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The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: a meta-analytic review

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ABSTRACT

This meta-analytic review examines the relationships between students' sense of school belonging and students' motivational, social-emotional, behavioural, and academic functioning in secondary education. Moreover, it examines to what extent these relationships differ between different student groups (grade level, SES), measurement instruments, and region. The meta-analysis included 82 correlational studies, published in peer-reviewed journals between 2000 and 2018. Results revealed, on average, a small positive correlation with academic achievement, and small to moderate positive correlations with motivational outcomes such as mastery goal orientations; with social-emotional outcomes such as self-concept and self-efficacy; and with behavioural outcomes such as behavioural, cognitive, and agentic engagement. A small negative correlation is observed with absence and dropout rates. Similar results are found across different student groups (grade level, SES). Although the results vary to some extent across measurement instruments and region, generally, the results reveal that school belonging plays an important role in students' school life.

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School belonging; academic achievement; motivation; behaviour; meta-analysis

Introduction

Meeting the psychological needs of adolescents who have become disaffected from school is one of the biggest challenges in education (Christenson, Reschly, and Wylie 2012; Fredricks, Blumenfeld, and Paris 2004). In the past decades, increased attention has been given to the importance of fulfilling the need to belong (Maslow 1962) in educational contexts. Researchers emphasise the importance of a caring school environment that facilitates a sense of community and a feeling of belongingness among students (Allen et al. 2018; Battistich et al. 1997; Osterman 2000). This feeling of belongingness is often defined in the literature as a sense of school belonging.[1] A widely accepted definition of school belonging is 'the extent to which students feel personally accepted, respected, included, and supported by others in the school social

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environment' (Goodenow 1993, 80; also using the label school membership). Multiple studies conducted in the last decade have shown that having a sense of school belonging is positively related to student functioning such as students' school motivation (e.g. Gonida, Voulala, and Kiosseoglou 2009; Walker and Greene 2009), their social-emotional functioning such as their self-esteem (e.g. Dotterer and Wehrspann 2016), their classroom behaviour (e.g. Kiefer, Alley, and Ellerbrock 2015), and their academic achievement (e.g. Anderman 2003; Ma 2003; Niemiec and Ryan 2009; Pittman, Richmond, and Richmond 2007; Zimmer-Gembeck et al. 2006) but negatively related to school dropout (e.g. Hascher and Hagenauer 2010; Ream and Rumberger 2008).

The meta-analysis presented here gives estimates of the strength of the suggested relationships between school belonging and various student outcomes across a broad range of studies and educational contexts. In the present meta-analysis, school belonging is considered as independent variable and students' motivational, social-emotional, behavioural, and academic achievement outcomes are considered as dependent variables. In line with the belongingness hypothesis (Baumeister and Leary 1995), having a sense of school belonging is perceived as a prerequisite for overall school functioning.

Meta-analyses provide insight into the strength of presumed relationships among variables by combining the knowledge from previously published papers about a specific topic. This paper builds on previous review studies on school belonging and related student outcomes. For example, Osterman (2000) published a review on students' need for belonging in the school community by integrating a broad range of previously published papers on belongingness, feelings of acceptance, and the role of school communities. Thereafter, Fredricks et al. (2004) published a comprehensive review on school engagement, including a focus on school belonging. Roorda, Koomen, Spilt, and Oort (2011) published a meta-analysis on the relation between teacher–student relationships and students' school engagement and achievement. Several years later, the 'Handbook of research on student engagement' was published, incorporating multiple contributions on engagement and belonging of scholars from various academic fields (Christenson, Reschly, and Wylie 2012). Following Roorda et al. (2011), the mediating effect of school engagement on the relationship between teacher–student relations and achievement was studied by (Roorda et al. 2017). In Allen et al. (2018) published a meta-analysis on the relationships between secondary school students' sense of school belonging (as dependent variable) and a broad range of student variables such as academic motivation, parental support, and teacher support. Yet, little attention was given to academic achievement in Allen et al., whereas improvement of student achievement is one of the most important goals in education. Additionally, they only included studies originating from English-speaking countries. Another observation is that few review studies have incorporated unfavourable student outcomes in their search terms, such as early school dropout, despite the fact that several studies emphasise the importance of engagement to prevent students from dropping out of school (Hascher and Hagenauer 2010; Ream and Rumberger 2008).

The present study builds on these previously published reviews by providing a comprehensive meta-analysis on the relationships between school belonging and a wide range of student outcomes, including their academic achievement and unfavourable outcomes such as school dropout. This was done by conducting a meta-analysis of the relevant peer-reviewed studies published between 2000 and 2018. Few correlational

studies have been published about school belonging before 2000. Thereafter, the number of studies considering this topic increased quite rapidly, which is why the year 2000 was taken as the starting point for the literature search. To further our understanding of the suggested relationships in secondary education, the presented meta-analysis examines to what extent these relationships differ between different student groups (across grade levels, namely lower/upper grades in secondary education; and across students from different socioeconomic backgrounds), measurement instruments, and region. Students in the lower grades may not (yet) have developed a strong connection to their new school, still being in the early phase of their identity formation process (Flum and Kaplan 2012). For them, a sense of school belonging may be more strongly related to their school functioning than for students in the upper grades. Moreover, little is known about differences between regions, particularly because most studies about school belonging have been published in the USA, whereas some relationships among variables may be stronger or weaker in other regions. Few scholars have studied the moderating role of culture (e.g. Western versus Eastern countries) in their meta-analyses. An exception is the study of Lei, Cui, and Chiu (2016). Their results indicated that positive teacher–student relationships might reduce externalising behaviour problems more for Western than for Eastern students, whereas negative teacher–student relationships might increase externalising behaviour problems more for Eastern than for Western students. Following these results, the associations between school belonging and the various student outcomes might be stronger for Western students than for Eastern students.

Some researchers have posed that students with low SES 'have more to gain or to lose than other students' (Roorda et al. 2011, 497; see also Hamre and Pianta 2001), suggesting that interpersonal relationships at school are more important for low SES students than for high SES students. Therefore, we expected stronger associations between school belonging and student outcomes for low SES students. SES is a strong predictor of students' overall school functioning (e.g. Van Rooijen et al. 2017). When the relationships between school belonging and, for example, academic achievement are stronger for low-SES students, this further enhances our understanding of (how to deal with) underperformance of low-SES students. Finally, due to the fact that various measurement instruments have been used to measure students' sense of school belonging in the past decades, we examined to what extent the associations between school belonging and the student outcomes differed across measurement instruments.

The research questions guiding this meta-analysis were:

(1) *To what extent is secondary school students' school belonging related to students' motivational, social-emotional, behavioural, and academic outcomes?*
(2) *To what extent do these relationships differ between different student groups (grade level, SES), different measurement instruments that were used to measure school belonging, and different regions where the included studies were conducted?*

Since scholars have used a broad range of related constructs, we will explain the meaning of these constructs in the theoretical framework, clarify similarities and dissimilarities, and explain the theoretical rationale behind the present study. Thereafter, the meta-analysis is presented. Important to note here is that the meta-analysis is correlational in

nature. In line with the earlier stated belongingness hypothesis as well as the self-determination theory (Ryan and Deci 2009; see theoretical framework for further details), one could argue that having a sense of school belonging is a basic psychological need that, if fulfilled, will result in favourable outcomes (e.g. motivation for school). In that sense, school belonging can be viewed as the predictor of students' academic, motivational, social-emotional, and behavioural outcomes. As will be explained in the results section, seven broad categories of relevant (i.e. school-related) student outcomes were included in the meta-analysis, namely academic achievement, motivational outcomes, perceived learning environment, behavioural engagement, educational aspirations/attitudes, absence/dropout rates, and self-perceptions.

Theoretical framework

School belonging

The concepts school belonging, school relatedness, school connectedness, school membership, and identification with school are interchangeably used by scholars, with small differences in operationalisation (Christenson, Reschly, and Wylie 2012). As a result, the precise meaning of each construct is not always transparent, although they seem to have the same general meaning. The theoretical basis for all these concepts is the so-called belongingness hypothesis. This hypothesis states that human beings 'have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships' (Baumeister and Leary 1995, 497). Belonging is defined as 'an individual's sense of being accepted, valued, included, and encouraged by others' (Baumeister and Leary 1995), strongly in line with the definition provided by Goodenow (1993; see also Goodenow and Grady, 1993), presented in the introduction. In a similar vein, Libbey (2004) defined school connectedness as 'a student's relationship to school' (274). The various labels and different operationalisations are explained and discussed below to clarify the similarities and dissimilarities across the various constructs.

The often-cited work of Finn (1989) has been used to develop measurement frameworks for the school belonging construct, presumably because Finn used a variety of important concepts in his participation-identification model to explain dropout behaviour, including students' identification with school (e.g. Voelkl 1996). Finn and Kasza (2009) have indicated that the identification with school construct is similar to the constructs school bonding, school connectedness, school membership, and school attachment. The participation-identification model posits that only the students who identify with their school develop a perception of school belonging. This perception of belonging then facilitates the students' engagement and their commitment to schooling. As stated previously, the social context determines whether students identify with the school, since teacher–student relations and support from teachers and peers are the basis of students' perception of school belonging (see also Allen et al. 2018; Roorda et al. 2011; Voelkl 1996, 1997, 2012).

