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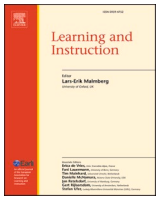

Need-support facilitates well-being across cultural, economic, and political contexts: A self-determination theory perspective

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ABSTRACT

Background: Self-determination theory (SDT) posits that teachers who engage in need-supportive teaching through satisfying students' basic needs for autonomy, competence, and relatedness facilitate optimal well-being. However, there are debates about the purported applicability and relevance of need-supportive teaching across cultural, economic, and political contexts.

Aims: This study examined whether need-supportive teaching was associated with students' subjective, eudaimonic, and cognitive well-being. These relationships were tested across different macro-contexts, including cultural, economic, and political systems.

Sample: We drew on data from 535,512 students across 70 countries. These students came from diverse cultural groups (Western Europe, Eastern-Central Europe, Eastern Europe, Latin America, English-speaking, Confucian, Southeast Asia, and Africa and the Middle East), economic systems (high, upper-middle, and lower-middle-income), and political climates (full democracies, flawed democracies, hybrid, and authoritarian regimes).

Methods: Confirmatory factor analyses, structural equation modelling, and multi-group invariance tests were conducted.

Results: By and large, need-supportive teaching was associated with better well-being across cultural, economic, and political contexts. However, the magnitude of associations was somewhat different across macro-contexts. Minor deviations from the general pattern were also found in a few cultural groups.

Conclusions: Across the globe, students who perceived their teachers to engage in need-supportive teaching were also more likely to experience better well-being. The results supported the universalist perspective, which recognizes the existence of broad universal patterns alongside contextual differences.

1. Introduction

There is an increasing recognition that schools have a mandate to nurture students' well-being (Hargreaves & Shirley, 2021; OECD, 2019, pp. 23–35; Seligman, 2019). Well-being refers to optimal psychological experience and functioning (Ryan & Deci, 2000). Aside from being a critical outcome in its own right, well-being is an important facilitator of higher academic engagement, better social relationships, and more optimal functioning (Bücker et al., 2018; Kaya & Erdem, 2021; OECD, 2019, pp. 23–35).

Well-being is complex, as it encompasses multiple dimensions including subjective, eudaimonic, and cognitive aspects among others (Disabato et al., 2016; Durand, 2015 Durand, 2015; Govorova et al., 2020; Greco et al., 2020; Ryan & Deci, 2000; Strelhow et al., 2020). It is also shaped by multiple factors (Anglim et al., 2020; Kern et al., 2015; King et al., 2024; Rand et al., 2020). In the educational context, one of the most important factors that could either promote or thwart well-being is the teacher (Howard et al., 2024; Reeve & Cheon, 2021). According to Self-Determination Theory (SDT), when teachers teach in ways that support basic psychological needs for autonomy, competence, and relatedness (i.e., need-supportive teaching), students are more likely to experience better well-being (Howard et al., 2024; Ryan & Deci, 2017, 2020).

A fundamental tenet of SDT is that supporting the basic needs for autonomy, competence, and relatedness is culturally universal (Ryan & Deci, 2017). However, much of the existing research has been based on a

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thin slice of the world's population, particularly from Western, educated, industrialized, rich, democratic (WEIRD) regions (Henrich et al., 2010). Despite the increasing diversity of the global student population, much of the evidence base is drawn from a limited range of cultural, economic, and political contexts, which could undermine the generalizability.

There are debates about the purported universality of need-supportive teaching in well-being (see also Soenens et al., 2015). Researchers vary in terms of how much contextual variation is expected with those on the absolutist end of the spectrum arguing for minimal contextual variations and those on the relativist end of the spectrum espousing for significant variability (King & McInerney, 2014, 2016; Zusho & Clayton, 2011). Some researchers situate themselves in the middle and adopt a universalist stance, acknowledging both broad similarities and context-specific variations (Zusho & Clayton, 2011; Zusho & King, 2024).

This study aimed to examine the relationship between student well-being and need-supportive teaching across three different types of macro-contexts: cultural, economic, and political systems. More specifically, we tested the relationship between need-supportive teaching and different dimensions of students' well-being, including their subjective, eudaimonic, and cognitive well-being.

1.1. Theoretical framework: self-determination theory

SDT posits that individuals have basic psychological needs for autonomy (experience of volition and self-determination when carrying out an activity), competence (experience of being capable and effective in achieving one's desired outcomes), and relatedness (experience of acceptance and social connection with others) (Ryan & Deci, 2017). When these basic needs are supported in the environment, well-being is enhanced (Disabato et al., 2016; Martela & Sheldon, 2019; Ryan & Deci, 2022).

In the educational context, teachers are one of the most important social contexts for students (Skinner, 2023; Skinner, Rickert, et al., 2022; Wentzel & Skinner, 2022). Teachers who teach in need-supportive ways can better support their students' basic needs for autonomy, competence, and relatedness (Cheon et al., 2018). Autonomy support happens when teachers provide students with a sense of volition and freedom that helps students develop their inner motivational resources. They acknowledge students' perspectives, use informational not controlling language, and provide the rationale to explain the relevance of learning activities. They are also keenly attuned to their students' interests, preferences, and goals and welcome their students' perspectives and feelings (Reeve et al., 2018).

Competence support occurs when teachers give clear information, set expectations, and provide students with the appropriate support to meet these expectations. Teachers promote competence by creating an environment that is contingent, consistent, and predictable. Such teachers state rules and instructions, give feedback on students' strengths and weaknesses, and provide detailed directions to help students attain their desired outcomes (Jang et al., 2010).

Teachers support relatedness by showing care, empathy, and respect toward their students. They interact with their students warmly and show personal interest in them. Relatedness support (also called involvement) helps students form meaningful interpersonal connections, thereby increasing their motivation and well-being (Capon-Sieber et al., 2022).

Although these three ways of supporting students' basic needs are somewhat distinct, they also overlap to a huge extent (Ahn et al., 2021; Reymond et al., 2023). Studies have shown that students tend to perceive these three ways of need-support more globally, and students may not always be able to make fine-grained distinctions among these three dimensions (Ahn et al., 2019). Hence, many studies measure need-supportive teaching as a global construct rather than focusing on the distinctions among the three ways of supporting basic needs (e.g., Burns et al., 2021; Olivier et al., 2021; Xia et al., 2022). We follow this precedent in the current study and measure need-supportive teaching as a global factor.

Need-supportive teaching has mostly been linked to students' academic-related outcomes. Studies have found that it is positively associated with more autonomous forms of academic motivation and negatively associated with more controlled forms of motivation (Howard et al., 2024). It is also linked to higher levels of engagement, greater persistence, and deeper strategy use (e.g., Haw & King, 2022, 2023; Hornstra et al., 2021; Leenknecht et al., 2017; Olivier et al., 2021).

Teachers have also been found to play a role in students' well-being (e.g., Skinner, 2023; Wentzel & Skinner, 2022). All individuals have basic psychological needs for autonomy, competence, and relatedness. Hence, when teachers support these basic needs, well-being is enhanced. Prior studies have shown that need-supportive teaching is also closely associated with students' well-being (Collie, 2022; Howard et al., 2024; Kleinkorres et al., 2023; Neufeld & Malin, 2020; Wang et al., 2021).

1.2. Well-being

In this study, we specifically focus on three key dimensions of well-being, including subjective, eudaimonic, and cognitive well-being (Martela & Sheldon, 2019). We include these three dimensions of well-being to have a more comprehensive understanding of what student well-being is, as each dimension can only give a limited picture. There is a rich body of work about these three dimensions of well-being (Clarke, 2020; Disabato et al., 2016; OECD, 2018). Prior studies have shown that these different dimensions of well-being are associated with distinct correlates (Jia et al., 2022; Pancheva et al., 2021). Hence, exploring multiple dimensions of well-being simultaneously would provide a more complete view of student functioning.

1.2.1. Subjective well-being

Subjective well-being is the most common operationalization of well-being. It refers to "people's appraisals and evaluations of their own lives" (Diener et al., 2018, p. 253). It is comprised of three dimensions: life satisfaction, positive affect, and negative affect (Diener, 1984).

Previous studies have found that autonomy support is associated with better subjective well-being among students. Ratelle et al. (2013) found that students' subjective well-being (i.e., life satisfaction) was facilitated by their perceptions of autonomy support. Other studies showed that support for autonomy had a significant and positive association with subjective well-being (i.e., life satisfaction in Chatzisarantis et al., 2019; life satisfaction and emotional well-being in Howard et al., 2024).

Support for competence and relatedness are also related to greater levels of subjective well-being. Studies have revealed that students who experienced higher levels of competence support also had better well-being (e.g., school satisfaction, positive affect, and negative affect in Tian et al., 2013). Relatedness support was a strong predictor of life satisfaction (Suldo et al., 2018). Additionally, longitudinal studies found that students whose needs for competence and relatedness were supported experienced higher levels of subjective well-being (i.e., life satisfaction in León & Núñez, 2013; positive affect in Stiglbauer et al., 2013; school satisfaction, positive affect, and negative affect in Su et al., 2021).

1.2.2. Eudaimonic well-being

While subjective well-being focuses on happiness from a hedonic perspective, eudaimonic well-being pertains to living a meaningful, authentic, and purposeful life (Ryff, 1989). One of the most common operationalizations of eudaimonic well-being is meaning in life, which refers to a sense of purpose and that one is part of something bigger than oneself (Ryff, 1989; Steger et al., 2006).

Studies have found that need-support was positively associated with eudaimonic well-being. For example, Philippe and Vallerand (2008)

found that basic psychological need was positively correlated with different dimensions of eudaimonic well-being including meaning in life. In the educational context, need-supportive teaching has been found to be closely associated with students' eudaimonic well-being. Cross-cultural research on adolescents from Russia and the United States found that autonomy support from teachers predicted higher levels of eudaimonic well-being (i.e., self-acceptance, self-realization, and intimate relationships) in both cultural settings (Chirkov & Ryan, 2001). Other studies have found that basic needs satisfaction was conducive to developing and strengthening a greater sense of meaning in life (Demirbaş-Çelik & Keklik, 2019; Trent & King, 2010; Weinstein et al., 2012). These results have also been replicated in non-Western contexts including Turkey and China (i.e., feelings of self-acceptance, self-respect, general positive self-evaluation in Erturan-Ilker, 2014; self-esteem, balance, social commitment, sociability, self and events control, and happiness in Tang et al., 2021).

1.2.3. Cognitive well-being

Although achievement is typically seen as distinct from well-being, researchers have posited achievement as a key indicator of cognitive well-being (Cabrera & Donaldson, 2023; Donaldson et al., 2021). For example, positive psychology's PERMA model, which stands for positive emotions, engagement, relationships, meaning, and accomplishment, specifically includes accomplishment or achievement as a key component of well-being (Seligman, 2018). PISA's well-being framework also uses academic achievement as an indicator of cognitive well-being (OECD, 2021). Hence, we included cognitive well-being in this study given that much of a student's life is devoted to academic-related matters and that having high levels of achievement is considered an indicator of overall functioning (Clarke, 2020; Seligman, 2019).

