Universidade do Minho
Escola de Psicologia

Juliana Andreia Oliveira Martins

Projeto Bússola: Impacto de um *School-based Mentoring Program* no envolvimento escolar de alunos do Ensino Básico

abril de 2022

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

Projeto Bússola: Impacto de um *School-based Mentoring Program* no envolvimento escolar de alunos do Ensino Básico

Resumo

Os programas de tutoria escolar são intervenções populares utilizadas para dar resposta a vários problemas educacionais. Caracterizada como um processo educacional em que um adulto, geralmente um professor, é emparelhado com um ou mais alunos para lhes providenciar suporte e orientação, a tutoria tem sido considerada uma ferramenta relevante para resgatar alunos em risco de abandono escolar precoce e para combater o baixo envolvimento dos alunos no seu processo de aprendizagem. Em Portugal, o Ministério da Educação definiu, ao longo dos últimos vinte anos, várias políticas educativas com o objetivo de proporcionar o apoio de um tutor aos alunos com dificuldades de aprendizagem. Estas políticas, de acordo com os relatórios nacionais, têm resultado na diminuição das taxas de abandono escolar; no entanto, no que diz respeito ao envolvimento escolar dos alunos, as trajetórias de declínio persistem. Além disso, a investigação existente indica que o envolvimento escolar dos alunos começa a diminuir nos primeiros anos de escolaridade. Por estes motivos, são necessários esforços de remediação e prevenção para combater as decrescentes trajetórias de envolvimento dos alunos mais vulneráveis nas etapas iniciais e avançadas de escolaridade. A presente dissertação engloba três estudos com o objetivo de contribuir para colmatar as lacunas identificadas na investigação e na prática educativa no âmbito da tutoria e do envolvimento escolar. O primeiro capítulo permitiu conhecer o papel do envolvimento escolar no ajustamento académico dos alunos e na sua permanência na escola a longo prazo, através do mapeamento de 35 anos de investigação em envolvimento escolar. O segundo e terceiro capítulos contribuíram para esclarecer como programas de tutoria cuidadosamente desenvolvidos podem ser utilizados para providenciar suporte a alunos em risco de abandono escolar e que enfrentam a sua primeira transição de escola, respetivamente. Ancorados em modelos teóricos robustos, os resultados dos estudos desenvolvidos estão alinhados com a literatura existente que destacam a importância de promover o envolvimento escolar o mais cedo possível, de modo a prevenir perdas na aprendizagem dos alunos (à medida que a escolaridade avança). Implicações educacionais relevantes para as escolas foram retiradas dos estudos, assim como diretrizes para trabalhos de investigação futuros.

Palavras-chave: Alunos do ensino básico, Autorregulação da aprendizagem, Envolvimento escolar, Estabelecimento de objetivos, Tutoria escolar.

Compass Project: Impact of a School-based Mentoring Program on the School Engagement of Elementary School Students

Abstract

School-based mentoring programs are popular interventions used to address several educational problems. Characterized as an educational process in which a supportive adult, usually a teacher, is paired with one or more students to provide them with guidance and support, mentoring has been understood as a relevant tool to rescue students at-risk of early leaving and to counter students' disengagement from education. In Portugal, the Portuguese Ministry of Education set, over the past twenty years, several educational policies aiming to provide students struggling to learn with the support of a mentor. These policies, according to national reports, have been resulting in a decrease of the dropout rates; however, in what concerns students' school engagement, the declining trajectories persist. Moreover, extant research has shown that students' school engagement starts to decline in elementary school years. Therefore, both remediation and prevention efforts are needed to counter the declining engagement trajectories of the most vulnerable students in both early and advanced stages of schooling. The current dissertation encompasses three research works aiming to contribute to fulfill the gaps identified in both research and educational practice on mentoring and school engagement. The first chapter allowed to learn the role of school engagement in students' academic adjustment and in school long-term enrollment through mapping 35 years of research on school engagement. The second and third chapters contributed to shed light on how thoroughly designed mentoring programs can be used to provide support to students at-risk of early school leaving and facing their first school transition, respectively. Anchored in robust theoretical models, results of all the works are aligned with extant research highlighting the importance of fostering school engagement as early as possible to prevent losses in students' learning (as schooling progresses). Valuable educational implications for schools were retrieved from the studies as well as future avenues for research.

Keywords: Elementary and middle students, Goal setting, School-based mentoring, School engagement, Self-regulated learning.

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LIST OF ABBREVIATIONS AND ACRONYMS

AE – Academic engagement

BE – Behavioral Engagement

CE – Cognitive Engagement

DV – Dependent variable

EE – Emotional Engagement

GS – Goal setting

M – Mean

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analysis

SD – Standard deviation

SE – School Engagement

SES – Socioeconomic status

SMART – Specific, Measurable, Attainable, Realistic, Time-bound

SRL – Self-regulated learning

SSMMD – Self-system Model of Motivation Development

SSP – Self-system process

Introduction

Introduction

[Sic parvis magna.]

Greatness [comes] from small, humble beginnings. - Sir Francis Drake

In their journey through childhood to adulthood, children and youth, no matter their birthhood, are constantly facing adversity and uncertainty throughout the incessant search to find their way (Forrest-Bank et al., 2015; Lyons et al., 2019). Constrained by individual, familial, academic, and economic factors, children and youth (mainly those) from vulnerable backgrounds, are early faced with the need to make decisions, prioritize, set goals as well as to deal with the challenges and obstacles that come in their way (Converse & Lignugaris/Kraft, 2009; Forrest-Bank et al., 2015; McLaughlin et al., 2013). These early experiences, help them develop new competencies and potentiate their growth; however, also lead to the emergence of doubts and questions regarding the future and the pathways more fitted to reach their ambitioned destination (e.g., Forrest-Bank et al., 2015).

The current project - Compass, integrates the hidden purpose of help students succeed in school and life, not by pointing the north (as traditional compasses) or providing students with a roadmap, but instead, providing youth with the skills and tools that will allow them to move from where they are to where they want to (or may) be. In other words, this project aims to help and support students, as new travelers, to design their own roadmap and define their route to their destination while searching for landmarks indicating whether they are following the correct path. This way, and irrespectively of their modest starting point, students will be able to find not only the north but also the other cardinal points; because all the dots of the compass rose are equally valid and still, a possible end.

Theoretical Background

The significant number of students chronically disengaged from school and education has merit researchers and educators' attention for several decades (Freeman & Simonsen, 2015; Janosz et al., 2008; Meltzer et al., 2020; Pino-James et al., 2019; Rumberger & Lim, 2008). Such disengagement, expressed by students through many forms of class behavior (e.g., students being inattentive, not actively participating in class, lacking curiosity and interest, exerting little mental effort; Shernoff, 2013) has been found earlier in the school system, being predictive of students' involvement in disruptive behaviors (e.g., delinquency, substance use; Wang & Fredricks, 2014) and school alienation (Fredricks et al., 2004). Considered one of the main developmental processes underlying academic failure and school dropout (Reschly & Christenson, 2012; Rumberger, 2011), disengagement represents a serious concern at the

individual and collective level, having significant social and economic implications in young adults' lives (Belfield & Levin, 2007; Freeman & Simonsen, 2015). In fact, disengagement from education, as well as school dropout present many risks for young people's health, social adjustment, and employment in later adulthood (Coles et al., 2010; Rumberger, 2011). For example, young adults who disengaged and dropped out from school while in compulsory education are more likely to suffer from depression or other mental health conditions, to be unemployed, and when employed, to make less money on average than their counterparts who complete high school (Meltzer et al., 2020; Rumberger, 2011). Data from international reports (Powell, 2022) are consistent with these statements indicating that 10.6% of the young people aged 16–24 was not in education, employment or training. In Portugal, this trend is similar with 9.5% of the young people not being in school nor employed (Simões et al., 2020). Despite not being new, this phenomenon has never been so preoccupying (Janosz et al., 2019; Rumberger, 2011). With the increasing complexity of modern societies, relying more and more on knowledge, education has become, more than ever, the cornerstone of the individuals well-being (Freudenberg & Ruglis, 2007; Wang & Amemiya, 2019).

Compelled by national and international data on school disengagement and dropout as well as by the constant and challenging world changes, schools are increasingly faced with the need to integrate in their educational practices, strategies to counter students' progressive disengagement from school and education (leading to early dropout) and to foster students' integration and engagement in school and class (Ananiadou & Claro, 2009; Janosz et al., 2019; OECD, 2018). Pointed as a promising strategy to promote school success and students' well-being, mentoring has been addressed in educational policies around the world as a tool likely to rescue students at risk of dropping out (DuBois et al., 2002, 2011; Eby et al., 2008; McDaniel & Yarbrough, 2016). Mentoring is understood as an educational process in which an adult (mentor), develop a meaningful relationship with one or more students (mentees) and provide them ongoing support, guidance, and encouragement (DuBois et al., 2002, 2011; Eby et al., 2008; Johnson & Lampley, 2010; Rhodes et al., 2002). This tool has been showing promising results in both school and community settings due to their positive impact on multiple student-related variables such as school attendance (Johnson & Lampley, 2010), self-regulated learning (Núñez et al., 2013), academic achievement (Leidenfrost et al., 2014) and development of significant relationships (McDaniel & Besnoy, 2019).

In Portugal, mentoring support has been integrated in the national strategy to combat school failure and dropout over the last two decades. The first national educational policy assigning a mentor-teacher to provide students struggling to learn with individual guidance in studying and performing school

tasks was set by the Portuguese Ministry of Education in 1999 (Decreto Regulamentar n.o 10/99, 1999). Since then, several educational policies comprising mentoring approaches (Decreto-Lei n.o 50/2005, 2005; Decreto-Lei n.o 75/2008, 2008; Despacho Normativo n.o 4-A/2016, 2016; Despacho Normativo n.o 10-B/2018, 2018; Lei n.o 51/2012, 2012) were set and implemented in the national schools to provide elementary and middle students with (individual or group) support to help them overcome school failure and persevere in school. In fact, mentoring flexibility and responsive nature makes this one of the best fitted tools to address school needs and respond to students' heterogeneity (Laco & Johnson, 2019; Larose et al., 2020; Lyons et al., 2019). Through mentoring, students regardless of their individual differences (e.g., gender, age, ethnic, socioeconomic backgrounds, learning difficulties) are provided with the opportunity to outline their own school path with the help of a mentor, and to set tangible and realistic goals to achieve academic success (Chan et al., 2020; Sulimani-Aidan et al., 2021).