The concept of school belonging has been integrated in various broader theoretical models as well. For example, Wehlage et al. (1989) and Smerdon (2002) used a broader definition of school membership, including three interrelated dimensions, namely (a) students' feeling of belonging (based on Baumeister and Leary 1995), (b) students'

commitment to school (regarding the institute as a whole, e.g. valuable for their own future), and (c) students' commitment to academic work (e.g. whether the investment in it is personally rewarding). These authors state that full membership only occurs when students have all these feelings.

Another theoretical model that has incorporated school belonging to some extent is the model proposed in the self-determination theory (SDT). SDT is a macrotheory of human motivation that explains people's inherent growth tendencies and innate psychological needs. The theory suggests that when basic psychological needs such as the need for relatedness, the need for autonomy, and the need for competence are met, positive outcomes occur. The need for autonomy refers to the experience of behaviour as volitional and reflectively self-endorsed. The need for competence refers to the experience of behaviour as effectively enacted (Niemiec and Ryan 2009, 133). The need to belong is included in this theory under the label 'need for relatedness' (Ryan and Deci 2009; see also Deci and Ryan, 1985; Deci and Ryan 2002; Deci et al. 1991; Niemiec and Ryan 2009), facilitating the process of internalisation. This means that people tend to internalise values and practices from contexts (and people within that context) in which they experience a sense of belonging (Niemiec and Ryan 2009). Within the school context, as explained in Korpershoek (2016), following both the belongingness hypothesis as well as SDT, students generally have a pervasive drive (or in SDT an innate need) to form and maintain significant interpersonal relationships (e.g. with their teachers and peers) and a psychological need to create ties to the school as institution. In SDT, individual needs are perceived as mediators between contextual factors and engagement (what is meant here is behavioural engagement, see the next paragraph), suggesting that students will be more engaged when the school or classroom context meets their basic psychological needs. Moreover, the theory posits that intrinsic motivation is sustained when basic psychological needs are met. The need for relatedness is not necessarily a prerequisite for intrinsic motivation, but a 'needed backdrop' that makes expression of the innate growth tendency of intrinsic motivation more likely (Deci and Ryan 2000, 235).

Notably, in the above-stated literature, it is generally assumed that those who do not have a sense of connection to a group or community will likely experience a variety of ill effects on health, adjustment, and well-being (Baumeister and Leary 1995). Several studies have indicated that school bonding (e.g. Maddox and Prinz 2003), school relatedness (e.g. Deci and Ryan 2000) and school connectedness (e.g. Resnick et al. 1997; Shochet et al. 2006; see also Lohmeier and Lee 2011) are negatively associated with unfavourable characteristics such as anxiety, low self-esteem, depression, substance use, delinquency, and antisocial behaviour. A positive relation with teachers and peers is vital for students' engagement and achievement in school (Lam et al. 2012; Roorda et al. 2011) and students are less likely to drop out of high schools where these relationships are positive (Lee and Burkam 2003).

School belonging and school engagement

Research on school engagement can be used to place the school belonging construct in a broader theoretical framework. School engagement is a multidimensional construct (Appleton, Christenson, and Furlong 2008; Christenson, Reschly, and Wylie 2012; Finn

and Zimmer 2012; Skinner, Kindermann, and Furrer 2009; Wang, Willett, and Eccles 2011), that can be defined as the quality of a student's connection or involvement with the endeavour of schooling and hence with the people, activities, goals, values, and place that compose it (Skinner, Kindermann, and Furrer 2009, 494). Engagement is a 'meta' construct that represents the interaction between the individual and the environment, that is, not as a trait-like characteristic of individuals. However, numerous different conceptualisations of school (or student) engagement have been used in prior studies. Corno and Mandinach (2004) state that school engagement 'emerges from the productive exercise of academic work' (311), but what is meant by the term is not explained. In the PISA 2000 studies, student engagement (in the school context) refers to students' attitudes towards schooling and their participation in school activities (Willms 2003, 8). Somewhat in contrast, some scholars suggest that engagement is a manifestation of motivation (Wigfield et al. 2006). The often referred to review study of Fredricks et al. (2004) distinguishes three domains, namely between behavioural, emotional, and cognitive engagement (see also Finn and Zimmer 2012; Furlong et al. 2003; Lawson and Lawson 2013; Wang, Willett, and Eccles 2011).

Behavioural engagement (or classroom engagement; Archambault, Pagani, and Fitzpatrick 2013; Blatchford, Bassett, and Brown 2011) represents students' active involvement and participation in academic or extracurricular activities. It can be split into three levels of observable engagement (Finn 1989; Finn and Rock 1997). Level one includes students' conformity to classroom and school rules, being prepared, and paying attention to the teacher. Level two refers to student initiative, enthusiasm, and spending more time on schoolwork. Level three includes involvement in school-related extracurricular activities. Appleton et al. (2006) distinguish between behavioural engagement (attendance, suspensions, participation in extracurricular activities) and academic engagement (e.g. time on task, homework completion). Cognitive engagement incorporates 'thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills' (60; see also Greene and Miller 1996; Walker, Greene, and Mansell 2006). The construct is generally measured by indicators such as students' perceptions and value of learning and the utilisation of self-regulation strategies.

Emotional engagement encompasses positive and negative reactions to teachers, classmates, academics, and school and is presumed to influence willingness to do the required school work. It encompasses students' relationship with their teachers and peers (Appleton, Christenson, and Furlong 2008) and has to do with 'students' feelings about school and the degree to which they care about their school' (Sciarra and Seirup 2008, 218), thus with students' feelings of belongingness (Osterman 2000). It is presumed to create ties to an institution, in other words, create a sense of school belonging. Appleton et al. (2006) use the label 'psychological engagement' for this component, while Jimerson, Campos, and Greif (2003) utilise the label 'affective engagement'. Following these definitions, school belonging is, in our view, conceptually similar to emotional engagement. For more clarity, Figure 1 gives an overview of the various construct labels and synonyms for school belonging and presents that, in our view, school belonging is conceptually similar to emotional engagement.

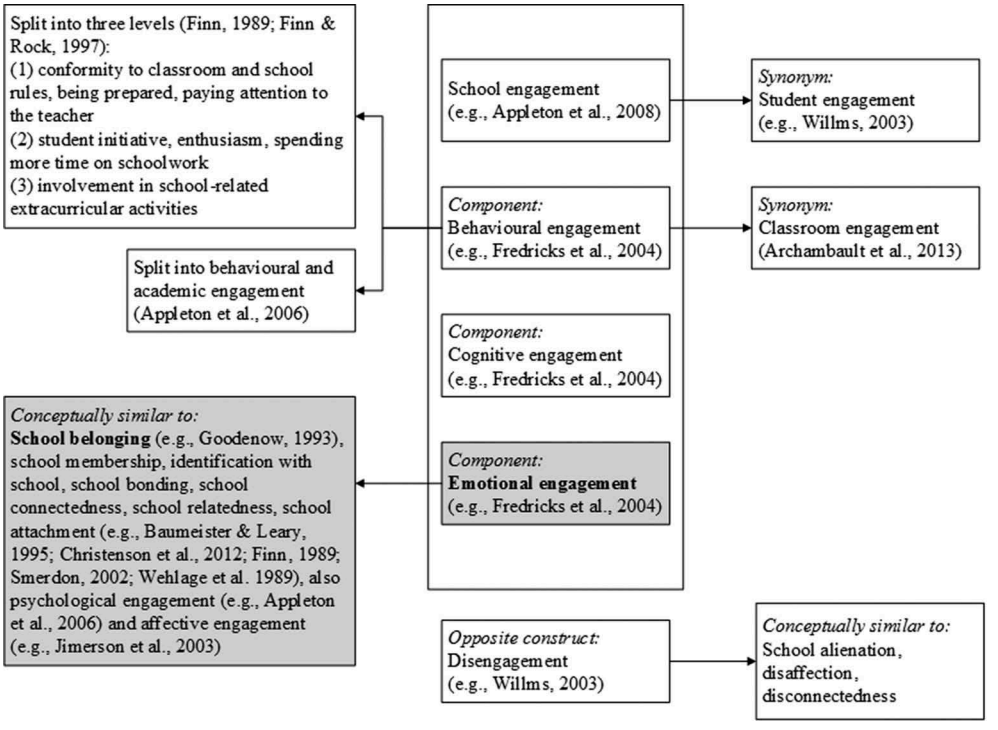

Figure 1. Relationships between the various constructs.