Need-supportive teaching is theorized to enhance students' cognitive well-being. Several longitudinal investigations showed that having a need-supportive teacher was associated with higher achievement across different regions (Taylor et al., 2014; Wang et al., 2021). Taken together, prior research on SDT and well-being leads us to posit the following hypothesis.

H1. Need-supportive teaching is associated with well-being across the globe.[1]

1.3. Macro-contexts: cultural, economic, and political systems

Macro-contexts pertain to broader environmental systems within which students, classrooms, and schools are embedded (Ryan et al., 2019). Researchers have posited three potential perspectives on how psychological variables operate across different macro-contexts. These are the absolutist, relativist, and universalist perspectives (Clayon & Zusho, 2016; King et al., 2018; Soenens et al., 2015; Zusho & Clayton, 2011; Zusho & King, 2024).

The absolutist perspective assumes that psychological processes are relatively unaffected by contextual influences. In the current study, an absolutist perspective would mean that the relationship between need-support and well-being is uniform across different contexts.

The second possibility is the relativist perspective which holds that psychological processes are highly contextualized and are best studied from a local perspective. A relativist perspective assumes that the relationship between need-support and well-being is highly variable across contexts.

The third perspective, which is situated in the middle ground, is the universalist perspective. It is also sometimes referred to as "universality without uniformity" or moderate universalism (Soenens et al., 2015; Vansteenkiste et al., 2020). This perspective recognizes the existence of key psychological processes that are universal and species-wide but also acknowledges the impact of larger contextual forces on psychological processes (King & McInerney, 2014, 2016; Zusho & Clayton, 2011; Zusho & King, 2024). In the current study, this means that the relationship between need-support and well-being is important across all contexts but there may be variations in the magnitude of these associations.

To test which of these three perspectives is best suited for understanding how need-supportive teaching is associated with well-being, we tested the relationships among the focal variables across contexts. The following competing hypotheses were posited.

H2a. Absolutist hypothesis: The association between need-supportive teaching and well-being is uniform across macro-contexts.

H2b. Relativist hypothesis: The association between need-supportive teaching and well-being demonstrates substantial variability across macro-contexts.

H2c. Universalist hypothesis: The association between need-supportive teaching and well-being shows both broad similarities and context-specific variations across macro-contexts.

In this study, we explore these three competing hypotheses across cultural, economic, and political contexts. As Ryan et al. (2017) noted, students are embedded in "more pervasive human contexts such as cultural, economic, and political systems" (p. 101). These macro-contexts powerfully shape teaching and learning processes, but they are mostly left unexamined in mainstream educational psychology research. In this study, we specifically test the three competing hypotheses across these macro-contexts.

1.3.1. Cultural contexts[2]

One possible way to understand different cultural contexts would be by recognizing that different cultures prioritize different values: embeddedness vs. autonomy, hierarchy vs. egalitarianism, and mastery vs. harmony (Schwartz, 2009). Embeddedness vs. autonomy pertains to the relationship between the person and the social group. Embedded cultures prioritize the collective over the individual. Meaning in life is largely driven by social relationships. In contrast, in high-autonomy cultures, individuals have distinct personalities, traits, goals, and desires that make them unique.

In hierarchical cultures, people accept the unequal distribution of resources such as authority, wealth, and social power. In egalitarian cultures, people recognize each other as moral equals and share basic interests as human beings. Mastery versus harmony pertains to how humans relate to the natural and social world. Mastery cultures value getting ahead through active self-assertion and emphasize ambition, success, and competence. On the other hand, people in harmony-oriented cultures are more likely to accept the world as it is and try to fit into it rather than change it.

Based on their scores across these three value dimensions, Schwartz (2006) proposed that the world's cultures fall into eight types: Western Europe (e.g., UK), Eastern Europe (e.g., Belarus), Eastern-Central Europe (e.g., Poland), Latin America (e.g., Brazil), English-speaking (e.g., UK), Confucian (e.g., China), Southeast Asia (e.g., Thailand), and Africa and

[1] More specifically, it is hypothesized that need-supportive teaching will be positively associated with the positive dimensions of well-being including life satisfaction, positive affect, eudaimonic well-being, and cognitive well-being but negatively associated with negative affect.

[2] There are different theoretical models that can be used to study cultural values. Among the most prominent are models by Hofstede (2001), Inglehart (1997), and Schwartz (1999). Although these three models use different approaches, they "identify almost the same seven or eight regions across the world" (Sagiv & Schwartz, 2022). The overlaps among the different models are quite substantial, and we decided to use Schwartz's (1999) model given its ability to capture nuanced distinctions across cultures and its strong theoretical grounding

the Middle East (e.g., Jordan). For example, Western Europe scores high in terms of autonomy, egalitarianism, and mastery, while Confucian cultures score high in embeddedness, hierarchy, and mastery.

Although prior studies have tested SDT's applicability across cultures, many of these have focused only on one or two cultural contexts. For example, Jang et al. (2009) tested the role of supporting students' autonomy in a Korean context, while Zhou et al. (2009) tested these tenets among rural Chinese. Both studies found that need-support was positively associated with academic and well-being-related outcomes. A more comprehensive examination was conducted by Nalipay et al. (2020) who examined East Asian (e.g., China) and Western English-speaking (e.g., USA) cultures. In total, they included 11 regions in their study and found that need-supportive teaching was positively associated with students' academic achievement across both Eastern and Western cultural contexts. However, their study did not focus on other dimensions of well-being such as subjective and eudaimonic well-being. Another study by Wang et al. (2021) focused on eight different cultures across the globe but their study focused mostly on subjective and eudaimonic well-being but did not include measures of cognitive well-being. Likewise, they did not delve into differences across economic and political contexts. The current research builds on these prior studies by examining a wider range of cultural, economic, and political contexts, thereby enabling a more rigorous examination of how need-supportive teaching plays a role in well-being across diverse macro-contexts.

Past studies have shown that a close match between environmental affordances and one's personal characteristics enhances well-being (van Vianen, 2018). Hence, one possibility is that need-supportive teaching would be more relevant in cultures that emphasize autonomy. In countries with a higher valuing of autonomy, students might be more likely to emphasize individual ownership of one's actions. In contrast, need-supportive might be less relevant in embedded and hierarchical cultures, where students might be more likely to emphasize the needs of the social group over one's individual preferences.

Another possibility is that need-support might be equally relevant across all cultures. Past SDT studies strongly suggest this possibility. For example, several studies have shown that need-support is also important for facilitating well-being in embedded and collectivist contexts (Haw et al., 2021; Jang et al., 2009; Zhou et al., 2009). We test these competing possibilities in the current study.

1.3.2. Economic contexts

Aside from culture, economic contexts powerfully shape the teaching and learning environment. The World Bank classifies economies around the world into four income groups: low, lower-middle, upper-middle, and high-income countries based on Gross National Income (GNI) per capita. Although GNI per capita is not a comprehensive summary of a country's level of development or welfare, it has proven to be a useful and easily accessible indicator that is closely associated with other non-monetary measures of quality of life (World Bank, 2021).

In the most recent version of the World Bank's (2021) classification system, the latest cut-offs were: 1) low-income (GNI per capita < $1085); 2) lower-middle (GNI per capita $1086 – $4255); 3) upper-middle (GNI per capita $4256 – $13,205); and 4) high-income (GNI per capita > $13,205).

Although there is no conclusive evidence to date about how economic contexts could moderate the role of need-support on well-being, the relationship between need-support and well-being may be stronger in more affluent countries. For example, there is a long tradition of theorizing in psychology suggesting that individuals need to satisfy their basic physiological needs first before they can attend to their higher-order psychological needs (Kenrick et al., 2010; Lomas, 2013). Perhaps in more economically disadvantaged contexts, need-supportive teaching might play a less important role as students might be more strongly influenced by physiological needs, such as the need for food and shelter which might be less likely to be met in disadvantaged contexts.

Conversely, it could be possible that need-supportive teaching might have an even more important role to play in disadvantaged contexts. A study by Wang et al. (2023) found that teacher support was even more important in disadvantaged settings, possibly because teacher support could compensate for the lack of resources in such contexts. Other studies have found teacher-related factors to be a key determinant of resilience, which could manifest in terms of narrowing achievement gaps between students from different socioeconomic backgrounds (e.g., Skinner et al., 2020; Wang et al., 2022)

A third possibility is that need-supportive teaching is equally important in both affluent and less affluent contexts. Although we are not aware of past studies that explicitly tested the basic tenets of SDT across diverse economic contexts, some studies have found need-support to be closely linked to well-being in less affluent environments such as India, Nigeria, Philippines, and rural China (e.g., Haw et al., 2021; Sheldon et al., 2009; Zhou et al., 2009).

1.3.3. Political contexts

The political context is another important part of the macro-context that might have important implications for teaching and learning. Political scientists have attempted to measure the state of democracy across countries through the Democracy Index (Economist Intelligence Unit, 2018). The democracy index is based on five key aspects of the political system involving the electoral process and pluralism, civil liberties, functioning of government, political participation, and political culture (Economist Intelligence Unit, 2018).

Countries can be categorized in terms of their different levels of democracy: full democracies, flawed democracies, hybrid regimes, and authoritarian regimes (Rahman, 2014). Full democracies are countries where civil liberties and fundamental political freedoms are not only respected but also actively promoted through a political culture that fosters democratic principles. These countries have a robust system of checks and balances in government, an independent judiciary whose decisions are upheld, well-functioning governments, and a diverse and independent media. Many full democracies flourish in Western Europe and North America.

In flawed democracies (e.g., Chile and the Philippines), elections are conducted in a fair and free manner, and basic civil liberties are respected. However, there may be problems such as limitations on media freedom and relatively minor suppression of political opposition and critics. Hybrid regimes refer to countries where regular electoral frauds occur, preventing them from being considered fair and free democracies. These nations often have governments that exert pressure on political opposition, non-independent judiciaries, rampant corruption, harassment and coercion of the media, and weak rule of law. Authoritarian regimes (e.g., Saudi Arabia) are countries where political pluralism is either non-existent or severely restricted. These nations are typically ruled by absolute monarchies or dictatorships, and while they may have nominal democratic institutions, their significance is limited. the media is frequently state-owned or controlled by groups aligned with the ruling regime.

Much of the existing SDT research has been conducted in full democracies. Much less work has been done in flawed democracies, hybrid, and authoritarian regimes. Given SDT's strong emphasis on autonomy, which might seem more aligned with democratic governance, it would be interesting to test SDT's core tenets in different political climates. For example, in less democratic settings, teachers may have limited freedom to choose or adapt their teaching methods and materials. They might be strongly pressed to follow state-mandated curricula. It is possible that in such contexts, need-supportive teaching might be deemed as less relevant to student well-being, as the teaching approaches are more catered to rote learning and alignment to state ideology.

Prior work on person-culture fit suggests that well-being is highest when there is a match between personal preferences and the norms in the broader environment (Oishi et al., 2007). For example, an individual

who values autonomy in an environment where autonomy is also highly valued will experience more well-being than someone who values autonomy but resides in a more stifling environment. It is possible that in a less democratic country where autonomy is not highly valued and where top-down decision-making is the norm, need-supportive teaching characterized by giving students autonomy, scaffolding competence, and encouraging relatedness might be seen as less aligned with the broader affordances in the macro-context (see also King et al., 2021; Lou & Li, 2023). Consequently, need-supportive teaching might not be as crucial a predictor of well-being in such contexts.

