AMERICAN PSYCHOLOGICAL ASSOCIATION

Journal of Educational Psychology

ISSN: 0022-0663

2024, Vol. 116, No. 1, 48–75
https://doi.org/10.1037/edu0000833

Student Engagement and Its Association With Academic Achievement and Subjective Well-Being: A Systematic Review and Meta-Analysis

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The purpose of this systematic review and meta-analysis is twofold: (a) to understand how the three key student engagement dimensions (i.e., affective, behavioral, and cognitive) have been conceptualized, operationalized, and measured by researchers in the field and (b) to examine the extent to which the construct, its dimensions, and subtypes are associated with academic achievement and subjective well-being (SWB). Effect sizes and other information (e.g., engagement measures) were retrieved from 137 studies involving 158,510 participants. The systematic review showed that the three engagement dimensions could be further distinguished into seven conceptually distinct engagement subtypes. Metaregression with robust variance estimation revealed that student engagement has a large average correlation with academic achievement ($r = .33$) and SWB ($r = .35$). Upon closer inspection, academic achievement has the strongest association with behavioral engagement ($r = .39$), followed by cognitive ($r = .31$) and affective ($r = .26$) engagement. SWB, in contrast, was most closely related to affective engagement ($r = .40$), followed by cognitive ($r = .35$) and behavioral ($r = .31$) engagement. Further analyses indicated that the magnitude of these effect sizes was moderated by the ways affective, behavioral, and cognitive engagement were operationalized in the primary studies, as well as other factors like the informant source of engagement and type of achievement measure used. While the present study showed that student engagement was positively associated with desirable student outcomes, it also illustrated how student engagement is, at the current point in time, overgeneralized and in dire need of conceptual refinement.

Educational Impact and Implications Statement

The present systematic review and meta-analysis showed that student engagement has large average correlations with academic achievement and subjective well-being. However, the magnitude of the correlations was moderated not only by the type of engagement dimensions (i.e., affective, behavioral, and cognitive) but also by the ways in which these engagement dimensions were operationalized into subtypes (e.g., participatory engagement, effortful engagement). Hence, while the study of student engagement is valuable due to its positive associations with desirable student outcomes, this study shows that the construct is, at the current point in time, overgeneralized. Our findings (a) suggest that scholars should view student engagement as a metaconstruct consisting of learning activity engagement and school community engagement, with each being made up of different indicators and relating more strongly to certain student outcomes than to others, (b) provide researchers empirical insights into the conceptual issues and the ways in which the construct could be conceptually refined, and (c) inform practitioners that engagement interventions ought to pay attention to the alignment between the target engagement variables and the outcome(s) of interest.

Keywords: academic achievement, meta-analysis, student engagement, subjective well-being, systematic review

Supplemental materials: https://doi.org/10.1037/edu0000833.supp

This article was published Online First October 23, 2023.

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Note that this study was not preregistered, and it is based on Zi Yang Wong's doctoral research supervised by Gregory Arief D. Liem, with Melvin Chan and Jesus Alfonso D. Datu as members of the Thesis Advisory Committee. The authors received no funding for this research. Study materials (e.g., coding protocol) can be found in the supplemental materials, and the data used for the meta-analysis are available via the Open Science Framework: https://osf.io/z2acj/?view_only=2e2b0859893f447ebe8b2fc3a65fd1b2.

Zi Yang Wong served as lead for conceptualization, data curation, formal analysis, investigation, methodology, writing–original draft, and writing–review and editing. Gregory Arief D. Liem served as lead for supervision, contributed equally to conceptualization and methodology, and served in a supporting role for data curation, formal analysis, investigation, writing–original draft, and writing–review and editing. Melvin Chan served in a supporting role for conceptualization, investigation, methodology, supervision, writing–original draft, and writing–review and editing. Jesus Alfonso D. Datu served in a supporting role for conceptualization, investigation, methodology, supervision, writing–original draft, and writing–review and editing.

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Student engagement has been described as "the holy grail of learning" (Sinatra et al., 2015, p. 1) and as "an individual strength leading to positive youth development and well-being" (Upadyaya & Salmela-Aro, 2021, p. 362). As a key construct in educational psychology, student engagement has been well catalogued as, among others, the outward manifestation of student motivation (Skinner et al., 2009), and a predictor of a range of student outcomes. These outcomes include, but are not limited to, academic achievement, on-time graduation, and student well-being (see Kahu & Nelson, 2018; M.-T. Wang et al., 2019), to name a few. Considering the multitude of variables that are linked to the construct, the present article will focus on student engagement and its association with two of its most proximal and prominent outcomes, namely academic achievement and subjective well-being (SWB), both of which are regarded as key indicators of successful schooling (Organisation for Economic Co-operation and Development, 2017). Notably, the focus on both achievement and SWB also corroborates the goal of positive education (Seligman et al., 2009) that underscores the importance of cultivating both cognitive (achievement) and well-being (SWB) skills in students.

While most researchers share the same view about the academic and nonacademic benefits of student engagement (Christenson et al., 2012), there is surprisingly a dearth of systematic reviews or meta-analytic studies that seek to ascertain its strength of association with these purported outcomes. One likely explanation for this observation is that student engagement is not a singular construct. Instead, it is a metaconstruct covering multiple dimensions (e.g., emotional, behavioral, cognitive; Fredricks et al., 2004) that operate in varying contexts (e.g., task, classroom, school) and time scale (e.g., daily, long term; M.-T. Wang et al., 2019). In addition to its multifaceted nature, the term student engagement also carries many different meanings. Some researchers view engagement as students' psychological state of absorption during learning activities, while others may regard engagement as students' sense of school connectedness (see Wong & Liem, 2022 for a recent critical analysis). As a result, there are many inconsistencies in the way student engagement is conceptualized, operationalized, and analyzed in the literature (Azevedo, 2015). The inherent complexities and pluralities make it difficult for researchers to interpret and synthesize findings from student engagement research and reliably estimate the strength of its association with a wide range of outcome variables.

Without a clear and coherent understanding of student engagement, we question what researchers mean when they claim that student engagement is positively associated with academic achievement and SWB. Are researchers really referring to the same construct even when they use similar labels? Systematic reviews and meta-analyses can provide much needed clarity about the extent to which conceptual and operational differences influenced the pattern of results within this field of research. Additionally, they also enable us to draw definitive conclusions on whether student engagement is associated with desirable student outcomes, at least in a magnitude that is of practical significance. To our best knowledge, however, such efforts are few and far between. Thus, the present article aimed to (a) conduct a systematic review and uncover how student engagement has been conceptualized, operationalized, and measured in the literature, (b) perform a meta-analysis to examine the strength of association between student engagement and two outcomes of interest,[1] and (c) explore if the associations are consistent across various operationalizations of engagement or moderated by other factors.

Conceptualizations of Student Engagement

Student engagement has been broadly defined as "student's active participation in academic and cocurricular or school-related activities, and commitment to educational goals and learning" (Christenson et al., 2012, p. 816). Due to the breadth of this definition, there is little consensus among researchers about the meaning, boundaries, and limitations of the engagement concept (Appleton et al., 2008; Azevedo, 2015; Boekaerts, 2016; Wong & Liem, 2022). Nevertheless, owing to a collection of seminal papers published during 2003–2004 (e.g., Fredricks et al., 2004; Furlong et al., 2003), contemporary educational psychology scholars agree on one feature of student engagement, that is, student engagement is a metaconstruct consisting of three dimensions: affective, behavioral, and cognitive engagement. In this article, we focused on the student engagement research that followed this affective–behavioral–cognitive (ABC) approach—known as the tripartite model of student engagement—and examined how affective, behavioral, and cognitive engagement relate to academic achievement and SWB.

Rationale for Focusing on the Tripartite Model of Student Engagement

The key reason for our decision to focus on the tripartite model is that student engagement is, at the current point in time, overgeneralized (Azevedo, 2015). When surveying the literature, one would observe that student engagement is often used as a catch-all term that encompasses any variables that affect student school success, ranging from teacher–student relationships to contextual or learning support, and to students' enactment of school or learning-related behavioral, cognitive, motivational, affective, metacognitive, and even social processes. Considering the very broad range of possible student engagement indicators, it can be a Sisyphean task for any individual researchers to perform a meta-analysis on the topic as the data set would be too heterogeneous to be synthesized. The use of the ABC approach (Fredricks et al., 2004), in contrast, provides a means for us to systematically classify and analyze existing student engagement indicators in a practical and realistic manner while also be theoretically and conceptually grounded. Since its formulation in 2004, the tripartite model has been widely adopted by researchers from different theoretical backgrounds, such as motivation (Skinner et al., 2009) and school bonding (Furlong et al., 2003), and even so these researchers have covered a wide range of different indicators (see the Inconsistencies in the Engagement Dimensions section). Hence, the use of the tripartite model allows us to be more focused in our meta-analysis, while simultaneously enables us to explore the different ways in which researchers have used the tripartite model to conceptualize and operationalize student engagement dimensions (the online supplemental materials provide a more detailed account for the rationale).

We also recognize that there are other student engagement models, such as the student school engagement model (comprising the aspiration, belonging, and productivity dimensions; Hazel et al.,

[1] Although academic achievement and SWB are referred to as "outcomes" of student engagement, it is important to note that the present meta-analysis admitted effect sizes from correlational studies only. Therefore, the engagement–outcome associations that were examined and reported in this paper should be interpreted as correlational and not necessarily causal (see the Limitations section).

2013), that do not adhere to the ABC characterization of student engagement. With the focus on the ABC approach, studies that employed these student engagement models would be excluded. Nevertheless, many of the indicators found in these models (e.g., aspiration) are also covered in the Tripartite Model (Fredricks et al., 2004), and thus we should be able to identify a good representative of engagement indicators in spite of the exclusion. Likewise, some researchers have also built on the ABC approach and proposed the inclusion of other dimensions, such as agentic engagement that represents students' proactive participation in learning (Reeve & Tseng, 2011), or social engagement that represents students' interpersonal interactions around instructional contents (M.-T. Wang et al., 2016). As the research on these engagement dimensions is still relatively new and few, we focused on the more established ABC dimensions and analyzed these emerging dimensions only if four or more related studies[2] were retrieved in the systematic review.

Inconsistencies in the Engagement Dimensions

Affective engagement (or emotional engagement) has been defined as students' affective reactions to academic work, classmates, teachers, and school (Fredricks et al., 2004). Depending on their research focus, researchers have assessed affective engagement in various ways, such as interest and enjoyment in classroom learning (Reeve & Tseng, 2011), relationships with teachers and peers (Appleton et al., 2006), or school identification and value (Finn & Zimmer, 2012). Behavioral engagement, in contrast, is concerned with students' participation in school-related academic, social, and extracurricular activities. It includes students' school conduct and compliance (Fredricks et al., 2005), exhibition of effort and persistence in schoolwork (Skinner et al., 2009), or involvement in extracurricular activities (Lam et al., 2014). Finally, cognitive engagement represents students' inner psychological quality and investment in learning that encompass the use of cognitive and metacognitive strategies (Reeve & Tseng, 2011), mental effort (M.-T. Wang et al., 2018), or cognitive and motivation orientation toward school and learning (e.g., goals and aspirations; Appleton et al., 2006).

Each engagement dimension, as illustrated above, could be conceptualized or operationalized differently, resulting in different engagement subtypes—an issue known as the jingle fallacy (Reschly & Christenson, 2012; Wong & Liem, 2022). In addition, the same indicator could also be classified under different engagement dimensions by different researchers. For example, there is a debate over whether "effort" should be classified into behavioral or cognitive engagement (Eccles, 2016). In view of the inconsistencies between and within each student engagement dimension, the present article (a) used a bottom-up approach to explore how extant studies conceptualized, operationalized, and measured affective, behavioral, and cognitive engagement (i.e., the engagement indicators measured and how they were classified into the ABC dimensions), and (b) conducted separate meta-analyses for the affective, behavioral, and cognitive engagement dimensions so as to gain a more robust and nuanced understanding of how each engagement dimension and its subtypes are associated with academic achievement and SWB.

Student Engagement and Academic Achievement

Academic achievement refers to a wide array of outcomes that indicate the extent to which a student has accomplished the learning goals of a school curriculum (Steinmayr et al., 2014). It is a multifaceted construct that comprises different subject areas (e.g., math, science) and domains of learning (e.g., cognitive, affective, psychomotor). It may also encompass student attainment (i.e., achievement at a time point) or improvement (i.e., change in performance; see Guskey, 2013). As academic achievement could cover a broad range of educational outcomes and indicators, the present article focused on students' attainment on measures of academic knowledge as reflected in school grades or scores on standardized tests (Bowers, 2011).

Past studies have shown that academic achievement was associated with various short- and long-term outcomes, ranging from academic self-concept (Huang, 2011) to one's future economic attainment (Watt, 2020). Considering its importance, many education researchers, policymakers, and practitioners have sought to identify key predictors of academic achievement. One promising candidate is student engagement. Since student engagement represents the quality of students' interaction with the source or context of learning (e.g., learning activities, school; Skinner et al., 2009), researchers have positioned the construct as a direct or proximal precursor of academic achievement. This is illustrated in several student engagement models, such as the conceptual framework of engagement, antecedents, and consequences (Kahu & Nelson, 2018) and the more recent development-in-sociocultural-context model for children's engagement in learning (M.-T. Wang et al., 2019). In each of these models, academic achievement is theorized as the key outcome of student engagement.

However, to what extent is student engagement associated with academic achievement? To our best knowledge, there are two meta-analytic studies that have sought to answer this question. First, Roorda et al. (2017) conducted a meta-analysis to investigate if student engagement would mediate the association between teacher–student relationship and academic achievement. In their meta-analysis, studies that measured engagement as feelings or reactions to teachers and classmates (an aspect of emotional engagement) were excluded due to a conceptual overlap with teacher–student relationship. Studies that measured engagement as extracurricular participation (an aspect of behavioral engagement) were also omitted because this participation is not directly related to academic learning. A total of 189 studies involving 249,198 primary and secondary school participants were retained. After the synthesis of relevant effect sizes, Roorda et al. reported that engagement has a positive medium association with academic achievement ($r = .28$), and the effect size remained significant even after controlling for teacher–student relationship ($\beta = .24$).