In the literature, it is widely accepted that emotional, behavioural, and cognitive engagement are interrelated, that there are multiple indicators for each type, and that these indicators partly overlap with constructs such as motivation to learn, self-efficacy, and attitudes towards school (e.g. Appleton et al. 2006; Fredricks et al., 2004). Fredricks et al. (2004) further stress that engagement can vary in intensity and duration; it can be short term and situation specific or long term and stable. Moreover, they emphasise that engagement in the classroom and engagement in the larger school community are distinct types of engagement. They, however, report that many studies they included in their review have failed to make these distinctions. Conceptualising school belonging as the emotional dimension in the broader school engagement construct further underlines the theoretical distinction between students' emotional and behavioural functioning in school. The distinction between behavioural and emotional engagement has been used in other publications besides Fredricks et al. (2004) and Appleton et al. (2006). For example, Skinner and Belmont (1993; see also Skinner, Wellborn, & Connell, 1990; Skinner et al., 2009; Skinner, Marchand, Furrer, & Kindermann, 2008) considered students' behavioural engagement in terms of students' effort, attention, and persistence during the initiation and execution of learning activities, and students' emotional engagement in terms of their emotional reactions in the classroom. This includes emotions such as interest versus boredom, happiness versus sadness, anxiety, and anger (see also Roeser, Strobel, and Quihuis 2002). Skinner et al. (2009) explain that the quality of students' participation includes engaged behaviour

(e.g. on-task behaviour) as well as engaged emotion (e.g. enthusiasm) and that these components interact.

In addition to the three types of engagement used by Fredricks et al. (2004), other scholars have also studied disengagement, mainly to characterise students who 'do not feel they belong at school and have withdrawn from school activities in a significant way' (Willms 2003, 8). Finn and Kasza (2009) define disengagement as 'the failure to develop a sense of school membership, failure to participate actively in class and school activities or failure to become cognitively involved in learning' (8). Other terms for this are school alienation, disaffection, and disconnectedness. Like the engagement construct, these terms incorporate behavioural indicators (e.g. irregular school and class attendance, no homework completion) and emotional indicators (e.g. a feeling of being disaffected), though they are not always labelled in that fashion in the literature. Some scholars suggest that disaffection and engagement are separate constructs, and not the ends of one continuum (e.g. Skinner et al. 2009; Skinner et al. 2008). Salmela-Aro et al. (2009) use the term school burnout when they refer to feelings of disengagement, although their definition refers to a broader set of feelings such as exhaustion because of school demands, cynical and detached attitude towards one's school, and feelings of inadequacy as a student (49). In line with their expectations, Salmela-Aro and Upadyaya (2014) found that school burnout predicted schoolwork engagement negatively.

Following these theoretical notions, it was decided to include a broad range of search terms and synonyms of school belonging and engagement in our database searches, to provide a comprehensive overview of relevant studies. Moreover, it stresses the need to analyse potential differences between the various measurement instruments that were used to measure school belonging (or a similar construct) in the primary studies. In the following section, we will elaborate on the methods we have used.

Method

Literature search and inclusion criteria

This meta-analysis focuses on studies published in English in peer-reviewed journals between January 2000[2] and December 2018. Online database searches included ERIC and PsycINFO, focusing on peer-reviewed journal articles. The following combination of terms was used: (school OR education) AND (engagement OR belonging OR relatedness OR connectedness OR membership OR identification with school OR identity OR commitment OR adjustment OR attachment) AND (educational outcomes OR cognitive OR achievement OR performance OR grades OR motivation OR drop-out* OR self-concept OR self-efficacy OR competence OR mastery OR expectanc* for success OR intrinsic value OR valu* of schooling OR aspirations OR expectations OR importance of schooling OR absenteeism OR attendance), focusing on students in secondary education. Additionally, the *Handbook of research on student engagement* (Christenson, Reschly, and Wylie 2012), the review study of Roorda et al. (2011) and the meta-analysis of Allen et al. (2018) were consulted for relevant additional papers by screening the reference lists.

The selection criteria were:

(1) The study related students' sense of school belonging to relevant academic, motivational, social-emotional, and/or behavioural student outcomes;
(2) The study was conducted in regular secondary education classrooms (excluding special needs education, studies with more than 25% single-sex schools, physical education, and out-of-school activities) and focuses on regular students (students with emotional and/or behavioural disorders, learning disabilities, and gifted students were excluded). Secondary education includes grades 6/7 to 12, including middle school and high school. When grade 6 students were still in primary school, the sample was not included;
(3) The study used quantitative research methods (excluding qualitative studies, ethnographic studies, case studies, and action research) and the student sample used in the study consisted of at least 30 students in order to calculate the correlation coefficients.

Empirical evidence for a causal relationship between school belonging and the various student outcomes is scarce. Despite the fact that some studies label school belonging as predictor of other variables, they often only studied correlational effects. Hence, it was decided to focus on all types of correlational studies, irrespective of the direction of the effects.

The ERIC and PsycINFO database searches resulted in 7,090 unique records (see Figure 2). After initial screening of the titles and abstracts by the first author, 679 papers were included for further inspection (eliminating the off-topic papers and/or papers that already showed in the abstract that they did not meet the inclusion criteria). The additional searches in Christenson et al. (2012) and Roorda et al. (2011) did not result in new potentially relevant papers (those that appeared relevant were already included in the 679 selected papers). The additional searches in Allen et al. (2018) resulted in 19 potentially relevant papers that were not yet included, resulting in an overall number of 698 potentially relevant papers. Two researchers (including the first author) read and judged a first subset of about 17% of the 698 full papers (n = 121), using the three inclusion criteria. The inter-rater agreement was 0.94 (114 out of 121 cases), Cohen's Kappa being 0.84. When there was a disagreement (n = 7), the authors read the full papers again in more detail and discussed until full consensus was reached. While assessing the papers, it was discovered that in some studies, the dependent and independent variables measured were part of the same measurement instrument. After deliberation, it was decided to not include those results, by adding a fourth inclusion criterion:

(4) The dependent and independent variables measured in the study were not part of the same measurement instrument.

When other relevant outcome variables were included in those studies (i.e. the studies that did not meet the fourth criterion), only the outcome variables that were part of the same measurement instrument were excluded. Because full consensus was reached about all papers by adding the fourth criterion, it was decided that the remaining papers (n = 577) would be assessed by the first author only. In 10 cases, the co-authors were consulted to decide about the eligibility.

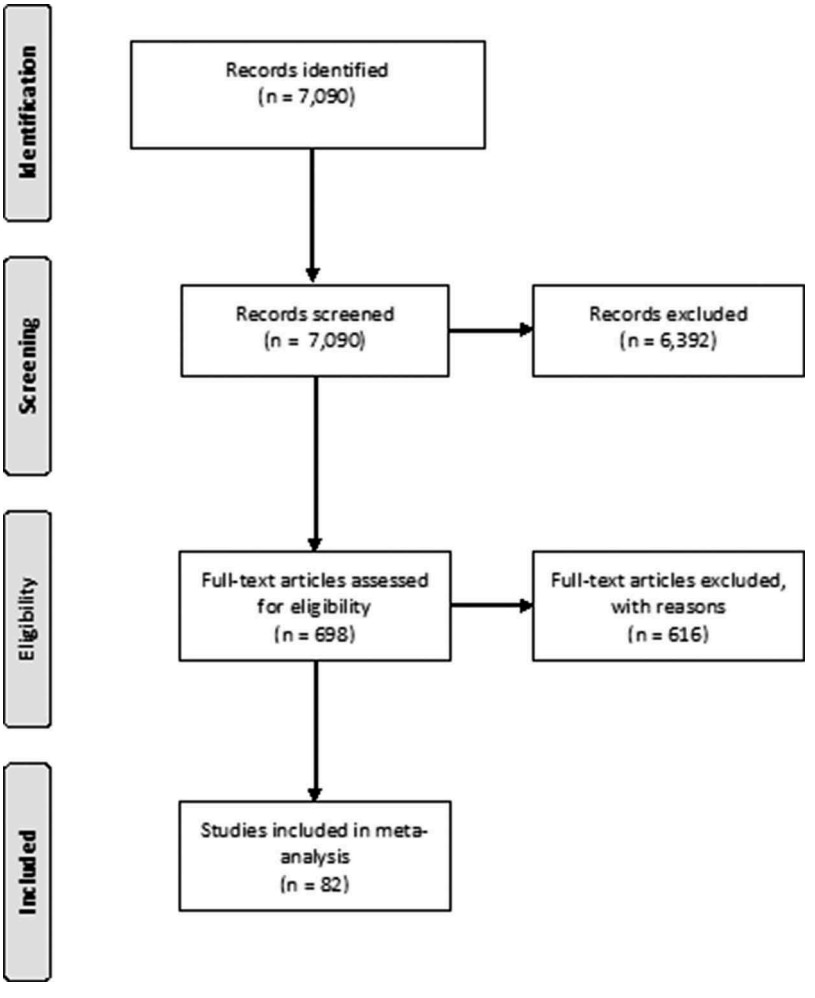

Figure 2. Flow chart.

In total, 82 studies met all inclusion criteria (see flow chart in Figure 2). The other 616 papers were excluded due to the following reasons: off-topic papers were eliminated (criterion 1; n = 535). These were studies that did not measure sense of school belonging (or a related construct), studies that measured sense of school belonging as a broader, more general construct (e.g. school engagement without subdimensions), and/or studies that did not relate sense of school belonging to relevant outcome measures (e.g. achievement measures). From the remaining set of papers, 44 were not conducted in regular secondary education classrooms (criterion 2), 17 studies did not use quantitative research methods and/or reported on samples of less than 30 students (criterion 3), in seven studies the dependent and independent variables measured were part of the same measurement instrument (e.g. measuring behavioural, cognitive, and emotional engagement; criterion 4), and from 13 papers only the abstracts were available.