However, and despite the progresses resulting from the efforts displayed by policy makers and schools in the last decades (IGEC, 2018, 2019), a significant number of students in compulsory education still shows school trajectories marked by cumulative academic failure experiences, underachievement, and low engagement (e.g., Li & Lerner, 2011). According to literature, these findings may be related to the time when the mentoring support occurs and/or the quality of the implementation process (Durlak & DuPre, 2008; McLaughlin et al., 2013). For example, most of the mentoring educational policies implemented in schools followed a remediation approach, targeting students struggling to learn (e.g., school retention; risk of early drop out) (McLaughlin et al., 2013). This means that the support comes after the emergence of the problem and to address the manifested symptoms. Also, this support is "often poorly implemented and nor sustained over time" (Janosz et al., 2019, p. 264), which may compromise the efficacy of the mentoring interventions (see Durlak & DuPre, 2008).

Given the current scenario, and to counter the declining trends found in students' educational paths, there is the need to move from the traditional symptom-based approaches to preventive ones (Schenk et al., 2021). Extant literature has already alerted to this need, highlighting the importance to act as early as possible to prevent losses in students' learning and engagement throughout schooling (e.g., DuBois & Keller, 2017; Meltzer et al., 2020). In fact, time is key when concerns to students learning (e.g., Cohen & Sherman, 2014) and students school experiences in elementary years set the ground for (dis)engagement trajectories in the following years of compulsory education (Perdue et al., 2009; Reschly & Christenson, 2012). Through the design and implementation of mentoring programs in early years of compulsory school, schools are expected to provide students with support tailored to their educational needs, maximizing the potential of each student (Schenk et al., 2021), and allowing students to develop

new behavioral, academic, and social skills essential for their well-being and for a successful academic path (Eccles et al., 1993; Eccles & Roeser, 2011; Rudolph et al., 2001).

Anchored on this knowledge, the current project was designed to respond to the literature gaps and to the needs and challenges faced by schools, comprising both remediate and preventive efforts to counter the sharped dropout rates of compulsory students while fostering their engagement in school. Hence, the knowledge gathered from this project is expected to shed light on two overarching questions with important implications for practice:

- 'What can help explain the persistent declining academic trajectories of compulsory students, despite two decades of educational policies assigning mentoring support for students in need?'
- 'What has been done and what could be done in early years to promote successful learning trajectories?'

Thesis Outline

Currently, we live in a constantly changing society, shaped by unprecedented technological changes that continuously poses challenges and demands to individuals and institutions that need to innovate/evolve and reinvent themselves to follow the world trends (Kennedy & Sundberg, 2020; Wang & Amemiya, 2019). Schools and educational systems are not an exception, being confronted with the need to reform and update their practices (e.g., teaching, evaluation methods) and strategies (e.g., restructure school curriculum, creating new programs) to prepare students to handle the complexity of modern societies, personally, academically, and professionally (Ananiadou & Claro, 2009; Kennedy & Sundberg, 2020). Attaining this overarching and ambitious goal is highly demanding, particularly considering the heterogeneity found in schools all over the world. In fact, students' diverse characteristics and backgrounds (e.g., learning difficulties, socioeconomic level, familiar support) requires schools to deeply know their strengths and vulnerabilities to be able to define specific strategies and design tailored interventions to address their specific needs (e.g., Lyons et al., 2019).

A closer look at national and international data (e.g., IGEC, 2018, 2019; OECD, 2018, 2021) underscoring the urgent need to act to prevent students from falling in disengaging and maladaptive learning paths, ending in early school dropout, launched the current project. Starting from a remediation perspective - mentoring disengaged students "at-risk" of school leaving and simultaneously mapping investigations conducted on SE in elementary school, to a preventive approach addressing elementary students in school transition through a group mentoring program, this project aims to contribute for both fields of educational practice and research, by providing knowledge on school engagement and mentoring. Therefore, three scientific works were conducted (see Figure 1) to learn about: (i) school engagement

state of the art and their importance in the promotion of students' long-term academic success [chapter 1]; and (ii) how school-based group mentoring programs can be used as malleable tools to target students in an at-risk situation [chapter 2] and elementary students' facing their first school transition [chapter 3].

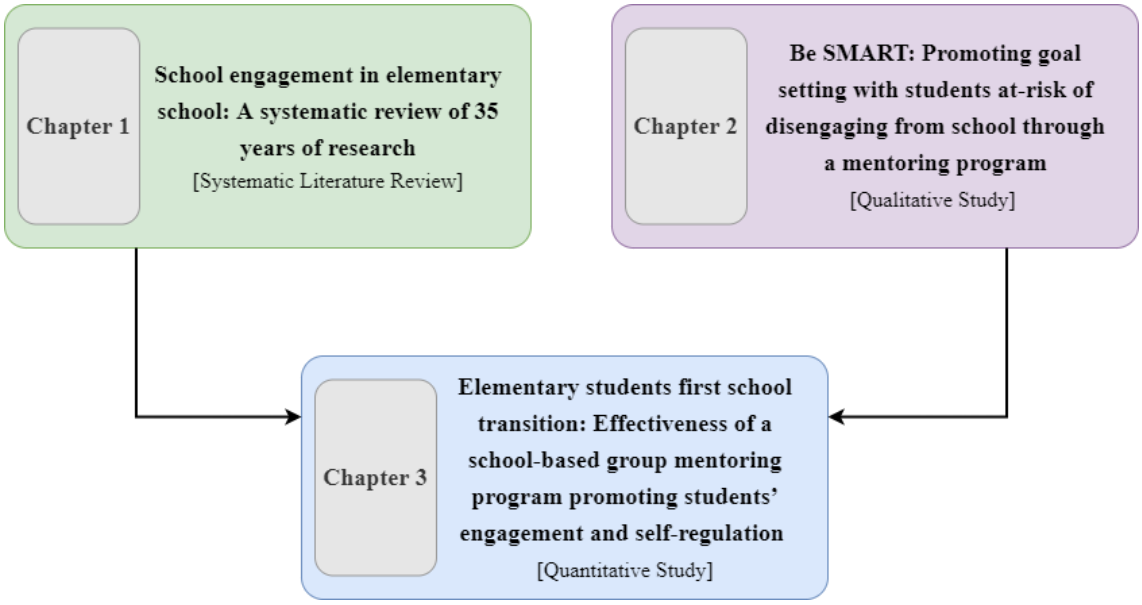


Figure 1 - Chapters sequence and interconnection

The first study [chapter 1] was conducted to deepen our understanding of how school engagement has been addressed in the last 35 years of research focusing students on elementary years of compulsory education whilst an antidote to several academic problems (Fredricks et al., 2004) and a protective factor of students' academic adjustment and perseverance in school (Wang & Fredricks, 2014). This study – a systematic review - offered relevant contributions to the literature and to the current project. In particular, it helped to (i) identify effective practices in the promotion of school engagement and how these practices can be embedded in/used to design school-based mentoring interventions with strong theoretical support, and (ii) uncover research gaps to be addressed in future studies.

Alongside the comprehensible synthesis of the school engagement research on elementary school [chapter 1], the study depicted in chapter 2 was conducted. Following a remediation approach the second study [chapter 2] was framed in the Portuguese educational policy "Specific Mentoring Support" (Despacho Normativo n.o 4-A/2016, 2016), and aimed to respond to the needs felt on the ground by educators, namely educational tools theoretically framed likely to provide support to students at-risk of early school leaving. Grounding on literature underlining the importance of goal setting interventions to mitigate risk factors and promote students' engagement (e.g., McDaniel & Besnoy, 2019; Rowe et al., 2017; Swann et al., 2020) this study consisted in a school-based group mentoring intervention to train

students at-risk of early school leaving on SMART[1] goal setting (Lawlor, 2012; Werle Lee, 2010). The implementation process together with the findings of this study allowed us to retrieve valuable information about "at-risk" students' goals and future perspectives, as well as educational and practical implications for designing school-based interventions.

Grounded on the knowledge gathered from the first and second studies [chapters 1 and 2] and on prior research showing that students' school engagement starts decreasing in elementary years, particularly at the first school transition (e.g., Eccles et al., 1993; Mireles-Rios & Romo, 2010; Rumberger & Lim, 2008; Wang & Eccles, 2012), the third study [chapter 3] – comprising a hybrid model of mentoring -was designed to provide schools and students with a preventive tool. Therefore, a thoroughly crafted school-based group mentoring program addressing elementary students' instrumental (e.g., self-regulated learning, goal setting) and developmental needs (e.g., building close and emphatic relationships) was designed to promote students' SE and deliver training on SRL in their first school transition. This way, students were encouraged and equipped with the necessary skills to assume an agent role in their learning (Moeller et al., 2012).

Altogether, these chapters offer robust scientific evidence presenting an extensive review of literature and gathering qualitative and quantitative data from two group mentoring interventions targeting different populations. The integration of the knowledge gathered from these works is expected to add literature and practice, by fulfilling the gaps identified on group mentoring and on the promotion of engagement in early years of compulsory school.

[1] SMART goal setting derived from the goal model of Doran (1981). S.M.A.R.T. stands for Specific, Measurable, Attainable, Realistic/Relevant and Time-bound goals.