In the other meta-analysis, Lei et al. (2018) examined the bivariate relationship between student engagement and academic achievement among first- to 12th-grade students. Unlike Roorda et al. (2017), Lei and colleagues sought to identify not only the overall association of engagement, but also the separate associations of affective, behavioral, and cognitive engagement with outcomes. Due to their study's scope, studies that did not subscribe to the tripartite model of student engagement were excluded during their literature search. A total of 69 independent studies involving 196,473 participants were retained in

[2] There is no universally accepted optimal minimum number of studies to conduct a meta-regression. Nevertheless, meta-analysts typically recommended at least four (Fu et al., 2011) to 10 (Tanner-Smith & Tipton, 2014) studies.

their meta-analysis. Consistent with Roorda et al.'s (2017) results, academic achievement was found to have a positive medium association with overall engagement ($r = .27$). It strongly correlated with behavioral engagement ($r = .35$), followed by cognitive ($r = .25$) and affective ($r = .22$) engagement.

Both Roorda et al.'s (2017) and Lei et al.'s (2018) meta-analyses support the widely claimed engagement–achievement association. However, they share two limitations, one statistical and the other conceptual in nature. On the statistical aspect, the two meta-analyses handled the issue of effect size dependency (i.e., having multiple effect sizes per study) via the averaging approach, whereby all relevant correlations were averaged to obtain a single effect size per study. While this is an efficient and simple approach, Moeyaert et al. (2017) cautioned that the averaging method tends to result in an increased risk of Type II error. Consequently, the use of other meta-analytic approaches like robust variance estimation (RVE) is advocated as they allow the inclusion of multiple effect sizes per study and are less susceptible to biases in their estimates. As for the conceptual limitation, both studies did not account for the complexity of student engagement. Although many researchers adopt the tripartite model (Fredricks et al., 2004), they disagree on what each dimension denotes. Such disagreements could affect how investigators operationalized engagement and in turn affect engagement's association with academic achievement.

To address these research gaps, the present meta-analysis (a) employed the RVE approach to identify the magnitude of the correlation between each engagement dimension and academic achievement, and (b) explored how different operationalizations of affective, behavioral, and cognitive engagement (i.e., what we call the "engagement subtypes" in this article) would relate to academic achievement and SWB.

Student Engagement and SWB

In addition to academic achievement, many scholars contend that student engagement promotes well-being (Kahu & Nelson, 2018; Upadyaya & Salmela-Aro, 2013). There are generally two approaches to the study of well-being, namely subjective (hedonic) and psychological (eudaimonic) well-being (see, e.g., Deci & Ryan, 2008). SWB, which focuses on the pursuit of pleasure or happiness, involves individuals' cognitive (i.e., life satisfaction) and affective (i.e., positive and negative affect) evaluation of their life (Diener, 1984). Psychological well-being, in contrast, is concerned with the fulfilment of human potential and positive functioning and includes such aspects as autonomy, self-acceptance, and purpose in life (Ryff, 1989; see Deci & Ryan, 2008 for other perspectives in psychological well-being). In this article, we only focused on SWB because (a) there are only a limited number of studies that investigated the correlation between student engagement and psychological well-being, and (b) young students, especially those at the primary school age, are more likely to define well-being in hedonic than eudaimonic terms (López-Pérez et al., 2016).

Engaged students are more likely to work hard and succeed in school (Upadyaya & Salmela-Aro, 2013), and since school is a significant part of students' lives, the positive school experience would result in higher levels of life satisfaction and enjoyment as well as lower levels of depression or negative emotions in students (Y. Li & Lerner, 2011). This is supported by a two-wave longitudinal study conducted by Datu and King (2018), who performed a cross-lagged panel analysis and found that T1 academic engagement significantly predicted all T2 SWB indicators, even after controlling for T1 SWB indicators. While this study demonstrated that engagement does predict SWB, little is known about how different dimensions of student engagement relate to SWB. Moreover, there was not any meta-analytic review that addresses this topic of interest. Hence, the present study also conducted a meta-analysis to explore the strength of the associations that student engagement dimensions (and subtypes) have with SWB.

Other Potential Moderators

No two studies are the same, and there is often variation in study outcomes due to various systematic or nonsystematic factors. In this meta-analysis, we explored whether the strength of the associations would vary as a function of publication bias and other theoretical or methodological moderators.

Publication Bias

Publication bias is a type of dissemination bias that describes the condition in which "the published literature is systematically unrepresentative of the population of completed studies" (Rothstein et al., 2005, p. 1). It usually stems from researchers' inclination to report, and journal editors' tendencies to favor, studies with statistically significant results over those with null findings. The issue of publication bias is well documented in various fields of scientific inquiries, including those in the educational and psychological sciences. Research has shown that published studies in education and psychology journals yielded a mean effect size that ranged from .18 (Polanin et al., 2016) to .64 (Chow & Ekholm, 2018) *SD*s larger than unpublished studies. To minimize and account for potential publication bias, the Campbell Collaboration (Kugley et al., 2017) has recommended systematic reviewers and meta-analysts to incorporate unpublished grey literature (e.g., student dissertations) in their literature search and compare the effect sizes of published and unpublished studies. Furthermore, meta-analysts have proposed a variety of statistical methods for detecting publication bias, and we have used one of these modern techniques (i.e., Egger sandwich test; Rodgers & Pustejovsky, 2021) in our meta-analysis (see Detecting Publication Bias section).

Theoretical Moderators

Theoretical moderators examine how differences in the conceptualization and operationalization of the same construct, or how certain theoretically derived factors, could moderate the strength of associations between variables. The ways in which student engagement was operationalized in the primary studies is one of the key theoretical moderators in this meta-analysis. For other theoretical moderators, we draw on Bronfenbrenner's bioecological theory (Bronfenbrenner & Morris, 1998; see also Skinner et al., 2022; M.-T. Wang et al., 2019), which maintains that person-, context-, and time-related factors interact to shape students' academic functioning, and the proximal processes that encapsulate the person–environment interactions (e.g., teacher–student interactions) are the primary drivers of student development. Based on this model, the present meta-analysis explored whether the geographical region where the students reside (context), student age (time), and gender (person) would moderate the engagement–outcome associations.

Engagement Dimensions and Subtypes. Much of the student engagement literature has been guided by the self-system model of motivational development (SSMMD; Connell & Wellborn, 1991; Skinner et al., 2008), which posits that contextual factors (e.g., teachers' motivating styles) shape students' internalized perceptions on autonomy, competence, and relatedness. These internalized perceptions, in turn, alter the emotional and cognitive states that energize actions, and it is the energized actions that are necessary for learning to take place. Using the SSMMD, scholars (e.g., Reeve et al., 2020; Reschly & Christenson, 2012) have argued that the internal forms of engagement (i.e., affective and cognitive engagement) are drivers or precursors of external engagement (i.e., behavioral engagement), and thus would have a more distal link with learning outcomes. Aligned with this perspective, we hypothesize that achievement would correlate more strongly with behavioral engagement than affective and cognitive engagement. On the contrary, SWB is an affective–cognitive construct that depicts a person's internal experience of wellness (Diener, 1984), and it is facilitated by the satisfaction of one's autonomy, competence, and relatedness needs (see self-determination theory; Deci & Ryan, 2000). Since SWB is an internal state of being, there are grounds to predict that it would correlate more strongly with affective and cognitive engagement than behavioral engagement.

Aside from the engagement dimensions, the ways in which each type of engagement dimension was operationalized could also moderate the strength of the engagement–outcome correlations. This is supported by Hughes et al. (2008) who examined two forms of behavioral engagement—effort and conduct. They revealed that effort was more predictive of achievement than conduct. Similarly, Kahraman (2014) has also observed how fourth- and eighth-grade students' affective engagement correlated more strongly with their science achievement when it was operationalized as liking science ($r_s = .21$–$.28$) than school belonging ($r_s = .03$–$.13$). In the earlier section, we noted that there are many potential engagement subtypes given the wide array of engagement indicators documented in the literature. Some of these indicators or subtypes concern students' active involvement in academic activities (e.g., effort, academic emotions), while others are more concerned with students' participation in social norms and interactions (e.g., conduct, relationships; M.-T. Wang & Hofkens, 2020). Therefore, this meta-analysis examined whether academic-oriented engagement subtypes would be more related to academic achievement, whereas social-oriented engagement subtypes would be more related to SWB.

Geographical Region. According to the conceptual framework of engagement, antecedents, and consequences (Kahu & Nelson, 2018), student engagement processes could differ between geographical regions due to sociocultural factors (e.g., see also Lam et al., 2016). To illustrate, Asians live in a collectivist culture where conformity and hard work (behavioral engagement) and interpersonal harmony and pursuit of group goals (emotional engagement) are highly valued (Triandis & Gelfand, 2012). Certain Asian cultures rooted in Confucian traditions (J. Li, 2003) also emphasize the importance of education and deep understanding in the learning process (cognitive engagement). Notably, these cultural beliefs, values, and virtues promote certain forms of engagement, and this could strengthen the links between student engagement and outcomes in Asian contexts. This conjecture was partially supported by Lei et al.'s (2018) meta-analysis showing that while the correlation between behavioral engagement and academic achievement was higher in Western contexts (i.e., Europe and North America), the correlations for emotional and cognitive engagement were higher in Eastern contexts (i.e., Asia). The present study thus sought to verify if the strength of the engagement–outcome associations would be stronger in Asian than Western contexts.

Student Age. Past studies have shown that student engagement (M.-T. Wang & Eccles, 2012), academic achievement (Wijsman et al., 2016), and SWB (González-Carrasco et al., 2017) progressively decrease over time. While age seems to be negatively associated with each of these variables of interest, it could also potentially moderate the correlations between these variables via changes in the school environment (e.g., school transitions) or changes within the student (e.g., developmental maturation) that accompany increases in age. Pintrich and Zusho (2002, p. 261), for example, noted that "active control of cognition may be a rather late-developing phenomenon." From this perspective, it is possible for cognitive engagement (cognitive and metacognitive strategies) to have a stronger influence on achievement in older students. This is because students will gain more metacognitive knowledge and develop better executive functions with age, and the developmental changes could in turn translate to better outcomes. Thus far, the meta-analysis conducted by Roorda et al. (2017) indicated that the correlation between overall engagement and academic achievement was almost the same for primary ($r = .28$) and secondary ($r = .29$) school students. Building on this finding, the present study explored whether student age would positively moderate the strength of associations between specific dimensions of student engagement and academic achievement or SWB.

Student Gender. It is well documented that boys tend to be less academically engaged than girls (Furrer & Skinner, 2003; Lam et al., 2012). However, does gender moderate the associations between student engagement and the outcome correlates? The interests as identity regulation model (see Kessels et al., 2014) suggests that the social and personalized meanings that students attach to their gender identity could lead to gender differences in student engagement. Many students view school and learning as being more of a feminine than masculine characteristic (Heyder & Kessels, 2013). Thus, if a male student perceived school and learning to be in conflict with their masculine gender identity, their engagement could be lowered and its role in educational outcomes could be undermined. Lei et al.'s (2018) meta-analysis partially supported this view as they revealed that larger proportion of male participants in the samples resulted in lower associations between achievement and overall, emotional, and cognitive engagement. Lam et al. (2012), however, did not find a significant interaction between gender and student engagement in predicting academic performance. In view of these inconsistent findings, the present article sought to ascertain if having higher percentage of male participants in a study sample would be linked to weaker engagement–outcome associations.

Social Identities and Backgrounds. Aside from gender, other student characteristics, such as race and ethnicity and socioeconomic status (SES), could also potentially moderate the strength of engagement–outcome associations. This is because a student's social identities and resources could shape how he or she interprets and engages in school-related activities (e.g., see Verkuyten et al., 2019; Yan & Gai, 2022). However, given that such information is not always reported in primary studies, the present article only explored the moderating role of race and ethnicity (i.e., percentage of racial and ethnic minorities) and SES (i.e., percentage of students from low SES backgrounds or receiving free or reduced lunch) on a subset of studies from the United States (see the online supplemental materials).

Methodological Moderators

Methodological moderators examine how measures or study design related factors could play a role in the strength of associations between variables. For measures, the present meta-analysis examined the moderating role of informant sources and subject specificity of engagement measures, subject domain and type of achievement measures, and the components and domains of SWB measures. For study design, we looked at the time lag in measurement.

Informant Sources of Engagement Measures. Student engagement is commonly measured via self-reports or teacher reports (Fredricks & McColskey, 2012). Lei et al. (2018) and other researchers (e.g., Furrer & Skinner, 2003; M.-T. Wang et al., 2016) observed that teacher-reported engagement correlated more strongly with academic achievement than did students' self-reported engagement. One possible explanation suggests that teachers' judgement of student engagement was often influenced by their perception of the individual students' academic prowess. This is supported by Kaiser et al. (2013) who showed that students' achievement significantly predicted teachers' judgement of their engagement level, and the effects persisted even after students' self-reported engagement, SES, and gender were controlled for. The results suggest that teachers' ratings of student engagement are often biased by students' prior academic achievement, and this could possibly strengthen the magnitude of the associations between teacher-reported engagement and subsequent academic achievement.