Coding

The selected studies were coded for further study, including the following information: (a) general information (title, country in which the study was conducted), (b) background characteristics of the students (ethnicity, socioeconomic status, age, grade level), (c) which constructs were measured (how they were measured, who provided the ratings, and type of measurement instrument), and (d) statistical information (sample size and correlation coefficients). A summary of the included studies is presented in Table 1. The table includes information on the sample size, the labelling of the school belonging construct, the measurement instrument used, and a list of student outcomes (categorised into seven broad categories for ease of interpretation, see footnote of Table 1 for detailed information).

All in all, the meta-analysis included the following numbers of studies per region: USA/Canada (n = 57), Europe (n = 9), Asia (n = 8), Australia (n = 4), South America (n = 2), and multiple countries (n = 2 ; of which one study reported the data for a subgroup of Asian students and a subgroup of USA students separately). From the 82 included studies, 24 were conducted in middle school, 38 in high school, and 20 studies included students from both grade levels. From the studies focused on both grade levels, 8 reported data for middle school and high school separately. From the 51 studies (62%) that reported students' SES, 16 were considered low SES samples (>40% free or reduced lunch), 33 were considered middle/high SES (<40% free or reduced lunch), and two studies included a subgroup of students with low SES and a subgroup of middle/high SES and reported associations for both groups separately.

Analyses

From each study, the correlation coefficients between school belonging and all relevant student outcomes are included. These correlation coefficients can serve as the effect size index. For the meta-analysis, the correlation coefficients are transformed into Fisher's Z (Z_{Fisher}). The studies are weighted by the accuracy of the effect size they provide, by using the inverse of the variance as a weight. The variance depends on the sample size. Larger sample sizes yield lower variances and subsequently higher weights. For each characteristic, a summary Z_{Fisher} value (an average effect size) is calculated. For the purpose of clear presentation, these summary values are converted back to correlations. When a study reported correlations with more than one similar student outcome, we averaged these measures and used this as the study's effect.

The variance of this averaged study effect was calculated by means of the formula provided by Borenstein et al. (2009; 230, formula 24.6), which is $V_{\bar{y}} = \frac{1}{m}V(1+(m-1)r).V$ is the variance, m is the number of outcomes within a study, r is the correlation between outcome measures of the same type. We estimated this correlation at 0.7. By doing this, the variance of the studies was adjusted in such a way that the variance decreased slightly when multiple outcome measures were reported.

Correlations with school belonging are calculated for seven domains (see Table 1): academic achievement, motivational outcomes, perceived learning environment, behavioural engagement, educational aspirations/attitudes, absence/dropout rates, and self-perceptions. Since different measurement instruments were used to measure school

Table 1. Overview of the studies included.

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
1	Prelow, Bowman, and Weaver (2006)	USA	206	School connectedness (Resnick et al. 1998)	Academic achievement
2	Benner, Graham, and Mistry (2008)	USA	1,116	School belonging (Effective School Battery; Gottfredson 1984)	Academic achievement Perceived learning environment Engagement
3	Knifsend and Graham (2011)	USA	864	Sense of belonging at school (Effective School Battery; Gottfredson 1984)	Academic achievement Engagement
4	Liu and Lu (2011)	China	567	Sense of school belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement
5	Thompson et al. (2006)	USA	13,207	School connectedness (Health Behavior in School-Aged Children Study; www.hbsc.org)	Academic achievement
6	Reeve and Tseng (2011)	Taiwan	365	Emotional engagement (Wellborn 1991)	Academic achievement Motivational outcomes Engagement
7	Wang and Holcombe (2010)	USA	1,046	School identification (School engagement index; Eccles et al. (1993)	Academic achievement Perceived learning environment
8	Perry, Liu, and Pabian (2009)	USA	285	School identification (Identification with School Questionnaire; Voelkl 1996)	Academic achievement Engagement
9	Mo and Singh (2008)	USA	1,235	Emotional engagement (Mo and Singh 2008)	Academic achievement
10	Sirin and Rogers-Sirin (2005)	USA	499	School identification (Identification with School Questionnaire; Voelkl 1996)	Academic achievement
11	Adelabu (2007)	USA	232	School membership (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement
12	Li and Lerner (2011)	USA	1,058	Emotional school engagement (Profiles of Student Life: Attitudes and Behaviors; Leffert et al. 1998)	Academic achievement
13	Singh, Chang, and Dika (2010)	USA	378	School belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Engagement Self-perceptions
14	Wang and Eccles (2011)	USA	1,148	Perceived sense of connectedness (Maryland Adolescent Development in Context Study; www.rcgd.isr.umich.edu)	Academic achievement Educational aspirations/attitudes
15	Chun and Dickson (2011)	USA	419	Sense of school belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Self-perceptions
16	Kuperminc, Darnell, and Alvarez-Jimenez (2008)	USA	324	School belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Self-perceptions
17	Irvin et al. (2011)	USA	6,247	School belonging (abbreviated PSSM by Hagborg 1994, Hagborg 1998)	Academic achievement Educational aspirations/attitudes

(*Continued*)

Table 1. (Continued).

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
18	Sánchez, Colón, and Esparza (2005)	USA	286	Sense of school belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Engagement Educational aspirations/attitudes Absence/dropout Self-perceptions
19	Anderman (2003)	USA	618	Sense of school belonging (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Perceived learning environment Educational aspirations/attitudes Self-perceptions
20	Gray and Hackling (2009)	Australia	255	School belonging (Gray and Hackling 2009)	Academic achievement Engagement Educational aspirations/attitudes Self-perceptions
21	Walker and Greene (2009)	USA	249	Sense of belonging (Psychological Sense of School Membership; Goodenow 1993)	Motivational outcomes Perceived learning environment Educational aspirations/attitudes Self-perceptions
22	King, McInerney, and Watkins (2012)	Philippines	1,147	Emotional engagement (Affect to School subscale of the Facilitating Conditions questionnaire; McInerney, Dowson, and Yeung 2005)	Motivational outcomes Engagement
23	Ibañez et al. (2004)	USA	129	School belonging (Psychological Sense of School Membership; Goodenow 1993)	Educational aspirations/attitudes
24	Ho (2005)	Hong Kong	4,478	Sense of belonging (www.oecd.org/pisa)	Academic achievement Perceived learning environment Educational aspirations/attitudes
25	Fall and Roberts (2012)	USA	14,781	Identification with school (Fall and Roberts 2012)	Academic achievement Engagement Absence/dropout Self-perceptions
26	LeCroy and Krysik (2008)	USA	170	School attachment (LeCroy and Krysik 2008)	Academic achievement Educational aspirations/attitudes
27	Walls and Little (2005)	USA	786	School adjustment (Self-Perception Profile; Harter 1988)	Academic achievement Motivational outcomes Engagement Self-perceptions

(*Continued*)

Table 1. (Continued).

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
28	Walker (2011)	USA	227	Perception of belonging (Psychological Sense of School Membership; Goodenow 1993)	Perceived learning environment Educational aspirations/attitudes
29	Aerts et al. (2012)	Belgium	1,736	Sense of belonging (Psychological Sense of School Membership; Goodenow 1993)	Motivational outcomes
30	Ahmavaara and Houston (2007)	UK	856	Identification with school (Houston 2000)	Academic achievement Educational aspirations/attitudes Self-perceptions
31	Akiba (2010)	USA	2,787	Sense of belonging (Akiba 2010)	Academic achievement Perceived learning environments
32	Booth and Gerard (2012)	USA	894	School connectedness (Booth and Gerard 2012)	Perceived learning environments Educational aspirations/attitudes Self-perceptions
33	Bryan et al. (2012)	USA	10,426	School bonding (Maddox and Prinz 2003)	Academic achievement
34	Cavendish (2013)	USA	154	School commitment (School Commitment Index; Jenkins 1995)	Absence/dropout
35	Cueto et al. (2010)	Peru	80	Sense of belonging (www.oecd.org/pisa)	Academic achievement Absence/dropout
36	Gillen-O'Neel and Fuligni (2012)	USA	546	School belonging (Institutional Engagement; Tyler and Degoey 1995) (adapted items)	Academic achievement Educational aspirations/attitudes
37	Hill and Wang (2015)	USA	1,157	Emotional engagement (The Michigan Study of Adolescent Life Transitions; Eccles et al. 1993)	Academic achievement Engagement Educational aspirations/attitudes
38	Johnson, Crosnoe, and Thaden (2006)	USA	9,154	School attachment (Johnson, Crosnoe, and Elder 2001)	Academic achievement Self-perceptions
39	Lam et al. (2014) Academic achievement Engagement	Austria, Canada, China, Cyprus, Estonia, Greece, Malta, Portugal, Romania, South Korea, UK, USA	3,420		Affective engagement (Lam et al. 2014)
40	Lee (2013)	USA	3,268	Sense of belonging (www.oecd.org/pisa)	Academic achievement Engagement

(*Continued*)

Table 1. (Continued).