Another possibility is that need-support is important regardless of the political climate. A study by Chirkov et al. (2003) in South Korea, Russia, Turkey, and the US found that need-support was positively associated with well-being in these four countries. Their study included both democratic (e.g., US) and authoritarian (e.g., Russia) regimes. More research is needed to explore the role of need-supportive teaching across political contexts.

1.4. The present study

This study aims to examine how need-supportive teaching is associated with students' well-being across cultural, economic, and political contexts. In terms of the overall sample, we posited the following hypothesis.

H1. Need-supportive teaching is associated with well-being across the globe.

Next, we examined whether the relationship between need-supportive teaching and well-being will be similar or different across cultural, economic, and political systems. We tested three competing hypotheses, reflecting the absolutist, relativist, and universalist perspectives.

H2a. Absolutist hypothesis: The association between need-supportive teaching and well-being is uniform across macro-contexts.

H2b. Relativist hypothesis: The association between need-supportive teaching and well-being shows substantial variability across macro-contexts.

H2c. Universalist hypothesis: The association between need-supportive teaching and well-being shows broad similarities with some context-specific variations across macro-contexts.

To test the robustness of the results, we also included different covariates that have known correlations with well-being (OECD, 2019, pp. 23–35; Ryan & Deci, 2000). We controlled for individual-level variables: gender and socioeconomic status (SES). We also controlled for school-related covariates such as school location and school type given their known association with well-being.

This paper will yield important theoretical and practical yields. Theoretically, the evidence base for need-supportive teaching is mostly based on research from WEIRD contexts. There are also divergences in views about the nature of the association between need-support and well-being, with some researchers adopting an absolutist, others a relativist, and still others a universalist stance. This study allows us to conduct a robust test of whether need-supportive teaching is associated with well-being across macro-contexts. All students and educational systems are embedded within larger cultural, economic, and political systems but studies have seldom explored the role of these macro-contexts as much of the research has mostly focused on the proximal contexts such as family, classroom, and school environments (e.g., Skinner, 2023). As Ryan et al. (2017, 2019, pp. 23–35) argued, these proximal contexts are nested within larger macro-contexts. Hence, explicitly examining how need-supportive teaching plays a role across macro-contexts could make important contributions to SDT theorizing.

This study will also have important practical yields. The evidence base for what constitutes 'good teaching' is mostly drawn from a thin slice of the world's population (Usher, 2018; Zusho & King, 2024). Given the increasing diversity of the student population, whether the same teaching approach that works for one context will also be beneficial in another context deserves greater attention. If we can find empirical support that certain teaching approaches such as need-supportive teaching are more adaptive than others and if the evidence base is sufficiently broad such that it draws from a diverse range of students across the globe, it might make sense to advocate for such approaches in teacher professional development.

What constitutes good teaching is sometimes shaped by fads (e.g., individual learning styles, pure discovery learning, left-brain vs. right-brain learning) (Cuevas et al., 2023). In other cases, the evidence base for educational recommendations is built on very small samples and might only work in highly contrived settings (e.g., Makel & Plucker, 2014). It might be better for educators and practitioners to adopt teaching approaches that have a strong empirical foundation and are built on a global evidence base. Hence, this study addresses this need by drawing on a global dataset that includes more than half a million students.

2. Methods

2.1. Data and procedures

We utilized the publicly available data from PISA 2018 in this study and assumed adherence to ethical standards (Database: OECD, 2021). PISA is a triennial program that assesses students' reading, math, and science literacy. It focuses on one subject as its main assessment domain every cycle with reading as its primary focus in the 2018 assessment.

The dataset has more than 600,000 nationally representative 15-year-old student participants across 79 countries[3] (OECD, 2021). In this dataset, students are nested within schools, which in turn are nested within countries/regions. We excluded countries that opted out from the well-being questionnaire. Their exclusion reduced our sample to a total of 535,512 students nested in 18,818 schools from 70 countries/regions. Missing data were expected due to the complex sampling design of the questionnaire. We did not remove them to be consistent with PISA's published mean scores.

We classified the countries/regions in terms of cultural, economic, and political contexts. We used Schwartz's (2009) work on cultural values, which classified countries into eight cultural groups based on their scores on the different cultural values including embeddedness vs. autonomy, hierarchy vs. egalitarianism, and mastery vs. harmony. Countries can be grouped into eight cultural groups: Western Europe (n = 119,910; e.g., Finland), Eastern-Central Europe (n = 70,747; e.g., Poland), Eastern Europe (n = 89,563; e.g., Belarus), Latin America (n = 75,622; e.g., Colombia), English-speaking (n = 24,233; e.g., USA), Confucian (n = 41,872; e.g., China), Southeast Asia (n = 51,657; e.g., Philippines), and Africa and the Middle East (n = 61,908; e.g., Jordan).

In terms of economies, we used the World Bank (2021) classification to group countries into high-income (n = 298,510; e.g., USA), upper-middle-income (n = 194,105; e.g., Mexico), and lower-middle-income (n = 42,897; e.g., Indonesia) countries.

Last, we used the Democracy Index to group countries into full democracies (n = 94,836; e.g., France), flawed democracies (n = 266,390; e.g., Philippines), hybrid (n = 48,865; e.g., Pakistan), and authoritarian regimes (n = 125,421; e.g., Russia). Table S1 in the Supplementary Materials shows how the different countries were classified.

[3] We use the term country for shorthand but note that some of the contexts included in the PISA dataset are more appropriately classified as cities, jurisdictions, or regions (e.g., Hong Kong SAR and Macau SAR).

2.2. Measures

2.2.1. Need-supportive teaching

We used PISA's three-item questionnaire on students' perception of autonomy-support (i.e., "The teacher listened to my view on how to do things"), competence-support (i.e., "The teacher made me feel confident in my ability to do well in the course"), and relatedness-support (i.e., "I felt that my teacher understood me"). Students were asked to think about their language classes when asked this question as PISA 2018 focused on the domain of reading. The measurement has good overall internal reliability ($\alpha = 0.86$; see Table S1 for country-level scores). This scale has also been used in prior research on need-supportive teaching (e.g., Wang et al., 2021). Given that each type of need-support is only measured by one item (Ahn et al., 2021), we operationalized need-supportive teaching as a one-factor latent variable comprised of three items. There is prior empirical precedent for operationalizing need-support as a global factor rather than as comprised of three distinct factors (e.g., Ahn et al., 2019, 2021; Burns et al., 2021; Reymond et al., 2023).

2.2.2. Well-being

Subjective well-being. We used three measures of subjective well-being: *life satisfaction* (one-item scale; "Overall, how satisfied are you with your life as a whole these days?"), *positive affect* (five-items; "How often do you feel happy …"; $\alpha = 0.80$), and *negative affect* (five-items; "How often do you feel sad …"; $\alpha = 0.75$). For positive affect, we used the scale scores provided by the OECD (2021). OECD, however, did not provide the scale scores for negative affect. Hence, we treated it as a latent factor underpinned by the scores on the following adjectives: 'scared', 'miserable', 'afraid', and 'sad'. The subjective well-being scales had acceptable to very good internal reliability across the different countries (See Table S1 for details).

Eudaimonic well-being. We used PISA's three-item questionnaire on meaning in life to measure students' *eudaimonic well-being* (e.g., "My life has clear meaning and purpose"; $\alpha = 0.85$). All items were rated on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). We reverse-coded negatively stated items. By and large, the eudaimonic well-being scale had acceptable to very good internal reliability across the different countries (see Table S1 for details).

Cognitive well-being. We used one of the students' plausible values (PV) in reading as reported by PISA to represent academic achievement. Specifically, we used PV1. Although PISA generates 10 plausible values, the usage of just one plausible value will not introduce bias according to OECD given the high correlations ($rs > 0.95$) among the different plausible values (OECD, 2009). Note that PISA also includes mathematics and science achievement, but we only focused on reading achievement as the need-supportive teaching pertained to students' language classes.

Covariates. We used individual-level (i.e., gender and SES) and school-related covariates (school location and type) to control for their potential confounding effects. SES was operationalized in terms of the PISA-provided values for economic, social, and cultural status, which is a measure of students' access to family resources. Except for SES, the other covariates were categorical. We recoded these covariates (e.g., gender, school type, and location) to reflect their dichotomous nature (i.e., *female* = 1, *male* = 0; *private* = 1, *public* = 0; *urban* = 1, *rural* = 0).

2.3. Analytic strategy

2.3.1. Preliminary analyses

2.3.1.1. Missing data analyses. We first conducted multiple imputations for samples with missing data using Markov Chain Monte Carlo methods (MCMC; van Buuren & Groothuis-Oudshorn, 2011). Five imputed datasets were used in the analysis following Rubin (2018)'s procedure for analyzing multiple imputed data.

2.3.1.2. Testing the measurement model. We first tested the measurement model by conducting a confirmatory factor analysis (CFA). Need-supportive teaching, positive affect, negative affect, and eudaimonic well-being were treated as latent variables. Life satisfaction and cognitive well-being were treated as manifest variables given that the former was derived from a single-item response and the latter was from one plausible value.

We used a maximum likelihood with robust standard errors and a scaled test statistic (MLR). This type of estimator is robust to data non-normality and misfit (Rosseel, 2012). We evaluated the model-data fit using other fit indices as the chi-square tests tend to be sensitive to large samples (Hu & Bentler, 1995). CFI and TLI ≥ 0.95 indicate a good fit while CFI/TLI values ≥ 0.90 are acceptable; RMSEA/SRMR ≤ 0.05 indicates a good fit while a value ≤ 0.08 is acceptable.

Given that our study focused on individual-level relationships, we followed Huang's (2016) suggestion to use the design-based approach in accounting for the clustering of data as an alternative to actual multi-level modelling. The design-based approach directly incorporates the clustering and stratification elements of the sample in drawing the parameter and variance estimates. Specifically, this involved the use of the weights and the 80 balanced replicate weights provided in the PISA 2018 dataset in the estimation (see Huang, 2016 for details). Note that the OECD (2009) used the same strategy to account for the clustering or nesting of data. We employed the R package *survey* (Lumley, 2004) in incorporating these weights and replicates in the analysis.

In conducting CFA, we first tested the model using the overall data. Then, we ran separate CFAs for each of the cultural, economic, and political climates. As these contexts involve different groups, we employed multigroup CFA (MGCFA) using the same estimator. We evaluated the measurement invariance across contexts by sequentially adding equality constraints on the parameters and evaluating the changes in fit indices (i.e., $\Delta CFI \leq 0.01$; $\Delta RMSEA \leq 0.01$).

2.3.2. Primary analyses

2.3.2.1. Testing hypothesis 1: need-supportive teaching and well-being across the globe. After ascertaining model-data fit, we tested a structural equation model (SEM) by adding the regression formula wherein need-support predicted the five well-being dimensions in the same model. As in CFA, robust maximum likelihood (MLR) was used in estimating the parameters to account for the non-normality of data. In the same way, we adapted the design-based approach in accounting for data clustering. We evaluated the model-data fit following the same fit criteria given above. Individual level (gender and SES) and school-related (school type and location) covariates were entered to control for their potential confounding effects.