Chapter 1

School Engagement in Elementary School: A Systematic Review of 35 Years of Research[2]

[2] This article was published in the journal Educational Psychology Review. https://doi.org/10.1007/s10648-021-09642-5

1. School Engagement in Elementary School: A Systematic Review of 35 Years of Research

Abstract

School engagement is considered an antidote to several academic problems found in middle and high school. Previous data highlight the importance of understanding school engagement in early years. The present systematic review aims to outline investigations regarding school engagement in elementary school. Findings are expected to (i) help educators learn about research in a comprehensible way, (ii) design future school-based interventions with strong theoretical support, and (iii) systematize information about research gaps and indicate new avenues for investigation. The systematic search for original articles published up to 2018 followed the PRISMA statement and Cochrane's guidelines. A total of 102 articles were included and organized, according to the self-system model of motivational development from Skinner et al. (*Journal of Educational Psychology, 100*, 765–781, 2008). Results showed that balanced and quality support from peers, teachers, and parents positively influenced school engagement. Additionally, some common characteristics of the school context were found to undermine school engagement. Regarding interventions aimed to promote school engagement, we found various effective designs, differing in complexity. Moreover, studies focused on students' emotions, behaviors and cognitions, experiences, motivational variables, and learning provided important inputs to promote school engagement. Furthermore, studies focused on examining the trajectories of school engagement provided data to understand how to prevent school engagement from declining throughout schooling. Finally, most studies found a positive and significant relationship between school engagement and achievement; however, results differ regarding the source of information or school domain examined. The school engagement conceptualizations, dimensions, and measures used were analyzed and their relationships to the results were discussed.

Keywords: School engagement, Academic engagement, Academic achievement, Elementary school students, Systematic review

1.1. Introduction

School engagement (SE) is related to students' malleable aspects of motivation and behavior underpinning learning and well-being in the school context (Christenson & Reschly, 2012). In the past few decades, researchers and educators have been investigating and working on SE; as the interest in this construct has grown, so has the variability of definitions and conceptualizations adopted (Appleton

et al., 2008; Jimerson et al., 2003; Sinclair et al., 2003). Among the various definitions of SE (see Krause & Coates, 2008; Jimerson et al., 2003), one of the most accepted is that by Fredricks et al. (2004). These authors termed SE as a multidimensional and multifaceted construct comprising the interrelated and mutually supportive dimensions of students' behavior, emotion, and cognition. Behavioral engagement may be understood as students' participation and involvement in academic, social, and extracurricular activities, and includes three forms: "positive conduct" (e.g., attending class, following class rules), "involvement in learning" (e.g., displaying effort, being persistent, finishing homework), and "participating in school-related activities" (e.g., taking part in extracurricular activities; Fredricks et al., 2004). Emotional engagement concerns students' affective reactions and sense of connectedness and belonging to school (Fredricks et al., 2004; Wang et al., 2011). Finally, cognitive engagement refers to the personal investment in academic tasks, self-regulation, and value of the learning process (Fredricks et al., 2004). Over the years, many researchers adopted other conceptualizations of SE. These approaches were dissimilar from that of Fredricks et al. (2004) regarding features (e.g., behavior, emotion, task, or classroom interactions), number of dimensions (e.g., agentic, psychological, social, effortful, or academic), and components (e.g., academic identity or relationships with teachers and classmates; Sinatra et al., 2015; Skinner et al., 2009). Among other aspects, emphasis was given to students' engagement with learning-related activities occurring in the classroom or instructional settings (e.g., Pino-James et al., 2019). For example, acknowledging the significant contribution of classroom-based engagement to developing high-quality learning, researchers focused their work on features regarding students' involvement in classroom work (e.g., time and persistence on a task, emotions stemming from classwork, or mental effort to execute classroom tasks; Pino-James et al., 2019). Consequently, research on classroom-based engagement was differentiated from forms of engagement that were not so influential to students' learning, such as engagement with school activities (Skinner et al., 2009). Additionally, the emergence of new models (e.g., self-system model of motivational development from Skinner et al., 2008 and the four-factor model of Reeve, 2013) added novel dimensions to those of Fredricks et al. (2004), for instance, social engagement and agentic engagement. The former refers to students' interactions with teachers and peers during academic instruction (Christenson et al., 2012; Fredricks et al., 2016; Wang et al., 2016), while the latter is displayed when students exert agency and actively contribute to the in-class instruction flow (e.g., asking questions or sharing their interests, thoughts, and needs; Reeve, 2013; Reeve & Tseng, 2011).

Despite researchers' efforts, there is still little agreement regarding SE definitions and conceptualizations (e.g., Sinatra et al., 2015; Skinner & Pitzer, 2012). However, the many overlaps

highlight the importance of differentiating between *indicators* and *facilitators* of engagement (Sinclair et al., 2003; Skinner et al., 2009). *Indicators* may be understood as descriptions of the construct itself that may be used to screen early engagement or disengagement. For example, students' academic features (i.e., behaviors, cognitions, emotions) and interactions with academic activities, such as homework completion (Skinner & Pitzer, 2012; Skinner et al., 2009), are indicators. Alternatively, facilitators comprise explanatory factors with the potential to influence individuals' engagement (e.g., classroom practices or relationships with teachers and peers; Skinner & Pitzer, 2012; Skinner et al., 2008). Both elements play an important role in students' engagement, either by identifying and monitoring student practices best suited to their development (indicators) or directing efforts to empower contexts or practices likely to improve students' engagement (facilitators; Christenson et al., 2008; Sinclair et al., 2003). For these reasons, to further examine and understand SE, researchers are expected to conceptually separate indicators from facilitators (Skinner et al., 2008). In sum, SE is expected to be conceptualized not as a student attribute, but rather as a state of being likely to be influenced by the contextual factors with which students interact (Sinclair et al., 2003). The SelfSystem Model of Motivational Development developed by Skinner et al. (2008) provides a graphic representation of the complex net of relationships between students' SE, contextual predictors, mediators, and outcomes.

1.1.1. Self-System Model of Motivational Development

The Self-System Model of Motivational Development (SSMMD) developed by Skinner et al. (2008) is grounded on the work of Connell (1990) and the self-determination theory (Deci & Ryan, 1985). This model analyzes how school contexts and students' self-systems promote or undermine the development of students' SE in a particular activity (Skinner & Pitzer, 2012; Skinner et al., 2008).

According to the SSMMD model, contextual features contribute to students' perceptions about themselves, which influences their engagement (versus disengagement; also mentioned as a student action) in school activities, and ultimately their personal outcomes (e.g., academic, social; Skinner & Pitzer, 2012; Skinner et al., 2009). As presented in Figure 2, the SSMMD model includes four higher-order constructs: context, self, action, and outcomes (Christenson et al., 2012).

The first component, context, is described as the settings where students engage in social interactions with their family, peers, and teachers (e.g., Skinner et al., 2009). The contexts that students are close to and interact most with (e.g., home and school) are considered key for SE development. In fact, students' engagement in school activities is likely to be influenced by the quality and nature of their interpersonal interactions with important social models, such as parents, teachers, and peers. These social models may contribute to SE by supporting or undermining students' learning experiences

(Skinner & Pitzer, 2012). In addition, students' interactions with social contexts help them build perceptions of themselves: their self-system processes (SSPs; Connell & Wellborn, 1991). SSPs may be defined as beliefs and durable cognitive appraisals regarding characteristics of the self (e.g., self-efficacy and belonging or identification with school); these processes shape students' interpretation of their experiences and guide their actions (Rimm-Kaufman et al., 2015). According to the SSMMD model, SSPs are organized around three fundamental psychological needs: competence, autonomy, and relatedness (Connell & Wellborn, 1991; Skinner et al., 2008). Competence refers to students' need to feel capable of completing classwork fully and effectively (Skinner & Pitzer, 2012). Autonomy refers to students' need to experience self-determination and control over their actions (Deci & Ryan, 1985). Finally, relatedness refers to students' need to experience a connection with their surrounding individuals (e.g., teachers and peers) and feel a sense of belonging (Furrer & Skinner, 2003). Social contexts providing students with opportunities to fulfill their basic needs (e.g., warmth, structure, and autonomy support) are likely to favor their engagement in learning (e.g., Skinner & Belmont, 1993). On the other hand, contexts in which these psychological needs are not considered, or are even thwarted (e.g., through rejection, chaos, and coercion), may encourage students to become disaffected or withdraw from their learning tasks (e.g., Skinner & Belmont, 1993; Skinner & Pitzer, 2012).

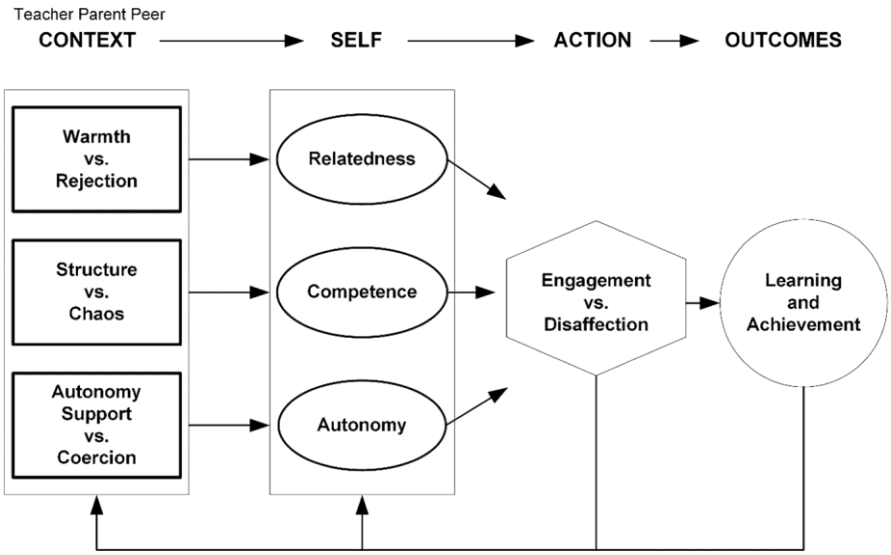


Figure 2 - Self-system model of motivational development (SSMMD; based on Skinner et al., 2008)

Therefore, SSPs play an important role in developing students' engagement versus disaffection (i.e., the action component of the SSMMD model; Skinner & Pitzer, 2012; Skinner et al., 2008). In fact, as the literature alerts, the extent to which students perceive their needs as satisfied determines their engagement with school and academic activities (Jang et al., 2009, 2016). All considered, we

may conclude that students' engagement (versus disaffection) stems from both external components (i.e., experiences with physical and social contexts such as classroom interactions) and internal processes (i.e., perceptions, goals, expectancies) experienced over their school path (Martin & Rimm-Kaufman, 2015). Finally, as claimed by the model, students' engagement or disaffection shape their motivational and learning outcomes (e.g., identification with school values or taking responsibility for their own learning; Skinner et al., 2009).