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
41	Lewis, Sullivan, and Bybee (2006)	USA	65	School connectedness (Psychological Sense of School Membership; Goodenow 1993)	Motivational characteristics
42	Li and Lerner (2012)	USA	1,029	Emotional engagement (Li and Lerner 2012)	Engagement
43	McGill et al. (2012)	USA	1,011	Emotional engagement (Wellborn 1991)	Academic achievement Self-perceptions
44	Popp and Peguero (2012)	USA	10,440	School attachment/commitment (Popp and Peguero 2012)	Academic achievement
45	Rostosky et al. (2003)	USA	1,725	School belonging (Rostosky et al. 2003)	Academic achievement
46	Shochet and Smith (2014)	Australia	504	School connectedness (Psychological Sense of School Membership; Goodenow 1993)	Perceived learning environment
47	Uwah, McMahon, and Furlow (2008)	USA	40	Sense of belonging in school (Psychological Sense of School Membership; Goodenow 1993)	Educational aspirations/attitudes Self-perceptions
48	Tyler and Boelter (2008)	USA	262	Emotional engagement (Student Engagement Scale; Fredricks, Blumenfeld, and Paris 2004)	Perceived learning environment Self-perceptions
49	Van Houtte and Van Maele (2012)	Belgium	6,087	Sense of belonging at school (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement
50	Wang and Fredricks (2013)	USA	1,272	Emotional engagement (items derived from various existing scales)	Academic achievement Engagement Absence/dropout
51	Wang and Peck (2013)	USA	1,025	Emotional engagement (Effective School Battery; Gottfredson 1984)	Academic achievement Engagement Educational aspirations/attitudes Absence/dropout
52	Wang and Sheikh-Khalil (2013)	USA	1,056	Emotional engagement (Effective School Battery; Gottfredson 1984)	Academic achievement Engagement
53	Wettersten et al. (2005)	USA	689	Identification with school (Identification with School Questionnaire; Voelkl 1996)	Engagement Self-perceptions
54	Galliher, Rostosky, and Hughes (2004)	USA	7,613	School bonding (Add Health; Udry 1998)	Self-perceptions
55	Kaminski et al. (2010)	USA	4,131	School connectedness (School Connectedness Scale; Resnick et al. 1997)	Academic achievement
56	Shochet, Smyth, and Homel (2007)	Australia	141	Sense of belonging at school (Psychological Sense of School Membership; Goodenow 1993)	Perceived learning environment
57	Bear et al. (2015)	Brazil	174	Emotional engagement (Brazilian) Delaware Student Engagement Scale; Bear et al. 2014)	Perceived learning environment
58	Bernardo, Ganotice, and King (2015)	The		Philippines	1,694

(*Continued*)

Table 1. (Continued).

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
	Affect to school (Affect to School subscale of the Facilitating Conditions questionnaire; FCQ; McInerney, Dowson, and Yeung 2005)		Motivational outcomes Educational	aspirations/attitudes Self-perceptions	
59	Bonell et al. (2017)	England	6,667	Sense of belonging (items derived from various existing scales)	Educational aspirations/attitudes
60	Boston and Warren (2017)	USA	105	School connectedness (California Healthy Kids Survey; WestEd 2008)	Academic achievement
61	Cleary and Kitsantas (2017)	USA	331	School connectedness (School Connectedness Scale; Resnick et al. 1997)	Academic achievement Engagement Educational aspirations/attitudes Self-perceptions
62	Datu, Yuen, and Chen (2018) Emotional engagement (subscale from the Academic Engagement Scale; Reeve and Tseng 2011)	The Philippines	Motivational outcomes Engagement		504
63	Demir and Akman Karabeyoglu (2015)	Turkey	581	Commitment to school (subscale from the School Attachment Scale for Children and Adolescents; Hill, 2006)	Absence/dropout
64	Dotterer and Wehrspann (2016)	USA	108	School bonding (Add Health; Udry 1998)	Academic achievement Motivational outcomes Self-perceptions
65	Fatou and Kubiszewski (2018)	France	955	Affective engagement (subscale from the Student Engagement Scale; Fredricks, Blumenfeld, and Paris 2004)	Perceived learning environment
66	Froiland, Davison, and Worrell (2016)	Hawaii	110	School belonging (Froiland, Davison, and Worrell 2016)	Academic achievement Educational aspirations/attitudes
67	Giano, McQuerrey Tuttle, Merten, Gallus, Cox, & Shreffler (2018)	USA	655	School connectedness (Giano et al. 2018)	Educational aspirations/attitudes
68	Griffin, Cooper, Metzger, Golden, White (2017)	USA	139	Emotional engagement (Wang, Willett, and Eccles 2011)	Academic achievement Educational aspirations/attitudes
69	Hernández et al. (2017)	USA	674	School belonging (items derived from various existing scales)	Self-perceptions
70	Hill et al. (2018)	USA	624	School belongingness (Community subscale of the Relational Health Indices for Youth; Liang et al. 2010)	Engagement
71	Hurd, Hussain, and Bradshaw (2018)	USA	28,104	Connectedness to school (items derived from various existing scales)	Academic achievement

(*Continued*)

Table 1. (Continued).

	Study	Country	Student sample (n_{max})	School belonging construct	Student outcomes[a]
72	Lee and Kim (2016)	Japan, South Korea, Taiwan, USA	25,099	School attachment (TIMSS data)	Academic achievement
73	Liu (2016)	China	2,117	School bonding (items derived from various existing scales)	Self-perceptions
74	Molinari and Mameli (2018)	Italy	640	Emotional Engagement (Lam et al., 2014)	Motivational outcomes Perceived learning environment Engagement
75	Okilwa (2016)	USA	12,026	School belonging (items derived from various existing scales)	Academic achievement
76	Reynolds et al. (2017)	Australia	340	School identification (items derived from various existing scales)	Academic achievement Perceived learning environment
77	Stefansson et al. (2016)	Iceland	539	Emotional engagement (subscale from the Behavioral-Emotional-Cognitive School Engagement Scale; BEC-SES; Li and Lerner 2013)	Academic achievement
78	Tomek et al. (2017)	USA	522	School connectedness (a short version of the Psychological Sense of School Membership questionnaire; Goodenow 1993)	Absence/dropout
79	Topçu, Erbilgin, and Arikan (2016)	USA	9,629	School connectedness (California Healthy Kids Survey; WestEd 2008)	Academic achievement Absence/dropout
80	Wormington et al. (2016)	Turkey	6,928	Belonging to school (TIMSS data)	Academic achievement
81	Kiefer, Alley, and Ellerbrock (2015)	USA	209	Sense of belonging at school (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement Engagement
82	Lam et al. (2015)	Macao	406	Sense of belonging at school (Psychological Sense of School Membership; Goodenow 1993)	Academic achievement

[a]Academic achievement = school grades, standardised test scores. Motivational outcomes = amotivation, controlled/autonomous motivation, performance/mastery approach/avoidance goals, intrinsic/extrinsic motivation, identified/introjected motivation, social goals, perceived autonomy. Perceived learning environment = performance/mastery approach/avoidance classroom goal structure, perceived classroom climate/disciplinary climate/school fairness. Engagement = behavioural/academic engagement, academic effort, cognitive engagement, agentic engagement/agency beliefs, psychological engagement. Educational aspirations/attitudes = educational aspirations, academic attitude, intrinsic value for school subject, importance of schooling for future success/perceived instrumentality. Absence/dropout = absence and dropout data. Self-perceptions = self-concept/perceived competence/agency for ability/self-esteem, self-efficacy/expectations for success, perceived behavioural control.

belonging in the primary studies, separate analyses for each measurement instrument are conducted as well. Correlations are reported when a measurement instrument was used in at least three studies. This is also done for regions (Asia, Australia, Europe, South America, USA/Canada, multiple countries). Additionally, group differences are reported to evaluate differences between students in different grade levels and between students from different socioeconomic backgrounds.

For the analyses of the summary effects, the study is used as unit of analysis. For the analyses of group differences related to country, socioeconomic background and grade level, the study was also used as unit of analysis. However, when studies reported data for more than one category, the study was split up. This happened for studies that reported data for two subsamples, but also in the case of grade year when there were multiple measurement moments of the same sample (in the latter case the variances of the split up studies were adjusted so that its total weight in the analysis remained the same). For the analyses of group differences related to the measurement instrument and the specified outcome type, the various *measures* within a study are used as the unit of analysis, instead of the study itself as the unit. This is because there were several studies in which results were reported for more than one measurement instrument or specific outcome type. In short: the within-study differences compelled us to change the unit of analysis. We adjusted the variances, and thus the weights, by multiplying the variances of each outcome measure with the number of measures of the same outcome type within a study. By doing this, the overall weight of a study with multiple outcome measures remained largely the same, but not fully, as we were unable to correct for the changing within-group variances (T-squared) per analysis. Comprehensive Meta-Analysis software of Biostat was used to carry out all statistical analyses (Borenstein et al. 2009).

Results

Results for research question 1

A total of 82 studies (including 208,796 students) were included in the meta-analysis. Table 2 shows the overall results of the average correlations between school belonging and the seven domains.