To test hypothesis 1, we fit our structural model to the overall PISA data. Following the PISA data analysis manual (see OECD, 2009), estimates were computed using PV1 and the 80 replicate weights embedded in the dataset (Lumley, 2004).

2.3.2.2. Testing hypothesis 2: absolutist, relativist, and universalist perspectives. We then tested a multigroup SEM using the same analytic parameters to evaluate generalizability across macro-contexts through assessing goodness of fit and invariance of the model in size and direction.

We checked for invariance in terms of the magnitude of the association between need-support and well-being to determine which of the three competing hypotheses (H2a, H2b, H2c) would hold. We first created a multigroup SEM model with no equality constraints on the regression path as our baseline model (Sass & Schmitt, 2013). Next, we tested a constrained model wherein we imposed equality constraints on each regression path and compared it with the baseline model. We

employed *lavaan*'s likelihood ratio test (LRT: Rosseel, 2012) and tested whether the baseline model and the constrained model were equal. To further check the robustness of our results, we also compared the difference in CFI of the two models. This was done repeatedly for the different cultural, economic, and political contexts.

Invariance is satisfied if the chi-square difference test is not significant and if the change in CFI is less than 0.01 (Cheung & Rensvold, 2002). Testing for cross-group invariance involved comparing two nested models: (1) a baseline model where no constraints were specified between need-support and the five dimensions of well-being, and (2) a second model where all the paths between need-support and well-being were constrained to be invariant across groups.

If the comparison between the baseline model and the constrained model is shown to be invariant through a chi-square difference test, then the absolutist hypothesis will hold. However, if the comparison between the baseline model and the constrained model is shown to be non-invariant, then the absolutist hypothesis is rejected.

When such a scenario occurs, then either the relativist or universalist hypothesis would hold. If the magnitude and direction of the path coefficients are very different from each other (e.g., need-support is a positive predictor of life satisfaction in culture A but a negative predictor of life satisfaction in culture B or if need-support positively predicted eudaimonic well-being in economy A but was not significant in economy B), then this would mean support for the relativist hypothesis. However, if the path coefficients were similar to each other in terms of size and direction, even with differences in magnitude, then the universalist hypothesis would hold. Table 1 summarizes the evidence needed to support each of the three competing hypotheses.

2.3.2.3. Supplementary analyses. We also conducted different sets of supplementary analyses. The first set of supplementary analyses involved testing each type of need-support individually and whether they were associated with well-being. This was kept in the supplement rather than the main analysis as this entails measuring each type of need-support with only a single item measure and may not be as psychometrically sound as the primary model we tested. The second set of supplementary analyses involved testing the correlations among the critical variables in each of the 70 countries to examine whether these more fine-grained results replicate the general pattern across macro-contexts. Last, our main model tested the path from need-supportive teaching to well-being. However, reverse causality is also possible with well-being predicting better need-support from teachers. We tested this reverse model in the current study in the supplementary analyses.

Table 1
Testing the three competing hypotheses (H2a, H2b, H2c).

Competing hypothesis	Evidence for the hypothesis
H2a: Absolutist hypothesis	The absolutist hypothesis will hold if the multi-group SEM model is invariant across cultural, economic, and political systems.
H2b: Relativist hypothesis	The relativist hypothesis will hold if the multi-group SEM model is not invariant across cultural, economic, and political systems and if the path coefficients between need-support and well-being are vastly different in terms of direction and magnitude across the macro-contexts.
H2c: Universalist hypothesis	The absolutist hypothesis will hold if the multi-group SEM model is not invariant across cultural, economic, and political systems and if the path coefficients between need-support and well-being are broadly similar in terms of direction and magnitude across the macro-contexts.

Note: Invariance is tested by comparing nested models. A significant chi-square test and a change in CFI >0.01 signifies lack of invariance.

3. Results

3.1. Preliminary analyses

3.1.1. Descriptive statistics and correlations

Table 2 provides the summary statistics and bivariate correlations. Results indicated that need-supportive teaching was positively and significantly correlated with subjective (i.e., life satisfaction and positive affect) and eudaimonic well-being. Need-supportive teaching was also positively associated with cognitive well-being. Furthermore, need-supportive teaching was negatively correlated with negative affect. The individual components of need-supportive teaching (i.e., autonomy, competence, and relatedness support) had similar patterns as the overarching need-supportive teaching construct. Country-by-country results are presented in the Supplementary Materials (see Table S2 and Table S3).

3.1.2. Testing the measurement model across macro-contexts

We first tested the measurement model in the whole sample. The CFA results indicated optimal model-data fit. The fit indices were: $\chi^2 = 4577.14$, df = 48, $p < 0.001$, scaling factor = 33.87; CFI = 0.99, TLI = 0.98; RMSEA = 0.04; SRMR = 0.03.

Next, we tested whether the measurement model was invariant across cultural, economic, and political contexts. The multigroup CFA results are presented in the supplementary material (see Table S5). Fit indices showed good model-data fit across different contexts using the measurement model without equality constraints. Sequentially adding equality constraints, the model was found to be scalar invariant in samples grouped by economic and political systems. However, it did not achieve the same level of invariance using the cultural groupings. We relaxed equality constraints at the intercept level for three items and detected a partial invariance which was enough to proceed to the next step.

3.2. Primary analyses

3.2.1. Testing hypothesis 1: Need-supportive teaching and well-being across the globe

To test H1, we constructed an SEM model with need-supportive teaching predicting well-being variables in the same model using the global sample. The SEM model yielded a good fit: $\chi^2 = 14{,}775.91$, df = 135, $p < 0.001$, scaling factor = 8.24; CFI = 0.96, TLI = 0.95; RMSEA = 0.04; SRMR = 0.03. Fig. 1 summarizes the different associations after controlling for the covariates (see Table S4 for complete details). Results supported our Hypothesis 1, which stated that need-supportive teaching will be associated with well-being across the globe.

3.2.2. Testing hypothesis 2: Absolutist, relativist, and universalist perspectives

We constructed a multigroup SEM model with need-supportive teaching as a predictor of the different dimensions of well-being in the same model and tested its generalizability across macro-contexts. The multigroup SEM model indicated that the hypothesized model fit the data well across different macro-contexts: *cultural* ($\chi^2 = 39{,}092.90$, df = 1080, $p < 0.001$, scaling factor = 4.02; CFI = 0.95, TLI = 0.93; RMSEA = 0.05; SRMR = 0.03); *economic* ($\chi^2 = 22715.31$, df = 405, $p < 0.001$, scaling factor = 6.06; CFI = 0.96, TLI = 0.94; RMSEA = 0.04; SRMR = 0.03), and *political* ($\chi^2 = 26{,}966.19$, df = 540, $p < 0.001$, scaling factor = 5.65; CFI = 0.95, TLI = 0.94; RMSEA = 0.05; SRMR = 0.04) contexts. The parameter estimates of the hypothesized model across three contexts are summarized in Table 3. Full details of the parameter estimates are presented as supplementary materials (see Tables S6-S8).

By and large, need-supportive teaching was positively associated with the positive dimensions of subjective (i.e., life satisfaction and positive affect: $0.10 < \beta < 0.20$), eudaimonic ($0.16 < \beta < 0.26$), and cognitive ($0.03 < \beta < 0.11$) well-being. Furthermore, need-supportive

Table 2
Descriptive statistics and latent correlations.

		1	2	3	4	5	6	7	8	9	10	11	12
1	Autonomy-support	–											
2	Competence-support	0.66*	–										
3	Relatedness-support	0.67*	0.65*	–									
4	Need-supportive Teaching	0.89*	0.86*	0.89*	–								
5	Subjective well-being: Life Satisfaction	0.13*	0.13*	0.15*	0.18*	–							
6	Subjective well-being: Positive Affect	0.15*	0.16*	0.17*	0.21*	0.56*	–						
7	Subjective well-being: Negative Affect	−0.06*	−0.06*	−0.08*	−0.09*	−0.49*	−0.39*	–					
8	Eudaimonic Well-being: Meaning in life	0.19*	0.20*	0.19*	0.25*	0.44*	0.48*	−0.33*	–				
9	Cognitive Well-being: Achievement	0.02*	0.03*	0.03*	0.04*	−0.08*	−0.03*	0.12*	−0.17*	–			
10	Gender (Female)	0.03*	0.03*	0.02*	0.03*	−0.06*	0.01*	0.17*	−0.02*	0.10*	–		
11	Socioeconomic status	−0.05*	−0.04*	−0.01*	−0.04*	−0.01*	0.02*	0.02*	−0.09*	0.45*	−0.02*	–	
12	School Location (Urban)	−0.04*	−0.04*	−0.03*	−0.04*	−0.06*	−0.03*	0.03*	−0.06*	0.16*	–	0.22*	–
13	School Type (Private)	−0.04*	−0.03*	−0.02*	−0.03*	0.02*	−0.03*	−0.04*	–	−0.04*	0.01*	−0.14*	−0.13*
	Mean	2.90	2.82	2.82	2.84	7.12	3.22	2.40	2.92	446.75			
	SD	0.84	0.83	0.84	0.74	2.61	0.56	0.60	0.70	108.29			

Note: Correlation analysis used standardized latent variable factor scores. All covariates were recoded to have dichotomous values. All zero or non-significant values were represented as "–". Correlation coefficients (*r*s) pertain to latent correlations. For more detailed country-by-country correlations, please refer to Table S3.

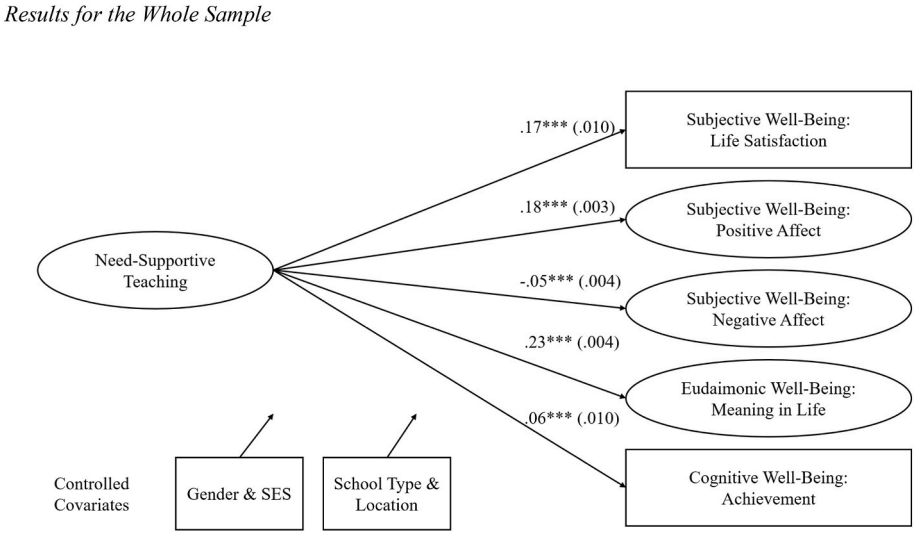

Fig. 1. Results for the Whole Sample. Note: ***$p < 0.001$; For simplicity of presentation, parameter estimates of the covariates are not presented. Circles represent latent variables and rectangles represent manifest variables. Estimates are in standardized form and were computed following Rubin's (2018) procedure for multiply imputed datasets. Standard errors are inside the parentheses. Full details including the estimates for the covariates can be found in the Supplementary Materials (see Table S4).

teaching was generally associated with lower negative affect across different contexts ($-0.13 < \beta < -0.3$). These results were also robust after controlling for individual- and school-related covariates.