1.1.2. School Engagement and Empirical Findings Throughout Schooling

SE has been widely studied among college students (Heng, 2014; Horstmanshof & Zimitat, 2007). However, despite data indicating low levels of SE in high and middle school, researchers have been paying little attention to SE at these school levels (Gottfried et al., 2007; Janosz et al., 2008; OECD, 2012). Moreover, literature and teacher reports indicate that students enrolled in compulsory education are likely to show low commitment to learning and display low efforts toward school activities as schooling progresses (Rosário et al., 2013, 2019; Wang et al., 2011). As prior literature suggests, this pattern of low interest toward school could have been set during elementary and middle school (Alexander et al., 2001; Hirschfield & Gasper, 2011).

Globally, rates of low engagement among students are rising, causing growing concern among educators. In fact, disengaged students are likely to struggle academically (Rosário et al., 2017a), display problematic behaviors (Fredricks et al., 2004), show negative psychosocial outcomes (Li & Lerner, 2011), and experience academic failure (Wang & Fredricks, 2013). Following the SSMMD model, students' agency and the role of contexts and educators (facilitators) in their SE should be considered to address these problems. Extant literature shows that peers, teachers, and parents are important agents in students' SE development (Wonglorsaichon et al., 2014; Zhang et al., 2005). Peers can help foster SE by maintaining supportive relationships (Janosz et al., 2008), while teachers can contribute by encouraging and providing them with positive reinforcement (Caraway et al., 2003; Stroet et al., 2013). Finally, parents involved in their children's education are likely to help improve their SE (Mo & Singh, 2008). Notwithstanding, the impact of students' SSPs on SE should also be considered. As referred to in the literature, students with robust internal resources (e.g., self-efficacy) are more likely to be prepared to face and deal with the challenges presented and engage in learning. Conversely, students lacking internal resources are more likely to depend on external resources (e.g., teacher or peer support) to enhance their SE (Martin & Rimm-Kaufman, 2015). In sum, both external and internal experiences contribute to SE, which, in turn, relates to students' outcomes (Christenson & Reschly, 2012). Succinctly, SE assumes a mediator role between context, students' psychological needs, and students' outcomes (context–self-action

[engagement/disaffection]–outcomes). This proposition indicates that students, through SE, are able to improve their learning and achievement (Skinner & Pitzer, 2012).

1.2. Purpose

During the early years of elementary school, students face diverse academic and social school experiences likely to affect their learning development (RimmKaufman et al., 2015). These early and gradual experiences are extremely important to students' SE, while setting the groundwork for a long-term process of SE or disaffection (Perdue et al., 2009). Prior research has documented a steady decline in students' SE throughout schooling, emphasizing considerable losses during transitions to upper educational stages (i.e., middle and high school; Janosz et al., 2008; Yazzie-Mintz, 2007). These declining SE trajectories are of great concern, especially because they tend to be initiated during early elementary school (Rumberger & Lim, 2008; Mireles-Rios & Romo, 2010). Elementary school is a critical developmental period for students' learning. At this stage, students are expected to learn basic skills, like reading and math (Hill et al., 2008), as well as build new knowledge essential to sustaining future learning experiences (Reyna & Brainerd, 2007). Therefore, SE assumes a prominent role in early years due to its strong linkages with students' academic achievement and school completion (Rosário et al., 2016; Wonglorsaichon et al., 2014). In fact, prior research indicates that students show high achievement and learning gains when engaged in learning (Bodovski & Farkas, 2007; Fredricks et al., 2004). On the other hand, students showing low engagement might not be able to reach their potential and achieve expected learning outputs expected for them (Bodovski & Farkas, 2007; Hill et al., 2008). Therefore, it is useful to deepen our understanding of SE during early years and provide educational agents with knowledge on the research findings. Generally, however, educators often fail to find the time needed to scrutinize findings due to their high workload (MacLellan, 2016; Zeuli, 1994). A systematic review is an opportunity to translate an extensive corpus of research into a comprehensible body of information (see Rousseau, 2012) while covering a considerable time span, thus making findings more accessible to educators. The present systematic review includes studies published up to 2018, which resulted in a time frame of thirty-five years (1983 to 2018). This comprehensive time span is important because it allows understanding of how SE relates to students' personal and academic variables over time. Our general goal was to map investigations conducted on SE in elementary school students. More specifically, we aimed to learn about engagement dimensions, the variables being investigated, their relationships, and the outcomes of the research. Thus, the following research questions guided the present investigation:

RQ1: What are the methodological characteristics of the SE research studies?

RQ2: What are the engagement conceptualizations, definitions, and dimensions examined in SE research?

RQ3: What are the main results of SE research?

This work is expected to offer contributions to the literature (e.g., analyzing the SE approaches followed), future research (e.g., identifying gaps in the literature that should be addressed in future studies), and field educational practices. Findings are expected to help educators and school administrators learn topics as follows: (i) SE state of art, (ii) effective educational practices for the promotion of SE in the classroom, (iii) a collection of interventions to promote SE, and finally (iv) designs for future evidence-based interventions on SE.

1.3. Method

Systematic reviews are robust evidence syntheses aiming to provide, in a single document, a comprehensive and unbiased description of the cumulative knowledge in a particular field of research (Aromataris & Munn, 2020; Gusenbauer & Haddaway, 2020). To warrant and elevate the quality of a systematic review, researchers face specific requirements and strict rules advocating the use of rigorous and transparent methods (Aromataris & Munn, 2020; Gusenbauer & Haddaway, 2020), namely (i) the elaboration of a careful plan encompassing the documentation of each step of the process (e.g., formulating the review questions, defining inclusion and exclusion criteria), and (ii) the development of a search strategy (considering Cochrane Collaboration and PRISMA statement guidelines) that allows for the identification, appraisal, and summarization of all relevant studies (or as many as possible) in a well-defined research area (Gusenbauer & Haddaway, 2020; Higgins et al., 2019; Moher et al., 2009; Uman, 2011). All stages of this review were grounded on literature recommendations (see Bramer et al., 2018; Gusenbauer & Haddaway, 2020; Uman, 2011) as described in the following topics.

1.3.1. Search Strategy

When conducting a systematic review, reviewers need to find a balance between comprehensiveness and relevance while developing their search strategy (Gusenbauer & Haddaway, 2020; Salvador-Oliván et al., 2019). To reach this balance, we used three databases suited for systematic searches (as recommended by literature, e.g., Gusenbauer & Haddaway, 2020; Wanyama et al., 2021), focused either on large and multidisciplinary domains (Web of Science and Scopus) or on or single or few domains of research

(PsycInfo); additionally, we used a combination of keywords accurately selected to address engagement in elementary school.

In this review, the articles included were gathered through a systematic search carried out in PsycINFO, Scopus, and Web of Science databases in December 2018. Our goal is to organize the investigations conducted on SE in elementary schools and further discuss the variables and outcomes of the research. To match our goal, we followed a multidimensional understanding of the SE concept (Fredricks et al., 2004), using the broad construct as well as its dimensions as specific keywords for the search. Also, the search on engagement was narrowed to the school context at elementary schools. Therefore, the keywords used for the search were as follows: "school engagement" OR "academic engagement" OR "behavioral engagement" OR "cognitive engagement" OR "emotional engagement" OR "student engagement" AND "elementary school" OR "elementary students" OR "elementary grades." Drawing on the experience of researchers with extensive training in systematic searches (Bramer et al., 2018; Salvador-Oliván et al., 2019) and the analysis of current search trials, we did not include subject-specific types of engagement (e.g., "reading engagement," "science engagement," or "math engagement") in the search query. As Bramer et al. (2018) alerted, the inclusion of overlapping and/or overly specific terms (e.g., reading engagement), as well as increasing the length of the search query, is likely to introduce bias in results and restrict data access to relevant references. For this reason, the body of literature presented in this review, despite encompassing studies assessing students' engagement in specific school subjects, may not be comprehensive with respect to engagement research focused on particular subjects.

The present systematic review conforms to the Cochrane Collaboration guidelines (Higgins et al., 2019) for searching, selecting, and extracting data. In addition, the data abstraction and elaboration of the manuscript followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis: The PRISMA Statement (Moher et al., 2009) guidelines. Finally, as suggested by the literature (e.g., Wanyama et al., 2021), a multi-method approach was followed to enrich the present review by performing reference screening on the sample of included articles stemming from database searches.

1.3.2. Selection Criteria

To deepen our understanding of SE in elementary schools, inclusion and exclusion criteria were defined, as required by the Cochrane Collaboration (Higgins et al., 2019). Therefore, articles were included during the identification and screening phases when their abstracts met the selection criteria or when there were doubts regarding the selection criteria's fulfillment. Articles used in this study conform to the following requirements: (i) written in the English, Spanish, or Portuguese language; (ii)

presented original research data; (iii) published in peer-reviewed journals; (iv) included a sample of children attending elementary school, with ages ranging between 5 and 12 years old (all ethnicities, socioeconomic statuses, and genders were considered); (v) focused on typically developing children (e.g., without specific developmental disorders and not referred to the special educational services); and (vi) included data about evaluations or interventions related to students' SE or academic engagement (AE) in the school context or data regarding student engagement in the context of classroom-related activities. Conversely, articles were excluded when they did not fulfill the above criteria or when they focused on investigating academic variables (e.g., academic adjustment) or other variables unrelated to the school context. Articles addressing student engagement in non-school-related activities (e.g., specific games or platforms) and articles spanning populations within and outside the predefined age ranges were excluded (e.g., studies whose participants' ages ranged from 10 to 18). Also, articles including research that focused exclusively on school level(s) other than elementary school were excluded. Moreover, meta-analyses were excluded as well as theoretical manuscripts, books, handbooks, and all types of gray literature.