Table 2 reveals, on average, small to moderately large associations between school belonging and a broad range of student outcomes. The average correlation coefficients are positive for all student outcomes except for the absence/dropout rates, which was negative. The correlations between school belonging and academic achievement and school belonging and absence/dropout rates were small[3] (r = .18 and r = −.16, respectively), whereas the correlations with the other motivational, social-emotional, and behavioural outcomes were medium to moderately large (varying between r = .30 and .39). The Q-statistics in Table 2 show if there is significant heterogeneity among the effect sizes. For all student outcomes (except absence/dropout rates) the Q-statistic is significant, indicating that the variations in effect size reflect real differences and that it is not a random error.

Table 3 shows the results for specific student outcomes within the seven domains, that is, those student outcomes that were reported at least three times. Across the studies included in the analyses, sense of school belonging was, as expected, positively associated with most of the specific student outcomes, that is, with academic

Table 2. Summary effects for the student characteristics (n = 82 studies).

Student outcomes	*n* studies	Correlation	95% confidence interval Lower bound	Upper bound	*Q*-statistic (df)
Academic achievement	54	.18***	.15	.21	1628.0*** (53)
Motivational outcomes	11	.30***	.21	.38	192.6*** (10)
Perceived learning environment	15	.39***	.29	.48	589.9*** (14)
Behavioural engagement	23	.36***	.29	.42	572.5*** (22)
Educational aspirations/attitudes	22	.29**	.16	.42	2849.2*** (21)
Absence/dropout rates	9	−.16***	−.18	−.14	5.3 (8)
Self-perceptions	23	.37***	.32	.42	457.0*** (22)

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

Table 3. Summary effects for specific student outcomes ($n \geq 3$).

Student outcomes	Specific student characteristics	*n* tests	Correlation	95% confidence interval Lower bound	Upper bound
Academic achievement	School grades	67	.18***	.16	.20
	Standardised test scores	19	.12***	.06	.19
Motivational outcomes	Performance approach goals	6	.06	−.06	.17
	Mastery approach goals	8	.34***	.23	.44
	Extrinsic motivation	3	.13	−.02	.28
	Social motivation	7	.16	−.08	.39
Perceived learning environment	Performance approach classroom goal structure	3	−.05	−.43	.34
	Mastery approach classroom goal structure	4	.44***	.36	.51
	Perceived classroom climate/disciplinary climate/ school fairness	13	.40***	.30	.49
Behavioural engagement	Behavioural/academic engagement and academic effort	29	.35***	.29	.41
	Cognitive engagement	13	.40***	.33	.47
	Agentic engagement/agency beliefs	3	.35***	.25	.43
Educational aspirations/attitudes	Educational aspirations	19	.18***	.12	.25
	Academic attitude	4	.42*	.08	.67
	Intrinsic value for school subject	10	.36***	.32	.40
	Importance of schooling for future success/ perceived instrumentality	9	.24*	.03	.42
Absence/dropout rates	Absence data	7	−.16***	−.18	−.14
	Dropout data	4	−.17***	−.21	−.13
Self-perceptions	Self-concept/perceived competence/agency for ability/self-esteem	24	.35***	.29	.40
	Self-efficacy/expectations for success	15	.38***	.30	.44

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

achievement such as school grades; with motivational outcomes such as mastery goal orientations; with social-emotional outcomes such as self-concept and self-efficacy; and with behavioural outcomes such as behavioural, cognitive, and agentic engagement. Some notable results are discussed below.

Many studies included a measure of school grades ($n = 67$). School belonging was positively associated with this variable ($r = .18$). The association with standardised test scores ($n = 19$) was also in the positive direction ($r = .12$), though less strong. Additionally, students' sense of school belonging was positively related to their perceived learning environment, such as the perceived classroom climate ($r = .40$) and a more mastery-oriented classroom goal structure ($r = .44$), indicating that students

with high levels of school belonging perceived their learning environment as more mastery oriented and generally as a more favourable classroom climate. The correlations between school belonging and some motivational outcomes (performance approach goals, extrinsic motivation, and social motivation) were small and non-significant, in contrast with the positive association between school belonging and mastery approach goals. The correlation with performance approach classroom goal structure was also very small and non-significant, in contrast with the positive association between school belonging and mastery approach classroom goal structure. Table 3 further reveals negative associations for the dropout and absence data, indicating that students with a stronger sense of school belonging showed lower absence and dropout rates. The differences in effect sizes between the various student outcomes were significant (*Q-between* = 1353.88; *df* = 20; $p < .001$).

Subsequently, we examined whether the findings were influenced by publication bias. This might happen because studies with large sample sizes and studies with high effect sizes are more likely to be published than studies based on small sample sizes or reporting small or non-significant effects. For each outcome type, we created a funnel plot of the relationship between standard error and effect size of the studies and applied Duval and Tweedie's Trim and Fill method (Borenstein et al. 2009) to estimate the degree of bias. According to this method, publication bias is indicated when the effect sizes of the primary studies in the meta-analysis are not distributed evenly around the mean effect in a funnel plot. The Duval and Tweedie's method explores if the symmetry of the distribution can be optimised by imputing (filling in) trimmed values of the most extreme effect sizes, but with opposite effect direction, and if so, it calculates an adjusted estimate of the effect size based on the observed and imputed studies. We searched for potentially missing studies on the left as well as the right side of the mean and used a random effects model for this.

We found no publication bias for the outcome types focused on motivation, perceived learning environment, educational aspirations and self-perceptions. However, we did find some publication bias for the other outcome types. The estimated adjusted effect sizes for these outcomes are: academic outcomes r = 0.215 (LL = 0.182; UL = 0.247), engagement r = 0.421 (LL = 0.353; UL = 0.485), and absence/dropout r = −0.158 (LL = −0.174; UL = −0.141). The estimated adjusted summary effects for the academic outcomes and engagement are somewhat higher than the observed summary effects. The adjusted summary effect for absence/dropout is practically the same as the observed summary effect. Figure 3 shows the funnel plots with the observed and imputed studies (when applicable) for each outcome type. The vertical line in the middle represents the average effect. The white circles represent the observed studies that were included in the meta-analysis, the black circles represent the imputed (missing) studies. The white diamond at the bottom of each funnel plot shows the summary effect of the observed studies only, the black diamond shows the summary effect after adjustment for publication bias, with the imputed studies included.

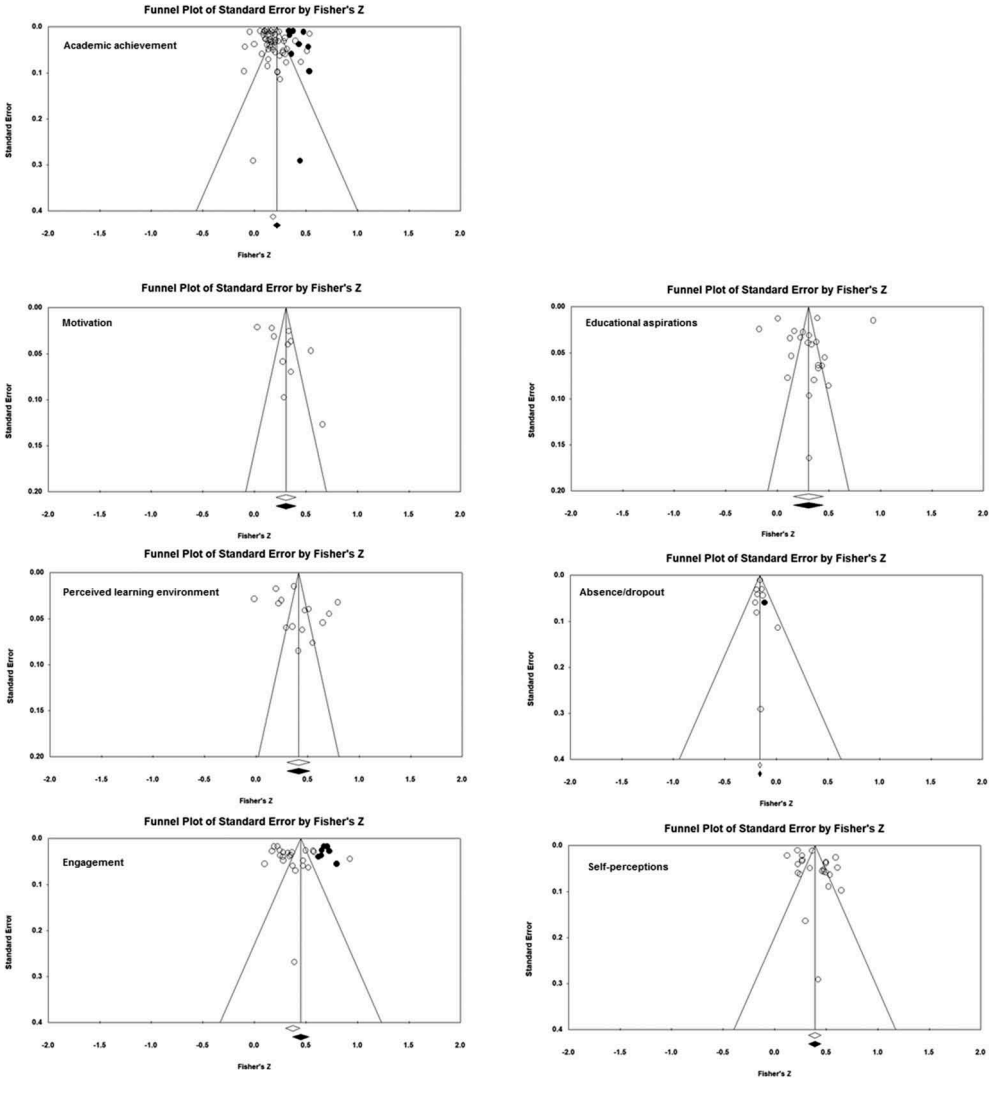

Figure 3. Funnel plots.