Subject Domains. Studies rarely compare the correlations of subject-specific and domain general engagement measures. Nevertheless, research in the motivation literature has shown that the associations of some constructs (e.g., social power goals) were generalizable across subjects, whereas others (e.g., effort goals) operated in a more subject specific manner (Green et al., 2007; Magson et al., 2013). It is therefore worth exploring whether general or subject-specific measures of engagement would differ in the magnitude of observed correlations. Likewise, the subject domain of academic achievement measures could also be another potential moderator. Each subject domain is distinct. This article mainly focused on math, science, language, and humanities subjects because, unlike other subjects such as visual arts and physical education (PE), they are more related to the academic knowledge dimension of academic achievement (Bowers, 2011). One could argue that math and science are qualitatively different from language and humanities subjects as the former involve more logical reasoning and problem solving with concrete solutions. Past meta-analyses (Dent & Koenka, 2016; Kriegbaum et al., 2018) have reported that the association between academic achievement and other constructs (e.g., value, cognitive strategies) differed across these subject domains. Therefore, there is reasonable ground to examine if subject domains would too moderate the associations between different engagement dimensions (and subtypes) and achievement in this meta-analysis.

Types of Achievement Measures. Academic achievement is often operationalized via school grades (e.g., grade point average [GPA]) or scores obtained on standardized achievement tests, such as the Woodcock–Johnson III Tests of Achievement (Woodcock et al., 2001). As both achievement indicators are designed to assess students' academic knowledge, there is a "tendency to assume that a grade average and a test score are, in some sense, mutual surrogates" (Willingham et al., 2002, p. 2). The two types of achievement measures, however, differ in the content areas and the kinds of competencies that they assess. Standardized tests cover skills and knowledge acquired both in and outside of formal instruction, and performance in such tests are largely determined by students' general cognitive abilities (Duckworth et al., 2012). School grades, in contrast, are obtained from school-based assessments that may vary depending on school curricular standards, time, and school resources. Hence, students' ability to exert self-control tends to have a greater influence on their school grades. Some studies found that student engagement was more strongly correlated with school grades than standardized test performances (e.g., Heffner & Antaramian, 2016). To ascertain the generalizability of this finding, the present meta-analysis examined if engagement would have a stronger association with student-reported or other-reported school grades (i.e., school grades reported by teachers or retrieved from school records) than with standardized test scores.

Components and Domains of SWB. SWB comprises three components, namely life satisfaction, positive affect, and negative affect (Diener, 1984). Chen et al. (2013) reported that while they share sufficient covariance to form a higher order or general factor, the three components of SWB, especially negative affect, are still fairly distinct from one another. This is corroborated by Datu and King (2018) who observed that student engagement was highly correlated with students' life satisfaction and positive affect, but only weakly correlated with negative affect. Therefore, it is worth investigating if student engagement would indeed correlate more strongly with life satisfaction and positive affect than with negative affect. Besides its components, SWB may also concern one's cognitive and affective evaluation of their life in general or a specific life domain, such as school, family, friends, living environment, or self domains (Huebner et al., 1998; Tian et al., 2015). Given that student engagement relates to students' active involvement in school or learning, it is likely that student engagement would be more strongly associated with SWB in the school domain.

Time Lag in Measurement. Time lag in measurement represents the time difference between the measurement of student engagement and that of the outcome variable. While some studies measured engagement and outcome (e.g., self-reported grades) concurrently (e.g., Z. Wang et al., 2014), others had the measurements taken years apart (e.g., first-grade engagement and eighth-grade achievement; Ladd & Dinella, 2009). In view of the variability, two strategies were adopted here. First, we focused on studies in which the measurements were no more than two years apart. This is because "students' engagement is formed in transaction with the context in which they study and learn" (Pöysä et al., 2018, p. 65), and a time lag of more than 2 years might be too large to capture the dynamic processes between certain engagement indicators (e.g., emotional states) and proximal outcomes like achievement and well-being. Second, given that there are often ambiguities in the time period when the data were measured or obtained, the present article compared two broad types of effect sizes: (a) same-year associations, where student engagement and outcome were measured in the same academic year and (b) different-year associations, where the outcome was measured in a different academic year after the measurement of student engagement.

Present Study

Taken together, the present study seeks to (a) systematically examine how each engagement dimension (i.e., affective, behavioral, and cognitive) has been conceptualized, operationalized, and measured by researchers, and (b) ascertain the widely proclaimed positive association between student engagement and academic achievement or SWB and, building

upon prior meta-analyses, examine the associations that engagement dimensions and their respective subtypes have with the two outcomes of interest. In view of these purposes, this systematic and meta-analytic review aimed to address the following research questions (RQs):

Research Question 1 (RQ1): How are affective, behavioral, and cognitive engagement conceptualized, operationalized, and measured in the extant literature?

Research Question 2 (RQ2): To what extent are affective, behavioral, and cognitive dimensions of engagement associated with academic achievement and SWB?

RQ2a: To what extent is affective engagement related to academic achievement?
RQ2b: To what extent is behavioral engagement related to academic achievement?
RQ2c: To what extent is cognitive engagement related to academic achievement?
RQ2d: To what extent is affective engagement related to SWB?
RQ2e: To what extent is behavioral engagement related to SWB?
RQ2f: To what extent is cognitive engagement related to SWB?

Research Question 3 (RQ3): Are these associations dependent on the ways in which engagement has been operationalized, and on other potential moderators (e.g., age)?

To answer these questions, we (a) conducted a systematic search of and review on published (i.e., journal papers) and unpublished (e.g., student dissertations) quantitative studies that examined the relationships between student engagement and the two outcomes of interest; (b) scrutinized the student engagement measures that were used in these studies to identify the different ways in which affective, behavioral, and cognitive engagement dimensions have been conceptualized and operationalized; (c) synthesized the data retrieved from the systematic review and uncover the strength of the associations between each student engagement dimension and academic achievement and SWB; and (d) performed moderation analyses to examine if the strength of the associations between student engagement and outcomes are contingent on the dimension of engagement, subtypes of engagement, and other moderators. Together, the present study is expected to clarify the current conceptualization of the student engagement construct and to provide nuanced analyses of the construct and its relationships with achievement and well-being, both of which help establish the empirical foundation to promoting achievement and well-being through fostering student engagement.

Method

Literature Search

Four databases were used in the literature search: PsycINFO (via EBSCOhost), Education Resources Information Center (via EBSCOhost), Education Database (via ProQuest), and Web of Science. Between August and September 2020, we conducted two sets of searches in each of the four databases. The first search sought to retrieve publications on student engagement and academic achievement, while the second search sought to retrieve publications on student engagement and SWB. Given that the engagement construct comes in different labels (e.g., student engagement, school engagement), we avoided using too specific search terms to increase the sensitivity of the literature search. The following search terms and Boolean operators were used:

- First search—"engagement" AND ("achievement" OR "performance")
- Second search—"engagement" AND ("well-being" OR "life satisfaction" OR "positive affect" OR "negative affect" OR "happiness")

Searches were limited by abstract, year of publication (2003–2019), language (English), and document types (academic journals, reports, dissertations/theses, conference proceedings, book chapters, and early access). To elaborate on the delimiter choices, searches were limited by abstract because the term "engagement" is often used in a nonscholarly or broad manner in the main text of articles. Hence, without the delimiter, there will be an exceedingly high volume of search returns, resulting in a significant decrease in search precision. Searches were also limited to literature that was published from 2003 because this was when researchers began to recognize the tripartite model (Fredricks et al., 2004; Furlong et al., 2003). Finally, since this meta-analysis aimed to compare the effect sizes that were reported in published and unpublished studies, the search accepted research publications of various document types.

The first search yielded a total of 21,390 articles across the four databases, and the second search yielded a total of 7,581 articles. In other words, a grand total of 28,971 articles were retrieved. Among these articles, we identified 10,677 duplicate records, and upon removal, 18,294 articles were admitted for abstract and full-text screening using the PRISMA guideline (see Figure 1; Moher et al., 2009).

Eligibility Criteria

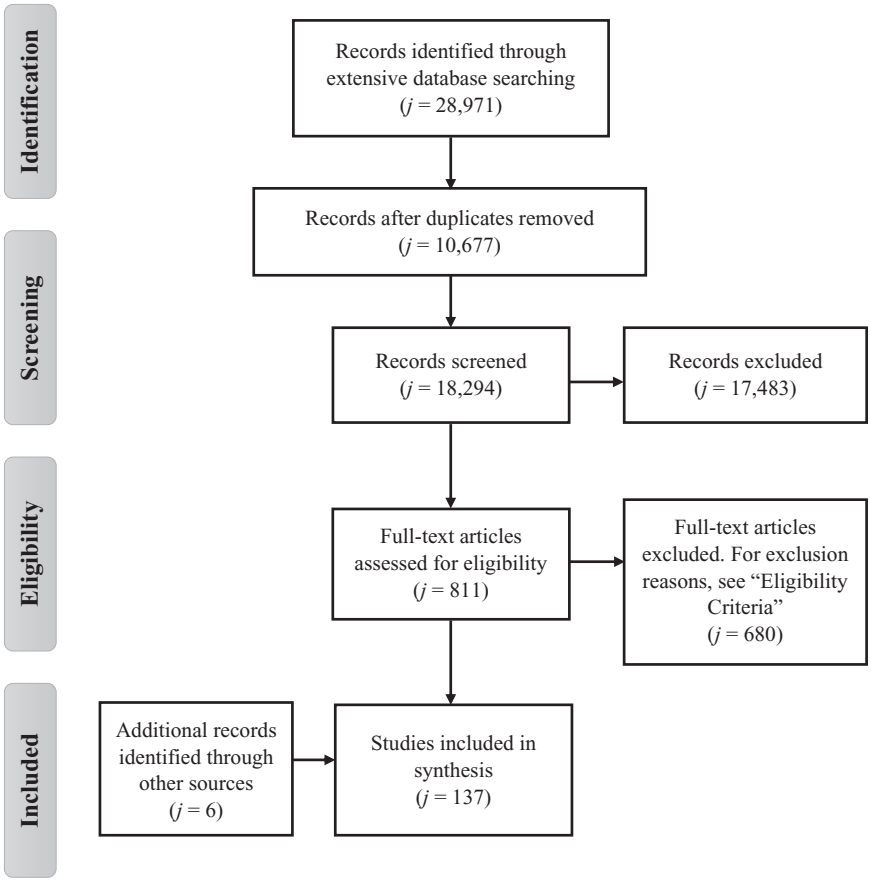
To control for publication bias, the present study included not only peer-reviewed journal articles, but also grey literature such as theses/dissertations, book chapters, and conference proceedings, as long as the following criteria for inclusion/exclusion are fulfilled:

1. Participant characteristics: Participants were students enrolled in the K-12[3] education. Studies that focused on students with medical conditions were excluded.
2. Context of engagement: Studies were conducted in authentic learning or school context. Studies that were conducted in laboratory setting or online contexts were excluded.
3. Subject domain: Studies that were conducted in math, science, language, humanities, or general subject domains were included. Those in visual arts, music, and PE were excluded because the nature of the engagement and achievement constructs in these domains differs from that in the curricular subjects that largely center on academic knowledge in their learning/instructional objectives (Bowers, 2011). For instance, in PE, researchers might be interested in exertion of physical effort (e.g., "how often did you exercise hard enough to start sweating?") and fitness performance (e.g., motor skills), in contrast to cognitive effort and test

[3] Note that prior to the execution of our meta-analysis, the range was restricted to third to 12th grade (see the Results section).

Figure 1

PRISMA Flow Diagram of the Literature Search Process



performance in classroom settings (see Hastie et al., 2022 for a review of the engagement concept in PE). These studies were thus omitted such that our meta-analysis is more conceptually focused and operationally targeted.

4. Intervention studies: To ensure the ecological validity of findings, intervention studies (e.g., flipped classroom) were excluded as different intervention might have differential impact on different engagement indicators (e.g., school belonging, academic emotions), achievement, SWB, or the associations among these variables of interest.
5. Conceptualization and measurement of student engagement: Only papers that defined, labeled, and measured engagement using the ABC approach (Fredricks et al., 2004) were admitted. Studies were excluded if: (a) The engagement construct was broad and unclear; (b) the engagement measure overlapped with the outcome measure; and (c) engagement was measured at the class instead of individual level.
6. Dimensions of student engagement: Studies that examined at least one of the three key engagement dimensions (i.e., affective, behavioral, cognitive) were admitted. Note that other non-ABC dimensions (e.g., agentic) found in these studies were included in the meta-analysis if it fulfilled the minimum-number-of-study requirement ($j \geq 4$; see below). Importantly, to understand how each engagement dimension was operationalized and associated with the outcome correlates, studies were excluded if they did not analyze engagement dimensions individually (e.g., combining two or more engagement dimensions to form a single composite or latent variable in their analyses). Given that each engagement dimension has been operationalized inconsistently in the literature (Wong & Liem, 2022), the constituents of each overall engagement construct would be different from study to study—its meaning would differ depending on the number of engagement dimensions that was included in the composite or latent variable and how each engagement dimension was operationalized across studies. Therefore, considering the interpretability of research findings, we avoided including these effect sizes as there is not an adequate way to disentangle them in moderation analysis.
7. Conceptualization and measurement of outcome variables: At least one outcome of interest was measured. Indicators of SWB include life satisfaction, positive affect, negative affect, and happiness (Diener, 1984). Indicators of academic achievement include teacher ratings of achievement, school grades, or standardized test scores. Studies that operationalized achievement as growth scores were excluded due to our focus on attainment rather than improvement. Outcome variables should be measured either concurrently with, or at a later time point that does not exceed two years after, engagement.

8. Effect size: Studies must provide the bivariate Pearson correlation (r) between (at least) one dimension of student engagement and an outcome correlate of interest.
9. Nonduplicated data: Data sets should not overlap or be reused across studies. In cases of duplication, priority was given to studies with a larger sample size and/or with more relevant information.

Using the abovementioned criteria, we first screened the titles and abstracts of the 18,294 articles for relevancy and removed 17,483 records. Subsequently, we conducted a full-text screening and removed an additional 693 records, which resulted in a total of 118 articles. The most common reasons for exclusion were a lack of bivariate correlation reporting, non-K-12 samples, an absence of analysis between individual dimensions of student engagement and outcome, and reuse of samples across studies. Additionally, we contacted 51 authors whose published studies did not provide the relevant bivariate correlations. Nine of them responded with the requested information, leading to the reinclusion of 13 other articles.