1.3.3. Data Extraction

Titles and abstracts of potentially relevant articles were sorted in the identification and screening phases. In the eligibility phase, all full-text articles were independently examined by two reviewers to check the inclusion criteria. Disagreements were resolved through discussion between the two reviewers, and a consensus was reached for all included articles. In the first phase of the studies' selection process, current authors analyzed the inclusion criteria and the purpose of this systematic review. Whenever the title of an article was not clear regarding that article's purpose, it was moved to the next phase, undergoing abstract reading. If there were remaining doubts about whether the article fulfilled the inclusion criteria, the article then underwent a complete reading in the eligibility phase. This methodology was also applied during the reference screening process previously mentioned.

To assess the studies' quality, we collected the following information for every included article: a brief summary of the purpose(s), sample size, ethnic composition, age, school grade level of the sample, design of the study, sampling method, analysis, main results, and topic(s) to which the study contributes (see Online Resource 1). All data was extracted by only one author. Still, data were reviewed independently by a separate researcher who cross-checked the extracted information.

1.3.4. Selection Process

A total of 1127 articles were identified in the database search (276 from Web of Science, 332 from Scopus, and 619 from PsycINFO). This sample was then further analyzed. The duplicates (n = 286) were deleted, and a collection of papers was removed after screening by title (n = 529) and abstract (n = 198), leaving 114 articles found to be potentially relevant. The full texts of these 114 studies were retrieved and analyzed to reach the final selection. Finally, a total of 68 articles fulfilled the inclusion criteria and were then included. Subsequently, the references cited in these 68 studies were examined to check for additional papers meeting the criteria. Screening references by title led to the selection of 200 potentially relevant papers (after eliminating the studies cited in more than one study and the studies previously included), of which 127 were removed following abstract screening. Hence, the full texts of the remaining 73 articles were analyzed. From this analysis, 34 articles fulfilling the selection criteria were finally added to our sample. Altogether, a total of 102 articles stemming from database searches (n = 68) and reference screening (n = 34) were included in the present review. A flowchart, consistent with the PRISMA Statement (Moher et al., 2009), summarizes the complete selection process (see Figure 3).

1.4. Results

1.4.1. Main Methodological Characteristics of School Engagement Studies

This section focuses on the included studies' main methodological characteristics: number of participants, research design, participant selection, data analytics, engagement assessment methods, and measures. The number of participants was highly variable among the selected studies, ranging from two to 13,043 students. The current sample of papers followed distinct research designs as follows: longitudinal design (n = 55); cross-sectional studies (n = 22); ABA, ABAB, ABCDE, or ABCDBCD withdrawal designs (n = 6); case studies (n = 5); pretest and posttest studies (n = 6); ethnographic studies (n = 2); grounded theory research (n = 2); within-subject (n = 1); split-splot (n = 1); nested design (i.e., students nested within classrooms; n = 1); and group randomized design (n = 1). The purposeful sampling method (n = 81) and the convenience sampling method (n = 19) were those most frequently used for selecting participants. The remaining two studies used single case and pseudo-random sampling methods. Regarding the data analytics used in the selected papers, structural equation modeling (n = 23), path analysis (n = 11), (latent) growth curve analyses (n = 10), hierarchical linear models (n = 9), multilevel analysis (n = 8), regression analysis (n = 8), and variance analysis (n = 7) were the analyses most frequently used. Four studies used latent profile/trajectory analysis, three used visual analyses (i.e., visual inspection of the percentage of time students were academically engaged),

and two used observational techniques. Moderation and mediation analysis, attrition analysis, partial correlations, mean percentage differences, cross-case analysis, Tau U, thematic analysis, discourse analysis, and grounded theory data were also used.

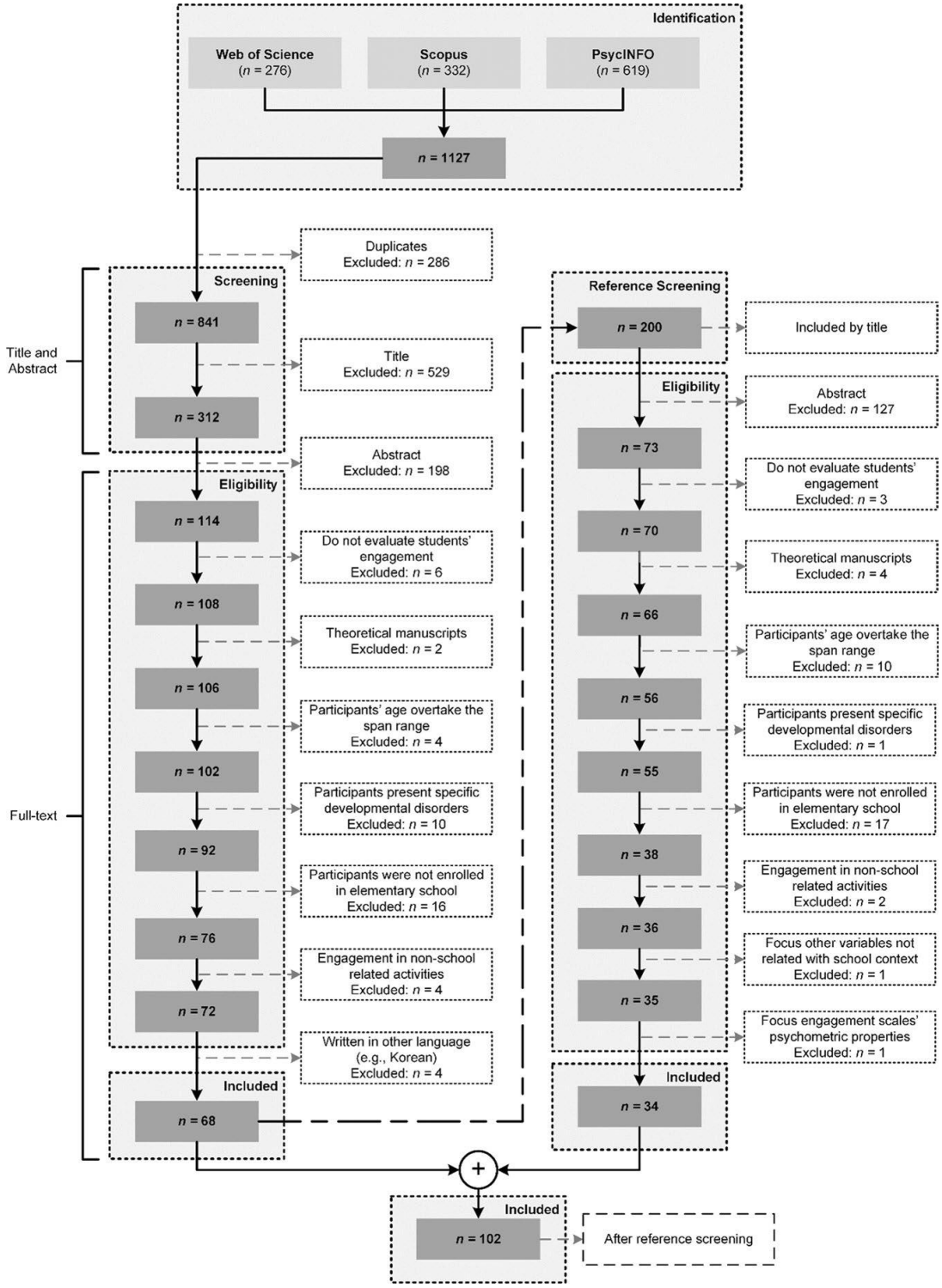


Figure 3 - Flowchart of selection process

Close inspection of the articles indicated that 83.3% of the studies focused on mapping SE and its relationships with other personal and contextual variables, and 16.7% of the studies reported on interventions designed to promote SE. Regarding the methods used to assess students' engagement, 50 of the 102 studies used teacher-reported methods (i.e., questionnaires or interviews), 47 used students' self-reported methods (i.e., questionnaires or interviews), 2 used household/parent-reported questionnaires, and 40 used classroom observations to measure students' engaged behaviors in academic tasks or during instruction. The majority of studies (n = 75) used a single method to assess students' engagement (e.g., teacher-rated or student-rated questionnaires or students' observations). Still, some studies (n = 27) used at least two methods (e.g., student reports and students' observations, Cadima et al., 2015; Dotterer & Lowe, 2011). Moreover, some studies assessed SE dimensions through reports informed by two different sources (e.g., Olivier et al., 2018 used teacher and student reports to gather data on students behavioral engagement), while others assessed the SE dimensions using reports from two different sources and/or observations (e.g., Rimm-Kaufman et al., 2015 used student reports to assess cognitive, emotional and social engagement, and observational measures to assess behavioral engagement; and Parsons et al., 2015 interviewed students to collect data on affective and cognitive engagement and observed their behavioral engagement).

Throughout the analysis of engagement measurement approaches, it was noted that studies reported using diverse measures to reach their purposes, irrespective of the variability on the number of dimensions assessed. For example, some studies used singular and conceptually distinct measures to assess each dimension of engagement (e.g., Cai & Liem, 2017; Gruman et al., 2008; Patrick et al., 1993; Skinner & Belmont, 2003), allowing the examination of each engagement dimension's unique contributions toward different student variables and outcomes. Other studies assessed engagement through a single measure comprising all dimensions examined (e.g., Archambault & Dupéré, 2016; Lutz et al., 2006; Parsons et al., 2015; Perdue et al., 2009). Finally, several studies developed their own measures to assess students' engagement (e.g., Linnenbrink-Garcia et al., 2011; Patrick et al., 2007; Rosário et al., 2017b; Wu et al., 2013), or adapted and combined items from measures used in prior studies (e.g., Martin & Rimm-Kaufman, 2015; Rimm-Kaufman et al., 2015; Rosário et al., 2016). The latter practice was used by many studies in our sample, resulting in the evaluation of distinct engagement dimensions (e.g., behavioral, Archambault et al., 2016; Cai & Liem, 2017; cognitive, Blumenfeld & Meece, 1988; Rimm-Kaufman et al., 2015; Parsons et al., 2015; academic, Dolezal et al., 2003; Kindermann, 2007; and classroom engagement, Hughes & Kwok, 2006, 2007; Hughes & Zhang, 2007) using similar characteristics (e.g., effort, persistence). Still, some studies in the sample did not explicitly

describe which items or indicators were specifically used to assess engagement (e.g., Peterson & Fennema, 1985; Pierson & Connell, 1992).