Results for research question 2

The significant heterogeneity we found for the summary effects of most outcome types indicated that there are real differences between the effects within each category. We examined whether the measurement instrument used to measure the effects, the region in which the study was executed, and the student characteristics (grade level and SES) moderated the summary effects, by executing multiple meta-ANOVA tests. Table 4 shows the test results for the group differences. A significant effect indicates that the groups differ, for example, that the correlations are higher in one region compared to the others.

In summary, Table 4 shows that the reported correlations differed per measurement instrument for several student outcomes, namely for academic achievement,

Table 4. Test results for the group differences (between measurement instruments, region, grade level, and SES with n_{tests} ≥3 per group).

	Q-between (df)			
Student outcomes	Measurement instrument[a]	Region[b]	Grade level[c]	SES[d]
Academic achievement	55.51*** (8) (n = 52)	2.91 (2) (n = 51)	0.42 (2) (n = 60)	3.10 (2) (n = 56)
Motivational outcomes	22.11*** (3) (n = 29)	0.01 (1) (n = 9)	0.46 (2) (n = 11)	2.71 (2) (n = 11)
Perceived learning environment	-	13.35*** (1) (n = 11)	0.03 (1) (n = 16)	0.01 (1) (n = 13)
Behavioural engagement	12.80** (2) (n = 18)	4.41* (1) (n = 20)	5.58 (2) (n = 25)	0.56 (2) (n = 23)
Educational aspirations/attitudes	-	-	0.05 (1) (n = 23)	1.19 (2) (n = 23)
Absence/dropout rates	-	-	0.87 (1) (n = 9)	0.10 (1) (n = 7)
Self-perceptions	46.76*** (3) (n = 26)	-	1.54 (2) (n = 26)	2.64 (2) (n = 23)

Notes. * p< .05, ** p< .01, *** p< .001. [a] Measurement instrument = measurement instrument used (see Table 1 for further details). Number (n) corresponds with the number of tests that included this measurement instrument. [b] Region = Asia, Australia, Europe, South America, USA/Canada, multiple countries. Number of studies (n) corresponds with the number of primary studies in a specific region. [c] Grade level = middle school, high school, both. Number (n) corresponds with the number of subgroups in the studies. When a study reported the results separately for each grade level, this study is counted as two subgroups. Longitudinal studies are split into grade levels as well (the sample sizes were adjusted accordingly). [d] SES = low SES (>40% free or reduced lunch), middle/high SES (<40% free or reduced lunch), not specified. Number (n) corresponds with the number of subgroups in the studies. When a study reported the results separately for each SES group, this study is counted as two subgroups.

motivational outcomes, behavioural engagement, and self-perceptions. For the other student outcomes, group differences could not be calculated, because there were no groups (or only one group) with at least three tests that used the same measurement instrument. The more precise results are presented in Table 5. The reported correlations differed to some extent per region, but only for perceived learning environment and behavioural engagement. For grade level and for socioeconomic background (SES), no significant between-group differences were found. The precise results are presented in Table 6.

In Tables 5 and 6, the correlations per group are presented when it was included in at least three tests. Note that it may be the case that these tests were either conducted within one primary study or in across primary studies. For absence/dropout rates, the number of conducted tests per measurement instrument was all below three and are therefore not reported in these tables.

The results are highly consistent regarding the direction of effects, that is, all measurement instruments revealed positive correlations between school belonging and the student outcomes. The only exceptions were the school belonging measures in PISA and TIMSS for academic achievement and the school bonding measure in Add Health for self-perceptions. The Psychological Sense of School Membership (PSSM) questionnaire was most frequently used in the primary studies to assess students' sense of school belonging and has been related to a wide range of student outcomes. Also here, we see a highly consistent positive trend across all student outcomes. Other measurement instruments were used far less frequently, but also showed positive associations.

Table 6 shows the results for region, grade level, and SES.

Table 5. Correlations per student outcome (n_{tests} ≥3), per measurement instrument.

	Measurement instrument[a]										
Student outcomes	ESB	EE (Wang)	EE (Wellborn)	SB (PISA)	PSSM	PSSM (short version)	SEI	SB (TIMSS)	SB (Add Health)	AS	AES
Academic achievement	.19*** (n = 6)	.42*** (n = 3)	.37*** (n = 4)	.29 (n = 3)	.15*** (n = 22)	.15*** (n = 4)	.18*** (n = 3)	.07 (n = 4)	.24*** (n = 3)	-	-
Motivational outcomes	-	-	.50*** (n = 3)	-	.26*** (n = 8)	-	-	-	-	.17* (n = 15)	.32*** (n = 3)
Perceived learning environment	-	-	-	-	.39*** (n = 8)	-	-	-	-	-	-
Behavioural engagement	.37*** (n = 7)	-	-	-	.33*** (n = 7)	-	-	-	-	.46*** (n = 4)	-
Educational aspirations/attitudes	-	-	-	-	.32*** (n = 21)	-	-	-	-	-	-
Self-perceptions	-	-	.54*** (n = 3)	-	.29*** (n = 13)	-	-	-	.16 (n = 4)	.12* (n = 6)	-

Notes. * p< .05, ** p< .01, *** p< .001. [a] ESB = Effective School Battery (Gottfredson 1984), EE = Emotional Engagement (Wang, Willett, and Eccles 2011), EE = Emotional Engagement (Wellborn 1991), SB (PISA) = School belonging (PISA), PSSM = Psychological Sense of School Membership (Goodenow 1993), SEI = School Engagement Index (Eccles et al. 1993), SB (TIMSS) = Sense of school belonging (TIMSS); School bonding (Add Health; Udry 1998), AS = Affect to School (McInerney, Dowson, and Yeung 2005), AES = Academic Engagement Scale (Reeve and Tseng 2011).

Table 6. Correlations per student outcome (n_{tests} ≥3), per region, grade level, and SES.

	Region				Grade level			SES		
Student outcomes	USA/ Canada	Asia	Europe	Australia	Middle school	High school	Both	Low SES	Middle/ High SES	Not specified
Academic achievement	.17*** (*n* = 42)	.27* (*n* = 5)	.06 (*n* = 4)	-	.19*** (*n* = 21)	.17*** (*n* = 32)	.18*** (*n* = 7)	.19*** (*n* = 12)	.15*** (*n* = 27)	.20*** (*n* = 17)
Motivational outcomes	.31*** (*n* = 5)	.30** (*n* = 4)	-	-	.33*** (*n* = 4)	.29* (*n* = 4)	.27*** (*n* = 3)	.39*** (*n* = 3)	.34*** (*n* = 3)	.23** (*n* = 5)
Perceived learning environment	.26*** (*n* = 8)	-	-	.54*** (*n* = 3)	.36* (*n* = 5)	.39*** (*n* = 11)	-	-	.40** (*n* = 6)	.39*** (*n* = 7)
Behavioural engagement	.32*** (*n* = 17)	.56*** (*n* = 3)	-	-	.25*** (*n* = 5)	.32*** (*n* = 14)	.47*** (*n* = 6)	.34*** (*n* = 6)	.35*** (*n* = 13)	.39*** (*n* = 4)
Educational aspirations/attitudes	.28*** (*n* = 17)	-	-	-	.28*** (*n* = 9)	.30* (*n* = 14)	-	.19* (*n* = 5)	.29*** (*n* = 9)	.31 (*n* = 9)
Absence/dropout rates	−.16*** (*n* = 7)	-	-	-	−.14*** (*n* = 3)	−.16*** (*n* = 6)	-	−.16*** (*n* = 4)	−.15*** (*n* = 3)	-
Self-perceptions	.39*** (*n* = 19)	-	-	-	.40*** (*n* = 11)	.38*** (*n* = 11)	.32*** (*n* = 4)	.36*** (*n* = 6)	.43*** (*n* = 6)	.34*** (*n* = 11)

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

The correlation between school belonging and academic achievement appears somewhat higher in Asian countries than in the USA/Canada, and non-significant in Europe (note that the differences between regions were not significant for academic achievement, see Table 4). Moreover, the correlation between school belonging and perceived learning environment is somewhat higher in Australia than in the USA/Canada, and the correlation between school belonging and behavioural engagement is higher in Asian countries than in the USA/Canada. However, the samples of Asian, European, and Australian studies are small, so these results need to be interpreted with caution. In line with the test results presented earlier, the associations among the variables were generally similar across grade levels (e.g. middle school versus high school samples). The differences in correlations between school belonging and the student outcomes across SES groups were also small. Comparing the low SES group to the middle/high SES group reveals that the correlation between school belonging and educational aspirations/attitudes is somewhat lower among the low SES group, but both indicated a positive association between these variables.