After the screening process, two additional search strategies were employed. First, we reviewed past student engagement papers, including the reference list of Roorda et al.'s (2017) meta-analysis, to ensure that no other studies were overlooked. Through this strategy, we identified six eligible articles not captured in our initial literature search. Second, we used a direct-contact strategy to increase the likelihood of acquiring previously undetected unpublished studies. An email was sent to 30 scholars who are either experts in the field of student engagement or have recently published papers on the topic of interest. Seven responded to the email request for unpublished studies and among them, two provided references of dissertations and conference papers. Unfortunately, the papers either have already been included in our meta-analysis or did not fulfil the inclusion criteria.

This led to a final sample of 137 papers that involved 158,510 participants in total (see Table S1 in the online supplemental materials). Most of these papers are journal articles ($j = 108$), followed by student dissertations ($j = 25$), conference papers ($j = 3$), and book chapter ($j = 1$). Most of the studies were conducted in the North America ($j = 73$), followed by Europe or Australia ($j = 41$), Asia ($j = 21$), and in multiple countries ($j = 2$).

Coding Procedure

A two-step coding procedure was carried out. We began the first step by reading through all the 137 papers to gain insights into the general characteristics of the primary studies. In the process, information about the student engagement instruments that were employed in these studies were extracted, and we used the information to devise a classification scheme that outlines the different subtypes of engagement within each type of engagement dimension. The second step involved using a detailed coding protocol (see Table S2 in the online supplemental materials) to extract the relevant data from the primary studies for meta-analysis. Note that some of the studies that were included due to their focus on one or more of the three key engagement dimensions also examined agentic ($j = 7$) and social ($j = 1$) engagement. As there are sufficient studies ($j \geq 4$) on agentic engagement to perform metaregression (Fu et al., 2011), we coded agentic engagement as the fourth dimension and included the relevant effect sizes for the meta-analysis. The coding of engagement subtypes was based on the classification scheme that was developed in Step 1 and the measures that were used in the primary studies. In the scenario where a measure contained items from two or more engagement subtypes, the classification was determined by the item distribution of the measure (i.e., whether the items in the measure were predominantly more pertinent to one of the subtypes), or by sample items and scale description provided in the primary study if the full information of the measure was not available.

Categorical moderators were dummy-coded. To ensure the reliability of coding, the first author coded all studies twice, with a 1-month break between the two coding sessions. The intracoder agreement rate was found to range from 93% to 100%. To further ensure the accuracy of the coding, the second author independently coded 30 studies and the coding by the second author was in full agreement (100% agreement rate) with those made by the first author. To deal with missing moderator data, we employed the infer strategy, which involves making an educated inference on a piece of missing moderator datum based on other available information in a study (e.g., using grade levels to infer average age of students if the latter information was not available; Pigott & Polanin, 2020). Using a detailed coding protocol, we were able to fill in most of the missing or unclear moderator information via the infer strategy. Only a small number of studies (≤ 7) have missing information on gender. Therefore, complete case analysis (i.e., listwise deletion) was used when there were missing moderator data.

Preparation of Effect Size

All bivariate correlations (r_s) between an engagement dimension and an outcome correlate of interest were extracted. Prior to conducting our meta-analysis, the direction of some effect sizes was reversed if the study measured disengagement instead of engagement or measured negative affect instead of positive affect (for SWB studies). This is to ensure that the extracted effect sizes represent the correlation between positive engagement and achievement or positive SWB. Notably, some researchers have argued that engagement and disengagement are distinct constructs (Jang et al., 2016). However, we decided to combine them in our main analysis because (a) only a small number of the included studies ($j = 8$) analyzed disengagement as a distinct dimension, (b) these disengagement studies were heterogeneous in terms of the types of disengagement dimension that were measured and other factors like the type of achievement measure used, and (c) many of the other included studies used engagement measures that contained varying numbers of engagement and disengagement items, with the latter reversed-coded. Nevertheless, we conducted a supplementary analysis on a subset of disengagement studies to gain preliminary insights on how disengagement relates to achievement.

To acquire an accurate estimate of the relationship between engagement and academic achievement or SWB, effect sizes were corrected for unreliability of survey measures (Hunter & Schmidt, 2004). The artifact correction was accomplished through various steps. First, reliability coefficients (e.g., Cronbach's α) of the engagement and SWB survey measures that were used in the primary studies were obtained from the papers. For academic achievement variables, their reliabilities were indicated as $\alpha = 1.00$. Next, the artifact correction value (a) for each effect size was calculated using Equation 1, where r_{xx} represents the reliability coefficient of the engagement measure and r_{yy} represents the reliability coefficient of the outcome measure. Finally, the adjusted effect size was

calculated using Equation 2. This formulation is akin to estimating the correlation between two latent variables in structural equation modelling (Wiernik & Dahlke, 2020). Correspondingly, artifact correction was not performed if the effect size was already a latent correlation, as unreliability would have been corrected for (Card, 2012).

$$a = \sqrt{r_{xx} r_{yy}}. \quad (1)$$

$$r_{\text{adjusted}} = \frac{r_{\text{observed}}}{a}. \quad (2)$$

After correcting for the methodological artifacts, all adjusted correlation coefficients were then converted to the Fisher's z scale, and the variance of the Fisher's z was also calculated and used in the synthesis. The correlation coefficient was transformed to Fisher's z because the sampling distribution of r around a given population ρ is skewed, whereas the sampling distribution of Z_r around its population is symmetrical (Card, 2012). Furthermore, the variance of the correlation coefficient depends strongly on the correlation value itself, whereas the variance of the Fisher's z depends only on the sample size. As Z_r is less easily interpretable than r, we converted the synthesized Z_r back into r after the meta-analysis.

Data Analysis Plan

There were three parts to the data analysis. First, we conducted a descriptive analysis on the student engagement measures that were used in the 137 primary studies. Through these measures, we identified and summarized the different affective, behavioral, and cognitive engagement subtypes and developed an engagement classification scheme for the subsequent meta-analysis.

Second, a random-effect metaregression model with RVE, accompanied with small sample adjustment (Tanner-Smith et al., 2016), was used to estimate the magnitude of associations between student engagement and the correlates of interest. This is because it is common for student engagement studies to provide multiple relevant yet statistically dependent effect sizes, and the RVE method permits the inclusion of multiple statistically dependent effect sizes to acquire unbiased parameter estimates (Tanner-Smith et al., 2016). In the RVE analysis, correlated effects weights were chosen as the method of weighting, and the average intercorrelation across the observed effect sizes within a study was assumed to be .80. Note that a small number of the included studies reported effect sizes for two or more independent samples. Since the correlated effects model assume that the effect sizes within the same study are based on the same participant sample, a unique study identifier (see Tanner-Smith & Tipton, 2014) was assigned to each of the independent samples within the same study for the purpose of the RVE analysis. Following the reference points provided by Hattie (2009), effect size of $r = .10$ is considered to be small, $r = .20$ to be moderate, and $r = .30$. to be large.

Third, we performed moderation analyses using the mixed-effects RVE metaregression model to explain the effect size variability. Previous meta-analyses often explored the effects of moderators using meta-analytic approaches that are analogous to one-way analysis of variance (ANOVA) or simple regression. Nevertheless, Pigott and Polanin (2020, p. 36) asserted that the "best practice in all statistical modeling is to use multiple moderators in a single model to reduce difficulties caused by confounding moderators." Therefore, the present meta-analysis conducted not only univariate but also multivariate moderation tests where all moderators were entered in the same model. In the univariate moderation tests, both between- and within-study effects of the moderators were examined (Tanner-Smith et al., 2016), unless the moderator (e.g., publication status) lacks between-study variability. The purpose is to ensure that the between- and within-study effects of the moderators are consistent in both magnitude and/or direction. To prevent overfitting of regression model, we only used the between-study version of the moderator in the multivariate moderation analyses. Within-study effects were only examined in the multivariate model when the moderator (a) lacks between-study variability or (b) shows dissimilar between- and within-study effects in the univariate tests.

Detecting Publication Bias

To detect publication bias, the present meta-analysis compared the effect sizes of published and unpublished studies via moderation analyses. However, as only a small number of unpublished studies met the inclusion criteria, we also carried out a publication bias test known as the Egger sandwich test, a metaregression RVE-based variant of the traditional Egger's regression test (Rodgers & Pustejovsky, 2021). We performed the Egger sandwich test by entering the sampling variance of the Fisher's z, a measure of effect size precision (Rodgers & Pustejovsky, 2021), into the metaregression model as a predictor. It is important to note that the Egger sandwich test has its limitations. Specifically, while the Egger sandwich test could detect systematic differences between small and large studies, the differences could be due to other factors (e.g., heterogeneity of sample characteristics) that are unrelated to publication bias (Rodgers & Pustejovsky, 2021). Hence, the test may favor potential small-study effects, and the results should be interpreted with caution.

Transparency and Openness

Study materials (e.g., coding protocol) can be found in the supplemental materials and the data used for the meta-analysis are available via the Open Science Framework (OSF): https://osf.io/z2acj/?view_only=2e2b0859893f447ebe8b2fc3a65fd1b2. Data were analyzed using RStudio Desktop 2022.07.0 + 548 and the "robumeta" package (Fisher & Tipton, 2014). This systematic and meta-analytic review was not preregistered.

Results

Student Engagement Measures

Among the 137 studies, four had collected school records (e.g., school attendance; see Motti-Stefanidi et al., 2015) to measure students' behavioral engagement in school, and 15 had used selected items that were either adapted from multiple sources (e.g., Wei et al., 2020) or acquired from no clear sources (e.g., Singh et al., 2010), or used self-designed items (e.g., Raval et al., 2018). Aside from the use of school records and selected or self-designed items, a total of 67 distinct measures were identified. Among the 67 measures, eight were from national or international research programs (e.g., Programme for International Student Assessment), while 29 were scales that measure constructs that are not specific to engagement, such as the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993).

The remaining 30 were measures specifically developed to capture student engagement (see Table S3 in the online supplemental materials). The three most frequently used student engagement instruments are the Engagement versus Disaffection with Learning Survey (EvsD learning survey; Skinner et al., 2009), School Engagement Measure (Fredricks et al., 2005), and Student Engagement Instrument (Appleton et al., 2006). They were used in 26, 14, and 14 studies, respectively. As for the remaining 27 instruments, most of them were used in only one or two studies. The sheer number of engagement measures suggests that student engagement was assessed disparately in the literature. This has made it difficult to compare and synthesize findings across studies. Thus, prior to the meta-analysis, we first evaluated the different ways in which affective, behavioral, and cognitive engagement were measured in the 137 studies and developed a classification scheme that would aid us to organize the existing literature for meaningful synthesis.

Student Engagement Subtypes

The admitted studies operationalized affective engagement in three ways: (a) relational engagement, (b) affective engagement in school, and (c) affective engagement in learning. Two studies had operationalized affective engagement as flow and burnout (M.-T. Wang et al., 2018) or perceived satisfaction in academic program (Suldo et al., 2018). Since these were exceptional cases, they were excluded from the classification. For behavioral engagement, it was operationalized in two ways: (a) participatory engagement and (b) effortful engagement. A small number of studies operationalized behavioral engagement as students' perceptions of their teachers or classroom instructions (e.g., my teacher is easy to understand; Kahraman, 2014), and these were excluded from the classification because they relate to how teachers engage the students, rather than to how engaged the students are. Finally, cognitive engagement was operationalized in three ways: (a) motivational engagement, (b) self-regulatory engagement, and (c) effortful engagement. Note that the same effortful engagement subtype has appeared twice because researchers have used the same indicators (i.e., effort and persistence) to either measure behavioral or cognitive engagement. Table 1 details the aforementioned engagement subtypes for each type of engagement dimension, including their indicators and sample items.

Data Screening

Prior to any meta-analysis, it is important to first consider whether the included effect sizes are similar enough to be synthesized. This is to ensure that the findings obtained from the meta-analysis would be interpretable, meaningful, and generalizable. Upon screening through the data and inspecting the distribution of each moderator variables, we decided to reduce the heterogeneity and improve the combinability of the data by omitting effect sizes if: (a) The engagement measure did not fit in to one of the categories outlined in Table 1; (b) engagement was measured using a single item; (c) engagement was measured via school records ($j = 3$) or researchers' in-class observations ($j = 3$). This is because not only were there very few included studies that used these measurement sources, the content of the measurements was also highly varied (e.g., attendance, extracurricular participation, and disciplinary referrals); (d) the effect size was based on kindergarten to second-grade student samples. This is because engagement of young children was mainly measured via researchers' in-class observations or teacher ratings, and none of the effect sizes obtained from this grade range was based on students' self-reports; and (e) the context of engagement was too specific (e.g., use of specific strategies for specific tasks). One correlation between affective engagement and school life satisfaction (Yuen, 2016) was also removed due to its high magnitude, that is, $r = .92$ (see the Discussion section for its implications).

Student Engagement and Academic Achievement

Table 2 displays the overall mean correlation between student engagement and academic achievement, as well as the mean correlations for each level of the categorical moderator variables. Upon synthesizing 533 effect sizes across 110 studies (121 independent samples) and using Hattie's (2009) guideline for effect sizes, student engagement was found to have a large average correlation with academic achievement ($r = .33$). Across the individual dimensions, academic achievement exhibited the largest association with behavioral engagement ($r = .39$), followed by cognitive ($r = .31$) and affective ($r = .26$) engagement. Seven of the 110 studies also provided effect sizes for agentic engagement, and the synthesis revealed that it has a medium association ($r = .21$) with academic achievement.