There were two minor deviations from the general pattern of results. The association between need-supportive teaching and life satisfaction was not significant in Eastern Europe, and the association between need-supportive teaching and cognitive well-being was not significant in East-Central Europe. Aside from these two exceptions, the general pattern of results was replicated in all other contexts.

The next step was to test the three competing hypotheses by investigating the magnitude and direction of path coefficients. We compared the unconstrained model with a more constrained model where the path coefficients between need-supportive teaching and the well-being variables were set to be equal across macro-contexts. The Likelihood Ratio Test (LRT) between the unconstrained model and the constrained model was statistically significant for cultural ($\Delta\chi^2 = 71501$, $p < 0.001$; Δ CFI $= 0.02$), economic ($\Delta\chi^2 = 19372$, $p < 0.001$; Δ CFI $= 0.01$), and political ($\Delta\chi^2 = 23475$, $p < 0.001$, Δ CFI $= 0.02$) contexts (please see Table S9 for details). The change in CFI was also greater than or equal to 0.01 between the two models. These results indicate that there was a significant difference in the magnitude of associations across different contexts contradicting the absolutist hypothesis (H2a). However, since all the contexts have shown broadly similar patterns of association (in terms of direction) albeit with differences in magnitudes, the results supported the universalist hypothesis (H2c) but not the relativist hypothesis (H2b). More detailed results are shown in the Supplementary Materials (see Table S9).

3.2.3. Supplementary analyses

In the main model, we only examined need-supportive teaching as a global factor. We analyzed each need-support independently in the supplementary analyses. Results indicated that the relationships among the three need-support constructs and well-being largely replicated the overall analysis (see Figure S1). Another set of supplementary analyses examined the correlations between need-supportive teaching and the various dimensions of well-being in all 70 regions. This complemented

Table 3
The relationship between need-supportive teaching and well-being across cultural, economic, and political contexts.

Pervasive Contexts	Subjective well-being: Life Satisfaction	Subjective well-being: Positive Affect	Subjective well-being: Negative Affect	Eudaimonic Well-being: Meaning in life	Cognitive Well-being: Achievement
Cultural Contexts					
Western Europe	0.20***(0.03)	0.20***(0.01)	−0.13***(0.01)	0.22***(0.00)	0.03***(0.01)
East-Central Europe	0.20***(0.04)	0.19***(0.01)	−0.11***(0.01)	0.26***(0.01)	0.00 (0.01)
Eastern Europe	0.14 (0.03)	0.14***(0.01)	−0.05***(0.01)	0.16***(0.01)	0.09***(0.01)
Latin America	0.16***(0.02)	0.14***(0.01)	−0.06***(0.01)	0.16***(0.01)	0.09***(0.01)
English Speaking	0.19***(0.03)	0.23***(0.01)	−0.12***(0.01)	0.21***(0.01)	0.08***(0.01)
Confucian	0.15***(0.04)	0.18***(0.01)	−0.03*(0.01)	0.29***(0.01)	0.06***(0.02)
Southeast Asia	0.17***(0.060)	0.17***(0.01)	−0.07***(0.01)	0.18***(0.02)	0.12***(0.02)
Africa and the Middle East	0.23***(0.02)	0.23***(0.01)	−0.10***(0.01)	0.28***(0.01)	0.11***(0.01)
Economic Contexts					
High Income	0.17***(0.02)	0.20***(0.01)	−0.04***(0.01)	0.20***(0.004)	0.08***(0.01)
Upper-middle	0.17***(0.03)	0.16***(0.01)	−0.04***(0.01)	0.20***(0.01)	0.08***(0.01)
Lower-middle	0.15***(0.04)	0.18***(0.01)	−0.03*(0.01)	0.29***(0.01)	0.05***(0.02)
Political Contexts					
Full Democracies	0.16***(0.02)	0.17***(0.01)	−0.02**(0.01)	0.23***(0.01)	0.06***(0.01)
Flawed Democracies	0.19***(0.04)	0.25***(0.01)	−0.06***(0.01)	0.24***(0.01)	0.11***(0.01)
Hybrid regimes	0.18***(0.02)	0.17***(0.01)	−0.11***(0.01)	0.20***(0.01)	0.06***(0.01)
Authoritarian Regimes	0.17***(0.03)	0.16***(0.01)	−0.07***(0.01)	0.18***(0.01)	0.04***(0.01)

Note. For clarity of presentation, only the focal association between need-supportive teaching and well-being are shown. Estimates for the covariates are not shown, but they can be found in the supplementary material (see Tables S6-S8). All parameter estimates are standardized. ***$p < 0.001$, **$p < 0.001$, *$p < 0.05$. Values in parentheses refer to standard errors.

the main analyses which only explored it across macro-contexts. The results of the correlational analyses largely replicated the main findings (see Table S3). The third set of supplementary analyses tested a reverse model exploring whether better well-being leads to more need-supportive teaching. Results did not indicate a good fit: (χ^2 (df) = 324587.00 (175), $p < 0.001$; CFI = 0.88; TLI = 0.86, RMSEA = 0.07, SRMR = 0.08) (See Figure S2). These findings supported our theoretical argument that need-supportive teaching is better conceptualized as a key predictor of well-being, rather than the other way around.

4. Discussion

This study aimed to examine whether need-supportive teaching was associated with well-being across cultural, economic, and political contexts. By and large, need-supportive teaching was associated with higher subjective, eudaimonic, and cognitive well-being across almost the different macro-contexts.

4.1. Hypothesis 1: Need-supportive teaching and well-being across the globe

The first hypothesis posited that need-supportive teaching will be associated with well-being across the globe. This hypothesis was supported as need-supportive teaching was positively associated with life satisfaction, positive affect, eudaimonic well-being, and cognitive well-being, and negatively associated with negative affect. These results held even after accounting for the roles of covariates such as gender, SES, school type, and school location. These results provide overall support to SDT's core idea that need-support is universally important for human functioning across the globe (Church et al., 2013; Deci & Ryan, 2009; Ryan & Deci, 2017).

This study has important theoretical implications given that macro-contexts such as cultural, economic, and political systems have seldom been explored by educational researchers. Past studies have primarily focused on proximal contexts such as the classroom or school setting (Jansen et al., 2022; Wang et al., 2020; Wentzel, 2021, 2022). However, students, classrooms, and schools are all nested in these macro-contexts. Furthermore, educational research is mostly conducted in WEIRD societies, with much less work conducted in non-WEIRD settings (Usher, 2018; Zusho & Kumar, 2018). By understanding that need-supportive teaching benefits students across macro-contexts, we are more likely to give actionable insights that would be relevant to students across different parts of the globe. The importance of supporting students' needs for autonomy, competence, and relatedness would be as relevant to an American student living in the suburbs, a student in the megacity of Shanghai, or a student in a rural town in the Philippines.

Overall, the correlation between need-supportive teaching and the various indicators of well-being ranged from $r = -0.05$, $p < 0.01$ (for negative affect) to 0.18, $p < 0.01$ (for life satisfaction). In terms of absolute effect size, the relationships between need-supportive teaching with life satisfaction and that with positive affect were relatively stronger. However, the magnitude of these relationships seemed slightly smaller than what has been found in prior meta-analytic research (Howard et al., 2024; Stroet et al., 2013). For example, Howard et al. (2024) found that the overall correlation between need-support and well-being ranged from $r = 0.21$ to 0.38. Furthermore, they found that the correlation of need-support with positive affect ranged from 0.35 to 0.46, while the correlation between need-support and eudaimonic well-being ranged from 0.36 to 0.42. The effect sizes in the current study are smaller than what they found.

One potential reason for the smaller effect sizes in the current study was that our study was more naturalistic and less tightly controlled. Furthermore, the database we used was much more extensive than prior studies that drew on a narrower population base. For example, in the Howard et al. (2024) meta-analysis, around 19% of the students sampled were from the United States alone. Almost half of the samples in their meta-analysis were only drawn from five countries including the United States, China, Spain, Belgium, and Canada. Our study draws on a broader population base across the globe. Hence, our study might represent a more accurate estimate of the real effect of need-supportive teaching on well-being.

4.2. Hypothesis 2: Absolutist, relativist, and universalist perspectives

The second hypothesis tested three competing hypotheses, including the absolutist, relativist, and universalist perspectives across cultural, economic, and political contexts. Overall, the results supported the universalist perspective which emphasizes the existence of broad universal patterns alongside contextual differences. Multigroup analyses indicated that the relationship between need-supportive teaching and

well-being was not invariant across contexts. However, the direction of the association between need-supportive teaching and well-being was generally in the same direction across all the contexts examined, though the size of the association varied somewhat.

Despite the remarkable consistencies across cultural, economic, and political contexts, we also surface a few minor differences. In terms of culture, the pattern of results in Eastern Europe and East-Central Europe was somewhat different from the rest of the globe. More specifically, the association between need-supportive teaching and life satisfaction was not significant in Eastern Europe, and the association between need-supportive teaching and cognitive well-being was not significant in East-Central Europe.

Note that in Eastern European contexts, citizens have emerged from Soviet influence, and the education system has undergone significant transformations, especially following the political and economic changes after the fall of communism. Communist educational systems emphasize centralized control over educational content and a focus on ideological conformity. It also emphasizes the development of science, mathematics, and technical education (Mincu, 2016). Against this backdrop, need-supportive teaching especially in the reading domain might not be that common and perhaps less likely to play a role in their well-being.

This potential interpretation, however, must be taken with a cautionary note as we do not yet understand the mechanisms that might cause slight deviation from SDT tenets in East Europe and East-Central Europe. In-depth cultural studies are needed to explore which types of teaching are most likely associated with better well-being in Eastern European contexts where Soviet influence on education is more prevalent.

Aside from cultural values, there are some debates about the importance of need-support across economic environments. For example, there are studies showing that individuals need to satisfy their basic physiological needs first before attending to higher-order psychological needs (Kenrick et al., 2016). These studies suggest that need-supportive teaching might only be relevant in high-income economies. However, the results of our study showed that across lower-middle, upper-middle, and high-income countries, need-supportive teaching was positively associated with well-being.

Political contexts have received relatively less attention in the educational literature. Our research showed that need-supportive teaching was equally relevant across the entire political spectrum ranging from authoritarian regimes to full democracies. Hence, even in regimes where personal freedom and autonomy are not highly valued, teachers' need-supportive practices are still important.

