believed effectiveness was a particularly strong individual predictor. Collectivism also explained teachers' tendency to self-describe a controlling style, and this was because teachers situated in collectivistic nations tended to believe that a controlling style represented culturally normative classroom practice. We conclude that teachers' beliefs do underlie their self-described motivating style, and that culture informs some (how normative is it?) but not all (how effective is it? how easy to implement it is?) of these beliefs.

Acknowledgments This research was supported by the WCU (World Class University) Program funded by the Korean Ministry of Education, Science and Technology, consigned to the Korea Science and Engineering Foundation (Grant No. R32-2008-000-20023-0).

References

- Ahmad, I., Vansteenkiste, M., & Soenens, B. (2012, Online First). Understanding the effects of perceived parental psychological control and responsiveness among Jordanian adolescents: The role of psychological need satisfaction. *Developmental Psychology*. doi:10.1037/a0027837.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Alkailani, M., Azzam, I. A., & Athamneh, A. B. (2012). Replicating Hofstede in Jordan: Ungeneralized, reevaluating the Jordanian culture. *International Business Research*, 5, 1–80.
- Assor, A., Kaplan, H., Kanat-Maymon, Y., & Roth, G. (2005). Directly controlling teacher behaviors as predictors of poor motivation and engagement in girls and boys: The role of anger and anxiety. *Learning and Instruction*, 15, 397–413.
- Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teaching behaviors predicting students' engagement in schoolwork. *British Journal of Educational Psychology*, 27, 261–278.
- Barrett, M., & Boggiano, A. K. (1988). Fostering extrinsic orientations: Use of reward strategies to motivate children. *Journal of Social and Clinical Psychology*, 6, 293–309.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011a). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology*, 37, 1459–1473.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R., & Thøgersen-Ntoumani, C. (2011b). Psychological need thwarting in the sport context: Development and initial validation of a psychometric scale. *Journal of Sport & Exercise Psychology*, 33, 75–102.
- Boggiano, A. K., Barrett, M., Weiher, A. W., McClelland, G. H., & Lusk, C. M. (1987). Use of the maximal-operant principle to motivate children's intrinsic interest. *Journal of Personality and Social Psychology*, 53, 866–879.
- Bond, M. H. (Ed.). (1988). *The cross-cultural challenge to social psychology*. Newbury Park, CA: Sage.
- Brislin, R. (1980). Translation and content analysis of oral and written material. In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology* (Vol. 2, pp. 389–444). Boston: Allyn & Bacon.

- Chen, B., Vansteenkiste, M., Beyers, W., Soenens, B., & Van Petegem, S. (2013, Online First). Autonomy in family decision making for Chinese adolescents: Disentangling the dual meaning of autonomy. *Journal of Cross-Cultural Psychology*. doi: 10.1177/0022022113480038.
- Cheon, S. H., Reeve, J., & Moon, I. S. (2012). Experimentally based, longitudinally designed, teacher-focused intervention to help physical education teachers be more autonomy supportive toward their students. *Journal of Sport and Exercise Psychology*, 34, 365–396.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233–255.
- Chirkov, V. I., & Ryan, R. M. (2001). Parent and teacher autonomy-support in Russian and U.S. adolescents: Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology*, 32, 618–635.
- Chirkov, V., Ryan, R. M., Kim, Y., & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: A self-determination theory perspective on internalization of cultural orientation, gender, and well-being. *Journal of Personality and Social Psychology*, 84, 97–110.
- Chirkov, V. I., Ryan, R. M., & Willness, C. (2005). Cultural context and psychological needs in Canada and Brazil: Testing a self-determination approach to internalization of cultural practices, identify, and well-being. *Journal of Cross-Cultural Psychology*, 36, 425–443.
- Deci, E. L., Schwartz, A., Sheinman, L., & Ryan, R. M. (1981). An instrument to assess adult's orientations toward control versus autonomy in children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology*, 73, 642–650.
- Downie, M., Koestner, R., ElGeledi, S., & Cree, K. (2004). The impact of cultural internalization and integration on well being among tricultural individuals. *Personality and Social Psychology Bulletin*, 30, 305–314.
- Gheorghiu, M. A., Vignoles, V. L., & Smith, P. B. (2009). Beyond the United States and Japan: Testing Yamagishi's emancipation theory of trust across 31 nations. *Social Psychology Quarterly*, 72, 365–383.
- Grouzet, F. M., Kasser, T., Ahuvia, A., Dols, J. M. F., Kim, Y., Lau, S., et al. (2005). The structure of goals across 15 cultures. *Journal of Personality and Social Psychology*, 89, 800–816.
- Hagger, M. S., Chatzisarantis, N. L., Barkoukis, V., Wang, C. K., & Baranowski, J. (2005). Perceived autonomy support in physical education and leisure-time physical activity: A cross-cultural evaluation of the trans-contextual model. *Journal of Educational Psychology*, 97, 376–390.
- Hardre, P. L., Chen, C., Huang, S., Chiang, C., Jen, F., & Warden, L. (2006). Factors affecting high school students' academic motivation in Taiwan. *Asia Pacific Journal of Education*, 26, 198–207.
- Hofstede, G. (1986). Cultural differences in teaching and learning. *International Journal of Intercultural Relations*, 10, 301–320.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). New York: McGraw Hill.
- Holmbeck, G. N., Li, S. T., Schurman, J. V., Friedman, D., & Coakley, R. M. (2002). Collecting and managing multisource and multimethod data in studies of pediatric populations. *Journal of Pediatric Psychology*, 27, 5–18.
- House, R. J., Hanges, P. J., Avidan, M., Dorfman, P. W., & Gupta, V. (Eds.). (2004). *Culture, leadership, and organizations: The GLOBE study of 62 societies*. Thousand Oaks, CA: Sage.
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings* (2nd ed.). Thousand Oaks, CA: Sage.
- Inglehart, R. (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton, NJ: Princeton University Press.
- Inglehart, R., & Baker, W. (2000). Modernization, cultural change and the persistence of traditional values. *American Sociological Review*, 65, 19–51.
- Jang, H., Reeve, J., Ryan, R. M., & Kim, A. (2009). Can self-determination theory explain what underlies the productive, satisfying learning experiences of collectivistically-oriented Korean adolescents? *Journal of Educational Psychology*, 101, 644–661.
- Joreskog, K. G., & Sorbom, D. (1996). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Hillsdale, NJ: Scientific Software International.
- Lamote, C., & Engels, N. (2010). The development of student teachers' professional identity. *European Journal of Teacher Education*, 33, 3–18.
- Lillard, A., & Else-Quest, N. (2006). The early years: Evaluating Montessori education. *Science*, 313, 1893–1894.
- Lim, B. S. C., & Wang, C. K. J. (2009). Perceived autonomy support, behavioural regulations in physical education and physical activity intention. *Psychology for Sport and Exercise*, 10, 52–60.
- Markus, H. R., & Kitayama, S. (2003). Models of agency: Sociocultural diversity in the construction of action. In V. Murphy-Berman & J. J. Berman (Eds.), *Nebraska symposium on motivation: Cross-cultural differences in perspectives on the self* (Vol. 49, pp. 1–57). Lincoln: University of Nebraska Press.
- Matsumoto, D., Yoo, S. H., Fontaine, J., Anguas-Wong, A. M., Arriola, M., Ataca, B., et al. (2008). Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology*, 39, 55–74.
- Montessori, M. (1964). *The Montessori method*. New York: Schocken.
- Newby, T. J. (1991). Classroom motivation: Strategies of first-year teachers. *Journal of Educational Psychology*, 83, 195–200.
- Oyserman, D., Coon, H., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, 128, 3–72.
- Oyserman, D., & Lee, S. W. S. (2008). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin*, 134, 311–342.
- Pelletier, L. G., Seguin-Levesque, C., & Legault, L. (2002). Pressure from above and pressure from below as determinants of teachers' motivation and teaching behaviors. *Journal of Educational Psychology*, 94, 186–196.
- Pelletier, L. G., & Sharp, E. C. (2009). Administrative pressures and teachers' interpersonal behaviour in the classroom. *Theory and Research in Education*, 7, 174–183.
- Pomerantz, E. M., & Wang, Q. (2009). The role of parental control in children's development in Western and East Asian countries. *Current Directions in Psychological Science*, 18, 285–289.
- Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., Congdon, R. T., Jr., & du Toit, M. (2011). *HLM 7: Hierarchical linear and nonlinear modeling [computer software]*. Lincolnwood, IL: Scientific Software International, Inc.
- Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, 44(3), 159–175.
- Reeve, J., Bolt, E., & Cai, Y. (1999). How autonomy-supportive teachers teach and motivate students. *Journal of Educational Psychology*, 91, 537–548.

- Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*, 209–218.
- Reeve, J., & Tseng, C.-M. (2011). Cortisol reactivity to a teacher's motivating style: The biology of being controlled versus supporting autonomy. *Motivation and Emotion, 35*, 63–74.
- Roth, G., & Weinstock, M. (2013, Online First). Teachers' epistemological beliefs as an antecedent of autonomy-supportive teaching. *Motivation and Emotion*. doi:10.1007/s11031-012-9338-x.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view on the state of the art. *Psychological Methods, 7*, 147–177.
- Schwartz, S. H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H. C. Triandis, C. Dagitcibasi, S. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory, method, and applications* (pp. 85–119). Thousand Oaks, CA: Sage Publications.
- Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology, 53*, 550–562.
- Sheldon, K. M., Abad, N., & Omoile, J. (2009). Testing self-determination theory via Nigerian and Indian adolescents. *International Journal of Behavioral Development, 33*, 451–459.
- Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*, 571–581.
- Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (2012). Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. *Journal of Educational Psychology, 104*, 108–120.
- Su, Y.-L., & Reeve, J. (2011). A meta-analysis of the effectiveness of intervention programs designed to support autonomy. *Educational Psychology Review, 23*, 159–188.
- Taylor, I., Ntoumanis, N., & Smith, B. (2009). The social context as a determinant of teacher motivational strategies in physical education. *Psychology of Sport and Exercise, 19*, 235–243.
- Tessier, D., Sarrazin, P., & Ntoumanis, N. (2008). The effects of an experimental programme to support students' autonomy on the overt behaviours of physical education teachers. *European Journal of Psychology of Education, 23*, 239–253.
- Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.
- Triandis, H. C. (2007). Culture and psychology: A history of the study of their relationship. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 59–76). New York: Guilford Press.
- Van den Berghe, L., Soenens, B., Vansteenkiste, M., Aelterman, N., Cardon, G., Tallir, I. B., et al. (2013, Online First). Observed need-supportive and need-thwarting teaching behavior in physical education: Do teachers' motivational orientations matter? *Psychology of Sport & Exercise*. doi:10.1016/j.psychsport.2013.04.006.
- Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic role of intrinsic goals and autonomy-support. *Journal of Personality and Social Psychology, 87*, 246–260.
- Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005a). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 2*, 483–501.
- Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005b). Experiences of autonomy and control among Chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology, 97*, 468–483.
- Woltman, H., Feldstain, A., MacKay, J. C., & Rocchi, M. (2012). An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology, 8*, 52–69.
- Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*, 81–91.
- Zhou, M., Ma, W. J., & Deci, E. L. (2009). The importance of autonomy for rural Chinese children's motivation for learning. *Learning and Individual Differences, 19*, 492–498.