Table 3 and Tables S4–S6 in the online supplemental materials show the results for the univariate and multivariate moderation analyses. After controlling for other moderators, the multivariate moderation test revealed that (a) the average effect size for behavioral engagement was significantly larger than those of affective, cognitive, and agentic engagement (see Table S5 in the online supplemental materials), the average effect size for cognitive engagement was significantly larger than those of affective and agentic engagement (see Table S6 in the online supplemental materials), while the average effect size for affective and agentic engagement were not significantly different, (b) student engagement was more strongly associated with academic achievement in general subject domain than in math, science, language, and humanities domains, (c) teacher-reported engagement has a stronger association with academic achievement than student-reported engagement, (d) student engagement was more strongly associated with school grades than with standardized test scores, and (e) student engagement has a stronger association with academic achievement when the latter was measured in the same academic year than in a different year.

With a few exceptions, most of the observed differences were found to have occurred at the within-study level. These incongruous results at the between- and within-study levels are likely due to the inconsistencies in the ways each engagement dimension was operationalized between studies. Hence, we conducted separate moderation analyses with the affective, behavioral, and cognitive engagement data sets to acquire a more nuanced perspective on how each type of engagement dimension relates to academic achievement. Tables S7–S14 in the online supplemental materials contain the preliminary synthesis and univariate moderation analyses for each engagement dimension.

Affective Engagement

Univariate moderation analyses (see Table S8 in the online supplemental materials) indicated that the strength of the association between affective engagement and academic achievement were

Table 1
Classification on the Student Engagement Dimensions and Subtypes

Dimension	Subtype	Description	Indicator	Sample items	Conceptual question
Affective	Relational engagement	Emotional attachment with people within the school community, such as teachers and peers. It also includes the relational support that students receive for school-related endeavor	Teacher–student relationship/ teacher support	The teacher often gives me encouraging feedback. Teachers at my school care about students.	Does engagement entail relational attachment/ closeness or relational support?
			Relationship with peers/peer support	Students at my school are there for me when I need them. I enjoy talking to the students here.	Which relational sources (e.g., teachers, peers, parents) are within the conceptual boundaries of engagement?
			Family support in learning	When I have problems at my school, my family/guardian(s) are ready to help me.	
	Affective engagement in school	Sense of psychological membership to the school, or students' perceived cognitive and affective significance of school and schooling	School identification	In general, I feel like a real part in this school. I am included in lots of activities at this school.	Does affective engagement entail students' emotional experiences or affective attitude?
			Affective school attitude/ emotional experiences in school	I feel proud of belonging to this school. I like my school. I feel happy in school.	If affective engagement includes students' emotional state or experience, how does it differ from subjective (or emotional) well-being? Does affective engagement include all kinds of affective states (e.g., happiness, excitement)?
			Valuing of school[a]	I have to do well in school if I want to be a success in life. School is one of the most important things in my life.	Does "value" indicate motivation or engagement? What distinguish a motivation indicator from an engagement indicator?
	Affective engagement in learning	Positive and energized emotional reactions toward or during class or learning activities	Energized emotional state during learning	When I'm in this class, I feel good. When we work on something in class, I feel interested.	
			Affective attitude toward learning	I like what I am learning in school. I enjoy learning new things in class.	
Behavioral	Participatory engagement	Observable participation in school activities. It includes compliance with school and class rules and expectations, and cooperative participation in class and extracurricular activities	School compliance	How often have you skipped class? How often do you get into a fight with another student? I follow the rules at school.	Does behavioral engagement entail the exhibition of normative behaviors or partaking of school-based activities? Can they be differentiated, and if so, which should be considered as an engagement indicator?
			Cooperative participation	I complete my work on time. I come to class prepared.	

(*table continues*)

Table 1 (*continued*)

Dimension	Subtype	Description	Indicator	Sample items	Conceptual question
				This child listens carefully to teacher's instructions and directions.	How is behavioral engagement/disengagement related to constructs like delinquency and consciousness (personality)?
			Outward/extracurricular participation	When I'm in class, I participate in class discussions. I volunteer to help with school activities such as sport day. I take an active role in extracurricular activities in my school.	Is extracurricular participation a sign of behavioral engagement, or a factor that promotes engagement?
	Effortful engagement[b]	Display of attention, effort, persistence, self-directedness that conveys the exertion of willpower (volition) to reach a certain goal	Effort	In class, I work as hard as I can. I pay attention in class. I listen carefully in class.	Do compliance, cooperative participation, and effort and persistence lie in a continuum, or are they distinct forms of behavioral engagement?
			Persistence	If I have trouble understanding a problem, I go over it again until I understand it. I keep trying even if something is hard.	
			Independent participation	This child seeks challenges. This child works independently.	

Table 2
Syntheses of the Correlation Between Student Engagement and Academic Achievement

Variable	*j*	*k*	*l*	*df*	*r*	95% CI of *r*	τ^2
Overall correlation	110	121	533	120.00	.33***	[0.29, 0.36]	.04
Publication status							
Published	86	92	424	90.70	.34***	[0.30, 0.37]	.04
Unpublished	24	29	109	27.90	.29***	[0.22, 0.35]	.04
Type of engagement dimension							
Affective	71	77	174	75.60	.26***	[0.22, 0.30]	.02
Relational	14	16	45	14.20	.12***	[0.10, 0.15]	.00
Affective school	24	28	52	26.80	.22***	[0.16, 0.28]	.02
Affective learning	36	39	77	37.70	.33***	[0.27, 0.38]	.02
Behavioral	87	95	215	93.70	.39***	[0.35, 0.42]	.03
Participatory	40	44	106	42.90	.40***	[0.34, 0.45]	.04
Effortful	52	55	109	53.70	.38***	[0.34, 0.42]	.03
Cognitive	58	61	132	59.70	.31***	[0.26, 0.36]	.03
Motivational	25	25	66	23.90	.32***	[0.22, 0.40]	.04
Self-regulatory	31	34	64	32.80	.30***	[0.24, 0.36]	.03
Effortful[a]	2	2	2	1.00	.26	[−0.90, 0.97]	.04
Agentic	7	9	12	7.98	.21**	[0.08, 0.32]	.02
Geographical region							
United States/Canada	55	61	286	59.70	.30***	[0.25, 0.34]	.03
Europe/Australia	36	39	147	37.90	.36***	[0.30, 0.42]	.04
Asia	16	17	78	16.00	.37***	[0.29, 0.45]	.04
Informant source of engagement							
Self-reported	99	110	471	108.00	.29***	[0.27, 0.32]	.03
Teacher-reported	21	21	62	19.90	.48***	[0.40, 0.56]	.03
Subject specificity of engagement							
General	81	91	423	89.60	.31***	[0.27, 0.35]	.03
Subject-specific	33	35	110	33.80	.35***	[0.30, 0.41]	.03
Subject of achievement measure							
General	65	68	263	66.80	.36***	[0.32, 0.40]	.03
Language and humanities	28	34	107	32.80	.25***	[0.19, 0.31]	.03
Math and science	42	49	163	47.80	.30***	[0.25, 0.35]	.03
Type of achievement measure							
Standardized test	36	41	176	39.80	.22***	[0.18, 0.27]	.03
School grades (other)	63	66	276	64.80	.38***	[0.34, 0.42]	.04
School grades (self)	20	23	81	21.90	.33***	[0.28, 0.38]	.03
Time lag in measurement							
Same-year associations	107	116	450	115.00	.34***	[0.30, 0.37]	.04
Different-year associations	19	22	83	21.00	.29***	[0.20, 0.38]	.05

Note. Analyses were performed using metaregression with RVE (correlated effects) random-effects model. The correlation coefficients (*r*) presented in the table were corrected from measurement errors and converted from Fisher's *z* to *r* after the meta-analysis. Note that only categorical moderators are displayed as this table reports the synthesized correlations at each level of the categorical moderator variables. *j* = number of studies; *k* = number of independent samples; *l* = number of effect sizes; CI = confidence interval; τ^2 = measure of heterogeneity; RVE = robust variance estimation.
[a] Results are not reliable as the Satterthwaite *df* is less than 4.
** $p < .01$. *** $p < .001$.

moderated by sampling variance, publication status, affective engagement subtypes, the subject domain and type of achievement measure, and time lag in measurement. However, after entering all moderators simultaneously into the metaregression model, the multivariate moderation analysis showed that the strength of the effect sizes was mainly moderated by affective engagement subtypes and time lag in measurement (see Table 4). Depending on the engagement subtype, the effect size could range from small (i.e., relational engagement, $r = .12$), to medium (i.e., affective-school engagement, $r = .22$), to large (i.e., affective-learning engagement, $r = .33$).

Note that the informant sources and subject specificity of engagement were excluded from the multivariate moderation analyses because studies that measured affective engagement via teacher reports, or in a subject specific manner, were mainly assessing the same engagement subtype, namely affective-learning engagement. In addition, univariate moderation analysis on a subset of U.S. studies revealed that affective engagement has a stronger association with academic achievement when the sample consisted of more students from low SES backgrounds (see Table S8 in the online supplemental materials).

Behavioral Engagement

Univariate moderation analyses (see Table S10 in the online supplemental materials) indicated that the strength of the association between behavioral engagement and academic achievement was moderated by informant source of engagement, as well as the subject domain and type of achievement measure. A multivariate moderation analysis was subsequently conducted (see Table 5). To explore the possible interactions between moderator variables, we also entered the interaction terms between informant source of

Table 3
Multivariate Moderation Analysis on the Relation Between Student Engagement and Academic Achievement

Moderator	*b*	*SE*	*t*	*df*	95% CI
Sampling variance (B)	11.00	9.11	1.21	30.22	[−7.60, 29.60]
Publication status (B)					
Unpublished versus published	−0.02	0.03	−0.44	32.91	[−0.09, 0.06]
Type of engagement dimension					
Behavioral versus affective (B)	0.09	0.05	1.78	31.60	[−0.01, 0.18]
Behavioral versus affective (W)	0.08***	0.02	3.79	53.89	[0.04, 0.13]
Cognitive versus affective (B)	−0.08	0.06	−1.32	26.54	[−0.19, 0.04]
Cognitive versus affective (W)	0.05*	0.03	2.02	46.07	[0.00, 0.11]
Agentic versus affective (B)	−0.26	0.22	−1.19	9.98	[−0.73, 0.22]
Agentic versus affective (W)	−0.08	0.05	−1.62	6.49	[−0.21, 0.04]
Geographical region (B)					
Europe/Australia versus United States/Canada	0.07	0.04	1.81	50.14	[−0.01, 0.16]
Asia versus United States/Canada	0.06	0.05	1.26	22.53	[−0.04, 0.17]
Age (B)	0.01	0.01	1.45	40.87	[−0.01, 0.03]
Gender (B)[a]	0.08	0.13	0.60	3.57	[−0.30, 0.45]
Informant source of engagement					
Teacher-reported versus self-reported (B)	0.20*	0.07	2.63	24.05	[0.04, 0.35]
Teacher-reported versus self-reported (W)	0.17**	0.04	4.21	8.93	[0.08, 0.27]
Subject specificity of engagement (B)					
General versus subject-specific	−0.02	0.04	−0.40	25.89	[−0.10, 0.07]
Subject of achievement measure					
Language and humanities versus general (B)	−0.03	0.06	−0.51	19.65	[−0.15, 0.09]
Language and humanities versus general (W)	−0.13*	0.04	−3.46	6.63	[−0.23, −0.04]
Math and science versus general (B)	0.02	0.05	0.30	30.30	[−0.09, 0.12]
Math and science versus general (W)	−0.14**	0.04	−3.87	6.18	[−0.23, −0.05]
Type of achievement measure (B)					
School grades (other) versus standardized test	0.18***	0.04	4.93	35.66	[0.11, 0.25]
School grades (self) versus standardized test	0.09	0.05	1.82	31.22	[−0.01, 0.20]
Time lag in measurement					
Different versus same year (B)	0.00	0.08	0.06	11.49	[−0.16, 0.17]
Different versus same year (W)	−0.05*	0.02	−2.70	15.88	[−0.08, −0.01]

Note. All moderators were entered simultaneously in each model. For categorical moderators, the second variable in each comparison is the reference group (e.g., in unpublished vs. published, published is the reference group in the dummy coding). Results were based on 101 studies involving 108 independent samples and 473 effect sizes. CI = confidence interval; B = between-study effects; W = within-study effects.
[a] Results are not reliable as the Satterthwaite *df* is less than 4.
* $p < .05$. ** $p < .01$. *** $p < .001$.

engagement and type of achievement measure (see also Table S11 in the online supplemental materials for model without interaction terms). From the multivariate moderation analysis, it was revealed that the association with academic achievement was significantly stronger for (a) participatory engagement ($r = .40$) than effortful engagement ($r = .38$), (b) general subject domain ($r = .43$) than math and science domains ($r = .35$), and (c) school grades that were obtained from students ($r = .39$) or school records and teachers ($r = .45$), than standardized test scores ($r = .28$). It is worth noting that although participatory engagement was shown to have a larger effect size than effortful engagement at the between-study level, effortful engagement was found to have a larger effect size at the within-study level (see Table S10 in the online supplemental materials). However, the within-study effect was not statistically significant due to a low *df* (<4), and thus the results should be interpreted with caution.

A significant interaction between informant source of engagement and type of achievement measure was also uncovered. Specifically, the association between student-reported engagement and academic achievement was fairly consistent, regardless of whether it was standardized test ($r = .23$), or school grades obtained from the school/teacher ($r = .41$) or from students ($r = .41$). In contrast, the association between teacher-reported engagement and academic achievement could vary drastically depending on whether it was standardized test ($r = .41$), or school grades obtained from the school/teacher ($r = .65$) or from students ($r = .24$). The graphical depiction of the interaction is shown in the online supplemental materials (Figure S1 in the online supplemental materials).

Among the 87 studies that contained correlations between behavioral engagement and academic achievement, six measured effortful engagement and disengagement (i.e., effort withdrawal) as distinct subscales using Skinner et al.'s (2009) EvsD learning survey. We conducted a supplementary analysis (see Table S12 in the online supplemental materials) on these six studies and did not observe a significant difference between effortful engagement ($r = .35$) and disengagement ($r = -.35$).

Cognitive Engagement

Univariate moderation analyses (see Table S14 in the online supplemental materials) indicated that the strength of the association between cognitive engagement and academic achievement was moderated by sampling variance, geographical region, student age, as well as the subject domain and type of achievement measure.