Furthermore, a considerable number of studies evaluated students' engagement in the context of instructional environments (e.g., classes) while students were performing academic tasks (Brophy et al., 1983; Cadima et al., 2015; Hastings & Schweiso, 1995; Lee & Anderson, 1993) or learning distinct content domains (e.g., math, Liu et al., 2017; Patrick et al., 2007; Peterson et al., 1984; science, Blumenfeld & Meece, 1988; Herrenkohl & Guerra, 1998; Lee & Anderson, 1993; reading, Cantrell et al., 2014; Guthrie et al., 1996, 2004; Wigfield et al., 2008). The authors' strategies for selecting the measures used were diverse. For example, some studies assessed engagement through general measures (e.g., Ashiabi, 2005; Lynch et al., 2013; Yang et al., 2018), examining engagement as a general tendency, while others retrieved and used consolidated measures from distinct educational research areas (e.g., Cantrell et al., 2014; Guthrie et al., 2004).

A detailed analysis of the measures used to assess students' engagement allowed us to comprehend how the different engagement dimensions were approached and which behaviors, emotions, and cognitions were considered. For example, behavioral engagement was addressed in almost all the sampled articles. However, the target behaviors assessed, as well as the measures used, varied across the studies. Indicators of the students' observable actions were as follows: (i) attention and participation in class, compliance with classroom and school rules, and effort and persistence displayed while performing classroom activities (e.g., Archambault & Dupéré, 2016; Archambault et al., 2016; Cai & Liem, 2017; Darensbourg & Blake, 2013; Furrer & Skinner, 2003; Kaiser et al., 2013; Kwon et al., 2018); (ii) on-task behavior, concentration, and homework completion (e.g., De Laet et al., 2015; Hastings & Schweiso, 1995; Perdue et al., 2009; Strambler & Weinstein, 2010; Weyns et al., 2017); (iii) self-reliance, time spent learning, and focus on tasks and autonomy (e.g., Guo et al., 2011, 2015); (iv) cooperative participation and self-directed academic behaviors (e.g., Buhs et al., 2006; Hughes & Kwok, 2006, 2007; Hughes et al., 2006, 2011; Luo et al., 2009; Wu et al., 2010); (v) questions asked or answered (Kaiser et al., 2013; Lan et al., 2009; Lutz et al., 2006; Rosário et al., 2016); (vi) participation in extracurricular activities (Portilla et al., 2014; Rosário et al., 2016); (vii) absence of disruptive behaviors (e.g., Li et al., 2010; Rimm-Kaufman et al., 2015); and (viii) school attendance (Archambault & Dupéré, 2016; Rosário et al., 2017b; Strambler & Mckown, 2013; Yang et al., 2018). This large spectrum of students' behaviors and observable actions were analyzed with measures as follows: teacher-reported (e.g., "Daily Behavior Report Cards," "Student Participation Questionnaire"), student self-reported (e.g., "School Engagement Dimensions Scale," "Schoolwork Engagement Inventory"), and observational

measures (e.g., "Student Engagement Rubric," "The Behavioral Observation of Students in Schools," "The Rochester Assessment Package for Schools"). Moreover, some studies combined distinct measures and informants to overcome the limitations of single approaches in assessing behavioral engagement (e.g., Cadima et al., 2015; Chen et al., 2010).

Regarding cognitive engagement, the indicators assessed were as follows: (i) use of metacognitive and self-regulation strategies to plan, organize, and monitor learning (Archambault & Dupéré, 2016; Blumenfeld & Meece, 1988; deep and surface strategies, Meece et al., 1988; Parsons et al., 2015; Patrick et al., 2007, Rosário et al., 2016); (ii) problem-solving skills and deep thinking (e.g., Bodovski & Farkas, 2007; Lutz et al., 2006); (iii) motivation (e.g., Dotterer & Lowe, 2011; Perdue et al., 2009; Wigfield et al., 2008); (iv) use of strategies to process information and content being learned, including memorization, elaboration, comprehension, and construction of new learnings based on previous knowledge (Cai & Liem, 2017, Cantrell et al., 2014; Lee & Anderson, 1993; Parsons et al., 2016); and (v) willingness to invest effort in learning and persisting in tasks through difficulty (Portilla et al., 2014; Rimm-Kaufman et al., 2015; Rosário et al., 2016). Authors analyzed this large range of indicators using diverse measures. The following are examples of the more frequently used: checklists assessing students' use of learning strategies (Blumenfeld & Meece, 1988), students' interviews (e.g., Almasi et al., 1996; Parsons et al., 2015, 2016), observations (Parsons et al., 2015; Rosário et al., 2016), and self-report questionnaires such as the "Metacognitive Awareness of Reading Strategies Inventory" (Cantrell et al., 2014), the "Elaboration subscale of the Goal Orientations and Learning Strategies Survey" (Cai & Liem, 2017), and the "What I Think About School Questionnaire" (Dotterer & Lowe, 2011).

Finally, emotional engagement measures included indicators focused on students' emotional experiences in learning environments as follows: emotional reactions (e.g., happiness, sadness, anxiety, frustration, and anger; Skinner & Belmont, 1993); affective attitudes (e.g., interest, enjoyment, enthusiasm, and pleasure; Hosan & Hoglund, 2017; Martin & Rimm-Kaufman, 2015; O'Neal, 2018; O'Neal et al., 2019) toward schoolwork, classroom activities, schoolmates, and teachers (Deed, 2008; Li et al., 2010); and students' feelings of connection and belonging to school (Archambault et al., 2016). Most studies addressing students' emotional engagement used teacher-reported (e.g., O'Neal, 2018; O'Neal et al., 2019) or self-reported measures (e.g., Chen et al., 2010; Hoglund et al., 2015). The following are examples of the measures used to identify both negative and positive emotional states during students' learning: the Rochester Assessment Package for Schools (e.g., Skinner & Belmont, 1993) and the Engagement versus Disaffection Scale (e.g., Furrer & Skinner, 2003; O'Neal et al., 2019). Moreover, a detailed analysis of the emotional engagement assessment revealed that this dimension was frequently

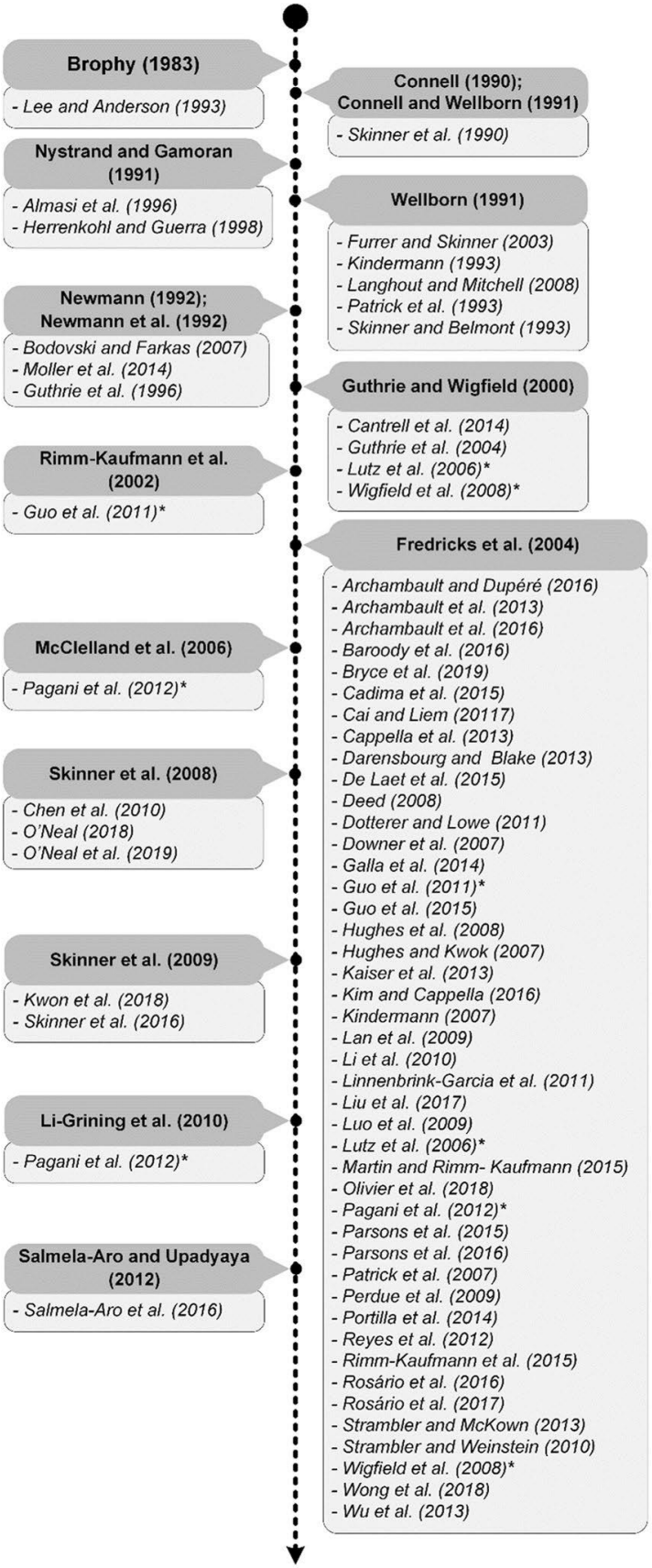
assessed jointly with behavioral engagement (e.g., Hosan & Hoglund, 2017; Kindermann, 2007; Li et al., 2010; Skinner et al., 1990, 2016), cognitive engagement (Dotterer & Lowe, 2011; Rimm-Kaufman et al., 2015), and social engagement (Martin & Rimm-Kaufman, 2015).