It is important to note, however, that the PISA data from more politically authoritarian regimes might be less representative compared to data in more democratic regions. Although the OECD (2019, pp. 23–35) recommends the use of nationally representative sampling in all participating regions, not all countries adhere strictly to these recommendations. This is sometimes the case in more authoritarian regimes (e.g., Candido et al., 2020). Participation in PISA is less likely in less democratic nations. There are nearly 200 countries in the world and many of the least democratic nations in the world (e.g., North Korea, Central African Republic, Myanmar, and Afghanistan) have not participated in PISA (OECD, 2018). Despite these caveats, we acknowledge that the PISA dataset used in the current study is still more representative of the global student population compared to prior studies which have seldom drawn on such an extensive database.

4.3. Theoretical and practical implications

This study contributes to SDT by engaging in a robust examination of the role of need-supportive teaching across various cultural, economic, and political contexts. To our knowledge, this study provides a strong empirical demonstration of the remarkable consistency of need-supportive teaching as a positive facilitator of well-being across a diverse range of contexts. Prior work on need-supportive teaching has mostly been confined to research in WEIRD contexts or a limited range of contexts but has seldom drawn from a global database (e.g., Jang et al., 2009; Zhou et al., 2009).

It also makes theoretical contributions to the cross-cultural literature and the debates among universalist, absolutist, and relativist approaches. These different stances are rooted in distinct epistemological assumptions, and our research shows that the universalist paradigm received the strongest support (Soenens et al., 2015; Zusho & King, 2024).

An important practical implication derived from this research is the need to encourage teachers to engage in need-supportive teaching practices. Examples of need-supportive teaching practices include providing students with choice, highlighting the relevance of schoolwork, setting clear expectations, trying to see things from the students' point-of-view, providing actionable feedback, being emotionally available, and providing warmth and support to their students among others (Ahmadi et al., 2023; Cheon et al., 2018; Moè et al., 2022). Professional development programs could be designed using SDT as a guiding framework, and results of these studies have shown that teachers could successfully incorporate need-supportive practices into their classroom teaching (Cheon et al., 2018; Reeve, 1998; Reeve & Cheon, 2021).

Despite the importance of need-supportive teaching, studies have found that teachers more readily embrace controlling styles such as providing rewards and punishments (Reeve, 1998). Teachers often feel pressured to implement controlling strategies that thwart basic needs due to external policies such as high stakes testing and accountability systems (Reeve, 1998). However, studies have also found a cause for optimism given that teaching styles can be changed. Professional development workshops have been found to improve teachers' need-supportive behaviours (e.g., Cheon et al., 2014). In addition, even minimalist interventions such as letting teachers read a booklet on need-supportive teaching were found to lead to durable changes in teaching styles (Reeve, 1998; Reeve et al., 2018). These studies demonstrate the promise of equipping teachers with the knowledge and skills associated with need-supportive teaching. Perhaps workshops or curricula that promote need-supportive teaching could be integrated into preservice teacher education and professional development opportunities for in-service teachers.

4.4. Limitations and directions for future research

Despite its strengths, this study also suffers from some limitations. First, PISA data is cross-sectional. We recommend future studies engage in longitudinal and experimental approaches to find stronger evidence of temporal precedence and causality. Reverse causality might also hold as students who are happier and who do better in school might perceive their teachers to engage in more need-supportive teaching (e.g., Su et al., 2022). Longitudinal studies that use cross-lagged analysis may help uncover the possible reciprocal and bidirectional associations among the key variables.

Second, consistent with the PISA design, need-supportive teaching was measured through students' perceptions. Though past SDT studies have mostly used self-report survey measures, it might be better to triangulate it with behavioral, observational, or qualitative approaches.

Third, we only measured teachers' need-supportive teaching. Recent SDT research has highlighted the importance of looking at need-thwarting practices (Aelterman & Vansteenkiste, 2023). Unfortunately, PISA does not have need-thwarting items. Future studies can include both need-supportive and need-thwarting teaching practices to yield a fuller picture of how teaching is associated with well-being.

Fourth, each type of need-support was only measured by a single item. This was not ideal as multi-item measures are more reliable and have greater predictive validity (Allen et al., 2022; Diamantopoulos et al., 2012). Furthermore, due to potential multicollinearity issues, we only focused on the overall need-support construct. Hence, we are

unable to test and juxtapose the distinct associations of autonomy, competence, and relatedness support with well-being. Future studies that use multi-item measures of need-support could tease apart these three distinct dimensions and examine their unique associations with key outcomes (e.g., Ahmadi et al., 2023; Moè et al., 2022).

Last, we were unable to measure whether and how need-support was linked with need-satisfaction, which was a 'missing link' in this study as SDT presumes that need-support leads to need satisfaction, which then leads to optimal well-being (Howard et al., 2024). Perhaps, future studies can include measures of need-satisfaction alongside need-support so that the fuller sequelae of theoretical variables elucidated in SDT could be tested.

4.5. Conclusion

Our study across approximately half a million students in 70 countries/regions revealed that students who perceived higher levels of need-support from their teachers also experienced better well-being in terms of subjective (i.e., higher levels of life satisfaction and positive affect but lower negative affect), eudaimonic, and cognitive well-being. Rather than being idiosyncratic to a particular setting, need-supportive teaching seems to be associated with adaptive outcomes across a wide range of macro-contexts spanning different cultural, economic, and political systems. Hence, teachers across the globe could consider using more need-supportive teaching practices.

Availability of data and materials

All the data used in this study are publicly available at: https://www.oecd.org/pisa/data/2018database/

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Authors' contributions

The first author RBK wrote the paper, conceived and designed the analysis, and supervised the project. The second author JYH performed the analysis. The third author WY assisted in writing the paper.

CRediT authorship contribution statement

Ronnel B. King: Writing – review & editing, Writing – original draft, Supervision, Conceptualization. **Joseph Y. Haw:** Methodology, Investigation, Formal analysis, Data curation. **Yi Wang:** Writing – review & editing, Validation, Methodology.

Declaration of competing interest

The authors have no competing interests to report.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.learninstruc.2024.101978.

References

Aelterman, N., & Vansteenkiste, M. (2023). Need-supportive and need-thwarting socialization: A circumplex approach. *The oxford handbook of self-determination theory*. Oxford Press.

Ahmadi, A., Noetel, M., Parker, P., Ryan, R. M., Ntoumanis, N., Reeve, J., Beauchamp, M., Dicke, T., Yeung, A., Ahmadi, M., Bartholomew, K., Chiu, T. K. F., Curran, T., Erturan, G., Flunger, B., Frederick, C., Froiland, J. M., González-Cutre, D., Haerens, L., … Lonsdale, C. (2023). A classification system for teachers' motivational behaviors recommended in self-determination theory interventions. *Journal of Educational Psychology, 115*(8), 1158–1176. https://doi.org/10.1037/edu0000783

Ahn, I., Chiu, M. M., & Patrick, H. (2021). Connecting teacher and student motivation: Student-perceived teacher need-supportive practices and student need satisfaction. *Contemporary Educational Psychology, 64*, Article 101950. https://doi.org/10.1016/j.cedpsych.2021.101950

Ahn, I., Patrick, H., Chiu, M. M., & Levesque-Bristol, C. (2019). Measuring teacher practices that support student motivation: Examining the factor structure of the Teacher as Social Context Questionnaire using multilevel factor analyses. *Journal of Psychoeducational Assessment, 37*(6), 743–756. https://doi.org/10.1177/0734282918791655

Allen, M. S., Iliescu, D., & Greiff, S. (2022). Single item measures in psychological science. *European Journal of Psychological Assessment, 38*(1), 1–5. https://doi.org/10.1027/1015-5759/a000699

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin, 146*(4), 279–323. https://doi.org/10.1037/bul0000226

Bücker, S., Nuraydin, S., Simonsmeier, B. A., Schneider, M., & Luhmann, M. (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in Personality, 74*, 83–94. https://doi.org/10.1016/j.jrp.2018.02.007

Burns, E. C., Martin, A. J., Collie, R. J., & Mainhard, T. (2021). Perceived classroom disruption undermines the positive educational effects of perceived need-supportive teaching in science. *Learning and Instruction, 75*, Article 101498. https://doi.org/10.1016/J.LEARNINSTRUC.2021.101498

Cabrera, V., & Donaldson, S. I. (2023). PERMA to PERMA+ 4 building blocks of well-being: A systematic review of the empirical literature. *The Journal of Positive Psychology*, 1–20. https://doi.org/10.1080/17439760.2023.2208099

Candido, H. H. D., Granskog, A., & Tung, L. C. (2020). Fabricating education through PISA? An analysis of the distinct participation of China in PISA. *European Education, 52*(2), 146–165. https://doi.org/10.1080/10564934.2020.1759097

Capon-Sieber, V., Köhler, C., Alp Christ, A., Helbling, J., & Praetorius, A. K. (2022). The role of relatedness in the motivation and vitality of university students in online classes during social distancing. *Frontiers in Psychology, 12*, 6393. https://doi.org/10.3389/fpsyg.2021.702323

Chatzisarantis, N. L., Ada, E. N., Ahmadi, M., Caltabiano, N., Wang, D., Thogersen-Ntoumani, C., & Hagger, M. S. (2019). Differential effects of perceptions of equal, favourable and unfavourable autonomy support on educational and well-being outcomes. *Contemporary Educational Psychology, 58*, 33–43. https://doi.org/10.1016/j.cedpsych.2019.02.002

Cheon, S. H., Reeve, J., Lee, Y., & Lee, J. W. (2018). Why autonomy-supportive interventions work: Explaining the professional development of teachers' motivating style. *Teaching and Teacher Education, 69*, 43–51.

Cheon, S. H., Reeve, J., Yu, T. H., & Jang, H.-R. (2014). The teacher benefits from giving autonomy support during physical education instruction. *Journal of Sport & Exercise Psychology, 36*, 331–346. https://doi.org/10.1123/jsep.2013-0231

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Chirkov, V. I., & Ryan, R. M. (2001). Parent and teacher autonomy-support in Russian and US adolescents: Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology, 32*(5), 618–635. https://doi.org/10.1177/0022022101032005006

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 orientations and well-being. *Journal of Personality and Social Psychology, 84*(1), 97–110. https://doi.org/10.1037/0022-3514.84.1.97

Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., de Jesús Vargas-Flores, J., … Ching, C. M. (2013). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology, 44*(4), 507–534. https://doi.org/10.1177/0022022112466590

Clarke, T. (2020). Children's wellbeing and their academic achievement: The dangerous discourse of 'trade-offs' in education. *Theory and Research in Education, 18*, 263–294. https://doi.org/10.1177/1477878520980197

Collie, R. J. (2022). Social-emotional need satisfaction, prosocial motivation, and students' positive behavioral and well-being outcomes. *Social Psychology of Education, 25*, 399–424. https://doi.org/10.1007/S11218-022-09691

Cuevas, J. A., Childers, G., & Dawson, B. L. (2023). A rationale for promoting cognitive science in teacher education: Deconstructing prevailing learning myths and advancing research-based practices. *Trends in Neuroscience and Education, 33*, Article 100209. https://doi.org/10.1016/J.TINE.2023.100209

Deci, E. L., & Ryan, R. M. (2009). 25 self-determination theory: A consideration of human motivational universals. In P. J. Corr, & G. Matthews (Eds.), *The cambridge handbook of personality psychology* (pp. 441–456). Cambridge University Press.