Table 4
Multivariate Moderation Analysis on the Relation Between Affective Engagement and Academic Achievement

Moderator	*b*	*SE*	*t*	*df*	95% CI
Sampling variance (B)	12.27	9.04	1.36	15.05	[−6.99, 31.54]
Publication status (B)					
Unpublished versus published	−0.04	0.05	−0.90	22.20	[−0.14, 0.06]
Affective engagement subtypes (B)					
Affective school versus relational	0.14**	0.05	2.82	21.82	[0.04, 0.24]
Affective learning versus relational	0.23***	0.05	4.42	24.11	[0.12, 0.34]
Geographical region (B)					
Europe/Australia versus United States/Canada	0.02	0.05	0.36	24.37	[−0.09, 0.13]
Asia versus United States/Canada	−0.05	0.06	−0.73	18.59	[−0.18, 0.09]
Age (B)	0.01	0.02	0.37	21.17	[−0.03, 0.04]
Gender (B)	−0.22	0.43	−0.51	11.43	[−1.15, 0.71]
Subject of achievement measure					
Language and humanities versus general (B)	−0.07	0.11	−0.68	13.01	[−0.30, 0.16]
Language and humanities versus general (W)	−0.07	0.05	−1.45	4.69	[−0.19, 0.05]
Math and science versus general (B)	−0.02	0.09	−0.28	19.74	[−0.21, 0.16]
Math and science versus general (W)	−0.05	0.04	−1.17	4.14	[−0.17, 0.07]
Type of achievement measure (B)					
School grades (other) versus standardized test	0.10	0.07	1.29	18.08	[−0.06, 0.25]
School grades (self) versus standardized test	0.05	0.09	0.53	16.48	[−0.14, 0.23]
Time lag in measurement					
Different versus same year (B)	−0.18*	0.06	−3.02	8.17	[−0.31, −0.04]
Different versus same year (W)	−0.03	0.02	−1.25	7.94	[−0.08, 0.02]

Note. All moderators were entered simultaneously in each model. For categorical moderators, the second variable in each comparison is the reference group (e.g., in unpublished vs. published, published is the reference group in the dummy coding). Results were based on 63 studies involving 66 independent samples and 150 effect sizes. CI = confidence interval; B = between-study effects; W = within-study effects.
* $p < .05$. ** $p < .01$. *** $p < .001$.

However, moderation effects of age and type of achievement measure were no longer significant after all moderators were controlled for (see Table 6 in the online supplemental materials). Instead, the multivariate moderation test revealed that the average effect sizes was larger when studies (a) had lower sample size (with larger sampling variance), (b) were conducted in Europe, Australia, or Asia than in the United States or Canada, (c) contained higher percentage of girls, (d) measured achievement in general subject domain than in math, science, language, and humanities domains, and (e) measured achievement in the same academic year than in different year. Note that informant source of engagement was excluded from the moderation analyses because there were very few cases of teacher-reported cognitive engagement, and studies that measured cognitive engagement via teacher reports were mainly assessing the same engagement subtype (i.e., self-regulatory engagement). Likewise, effortful engagement ($r = .26$, $p < .05$, see Table 2), one of the three cognitive engagement subtypes, was also removed as there were only two studies that operationalized cognitive engagement in this manner.

Student Engagement and SWB

Table 7 displays the overall mean correlation between student engagement and SWB, as well as the mean correlations for each level of the categorical moderator variables. Publication status, informant source and subject specificity of engagement, and time lag in measurement were excluded from the moderator list because all SWB studies used student-reported engagement measures and assessed engagement in a non-subject-specific manner. There was also only one unpublished study (i.e., student dissertation) and two studies with different-year associations in the data set. Upon synthesizing 158 effect sizes across 18 studies, student engagement was found to have a large average correlation with SWB ($r = .35$). Across the individual dimensions, SWB was found to have the largest association with affective engagement ($r = .40$), followed by cognitive ($r = .35$) and behavioral ($r = .31$) engagement.

Table 8 shows the results for the univariate analyses. Note that (a) for component of SWB, only the within-study effects of the moderator were examined because the moderator lacks between-study variability, and (b) multivariate moderation analyses were not conducted for SWB studies due to a low number of studies and unbalanced frequency distribution of covariates, resulting in low *df* (<4) for the analyses. Overall, the univariate analyses revealed that the average effect size for affective engagement was significantly larger than those of behavioral engagement and cognitive engagement, and the average effect size for cognitive engagement was also significantly larger than behavioral engagement. In addition, the effect sizes were found to be significantly smaller when SWB was measured as negative affect ($r = -.20$), than when it was measured as positive affect ($r = .36$) or life satisfaction ($r = .39$).

Like academic achievement, we observed incongruous results at the between- and within-study levels, which are likely due to the inconsistencies in the ways each engagement dimension was operationalized between studies. Hence, we conducted separate moderation analyses with the affective, behavioral, and cognitive engagement data sets (see Tables S15–S20 in the online supplemental materials) to acquire a more nuanced perspective on how each engagement dimension relates to SWB. As shown in Table 9, affective engagement was found to have a stronger association with SWB when it was operationalized as relational engagement ($r = .43$) or

Table 5
Multivariate Moderation Analysis on the Relation Between Behavioral Engagement and Academic Achievement

Moderator	*b*	*SE*	*t*	*df*	95% CI
Sampling variance (B)	9.52	10.51	0.91	20.37	[−12.38, 31.41]
Publication status (B)					
Unpublished versus published	−0.09	0.06	−1.67	19.49	[−0.21, 0.02]
Behavioral engagement subtypes (B)					
Participatory versus effortful	0.10*	0.04	2.31	40.24	[0.01, 0.18]
Geographical region (B)					
Europe/Australia versus United States/Canada	0.00	0.05	−0.04	34.11	[−0.10, 0.10]
Asia versus United States/Canada	−0.02	0.04	−0.50	24.04	[−0.11, 0.07]
Age (B)	0.01	0.01	0.47	25.34	[−0.02, 0.03]
Gender (B)[a]	0.08	0.11	0.67	3.45	[−0.26, 0.42]
Informant source of engagement (B)					
Teacher-reported versus self-reported	0.19	0.09	2.00	6.98	[−0.03, 0.41]
Subject specificity of engagement (B)					
General versus subject-specific	−0.01	0.06	−0.17	13.86	[−0.13, 0.11]
Subject of achievement measure					
Language and humanities versus general (B)	−0.12	0.09	−1.39	8.72	[−0.31, 0.08]
Language and humanities versus general (W)	−0.20	0.09	−2.38	5.60	[−0.42, 0.01]
Math and science versus general (B)	0.02	0.06	0.38	16.94	[−0.10, 0.15]
Math and science versus general (W)	−0.21*	0.08	−2.73	5.12	[−0.41, −0.01]
Type of achievement measure (B)					
School grades (other) versus standardized test	0.16**	0.05	3.17	26.37	[0.05, 0.26]
School grades (self) versus standardized test	0.17*	0.06	2.59	25.45	[0.03, 0.30]
Time lag in measurement (B)					
Different versus same year	−0.05	0.07	−0.64	10.33	[−0.21, 0.11]
Interaction terms					
School Grades (Other) × Informant Source of Engagement	0.24	0.13	1.77	11.65	[−0.05, 0.53]
School Grades (Self) × Informant Source of Engagement	−0.38*	0.14	−2.74	7.79	[−0.70, −0.06]

Note. All moderators were entered simultaneously in each model. For categorical moderators, the second variable in each comparison is the reference group (e.g., in unpublished vs. published, published is the reference group in the dummy coding). Results were based on 79 studies involving 85 independent samples and 198 effect sizes. CI = confidence interval; B = between-study effects; W = within-study effects.
[a] Results are not reliable as the Satterthwaite *df* is less than 4.
* $p < .05$. ** $p < .01$.

affective-school engagement ($r = .47$), than as affective-learning engagement ($r = .28$). Behavioral engagement was found to have a stronger association with SWB when it was operationalized as participatory engagement ($r = .36$) than effortful engagement ($r = .23$). However, the way in which cognitive engagement was operationalized did not significantly impact the strength of the effect sizes. Finally, negative affect has a weaker association with all three types of engagement dimension than positive affect and life satisfaction.

Discussion

Is student engagement associated with academic achievement and SWB? The short answer is "yes"—student engagement was strongly associated with academic achievement ($r = .33$) and SWB ($r = .35$). Although the answer appears straightforward, differential associations of engagement with varying effect sizes were found across moderator variables. Consistent with past findings (Lei et al., 2018), academic achievement was found to have the strongest association with behavioral engagement ($r = .39$), followed by cognitive ($r = .31$) and affective ($r = .26$) engagement. Seven of the included studies also examined a fourth agentic engagement dimension (Reeve & Tseng, 2011), and its correlation with academic achievement ($r = .21$) was found to be comparable with those of affective engagement. The present results also add to the existing literature by revealing that the order of the correlation magnitude was reversed for SWB, whereby SWB was most closely related to affective engagement ($r = .40$), followed by cognitive ($r = .35$) and behavioral ($r = .31$) engagement. Beyond the engagement dimensions, our moderation analyses indicated that the strength of the effect sizes was moderated by how the engagement dimensions were operationalized, as well as other notable factors like informant source of engagement, subject domain and type of achievement measure, time lag in measurement, and component of SWB.

Student Engagement Measures

Consistent with past reviews (Fredricks & McColskey, 2012; Martins et al., 2022; Salmela-Aro et al., 2021), we observed considerable variations in the measurement and operationalization of student engagement. As shown in Table 1, each of the three student engagement dimensions could be further distinguished, resulting in (at least) seven conceptually distinct engagement subtypes. This finding reinforces the idea that student engagement is conceptually incoherent and operationally messy (Azevedo, 2015), an issue commonly known as the jingle fallacy (see Reschly & Christenson, 2012). It is important to note that the indicators in Table 1 were from the admitted studies, and whether they should be considered

Table 6
Multivariate Moderation Analysis on the Relation Between Cognitive Engagement and Academic Achievement

Moderator	*b*	*SE*	*t*	*df*	95% CI
Sampling variance (B)	48.11**	12.72	3.78	11.10	[20.14, 76.08]
Publication status (B)					
Unpublished versus published	−0.08	0.09	−0.92	13.63	[−0.27, 0.11]
Cognitive engagement subtypes (B)					
Motivational versus self-regulatory	0.07	0.07	1.02	22.19	[−0.08, 0.22]
Geographical region (B)					
Europe/Australia versus United States/Canada	0.14*	0.06	2.36	19.11	[0.02, 0.27]
Asia versus United States/Canada	0.17*	0.08	2.20	14.10	[0.00, 0.34]
Age (B)	0.03	0.02	1.51	15.19	[−0.01, 0.07]
Gender (B)	−1.13*	0.49	−2.31	10.54	[−2.21, −0.05]
Subject specificity of engagement (B)					
General versus subject-specific	−0.10	0.07	−1.44	12.51	[−0.25, 0.05]
Subject of achievement measure					
Language and humanities versus general (B)	−0.19	0.13	−1.43	11.78	[−0.47, 0.10]
Language and humanities versus general (W)	−0.08*	0.03	−3.03	4.78	[−0.15, −0.01]
Math and science versus general (B)	0.05	0.11	0.45	13.06	[−0.18, 0.28]
Math and science versus general (W)	−0.12**	0.02	−6.12	4.16	[−0.18, −0.07]
Type of achievement measure (B)					
School grades (other) versus standardized test	0.07	0.09	0.81	12.76	[−0.12, 0.27]
School grades (self) versus standardized Test	0.05	0.08	0.59	12.05	[−0.12, 0.22]
Time lag in measurement					
Different versus same year (B)	−0.31*	0.14	−2.18	12.35	[−0.62, 0.00]
Different versus same year (W)	−0.04	0.02	−1.72	7.00	[−0.09, 0.01]

Note. All moderators were entered simultaneously in each model. For categorical moderators, the second variable in each comparison is the reference group (e.g., in unpublished vs. published, published is the reference group in the dummy coding). Results were based on 49 studies involving 50 independent samples and 115 effect sizes. CI = confidence interval; B = between-study effects; W = within-study effects.
* $p < .05$. ** $p < .01$.

as engagement indicators from a conceptual standpoint is a separate discussion that is worth undertaking but is beyond the scope of the present article. Further research is needed to generate a cohesive definition of student engagement and develop an integrative model of engagement that encompasses similar and distinct features of different engagement subtypes.

Affective Engagement Subtypes

This study revealed that affective engagement could be further differentiated into relational, affective-school, and affective-learning engagement (see Table 1). Both the relational and affective-school engagement subtypes are rooted in the school bonding literature (Furlong et al., 2003; Jimerson et al., 2003), with the former focusing on students' connectedness with people within the school community, and the latter on connectedness with the school community itself. Affective-learning engagement, in contrast, is rooted in the motivation literature (Skinner et al., 2009) and depicts students' affective reaction to learning activities (e.g., classwork).

Notably, substantial variability exists within each of the engagement subtypes as researchers often integrate different indicators loosely without considering their conceptual distinction and how they relate to the engagement concept. For example, while relational engagement encompasses affective relationships and learning support, these two indicators are to a certain extent distinct (Roorda et al., 2017), with the former focusing more on emotional attachment while latter on supportive behaviors. Likewise, affective-school and affective-learning engagement measures often combine items on emotional experiences and affective attitude. Although the two variables are positively correlated, they are not identical since school attitude shapes students' retrospective reports of their emotional experiences in school (Zurbriggen et al., 2021). We also observed that the two affective engagement subtypes share indicators with other distinct constructs like SWB (e.g., emotional experiences) and motivation (e.g., perceived value). In fact, the current meta-analysis had to remove a correlation between affective engagement and school satisfaction (Yuen, 2016) as the magnitude was so high ($r = .92$) that the constructs were practically indistinguishable. Considering the conceptual overlap and ambiguity, Table 1 provides the list of key conceptual questions for researchers to address in order to clarify the student engagement construct.