Furthermore, novel dimensions of engagement emerged from the combination of indicators from any or all of the three engagement dimensions. For example, the psychological engagement dimension arose from the combination of indicators from affective (e.g., connectedness, belonging, and valuing of learning) and cognitive engagement (e.g., psychological investment in learning, motivational processes; Dotterer & Lowe, 2011; Luo et al., 2009; Strambler & McKown, 2013; Strambler & Weinstein, 2010). This novel engagement dimension was measured through student self-reported questionnaires (Luo et al., 2009; Strambler & Weinstein, 2010) and open- and closed-ended questions (Strambler & McKown, 2013). To evaluate the other emergent engagement dimensions (e.g., classroom and effortful engagement), authors integrated and adapted measures typically used to assess constructs other than SE (e.g., Hughes et al., 2006, 2008, 2009, Hughes & Zhang, 2007, and Luo et al., 2009 used a measure including items from the Big Five Inventory and the Social Competence Scale; Linnenbrink-Garcia et al., 2011 combined items from the Social Lofting and the Positive Group Interaction Scales).

Overall, the examination of data allowed us to conclude that most of the studies used methods and measures to analyze engagement consistent with the definitions set for the selected dimensions. Finally, the large number of features encompassed by the typical and emergent engagement dimensions contributes to explaining the high variability in the engagement measures identified. More detailed information on the methods and measures used in each study to assess engagement is provided in the Online Resource 2.

1.4.2. School Engagement Conceptualizations, Definitions, and Dimensions

Consistent with previous alerts from research (e.g., Fredricks et al., 2016), the studies sampled showed inconsistency and variability in the SE conceptualizations used. As described in the Online Resource 2, distinct terms were used to approach the engagement construct and distinct definitions for the same construct or dimension were found. An overview of the studies indicated that 44 studies (43.1%) followed the Fredricks et al. (2004) conceptualization of engagement, 38 (37.3%) did not reference their engagement conceptualizations, and 20 (19.6%) adopted varied conceptualizations (e.g., Kindermann, 1993; O'Neal et al., 2019). Note that eight out of the 102 studies did not present a definition for engagement (e.g., Hoglund et al., 2015; Sage & Kindermann, 1999).



Legend: The papers introducing a SE conceptualization are presented in bold. Papers in the sample following a SE conceptualization are in italic. Finally, * represents studies following more than one conceptualization of SE.

Figure 4 - Temporal organization of school engagement conceptualizations

1.4.2.1. School Engagement Conceptualizations: A Temporal Analysis

The sampled studies' conceptualizations of engagement were organized following a temporal lens (see Figure 4). Three distinct milestones regarding SE conceptualizations were identified as follows: (i) the SE conceptualizations prior to Fredricks et al. (2004), on which some of the included studies grounded their definitions; (ii) the Fredricks et al. (2004) conceptualization of SE; this seminal work grounded a considerable number of the studies sampled, being the most cited conceptualization used; and (iii) the SE conceptualizations emergent after Fredricks et al. (2004), comprised of indicators of engagement similar to previous conceptualizations as well as new indicators. A close examination of the conceptualizations adopted indicates that the studies published prior to 2004 were grounded on classic literature approaches to engagement (Brophy, 1983; Connell & Wellborn, 1991; Newmann, 1992; Newmann et al., 1992; Nystrand & Gamoran, 1991; Wellborn, 1991). For example, Lee and Anderson (1993) followed Brophy's (1983) conceptualization of engagement, stressing elements of the students' motivations to learn. Consistently, the main indicators assessed were students' attention, mastery goals, and strategies to better understand the class content (Lee & Anderson, 1993). Similarly, the works of Almasi et al. (1996) and Herrenkohl and Guerra (1998) analyzed students' deep involvement and commitment to learning and the metacognitive and self-regulation strategies used in class, such as constructing knowledge and monitoring one's own discourse practices. These authors followed the Nystrand and Gamoran (1991) engagement conceptualization, which stressed the students' sustained personal commitments to school content and their attempts to meet task requirements. Interestingly, the Fredricks et al. (2004) understanding of the cognitive engagement dimension presents similarities with this conceptualization. Also, in 1991, the work of Wellborn (1991) presented a conceptualization of engagement stressing students' behaviors in class, such as class participation and effort during learning activities, and students' positive and negative emotional reactions (e.g., happiness, sadness, boredom). This conceptualization, adding an emotional focus to the previous conceptualizations, was followed by some of the studies sampled (Furrer & Skinner, 2003; Langhout & Mitchell, 2008; Patrick et al., 1993; Skinner & Belmont, 1993).

The work by Connell (1990) and Connell and Wellborn (1991) set the ground for a multidimensional perspective on engagement. These authors understood engagement as a construct with three dimensions comprising students' behaviors (e.g., student initiation of actions, participation in class discussions, effort, and persistence), emotions (e.g., happiness, anxiety), and cognitions (e.g., problem-solving, flexibility), and included *negative engagement* (i.e., students' maladaptive motivational states) referred to as disaffection. This conceptualization was followed by Skinner et al. (1990).

In 1992, Newmann and Newmann et al. presented a conceptualization of engagement emphasizing the cognitive aspects (e.g., psychological investment in learning, mental effort, and metacognitive strategies), aligning with the previous work of Brophy (1983) and Nystrand and Gamoran (1991). This new conceptualization integrated social aspects of the classroom context (e.g., peer interactions) and prompted three studies in our sample (Bodovski & Farkas, 2007; Guthrie et al., 1996; Moller et al., 2014). Finally, Guthrie and Wigfield (2000) presented a domain-focused understanding of engagement a few years later. These authors presented the construct of engaged reading, described as multidimensional, while also highlighting the role of students' motivational processes, comprehension strategies, and behavioral characteristics. This approach was followed by some of the studies sampled (Cantrell et al., 2014; Guthrie et al., 2004; Wigfield et al., 2008).

The review by Fredricks et al. (2004) was an important milestone in SE research. As mentioned above, these authors conceptualized engagement as a three-arm construct bridging different lines of research. In addition, this seminal work alerted the need to strengthen the consistency of the engagement definitions and measures and pointed directions for future investigations. Many studies followed this conceptualization in our sample (e.g., Cai & Liem, 2017; Deed, 2008; Rimm-Kaufman et al., 2015).

Furthermore, some studies in our sample reported following conceptualizations published after Fredricks et al. (2004), namely those of Skinner et al. (2008, 2009) and Salmela-Aro and Upadyaya (2012). The Skinner et al. (2008, 2009) conceptualizations of SE addressed behavioral and/or emotional dimensions with features proximal to those of Wellborn (1991), Connell (1990), Connell and Wellborn (1991), and Fredricks et al. (2004), such as effort, attention, and persistence for behavioral engagement, and enthusiasm and interest for emotional engagement. Some of the sampled studies (e.g., Chen et al., 2010; O'Neal et al., 2019; Skinner et al., 2016) followed the Skinner et al. (2008, 2009) conceptualizations. On the other hand, the work of Salmela-Aro et al. (2016) followed a completely different and new conceptualization, termed *engagement in schoolwork* (see Salmela-Aro & Upadyaya, 2012). This new understanding of SE stresses the affective component of engagement through the combinations of students' energy (e.g., vigor and energy while studying), dedication (positive attitude toward studying), and absorption (e.g., concentration in studying).

Though the majority of studies sampled reported following just one conceptualization of SE, four studies reported following more than one conceptualization regarding students' engagement. For example, Guo et al. (2011) combined the conceptualizations of Fredricks et al. (2004) and Rimm-Kaufman et al. (2002) by defining engagement as students' levels of attention (Fredricks et al., 2004) and self-reliance (i.e., "the degree to which the child displays autonomy, self-regulation, and personal initiative

in the classroom," Rimm-Kaufman et al., 2002, p. 459). Furthermore, Lutz et al. (2006) and Wigfield et al. (2008) combined the conceptualizations of Fredricks et al. (2004) and Guthrie and Wigfield (2000) by adjusting Fredricks et al.'s (2004) behavioral, cognitive, and emotional dimensions to engagement in reading (Guthrie & Wigfield, 2000). Finally, the work of Pagani et al. (2012) grounded their definition of engagement on the conceptualizations of Fredricks et al. (2004), McClelland et al. (2006), and Li-Grining et al. (2010). These authors' collective perspective on engagement includes features such as "malleability, responsivity to contextual features, and amenability to environmental change" (p. 717), as stressed by Fredricks et al. (2004). However, it also emphasizes learning-related skills and the capacity to work in groups, as advocated by McClelland et al. (2006), and cognitive flexibility and emotional regulation, as suggested by Li-Grining et al. (2010).

1.4.2.2. School Engagement Definitions and Dimensions

Current research has shown that researchers have grounded their works on different SE conceptualizations. Not surprisingly, this diversity has translated into the use of various definitions and engagement dimensions. Therefore, to help better understand the definitions and dimensions used, our sample of studies was organized and grouped according to the conceptualization followed. Acknowledging that the Fredricks et al. (2004) conceptualization was the most followed within our sampled studies, these studies' SE definitions and dimensions were first addressed. Then, the SE definitions and dimensions of studies following other conceptualizations were analyzed, including works that did not report any conceptualizations.