Discussion

Discussion of the findings

The need to belong (Maslow 1962) has shown its relevance in the secondary school context. The meta-analytic results show that students who 'feel personally accepted, respected, included, and supported by others in the school social environment' (Goodenow 1993, 80) are likely to perform better in school (e.g. academic achievement) and show more favourable motivational (e.g. mastery goal orientations), social-emotional (e.g. self-concept and self-efficacy), and behavioural outcomes (e.g. behavioural, cognitive, and agentic engagement). The importance of maintaining 'at least a minimum quantity of lasting, positive, and significant interpersonal relationships' (Baumeister and Leary 1995, 497) in school is visibly expressed in our results by the pattern of positive associations across a broad range of student outcomes. Although the associations are small to moderate in size, the central role sense of school belonging appears to play in school settings is striking.

One of the notable findings was that the results distinctly showed that students who perceived their classroom as mastery goal oriented and were positive about the overall classroom climate, also felt more strongly related to school. The effectiveness of interventions with a dual focus on, for example, strengthening students' sense of school belonging and triggering them to strive for mastery goals, needs to be further explored. The importance of mastery goal oriented classrooms (instead of performance goal oriented classrooms) was also presented by Rolland (2012) in her meta-analysis on classroom goal structures (see also Fokkens-Bruinsma et al. 2018).

Furthermore, the positive and moderately strong relationships between school belonging and self-concept and self-efficacy highlight the importance of school belonging for students' social-emotional functioning in school. The feeling of being supported and encouraged by significant others (Baumeister and Leary 1995; Goodenow 1993), such as teachers and peers, seems to stimulate students' self-esteem (or vice versa, see discussion later on). In a similar fashion, when students'

need to belong is met, they are more behaviourally engaged, in line with the belongingness hypothesis as well as SDT.

Our results further revealed a small positive association between school belonging and achievement (for school grades; and to a lesser extent for standardised test scores). That is, students' with a higher sense of school belonging also showed more favourable school grades, which was confirmed across no less than 67 tests reported in primary studies. This is an important outcome for teachers. A plausible explanation for the slightly stronger relationship for school grades compared to standardised achievement tests could be that school grades represent more than achievement alone, as they are often more subjective assessments of student functioning. School grades may, to some extent, follow from teachers' perception of students' motivation and/or behaviour, in addition to an assessment of students' actual performance. It is important to note, however, that a reciprocal relationship between school belonging and academic achievement is probable, due to the deteriorating effect of underperformance on students (e.g. Willms 2003).

Similarly, school belonging was negatively associated with absence and dropout rates, confirming that those who do not feel attached to their school are more likely to skip classes or even become early school-leavers (see Hascher and Hagenauer 2010; Lee and Burkam 2003; Ream and Rumberger 2008). Developing a stronger sense of school belonging may prevent students from dropping out of school, as was already suggested by Finn (1989) in his participation-identification model. The perception of belonging facilitates the students' engagement and their commitment to schooling. Woolley and Bowen (2007) stress the importance of significant others (parents, people from school) to stimulate feelings of school belonging among adolescents.

The presented results further revealed that the associations between the variables differed to some extent per region, but that the differences across the region were small. Therefore, we did not find support for the idea that the relationships between school belonging and the various student outcomes were systematically stronger in Western studies compared to studies conducted in, for example, Asian studies (see Liu 2016). As stated earlier, the samples of studies conducted outside the USA/Canada are relatively small. More research in these areas is needed to further understand the potential moderating role of country and culture on the relationship between school belonging and student outcomes.

Grade level (middle versus high school) did not moderate the reported relationships. For both grade levels, having a sense of school belonging was positively (and equally strong) related to the student outcomes. Not only in the early phase of the identity formation process (Flum and Kaplan 2012) do students need to feel connected to their school, our findings show this is important later in students' educational career as well. For socioeconomic background (SES), no significant between-group differences were found, although stronger associations were expected among low SES students (Hamre and Pianta 2001; Roorda et al. 2011). The only exception was the somewhat lower correlation between school belonging and educational aspirations/attitudes among low SES students.

These are relevant findings for educational practice, highlighting the importance of stimulating a sense of school belonging among all grade levels and among both advantaged and disadvantaged (e.g. low SES) student groups. An overview of 'curricular

and pedagogical ideas educators might successfully use to better engage students in learning' can be found in Taylor and Parsons (2011, 1). Few classroom intervention studies, however, explicitly include (learning) activities that improve teacher–student relationships (Korpershoek et al. 2016) and/or students' sense of school belonging. This is an aspect that researchers could consider including in further research into enhancing school belonging.

Finally, the direction of correlations was the same across measurement instruments, yet the strength of the correlations differed per type of instrument used to measure school belonging. This not only stresses the importance of testing the construct validity of measurement instruments in scientific research, but also underscores the relevance of conducting separate analyses for each measurement instrument used in the primary studies. Different measurement instruments yield slightly different results, despite overlap in theoretical framing of the construct. This aspect is, to our knowledge, often overlooked in social sciences. Notably, despite considerable overlap in construct definitions of the various synonyms for school belonging (and, in our view, also for emotional engagement), the differences in construct operationalisation in the questionnaires and the presented findings in this paper, stress the importance of analysing potential differences between measurement instruments in meta-analytic studies.

Limitations and directions for future research

Our study underlines the relevance of adolescents' sense of school belonging throughout secondary education. Readers should, nevertheless, bear in mind that our findings are based on a relatively small number of primary studies for some of the specific student outcomes, and relatively few primary studies conducted in, for example, Europe or Asia. The more stringent the inclusion criteria, the smaller the number of studies meeting these criteria. However, stringent criteria also result in a more homogeneous sample of studies and inclusion of studies of higher quality. The included studies used similar definitions of school belonging, which made the findings of these studies better comparable and thus suitable for calculating average effect sizes in a meta-analysis.

The primary studies used various instruments to measure school belonging. Although results from highly unreliable instruments were excluded, the construct validity of the various instruments was often unclear. A recent study of Abubakar et al. (2016) examined the validity of the frequently used PSSM (Goodenow 1993) instrument. Their analyses revealed that a valid one-factorial model for school belonging could be found when items were combined per target (i.e. school, student, teacher, other people, and self). This result still needs to be confirmed in other student samples. Unfortunately, most primary studies did not present sufficient information on the construct validity (e.g. on the factor structure and dimensionality) of the instrument they had used. For enabling methodologically sound meta-analyses, we would like to stress the importance of providing this information in each primary study.

Another issue is that we found indicators of publication bias for two of our outcome categories. The estimated adjusted summary effects for the academic outcomes ($r = .22$ instead of .18) and engagement ($r = .42$ instead of .36) were somewhat higher than the observed summary effects.

Finally, the selected studies used cross-sectional designs; therefore, conclusions about causality cannot be drawn. The relationships between school belonging and the various student outcomes are likely to be reciprocal and cumulative. The 'reverse' direction of effects, for example, academic achievement predicting school belonging, or reciprocal effects (e.g. Skinner and Belmont 1993), are rarely considered (Juvonen 2006). This is remarkable because low academic performance is one of the risk factors for school disaffection (Willms 2003). Those who already dropped out, are likely to feel disconnected to their school and may not have been included in the cross-sectional studies. Hence, it is important to further investigate cause and effect in more detail, using longitudinal designs and well-targeted intervention studies. By doing so, empirical evidence may reveal which variables have the highest potential for improved student functioning in secondary education.

School engagement (and the narrower construct of school belonging) is a potentially malleable target for intervention (Lazowski and Hulleman 2016; see also Christenson et al. 2001; Lawson and Lawson 2013; Maddox and Prinz 2003). The insights from the meta-analyses presented here can be used to design relevant intervention studies incorporating the most relevant school belonging measures presented in this paper. Particularly the PSSM questionnaire (Goodenow 1993) yields promising results across all student characteristics (e.g. Van Houtte and Van Maele 2012; Walker and Greene 2009). Using a longitudinal design, evaluating the effect of interventions aiming to enhance students' sense of school belonging and overall school functioning would further increase our understanding of the variability and stability of students' sense of school belonging (e.g. Hughes, Im, and Allee 2015). Furthermore, longitudinal studies (e.g. using cross-lagged models) are necessary to investigate the reciprocity of the relationships between school belonging and, for example, their academic achievement.

Evidence-based classroom interventions (e.g. based on randomised control trials) that clearly enhance students' sense of school belonging are yet to be developed. Future studies that pinpoint how sense of school belonging can be enhanced will further develop our thoughts on how to progress students' learning processes and their academic achievement. Our meta-analysis provides a strong basis for this by exemplifying that a sense of school belonging plays an important role in students' school life.

Notes

1. The concepts of school belonging, school relatedness, school connectedness, school membership, and identification with school can be considered synonyms for the same underlying construct (Christenson, Reschly, and Wylie 2012).
2. Because we did not find any relevant studies that met the inclusion criteria in the years 2000–2002, we decided not to look further back for relevant studies. The first study included in our meta-analyses was published in 2003.
3. Correlations below .10 are considered as small, between .10 and .25 as small to medium, around .25 as medium, between .25 and .40 as medium to large, and above .40 as large (Lipsey and Wilson 2001, 147).

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No potential conflict of interest was reported by the authors.

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