Demirbaş-Çelik, N., & Keklik, İ. (2019). Personality factors and meaning in life: The mediating role of competence, relatedness and autonomy. *Journal of Happiness Studies, 20*(4), 995–1013. https://doi.org/10.1007/s10902-018-9984-0

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. *Journal of the Academy of Marketing Science, 40*, 434–449. https://doi.org/10.1007/s11747-011-0300-3

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour, 2*(4), 253–260. https://doi.org/10.1038/s41562-018-0307-6

Disabato, D. J., Goodman, F. R., Kashdan, T. B., Short, J. L., & Jarden, A. (2016). Different types of well-being? A cross-cultural examination of hedonic and eudaimonic well-being. *Psychological Assessment, 28*(5), 471–482. https://doi.org/10.1037/PAS0000209

Donaldson, S. I., Heshmati, S., Lee, J. Y., & Donaldson, S. I. (2021). Examining building blocks of well-being beyond PERMA and self-report bias. *The Journal of Positive Psychology, 16*(6), 811–818. https://doi.org/10.1080/17439760.2020.1818813

Durand, M. (2015). The OECD better life initiative: How's life? And the measurement of well-being. *Review of Income and Wealth, 61*(1), 4–17. https://doi.org/10.1111/roiw.12156

Economist Intelligence Unit. (2018). *Democracy index 2018*. Retrieved from https://www.eiu.com/n/campaigns/democracy-index-2018/.

Erturan-Ilker, G. (2014). Psychological well-being and motivation in a Turkish physical education context. *Educational Psychology in Practice, 30*(4), 365–379. https://doi.org/10.1080/02667363.2014.949374

Govorova, E., Benítez, I., & Muñiz, J. (2020). Predicting student well-being: Network analysis based on PISA 2018. *International Journal of Environmental Research and Public Health, 17*(11), 4014. https://doi.org/10.3390/ijerph17114014

Greco, S., Ishizaka, A., Resce, G., & Torrisi, G. (2020). Measuring well-being by a multidimensional spatial model in OECD Better Life Index framework. *Socio-Economic Planning Sciences, 70*, Article 100684. https://doi.org/10.1016/j.seps.2019.01.006

Hargreaves, A., & Shirley, D. (2021). *Well-being in schools: Three forces that will uplift your students in a volatile world*. ASCD.

Haw, J. Y., & King, R. B. (2022). Need-supportive teaching is associated with reading achievement via intrinsic motivation across eight cultures. *Learning and Individual Differences, 97*, 102161. https://doi.org/10.1016/j.lindif.2022.102161

Haw, J. Y., & King, R. B. (2023). Perceived need-supportive leadership, perceived need-supportive teaching, and student engagement: A self-determination perspective. *Social Psychology of Education, 26*(5), 1289–1319. https://doi.org/10.1007/s11218-023-09790-2

Haw, J. Y., King, R. B., & Trinidad, J. E. R. (2021). Need-supportive teaching is associated with greater reading achievement: What the Philippines can learn from PISA 2018. *International Journal of Educational Research, 110*, Article 101864. https://doi.org/10.1016/j.ijer.2021.101864

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature, 466*(7302), 29. https://doi.org/10.1038/466029a, 29.

Hofstede, G. (2001). In *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Sage.). https://doi.org/10.1016/S0005-7967(02)00184-5

Hornstra, L., Stroet, K., & Weijers, D. (2021). Profiles of teachers' need-support: How do autonomy support, structure, and involvement cohere and predict motivation and learning outcomes? *Teaching and Teacher Education, 99*, Article 103257. https://doi.org/10.1016/j.tate.2020.103257

Howard, J. L., Slemp, G. R., & Wang, X. (2024). Need support and need thwarting: A meta-analysis of autonomy, competence, and relatedness supportive and thwarting behaviors in student populations. *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/01461672231225364. Published Online First.

Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76–99). Sage.

Huang, F. L. (2016). Alternatives to multilevel modeling for the analysis of clustered data. *The Journal of Experimental Education, 84*(1), 175–196. https://doi.org/10.1080/00220973.2014.952397

Inglehart, R. (1997). Modernization, postmodernization and changing perceptions of risk. *International Review of Sociology, 7*(3), 449–459. https://doi.org/10.1080/03906701.1997.9971250

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588–600. https://doi.org/10.1037/a0019682

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 students? *Journal of Educational Psychology, 101*(3), 644–661. https://doi.org/10.1037/a0014241

Jansen, T., Meyer, J., Wigfield, A., & Möller, J. (2022). Which student and instructional variables are most strongly related to academic motivation in K-12 education? A systematic review of meta-analyses. *Psychological Bulletin, 148*(1–2), 1–26. https://doi.org/10.1037/bul0000354

Jia, N., Li, W., Zhang, L., & Kong, F. (2022). Beneficial effects of hedonic and eudaimonic motivations on subjective well-being in adolescents: A two-wave cross-lagged analysis. *The Journal of Positive Psychology, 17*(5), 701–707. https://doi.org/10.1080/17439760.2021.1913641

Kaya, M., & Erdem, C. (2021). Students' well-being and academic achievement: A meta-analysis study. *Child Indicators Research, 14*(5), 1743–1767.

Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science, 5*(3), 292–314. https://doi.org/10.1177/1745691610369469

Kern, M. L., Waters, L. E., Adler, A., & White, M. A. (2015). A multidimensional approach to measuring well-being in students: Application of the PERMA framework. *The Journal of Positive Psychology, 10*(3), 262–271. https://doi.org/10.1080/17439760.2014.936962

King, R. B., Cai, Y., & Du, H. (2021). Societal-level utility value strengthens the relationship between student-level utility value and achievement: A person-culture fit perspective. *British Journal of Educational Psychology, 91*(1), 328–346. https://doi.org/10.1111/bjep.12354

King, R. B., & McInerney, D. M. (2014). Culture's consequences on student motivation: Capturing cross-cultural universality and variability through personal investment theory. *Educational Psychologist, 49*(3), 175–198. https://doi.org/10.1080/00461520.2014.926813

King, R. B., & McInerney, D. M. (2016). Culturalizing motivation research in educational psychology. *British Journal of Educational Psychology, 86*, 1–7. https://doi.org/10.1111/bjep.12106

King, R. B., McInerney, D. M., & Pitliya, R. J. (2018). Envisioning a culturally imaginative educational psychology. *Educational Psychology Review, 30*, 1031–1065. https://doi.org/10.1007/s10648-018-9440-z

King, R. B., Wang, Y., Fu, L., & Leung, S. O. (2024). Identifying the the top predictors of students' well-being across cultures: Combining machine learning and conventional statistics. *Scientific Reports*. https://doi.org/10.21203/rs.3.rs-3362788/v1. Published Online First.

Kleinkorres, R., Stang-Rabrig, J., & McElvany, N. (2023). The longitudinal development of students' well-being in adolescence: The role of perceived teacher autonomy support. *Journal of Research on Adolescence, 33*(2), 496–513. https://doi.org/10.1111/JORA.12821

Leenknecht, M. J., Wijnia, L., Loyens, S., & Rikers, R. (2017). Need-supportive teaching in higher education: Configurations of autonomy support, structure, and involvement. *Teaching and Teacher Education, 68*, 134–142. https://doi.org/10.1016/j.tate.2017.08.020

León, J., & Núñez, J. L. (2013). Causal ordering of basic psychological needs and well-being. *Social Indicators Research, 114*, 243–253. https://doi.org/10.1007/s11205-012-0143-4

Lomas, J. C. (2013). Climbing the needs pyramids. *Sage Open, 3*(3), 1–6. https://doi.org/10.1177/2158244013500283

Lou, N. M., & Li, L. M. W. (2023). The mindsets× societal norm effect across 78 cultures: Growth mindsets are linked to performance weakly and well-being negatively in societies with fixed-mindset norms. *British Journal of Educational Psychology, 93*(1), 134–152. https://doi.org/10.1111/bjep.12544

Lumley, T. (2004). Analysis of complex survey samples. *Journal of Statistical Software, 9*, 1–19.

Makel, M. C., & Plucker, J. A. (2014). Facts are more important than novelty: Replication in the education sciences. *Educational Researcher, 43*(6), 304–316. https://doi.org/10.3102/0013189X14545513

Martela, F., & Sheldon, K. M. (2019). Clarifying the concept of well-being: Psychological need satisfaction as the common core connecting eudaimonic and subjective well-being. *Review of General Psychology, 23*(4), 458–474. https://doi.org/10.1177/1089268019880886

Mincu, M. E. (2016). Communist education as modernisation strategy? The swings of the globalisation pendulum in eastern Europe (1947–1989). *History of Education, 45*(3), 319–334. https://doi.org/10.1080/0046760X.2015.1127432

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

Nalipay, M. J. N., King, R. B., & Cai, Y. (2020). Autonomy is equally important across East and West: Testing the cross-cultural universality of self-determination theory. *Journal of Adolescence, 78*, 67–72. https://doi.org/10.1016/j.adolescence.2019.12.009

Neufeld, A., & Malin, G. (2020). How medical students' perceptions of instructor autonomy-support mediate their motivation and psychological well-being. *Medical Teacher, 42*(6), 650–656. https://doi.org/10.1080/0142159X.2020.1726308

OECD. (2009). *PISA data analysis manual* (SPSS second edition). OECD Publishing. https://doi.org/10.1787/9789264056275-9-en

OECD. (2018). *PISA 2018 technical report*. OECD. https://www.oecd.org/pisa/data/pisa2018technicalreport/.

OECD. (2019). *An OECD learning framework 2030*. Springer International Publishing.

OECD. (2021). Pisa: Programme for international student assessment. *OECD Education Statistics (database)*. https://doi.org/10.1787/data-00365-en

Oishi, S., Diener, E., & Lucas, R. E. (2007). The optimum level of well-being: Can people be too happy? *Perspectives on Psychological Science, 2*(4), 346–360. https://doi.org/10.1111/j.1745-6916.2007.00048.x

Olivier, E., Galand, B., Morin, A. J., & Hospel, V. (2021). Need-supportive teaching and student engagement in the classroom: Comparing the additive, synergistic, and global contributions. *Learning and Instruction, 71*, Article 101389. https://doi.org/10.1016/j.learninstruc.2020.101389

Pancheva, M. G., Ryff, C. D., & Lucchini, M. (2021). An integrated look at well-being: Topological clustering of combinations and correlates of hedonia and eudaimonia. *Journal of Happiness Studies, 22*(5), 2275–2297. https://doi.org/10.1007/S10902-020-00325-6

Philippe, F. L., & Vallerand, R. J. (2008). Actual environments do affect motivation and psychological adjustment: A test of self-determination theory in a natural setting. *Motivation and Emotion, 32*, 81–89. https://doi.org/10.1007/s11031-008-9087-z

Rahman, M. S. (2014). Statistical analysis of democracy index. *Humanomics, 30*(4), 373–384.