The affective engagement subtypes were found to be a key moderator for affective engagement's associations with academic achievement and SWB. Academic achievement correlated more strongly with students' affective-learning engagement ($r = .33$) than affective-school ($r = .22$) and relational ($r = .12$) engagement. Contrastingly, SWB correlated more strongly with students' relational ($r = .43$) and affective-school ($r = .47$) engagement than affective-learning engagement ($r = .28$). This is not surprising. As affective-learning engagement conveys students' direct and specific emotional reaction to academic activities, it would thus have more direct impact on students' academic outcomes (Buenconsejo et al., 2023; Connell & Wellborn, 1991). On the other hand, relational and affective-school engagement convey students' social and school connectedness that satisfy their inherent need to belong (which in this case to a school community; Bond et al., 2007; Osterman, 2000). Since relatedness or belongingness need is one of the "innate psychological nutriments that are essential for ongoing psychological growth, integrity, and

Table 7
Syntheses of the Correlation Between Student Engagement and Subjective Well-Being

Variable	*j*	*k*	*l*	*df*	*r*	95% CI of *r*	τ^2
Overall correlation	18	18	158	17.00	.35***	[0.29, 0.41]	.05
Type of engagement dimension							
Affective	14	14	57	13.00	.40***	[0.34, 0.47]	.04
Relational[a]	5	5	27	3.99	.43***	[0.33, 0.51]	.02
Affective school	6	6	23	4.99	.47***	[0.36, 0.56]	.02
Affective learning[a]	4	4	7	3.00	.28**	[0.16, 0.39]	.07
Behavioral	16	16	51	14.90	.31***	[0.25, 0.38]	.04
Participatory	10	10	33	8.99	.36***	[0.28, 0.45]	.04
Effortful	7	7	18	5.89	.23***	[0.16, 0.30]	.02
Cognitive	13	13	50	12.00	.35***	[0.26, 0.43]	.06
Motivational	6	6	21	4.99	.40***	[0.31, 0.48]	.02
Self-regulatory	8	8	29	7.00	.30**	[0.16, 0.43]	.08
Geographical region							
United States/Canada	7	7	57	5.99	.36***	[0.26, 0.45]	.03
Europe/Australia[a]	4	4	19	2.98	.35*	[0.12, 0.55]	.05
Asia	6	6	76	5.00	.37**	[0.21, 0.51]	.06
Life domain of SWB							
General	12	12	70	11.00	.34***	[0.25, 0.42]	.04
School domain	9	9	48	7.97	.43***	[0.33, 0.53]	.06
Other domains[a]	3	3	40	2.00	.36*	[0.03, 0.62]	.04
Component of SWB							
Positive affect	9	9	29	7.91	.36***	[0.28, 0.43]	.03
Negative affect	8	8	27	6.89	−.20**	[−0.30, −0.10]	.02
Life satisfaction	11	11	93	9.99	.39***	[0.32, 0.46]	.04
Overall[a]	2	2	9	1.00	.39	[−0.97, 0.99]	.14

Note. Analyses were performed using metaregression with RVE (correlated effects) random-effects model. The correlation coefficients (*r*) presented in the table were corrected from measurement errors and converted from Fisher's *z* to *r* after the meta-analysis. Note that only categorical moderators are displayed as this table reports the synthesized correlations at each level of the categorical moderator variables. *j* = number of studies; *k* = number of independent samples; *l* = number of effect sizes; τ^2 = measure of heterogeneity; CI = confidence interval; SWB = subjective well-being; RVE = robust variance estimation.
[a] Results are not reliable as the Satterthwaite *df* is less than 4.
* $p < .05$. ** $p < .01$. *** $p < .001$.

well-being" (Deci & Ryan, 2000, p. 229), this would explain the relatively strong correlation of relational and affective-school engagement with SWB.

Behavioral Engagement Subtypes

Behavioral engagement could be further differentiated into participatory and effortful engagement (see Table 1). Participatory engagement encompasses students' compliant, cooperative, and observable participation in school activities, and it conveys the extent to which a student has socialized into the student role (Wentzel, 1991). However, upon closer inspection of the indicators, one could further discern two kinds of participation: the exhibition of normative school behaviors (e.g., following school rules) and the partaking of school-related activities (e.g., extracurricular participation). Future research could explore the different forms of participation and their relation to engagement. Effortful engagement includes indicators like effort, persistence, and independent participation in learning. Rooted in motivation literature (Skinner et al., 2009), it is seen as a conative construct that relates to students' active mental state during learning activities (Hughes et al., 2008). Effortful engagement is less observable than participatory engagement and it is more focused on learning experience than on social roles and activities. Due to its covert nature, effortful engagement has at times been classified as cognitive engagement. Researchers thus need to theorize how participatory and effortful engagement relate to one another, and the distinction between effortful and cognitive engagement (see Table 1 for the conceptual questions that were posed).

Academic achievement was found to have a significantly stronger association with participatory engagement ($r = .40$) than effortful engagement ($r = .38$) after other moderators were controlled for. The results contradicted those from past studies (e.g., Diemer et al., 2014; Hughes et al., 2008) which reported that effort was more facilitative of academic achievement than conduct and compliance. This finding could be due to an overlap in the indicators of engagement and outcome, since some schools might factor in students' classroom conduct when they determine the academic report card grades (Duckworth et al., 2012). The observed difference could also be the product of measurement heterogeneity between studies as several behavioral engagement measures (e.g., Lam et al., 2014) contained items from both engagement subtypes. Although these measures were subsequently classified based on the item distribution, the varying mixture of items from both subtypes could have impaired the reliability and precision of the results. This would explain why effortful engagement was found to have a weaker association at the between-study level, yet a stronger association at the within-study level (see Table S10 in the online supplemental materials). Unfortunately, results from the within-study analysis lacked statistical power and were inconclusive. To advance our understanding of behavioral engagement,

Table 8

Univariate Moderation Analyses on the Relation Between Student Engagement and Subjective Well-Being

Moderator	*j*	*k*	*l*	*b*	*SE*	*t*	*df*	95% CI
Sampling variance (B)[a]	18	18	158	−1.89	10.40	−0.18	1.97	[−47.28, 43.49]
Type of engagement dimension								
Behavioral versus affective (B)	18	18	158	0.11	0.13	0.87	5.39	[−0.21, 0.44]
Behavioral versus affective (W)				−0.09**	0.03	−3.60	11.95	[−0.15, −0.04]
Cognitive versus affective (B)[a]				0.61	0.21	2.97	2.63	[−0.10, 1.32]
Cognitive versus affective (W)				−0.11***	0.02	−4.40	12.27	[−0.16, −0.05]
Type of engagement dimension (alternative model)								
Affective versus behavioral (B)	18	18	158	−0.11	0.13	−0.87	5.39	[−0.44, 0.21]
Affective versus behavioral (W)				0.09**	0.03	3.60	11.95	[0.04, 0.15]
Cognitive versus behavioral (B)				0.50*	0.14	3.63	4.47	[0.13, 0.86]
Cognitive versus behavioral (W)				−0.01	0.02	−0.55	11.85	[−0.06, 0.04]
Geographical region (B)								
Europe/Australia versus United States/Canada	17	17	152	−0.01	0.09	−0.08	6.17	[−0.23, 0.21]
Asia versus United States/Canada				0.01	0.08	0.18	10.72	[−0.17, 0.19]
Age (B)	18	18	158	−0.03	0.02	−1.89	4.18	[−0.08, 0.02]
Gender (B)	17	17	144	0.37	0.41	0.90	5.12	[−0.68, 1.43]
Race and ethnicity (B)[a,b]	7	7	57	−0.10	0.11	−0.91	2.12	[−0.53, 0.34]
SES (B)[a,b]	6	6	56	0.22	0.26	0.84	2.52	[−0.69, 10.13]
Life domain of SWB								
School domain versus general (B)	18	18	158	0.10	0.07	1.37	9.55	[−0.06, 0.26]
School domain versus general (W)[a]				−0.03	0.12	−0.25	2.01	[−0.54, 0.48]
Other domains versus general (B)[a]				0.16	0.13	1.23	2.41	[−0.31, 0.62]
Other domains versus general (W)[a]				−0.18	0.11	−1.67	1.83	[−0.70, 0.33]
Component of SWB (W)								
Positive affect versus life satisfaction[a]	16	16	149	−.04	0.03	−1.30	3.55	[−0.14, 0.05]
Negative affect versus life satisfaction[a]				−.24**	0.03	−9.14	3.55	[−0.32, −0.17]

Note. Moderation analysis was conducted separately for each moderator. For categorical moderators, the second variable in each comparison is the reference group (e.g., in positive affect vs. life satisfaction, life satisfaction is the reference group in the dummy coding). *j* = number of studies; *k* = number of independent samples; *l* = number of effect sizes; CI = confidence interval; B = between-study effects; W = within-study effects.

[a] Results are not reliable as the Satterthwaite *df* is less than 4. [b] Only studies from the United States were included.

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

future research should examine the relative contributions of the two engagement subtypes to learning outcomes within the same statistical model.

SWB was also shown to have a significantly stronger association with participatory engagement ($r = .36$) than effortful engagement ($r = .23$). This could be attributed to indicators of participatory engagement being more related to the concept of school community engagement, whereas indicators of effortful engagement are more related to learning activity engagement (Wong & Liem, 2022). Therefore, like relational and affective-school engagement, participatory engagement reflects how well a student has socially integrated into the school community, which then translates to high satisfaction of belonging needs and better well-being.

Cognitive Engagement Subtypes

Cognitive engagement could be further differentiated into motivational and self-regulatory engagement, as well as effortful engagement that was previously discussed as one of the behavioral engagement subtypes (Table 1). Motivational engagement encompasses various motivational indicators, such as values, goals, and aspirations. While motivational variables are often used to measure cognitive engagement, this is highly contested because motivation is a precursor of engagement (Appleton et al., 2008), and using the same set of variables to measure motivation and engagement would muddle the distinction between the two constructs. Self-regulatory engagement includes the use of cognitive and metacognitive strategies, which are related to the broader concept of self-regulation (Greene, 2015). Some researchers (e.g., Lam et al., 2014) argued that there is a need to distinguish engagement and self-regulation. Boekaerts (2016), for instance, proposed that engagement and self-regulation should be viewed as parallel processes, with self-regulation representing a set of purposeful control processes that help facilitate engagement. There is, however, no consensus on this issue. As cognitive engagement overlaps with the concepts of motivation and self-regulation, more conceptual discourse is required to differentiate cognitive engagement from cognate constructs (see Table 1 on the conceptual questions).

Moderation analyses revealed that motivational and self-regulatory engagement did not significantly differ in their associations with academic achievement or SWB. The results suggest that both motivation and self-regulation could be equally essential in promoting positive student outcomes. Indeed, from a self-regulated learning perspective (Zimmerman & Moylan, 2009), effective use of self-regulatory strategies depends on the presence of motivation sources (e.g., perceived task value). In other words, rather than one holding a stronger predictive power than the other, it is possible than motivation and self-regulation interact with one another to impact students' academic achievement and well-being, with the optimal outcome achieved only when both motivation and self-regulation are high.

Table 9
Univariate Moderation Analyses on the Relation Between Engagement Subtypes and Subjective Well-Being

Moderator	*j*	*k*	*l*	*b*	*SE*	*t*	*df*	95% CI
Affective engagement subtypes (B)								
Affective school versus relational	14	14	57	0.05	0.08	0.66	7.51	[−0.13, 0.23]
Affective learning versus relational				−0.17*	0.06	−2.83	6.56	[−0.31, −0.03]
Behavioral engagement subtypes (B)								
Participatory versus effortful	16	16	51	0.14*	0.06	2.32	10.91	[0.01, 0.27]
Cognitive engagement subtypes (B)								
Motivational versus self-regulatory	13	13	50	0.12	0.08	1.41	10.00	[−0.07, 0.31]

Note. Moderation analysis was conducted separately for each moderator. For categorical moderators, the second variable in each comparison is the reference group (e.g., in affective school vs. relational, relational is the reference group in the dummy coding). *j* = number of studies; *k* = number of independent samples; *l* = number of effect sizes; CI = confidence interval; B = between-study effects.
* $p < .05$.

Other Moderators

Publication Bias

The present meta-analysis did not observe a significant difference between published and unpublished studies, though Egger sandwich test revealed that the association between cognitive engagement and academic achievement was larger among studies with smaller sample size (see Table 6). One possible reason for the nonsignificant results is that unlike most meta-analyses, the present meta-analysis corrected the observed effect sizes for measurement errors prior to the synthesis. Wiernik and Dahlke (2020) noted that "measurement error variance can also cause publication-bias analyses to suggest the presence of bias when none exists" (p. 97), especially if published studies tend to use better quality measures than unpublished studies. Incorporating the measurement error correction procedures into this meta-analysis could thus have reduced the difference in effect sizes between published and unpublished studies. Another possible reason could be the use of correlations as the primary metric of analysis which recent studies have found to be less affected by publication bias, as opposed to standardized mean difference (e.g., Chow & Ekholm, 2018). The lack of evidence for publication bias does not mean the absence of it. Future meta-analyses on this topic of interest should continue to admit unpublished studies and carry out appropriate statistical analyses to detect and control for such potential bias.

Theoretical Moderators

Besides the type of engagement dimension and their subtypes, other theoretical moderators like geographical region, student age, and gender did not significantly moderate the student engagement associations. The only exception is cognitive engagement, which was shown to have a higher correlation with academic achievement in (a) Asia, Europe, and Australia than in the United States or Canada, and (b) studies with higher percentage of girls (see Table 6). This might suggest a possible cultural and gender difference in the association between cognitive engagement and academic achievement (see Lei et al., 2018). However, upon inspecting the distribution of the moderator data, we found that most studies of cognitive engagement that used standardized achievement tests were conducted with male dominated student samples in the United States. Since the use of standardized achievement tests was associated with lower effect sizes (see the Methodological Moderators section), it could have acted as a "third" or confounding variable for geographical region and gender in the multivariate model. The results should thus be interpreted with caution considering the systematic links that the use of standardized tests had with geographical region and gender compositions in our sample of studies.