Rand, K. L., Shanahan, M. L., Fischer, I. C., & Fortney, S. K. (2020). Hope and optimism as predictors of academic performance and subjective well-being in college students. *Learning and Individual Differences, 81*, Article 101906. https://doi.org/10.1016/j.lindif.2020.101906

Ratelle, C. F., Simard, K., & Guay, F. (2013). University students' subjective well-being: The role of autonomy support from parents, friends, and the romantic partner. *Journal of Happiness Studies, 14*, 893–910. https://doi.org/10.1007/s10902-012-9360-4

Reeve, J. (1998). Autonomy support as an interpersonal motivating style: Is it teachable? *Contemporary Educational Psychology, 23*(3), 312–330. https://doi.org/10.1006/ceps.1997.0975

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

Reeve, J., Ryan, R. M., & Deci, E. L. (2018). Sociocultural influences on student motivation as viewed through the lens of self-determination theory. In G. A. D. Liem, & D. M. McInerney (Eds.), *Big theories revisited 2* (pp. 15–38). Information Age Press.

Reymond, N. C., Großmann, N., & Fries, S. (2023). The power of instructional quality, structure, and autonomy support to predict students' perceived competence: A bifactor-ESEM representation. *Teaching and Teacher Education, 135*, Article 104334. https://doi.org/10.1016/J.TATE.2023.104334

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Rubin, D. B. (2018). Multiple imputation. In S. van Buuren (Ed.), *Flexible imputation of missing data* (2nd ed., pp. 29–62). Chapman and Hall/CRC. https://doi.org/10.1002/9780470316696.

Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*, 319–338.

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

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

Ryan, R. M., & Deci, E. L. (2022). Self-determination theory. In F. Maggino (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 1–7). Springer.

Ryan, R. M., Domenico, S. I. D., Ryan, W. S., & Deci, E. L. (2017). Pervasive influences on wellness and thriving: Cultural, political, and economic contexts and the support of basic psychological needs. In F. Guay, H. W. Marsh, D. M. McInerney, & R. G. Craven (Eds.), *Self: Driving positive psychology and well-being* (pp. 199–231). IAP Information Age Publishing.

Ryan, R. M., Ryan, W. S., Di Domenico, S. I., & Deci, E. L. (2019). The nature and the conditions of human autonomy and flourishing. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 89–110). Oxford Press.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Sagiv, L., & Schwartz, S. H. (2022). Personal values across cultures. *Annual Review of Psychology, 73*, 517–546. https://doi.org/10.1146/annurev-psych-020821-125100

Sass, D. A., & Schmitt, T. A. (2013). Testing measurement and structural invariance: Implications for practice. In T. Teo (Ed.), *Handbook of quantitative methods for educational research* (pp. 315–346). Sense Publishers.

Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology: International Review, 48*(1), 23–47. https://doi.org/10.1111/j.1464-0597.1999.tb00047.x

Schwartz, S. (2006). A theory of cultural value orientations: Explication and applications. *Comparative Sociology, 5*(2–3), 137–182.

Schwartz, S. H. (2009). Culture matters. In R. S. Wyer, C. Chiu, & Y. Hong (Eds.), *Understanding culture: Theory, research, and application* (pp. 127–150). Psychology Press. https://doi.org/10.4324/9781441605054.

Seligman, M. (2018). PERMA and the building blocks of well-being. *The Journal of Positive Psychology, 13*(4), 333–335, 1abrer0.1080/17439760.2018.1437466.

Seligman, M. E. (2019). Positive psychology: A personal history. *Annual Review of Clinical Psychology, 15*, 1–23. https://doi.org/10.1146/annurev-clinpsy-050718-095653

Sheldon, K. M., Abad, N., & Omoile, J. (2009). Testing self-determination theory via Nigerian and Indian adolescents. *International Journal of Behavioral Development, 33*(5), 451–459. https://doi.org/10.1177/0165025409340095

Skinner, E. A. (2023). Four guideposts toward an integrated model of academic motivation: Motivational resilience, academic identity, complex social ecologies, and development. *Educational Psychology Review, 35*, 80. https://doi.org/10.1007/S10648-023-09790-W

Skinner, E. A., Graham, J. P., Brule, H., Rickert, N., & Kindermann, T. A. (2020). I get knocked down but I get up again": Integrative frameworks for studying the development of motivational resilience in school. *International Journal of Behavioral Development, 44*(4), 290–300. https://doi.org/10.1177/01650254166420

Skinner, E. A., Rickert, N. P., Vollet, J. W., & Kindermann, T. A. (2022). The complex social ecology of academic development: A bioecological framework and illustration examining the collective effects of parents, teachers, and peers on student engagement. *Educational Psychologist, 57*(2), 87–113. https://doi.org/10.1080/00461520.2022.2038603

Soenens, B., Vansteenkiste, M., & Van Petegem, S. (2015). Let us not throw out the baby with the bathwater: Applying the principle of universalism without uniformity to autonomy-supportive and controlling parenting. *Child Development Perspectives, 9*(1), 44–49. https://doi.org/10.1111/cdep.12103

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53*(1), 80–93. https://doi.org/10.1037/0022-0167.53.1.80

Stiglbauer, B., Gnambs, T., Gamsjäger, M., & Batinic, B. (2013). The upward spiral of adolescents' positive school experiences and happiness: Investigating reciprocal effects over time. *Journal of School Psychology, 51*(2), 231–242. https://doi.org/10.1016/j.jsp.2012.12.002

Strelhow, M. R. W., Sarriera, J. C., & Casas, F. (2020). Evaluation of well-being in adolescence: Proposal of an integrative model with hedonic and eudemonic aspects. *Child Indicators Research, 13*, 1439–1452. https://doi.org/10.1007/s12187-019-09708-5

Stroet, K., Opdenakker, M. C., & Minnaert, A. (2013). Effects of need supportive teaching on early adolescents' motivation and engagement: A review of the literature. *Educational Research Review, 9*, 65–87. https://doi.org/10.1016/j.edurev.2012.11.003

Su, T., Tian, L., & Huebner, E. S. (2021). The reciprocal relations among prosocial behavior, satisfaction of relatedness needs at school, and subjective well-being in school: A three-wave cross-lagged study among Chinese elementary school students. *Current Psychology, 40*, 3734–3746. https://doi.org/10.1007/s12144-019-00323-9

Su, L., Yang, X., & Huang, Y. (2022). How do tourism goal disclosure motivations drive Chinese tourists' goal-directed behaviors? The influences of feedback valence, affective rumination, and emotional engagement. *Tourism Management, 90*, Article 104483. https://doi.org/10.1016/j.tourman.2021.104483

Suldo, S. M., Shaunessy-Dedrick, E., Ferron, J., & Dedrick, R. F. (2018). Predictors of success among high school students in Advanced placement and international baccalaureate programs. *Gifted Child Quarterly, 62*, 350–373. https://doi.org/10.1177/0016986218758443

Tang, M., Wang, D., & Guerrien, A. (2021). The contribution of basic psychological need satisfaction to psychological well-being via autonomous motivation among older adults: A cross-cultural study in China and France. *Frontiers in Psychology, 12*, Article 734461. https://doi.org/10.3389/fpsyg.2021.734461

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology, 39*(4), 342–358. https://doi.org/10.1016/j.cedpsych.2014.08.002

Tian, L., Liu, B., Huang, S., & Huebner, E. S. (2013). Perceived social support and school well-being among Chinese early and middle adolescents: The mediational role of self-esteem. *Social Indicators Research, 113*(3), 991–1008. https://doi.org/10.1007/s11205-012-0123-8

Trent, J., & King, L. A. (2010). Predictors of rapid versus thoughtful judgments of meaning in life. *The Journal of Positive Psychology, 5*(6), 439–451. https://doi.org/10.1080/17439760.2010.534106

Usher, E. L. (2018). Acknowledging the whiteness of motivation research: Seeking cultural relevance. *Educational Psychologist, 53*(2), 131–144. https://doi.org/10.1080/00461520.2018.1442220

van Buuren, S., & Groothuis-Oudshorn, K. (2011). Mice: Multivariate imputation by chained equation. *Journal of Statistical Software, 45*, 1–67. https://doi.org/10.18637/jss.v045.i03

van Vianen, A. E. (2018). Person–environment fit: A review of its basic tenets. *Annual Review of Organizational Psychology and Organizational Behavior, 5*, 75–101. https://doi.org/10.1146/Annurev-Orgpsych-032117-104702

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion, 44*(1), 1–31. https://doi.org/10.1007/S11031-019-09818-1/TABLES/3

Wang, M. T., Degol, J. L., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review, 57*, Article 100912. https://doi.org/10.1016/j.dr.2020.100912

Wang, F., King, R. B., & Leung, S. O. (2022). Beating the odds: Identifying the top predictors of resilience among Hong Kong students. *Child Indicators Research, 15*(5), 1921–1944. https://doi.org/10.1007/s12187-022-09939-z

Wang, H., King, R. B., & McInerney, D. M. (2023). Ability grouping and student performance: A longitudinal investigation of teacher support as a mediator and moderator. *Research Papers in Education, 38*, 121–142. https://doi.org/10.1080/02671522.2021.1961293

Wang, Y., King, R. B., Wang, F., & Leung, S. O. (2021). Need-supportive teaching is positively associated with students' well-being: A cross-cultural study. *Learning and Individual Differences, 92*, 102051. https://doi.org/10.1016/j.lindif.2021.102051

Weinstein, N., Ryan, R. M., & Deci, E. L. (2012). Motivation, meaning, and wellness: A self-determination perspective on the creation and internalization of personal meanings and life goals. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories, research, and applications* (pp. 81–106). Routledge/Taylor & Francis Group.

Wentzel, K. R. (2021). Motivational decision-making in achievement settings: A competence-in-context approach. *Advances in Motivation Science, 8*, 245–284. https://doi.org/10.4324/9781138609877-REE181-1

Wentzel, K. R. (2022). Does anybody care? Conceptualization and measurement within the contexts of teacher-student and peer relationships. *Educational Psychology Review, 34*(4), 1919–1954. https://doi.org/10.1007/s10648-022-09702-4

Wentzel, K., & Skinner, E. (2022). The other half of the story: The role of social relationships and social contexts in the development of academic motivation. *Educational Psychology Review, 34*(4), 1865–1876. https://doi.org/10.1007/s10648-022-09713-1

World Bank. (2021). The world by income and region. Retrieved from https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html.

Xia, Q., Chiu, T. K., Lee, M., Sanusi, I. T., Dai, Y., & Chai, C. S. (2022). A self-determination theory (SDT) design approach for inclusive and diverse artificial intelligence (AI) education. *Computers & Education, 189*, Article 104582. https://doi.org/10.1016/j.compedu.2022.104582

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

Zusho, A., & Clayton, K. (2011). Culturalizing achievement goal theory and research. *Educational Psychologist, 46*(4), 239–260. https://doi.org/10.1080/00461520.2011.614526

Zusho, A., & King, R. (2024). Cross-cultural research on learning and teaching. In P. A. Schutz, & K. Muis (Eds.), *Handbook of educational psychology* (pp. 92–118). Routledge.

Zusho, A., & Kumar, R. (2018). Introduction to the special issue: Critical reflections and future directions in the study of race, ethnicity, and motivation. *Educational Psychologist, 53*(2), 61–63. https://doi.org/10.1080/00461520.2018.1432362

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