The general lack of significant results for the theoretical moderators suggests that student engagement is important for the development of positive outcomes regardless of these student characteristics. Nevertheless, it is also possible that these factors moderate the engagement process, but the present meta-analysis was not sensitive enough to detect them due to certain contextual or cultural nuances. As a case in point, although China and the Philippines are both located in Asia, they have very different cultures. The Han Chinese values achievement and competition (Leung & Au, 2010), whereas Filipinos values cooperativeness and interpersonal harmony (Bernardo et al., 2014). Given evidence of systematic cultural differences among Asian countries (Buenconsejo et al., 2023), it was possible that inherent cultural differences would not be detected in the current meta-analysis since countries were broadly grouped together at the regional level. Considering this limitation, future primary studies should continue to explore the effects of these theoretical moderators in the student engagement process.

Additionally, our supplementary analyses revealed that the association between affective engagement and academic achievement was stronger in studies with a higher percentage of students from low SES backgrounds. According to the reserve capacity model (Gallo & Matthews, 2003), individuals from low SES backgrounds are exposed to more chronic stressors that deplete both social and emotional resources which could serve as important buffers against negative academic outcomes (see, e.g., Yan & Gai, 2022). Thus, promoting opportunities to boost positive emotions toward school and learning can protect these at-risk students against the hazards of depleted and challenging experiences. This finding indirectly supports extant literature (Seligman et al., 2009) on how teaching of positive emotions (e.g., joy and excitement) can contribute to effective learning processes and outcomes in students with diverse abilities and sociocultural backgrounds. However, as we only analyzed a subgroup of U.S. studies and did not differentiate the affective engagement subtypes, further research is required to explore how subtypes of affective engagement relate to academic outcomes in

students from low SES and other forms of disadvantage backgrounds (e.g., students with learning challenges).

Methodological Moderators

The present meta-analysis showed that the informant source of engagement, subject domain and type of achievement measure, time lag in measurement, and components of SWB were significant moderators. In contrast, other methodological factors like subject specificity of engagement and life domain of SWB did not significantly moderate the magnitude of the effect sizes.

Informant Source of Engagement. Teacher-reported engagement ($r = .48$) was found to have a significantly higher correlation with academic achievement than student-reported engagement ($r = .31$). The finding corroborated previous research that observed the same phenomenon (Lei et al., 2018; M.-T. Wang et al., 2016). One likely explanation is that teachers' judgment of students' engagement is often influenced not only by the students' actual engagement but also by the students' prior achievement (Kaiser et al., 2013). Since students' prior achievement is a strong predictor of their subsequent achievement, prior achievement could have become the "third" variable that explains the association between teacher-reported engagement and academic achievement. To circumvent this potentially confounding issue, future studies that use teacher-reported engagement need to also obtain information about students' prior achievement and control for its effects in analyses.

Subject and Type of Achievement Measure. The association between student engagement and academic achievement was found to be significantly smaller in language and humanities ($r = .27$) and math and science domains ($r = .32$) than in general subject domain ($r = .37$). These moderations were significant only at the within-study level. In other words, the observed differences were found mainly in studies that measured and analyzed achievement in multiple subject domains. Closer inspection revealed that many of these studies often measured achievement scores in general subject domain as school grades (e.g., GPAs) and those in specific subject domains (e.g., math) as standardized test scores. The use of different types of achievement measure, as discussed in the next paragraph, could explain why achievement scores in general subject domain have a stronger effect size at the within-study level.

Student engagement was found to have a smaller association with standardized test scores ($r = .24$) than student-reported school grades ($r = .33$) or those provided by teachers/schools ($r = .39$). The differences in the effect sizes could be attributed to the type of knowledge assessed with standardized tests and school grades. According to Duckworth et al. (2012), standardized tests cover skills and knowledge acquired not only in school but also outside of formal instruction. School grades, in contrast, cover knowledge acquired in school, and may also include assessment of students' class participation and conduct. Therefore, students' performance in standardized tests is largely determined by their general cognitive ability, whereas performance in school grades is largely determined by students' ability to exert self-control (e.g., effort) and exhibit proper study behaviors, both of which are indicators of behavioral engagement. In this meta-analysis, we also observed that the association between teacher-reported behavioral engagement and school grades could vary drastically depending on whether it was obtained from school records or teachers ($r = .64$) or from students ($r = .24$). The findings highlight a potential concern of method effect. To prevent this problem, future studies are encouraged to use multiple sources to triangulate the engagement data.

Time Lag in Measurement. Consistent with our prediction, engagement correlated more strongly with academic achievement when achievement was measured in the same academic year. As temporal changes are often accompanied with contextual changes (e.g., change in classroom context), the finding reinforces the idea that engagement is highly context specific (Pöysä et al., 2018; M.-T. Wang et al., 2019). Nevertheless, it is interesting to point out that unlike its other dimensions, time lag in measurement did not significantly moderate the association between behavioral engagement and academic achievement. This could be attributed to the stability of behavioral engagement indicators like academic effort, which was closely related to trait conscientiousness (Rieger et al., 2017; Trautwein et al., 2009). The results suggest that different engagement variables might have different sensitivity to time and context, and by extension, different short- or long-term influences on students' educational outcomes.

Component of SWB. Compared with life satisfaction ($r = .39$) and positive affect ($r = .36$), negative affect was found to have a smaller association with student engagement ($r = -.20$). The results indicate that there might be a degree of independence between positive (i.e., life satisfaction and positive affect) and negative (i.e., negative affect) well-being, and that they could be influenced by different predictors. Karademas (2007) reported that positive well-being was associated with specific predictors like self-efficacy and positive coping strategies, whereas negative well-being was associated with predictors like neuroticism and life stress. In the case of student engagement, it is possible that it is more strongly associated with positive well-being. On the contrary, student disengagement, which was argued to be distinct from student engagement (Jang et al., 2016), could be more strongly associated with negative well-being. Due to a lack of studies on student disengagement, future research could seek to ascertain if this is the case.

Limitations

The results of the present meta-analysis should be interpreted with certain limitations. First, this meta-analysis only focused on two outcome variables: academic achievement and SWB. Recognizing that student engagement is also linked to a multitude of other outcome correlates, future meta-analyses could seek to examine its associations with these other correlates. Second, although we positioned academic achievement and SWB as outcomes of student engagement, the effect sizes we retrieved were bivariate correlations derived from a mixture of cross-sectional and longitudinal studies. As such, the data do not permit conclusions about causality. Third, due to the strict eligibility criteria that we imposed, many papers, such as those that did not adhere to the tripartite model, were excluded. Consequently, the present meta-analysis did not consider the role of unique engagement constructs like flow (Shernoff et al., 2003) and schoolwork engagement (Salmela-Aro & Upadaya, 2012). Fourth, this study did not consider the internal dynamics between engagement dimensions (see Skinner et al., 2008) and investigate how an engagement dimension would relate to an outcome after its covariances with other engagement dimensions were controlled for. Future student engagement meta-analysis could seek to

synthesize these partial correlations, but it would need to adopt a narrower focus and prespecify what each engagement dimension represents at the outset of the study.

Fifth, despite our best effort to include unpublished literature, most of our included studies were journal articles. The meta-analytic results could thus potentially be affected by publication bias. Sixth, we did not differentiate engagement from disengagement in our main analysis. Given the small number of disengagement studies and the recent argument of disengagement being distinct from engagement (Jang et al., 2016), future studies should explore the differences between engagement and disengagement in their associations with desirable and undesirable student outcomes. Seventh, studies on university students were excluded in the initial screening. In addition, effect sizes that were based on kindergarten to second-grade students were later omitted prior to the meta-analysis. Given the sample restriction, the meta-analytic findings of this article should be applicable only to third- to 12th-grade students. Eighth, studies from the visual arts, music, and PE fields were excluded during the systematic review. Therefore, the findings are not generalizable to these subject domains, and more primary and meta-analytic studies could be conducted in the future to explore how engagement is operationalized in these subject domains and how they relate to achievement and other outcome variables.

Ninth, as compared to academic achievement, there are relatively fewer number of studies on student engagement and SWB. As a result, some of the moderation analyses for SWB have produced a low *df* (<4), which indicates a need to interpret these findings with caution (Tanner-Smith et al., 2016). Nevertheless, as there is no precedence of a meta-analysis on student engagement and SWB, the present meta-analysis involving SWB has provided new insights into the engagement–SWB associations. We hope that the findings could trigger further primary research and meta-analyses on this topic given the importance of well-being in education. Tenth, many student characteristics like gender, nationality, and race and ethnicity did not significantly moderate the engagement–outcome associations. This could reflect the nuanced ways in which different cultural and social identities (e.g., Asian vs. African American identity) influence the engagement experience of different students (e.g., students with different levels ethnic group identification; see Verkuyten et al., 2019). As these nuances could not be adequately captured in our meta-analysis, much more work is needed to explore how engagement operates in students with different cultural and social identities.

Lastly, despite our efforts to explain the variability of the effect sizes by differentiating the associations of different engagement subtypes, there is still much heterogeneity in the data set. In our view, this is largely attributed to the overgeneralization of the student engagement (Azevedo, 2015) with its multitude of indicators. While the present article tried to organize the existing ways in which student engagement was operationalized (see Table 1), more theoretical work is required to determine the conceptual boundaries of student engagement.

Theoretical and Applied Implications

What are some of the theoretical and applied implications that we can draw from this systematic review and meta-analysis? This section summarizes three key takeaways for researchers and practitioners based on the findings of this review.

Distinguish Learning Activity and School Community Engagement

One significant finding is how the three engagement dimensions can be further differentiated into different subtypes. Some subtypes (e.g., affective learning, effortful) are concerned with students' learning experiences and exhibited strong associations with academic achievement, while others (e.g., relational, affective school, participatory) are concerned with school or social connectedness and exhibited strong associations with student well-being. In view of this observation, we encourage scholars to view student engagement as a metaconstruct consisting of two distinct components, namely learning activity engagement and school community engagement (Wong & Liem, 2022). The former refers to an active mental state in learning activities that relates to students' (academic) work role, while the latter refers to a state of connection with the school community that relates to students' role as a member of the school. Both engagement components are made up of different indicators (e.g., academic vs. social; M.-T. Wang & Hofkens, 2020) and are related to different student outcomes (e.g., achievement vs. well-being). Making this distinction, in our view, is an important first step to help resolve the conceptual and operational incoherence in the student engagement literature.

Differentiate Engagement From Related Constructs

Table 1 shows that student engagement is often measured using a wide range of indicators that overlap with those of other constructs. To address the issue of overgeneralization (Azevedo, 2015), there is a need for researchers to (a) articulate the defining characteristics of student engagement that bind its dimensions and indicators, (b) establish a set of criteria for identifying what is and what is not a conceptually valid engagement indicator, (c) provide theoretical justifications for combining individual constructs to form a higher order constructs, and (d) specify how each indicator relates to each engagement dimension and to the broader engagement concept (Edwards & Bagozzi, 2000; Johnson et al., 2012; Law et al., 1998). To illustrate, if engagement is defined as students' active mental state during learning activities, one could select or design indicators based on the criteria of whether they represent an activating state (e.g., activating emotions, behavioral activation) and occur during a learning event. With these criteria, we could also determine how indicators like perceived value would fall outside the conceptual boundaries of engagement since they are academic beliefs that are held outside of the learning activities. More of such conceptual discourse is necessary to move the field forward (see other conceptual questions in Table 1).

Identify the Targets of Engagement Interventions

Different engagement subtypes were shown to have distinct patterns of correlations with academic achievement and SWB. To enhance academic achievement, practitioners should design interventions (see Pino-James et al., 2019 for examples of instructional engagement interventions) that would help increase students' energized emotions (affective learning), effort and persistence (effortful), and deep thinking (self-regulatory) during learning activities. Contrastingly, interventions that seek to increase students' SWB should include strategies that target their sense of belongingness

(affective school), social relationships (relational), and cooperative participation in school (participatory). These may include social–emotional learning or socio–emotional climate interventions (e.g., Yang et al., 2018). Rather than a generic student engagement intervention, the present study suggests that practitioners should develop interventions that target different engagement subtypes based on the outcomes desired.

Conclusion

There is a dearth of systematic reviews and meta-analytic studies that seek to consolidate research findings on student engagement and to ascertain its value in promoting positive student outcomes. To bridge this gap, the present meta-analysis showed that student engagement was significantly associated with academic achievement and SWB. However, as raised by other researchers (e.g., Salmela-Aro et al., 2021), we observed that the student engagement construct has been conceptualized, operationalized, and measured disparately in the literature. Furthermore, we also found that the student engagement associations varied significantly depending on how the construct was operationalized, and on certain methodological factors like informant source of engagement or choice of achievement measure. The findings are concerning because in its current state, student engagement is incoherent and at times indistinguishable from other related constructs (e.g., motivation and self-regulation).

To advance this important field of study, there is a timely and pressing need for scholars to take a step back and critically reflect on the meaning of student engagement, and to consider how it adds value to our understanding of student development above and beyond other existing constructs or models (e.g., self-regulated learning; see Azevedo, 2015). The clarity and validity of constructs is the foundation of any theory, measure, empirical work, or scientific discourse in general. As such, the current field of student engagement is in critical need for more conceptual research (e.g., M.-T. Wang & Hofkens, 2020; Wong & Liem, 2022) to provide an integrative and inclusive approach in understanding engagement. Even though student engagement has the potential to promote positive student outcomes, without a common and clear lens, it is difficult for researchers, policymakers, and practitioners to engage in productive discourses about student engagement, and to make practical use of the research findings to impact student development.

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Received April 28, 2022
Revision received August 22, 2023
Accepted August 28, 2023 ■