A full-text analysis of the studies following the Fredricks et al. (2004) conceptualization indicated an overall agreement on the need to approach engagement as a meta-construct with different dimensions. Nevertheless, there was no consistency in the terms used to address the engagement construct or its dimensions. For example, some studies defined engagement as a multidimensional construct with three dimensions (i.e., cognitive, behavioral, and emotional/affective; e.g., Archambault & Dupéré, 2016; Parsons et al., 2016), while others adopted a broad definition with no dimensions, despite using the term *school engagement* (Baroody et al., 2016; Deed, 2008; Reyes et al., 2012). Additionally, a considerable number of studies did not consider nor assess the three dimensions suggested by Fredricks et al. (2004). Instead, these works measured either the behavioral and emotional dimensions (e.g., Li et al., 2010; Wu et al., 2013), the cognitive and behavioral dimensions (e.g., Patrick et al., 2007; Rosário et al., 2016), or just the behavioral dimension (e.g., Bryce et al., 2019; Guo et al., 2011; Kaiser et al., 2013). Moreover, some studies, despite explicitly referencing the Fredricks et al. (2004) conceptualization, used alternative terms to describe the engagement dimensions (e.g., *effortful*

engagement, Galla et al., 2014; Hughes et al., 2008; and *social-behavioral engagement*, Linnenbrink-Garcia et al., 2011) or added dimensions to the model (e.g., *social engagement*, Lutz et al., 2006; Martin & Rimm-Kaufman, 2015; Rimm-Kaufman et al., 2015; or *psychological engagement*, Luo et al., 2009; Strambler & Mckown, 2013; Strambler & Weinstein, 2010). The underlying reasoning supporting these novel terms was based on prior research and directly related to the studies' aims and purposes. For example, the term *effortful engagement*, used by Galla et al. (2014), characterized volitional and effortful aspects of involvement in learning activities. This term was adopted due to researchers' interest in assessing engagement through students' individual attributes, such as impulsivity, persistence, effort, and attention (Hughes et al., 2008). Similarly, the study of Linnenbrink-Garcia et al. (2011) adopted the term *social-behavioral engagement* to capture two social forms of students' engagement during group work, such as social lofting and quality of group interactions. In addition, the *social and psychological engagement* dimensions were adopted by a few studies. According to these studies, the *social engagement* dimension was defined as students' social interactions during academic instruction and learning tasks (Lutz et al., 2006; Martin & Rimm-Kaufman, 2015; Rimm-Kaufman et al., 2015). These authors intended to stress students' interactions with peers while performing academic tasks. Note that the three papers investigating this dimension used similar definitions for *social engagement*. However, the definition for *psychological engagement* was dissimilar in the four papers that referenced this dimension. In fact, Strambler and Mckown (2013) and Strambler and Weinstein (2010) defined this dimension as students' feelings of connection and identification with school, while Luo et al. (2009) and Dotterer and Lowe (2011) approached *psychological engagement* as a motivational process. In addition, three of the four papers (Luo et al., 2009; Strambler & Mckown, 2013; Strambler & Weinstein, 2010) approached *psychological engagement* as equivalent to emotional engagement, focusing engagement indicators on students' internal variables.

The remaining 58 studies identified distinct engagement conceptualizations and definitions, still with features proximal to the Fredricks et al.'s (2004) conceptualization (e.g., Gruman et al., 2008 defined *school engagement* through three dimensions: academic, affective, and behavioral; Bodovski and Farkas 2007 defined *student engagement* through learning-related work habits, cognitive behaviors, and emotions). Nevertheless, a few studies presented engagement definitions with no links or similarities to the work by Fredricks et al. (2004). For example, Salmela-Aro et al. (2016) defined *school engagement* as "a combination of energy, dedication, and absorption" (p.705), and Iyer et al. (2010) defined *school engagement* as students' ability to work independently and willingly participate in classroom activities. Moreover, to emphasize the influence of learning environments on

students' engagement, Herrenkohl and Guerra (1998) defined *student engagement* as an "act of constructing, monitoring, clarifying, and challenging perspectives within the classroom context" (p. 433), while Hughes and Zhang (2007) characterized *classroom engagement* as students' "effort, attention, persistence, and cooperative participation in learning" (p. 406). Lastly, other studies focused on students' engagement in a specific task (Brophy et al., 1983; Cantrell et al., 2014; Hastings & Schweiso, 1995; Lee & Anderson, 1993; Martens et al., 1997). Irrespective of their engagement conceptualizations, a considerable number of studies focused on just one engagement dimension: behavioral (n = 18) or academic engagement (n = 17). Interestingly, several studies considered behavioral and academic engagement to be equivalent constructs due to their focus on externally observable and academic indicators of engagement (e.g., Dolezal et al., 2003; Kindermann, 1993, 2007; Rosário et al., 2017b; Schardt et al., 2018).

A final aspect to consider is that which concerns the theoretical framework on which the studies were grounded. Of the 102 included studies, 55 reported being guided by a theoretical framework, while 47 did not mention any theoretical framework grounding the study. We found a great variety of theoretical frameworks reported (e.g., self-determination theory, attachment theory, and Bronfenbrenner's bio-ecological model). Importantly, some studies related the engagement conceptualization adopted with the theoretical framework selected. For example, the study of Rimm-Kaufman et al. (2015) adopted the conceptualization of Fredricks et al. (2004), but added a fourth dimension, *social engagement*, as advocated by the SSMMD model (Skinner et al., 2008). A similar situation was found in the study of Archambault et al. (2013). Despite following Fredricks et al.'s (2004) conceptualization, this study focused on students' classroom engagement, more specifically on students' involvement with their peers and teachers, as advocated by the attachment theory. Therefore, the use of theoretical frameworks grounding the study may help explain the variability of engagement definitions and dimensions found, particularly in studies that did not report an engagement conceptualization (e.g., Gremmen et al., 2018; Meece et al., 1988).

In sum, through inductive-approach analyses, it was identified that a considerable number of studies based their works on the conceptualization laid out by Fredricks et al. (2004). However, a large number of studies did not report the conceptualization of engagement followed. Therefore, based on current data, we found a reasonable consensus regarding the use of the Fredricks et al.'s (2004) conceptualization. Moreover, we also found an inconsistency across studies regarding the number of dimensions studied, as well as the specific definitions and theoretical frameworks used to ground the studies (see Online Resource 2).

1.4.3. Main Results of School Engagement Research

As previously mentioned, the literature presents distinct terms to describe engagement. In this investigation, we maintained consistency with the terms originally used in the sample of articles. Data were organized according to the SSMMD model of Skinner et al. (2008). Therefore, the four main categories set were as follows: (i) external factors contributing to students' SE (context), (ii) internal factors contributing to students' SE (self), (iii) student SE (action), and

(iv) outcomes of SE. The first category is focused on student's social interaction with SE facilitators, contextual and environmental features, and interventions designed to promote SE. This category comprises three main topics: (i) the role of class peers, teachers, or parents on SE; (ii) SE and the school context; and

(iii) intervention programs to promote SE. The second category is focused on students' internal processes and perceptions and comprises three topics: (i) SE, students' emotions, behaviors, and cognitions; (ii) SE and students' retention; and (iii) SE, motivational variables, and learning. The third category describes students' trajectories of SE throughout schooling. Finally, the last category presents the research findings regarding SE and academic achievement. Each of the following sections summarizes the main conclusions for each topic.

1.4.4. External Factors Contributing to Students School Engagement

1.4.4.1. The Role of Class Peers, Teachers, or Parents on School Engagement

Fifty-eight out of the 102 studies were focused on the role of class peers, teachers, or parents on SE (e.g., Hoglund et al., 2015; Hosan & Hoglund, 2017; Olivier et al., 2018; Shin, 2017).

1.4.4.2. Class peers

Results stress that peer culture (i.e., school-wide peer behaviors and the nature of peer relationships in school) is related to students' SE with SE increasing as peer culture becomes more positive (e.g., high levels of friendship quality; Lynch et al., 2013). Friendship quality (i.e., characteristics of students' relationships with their classmates) reported by students was found to be associated with prospective academic skills and SE (Hosan & Hoglund, 2017; Perdue et al., 2009). For example, Hosan and Hoglund (2017) found that students who develop friendships characterized by great closeness and low conflict tend to show high emotional and behavioral SE. Consistent with this finding, the work of Kim and Cappella (2016) reported that students developing few connections with their peers (i.e., "number of relational ties a child has in the classroom"; p. 25) were less engaged than their counterparts

with a strong peer connection network. Along this line of thought, Furrer and Skinner (2003) stated that students reporting high relatedness to their peers also reported high emotional and behavioral SE. These propositions highlight the importance of building strong relationships between students and their peers (Hosan & Hoglund, 2017; Kim & Cappella, 2016; Olivier et al., 2018). In fact, students displaying high-quality friendships, perceiving high social support from their peers, and displaying low levels of overt aggression (i.e., verbal and physical aggression) toward their peers are likely to report high levels of SE (Lynch et al., 2013; Perdue et al., 2009). Conversely, four of the included studies show that peer victimization (i.e., frequent verbal harassment, physical abuse, or exclusionary behaviors from peers; Archambault et al., 2016; Iyer et al., 2010), peer exclusion (Buhs et al., 2006), and peer rejection (Buhs, 2005) are related to the development of negative attitudes toward school (e.g., disengagement from school activities and poor academic outcomes). These authors concluded that high levels of peer victimization were associated with low levels of SE. Additionally, early peer rejection and abuse showed near-term negative effects on students' classroom behaviors and adjustment, with students evidencing declines in classroom participation and increases in school avoidance (Buhs, 2005; Buhs et al., 2006). In sum, children suffering from victimization or exclusion are likely to show behavioral problems that may prevent their engagement and focus on school tasks (Archambault et al., 2016; Buhs, 2005; Buhs et al., 2006; Iyer et al., 2010).

The paper of Shin (2017) helps to further the understanding of students' classroom peer climate. This author investigated the role played by social status (i.e., "admired, popularity and leader," p. 3) and status norms on AE and students' academic and social behaviors. Findings indicated that showing behaviors related to positive status norms tended to enhance students' social status. For example, students displaying prosocial behaviors and high AE are likely to improve their social status (i.e., admired by their peers). However, findings also indicated that status norms diverged for each social status. Social statuses such as *popularity* and *leader-like positions* were associated with positive and negative behaviors in both academic and social domains. For example, some students stated that displaying aggressive behaviors was important to achieve a high social status or to acquire social prominence. These latter propositions show how aiming to achieve a high social status may detrimentally affect students' behavioral development and AE (Shin, 2017). The work of Gremmen et al. (2018) examined the influence of near-seated peers on students' AE and achievement. Findings show that students' AE and achievement improved when their near-seated friends scored high in AE and achievement. Conversely, a negative correlation was found regarding peers not being befriended. These results alert the need to foster students' positive development by (i) promoting a positive classroom peer climate supportive of AE and prosocial

behavior (Shin, 2017), and (ii) monitoring and organizing the classroom processes of peer influence to favor students AE (e.g., planning of students' seating arrangements; Gremmen et al., 2018). The role of natural peer groups and networks and their influence on students' development, motivation, and engagement were also examined (Kindermann, 1993, 2007; Sage & Kindermann, 1999). For instance, through the analysis of a composite map, Kindermann (1993) found that fourth- and fifth-grade students tended to select peer-groups with similar levels of behavioral engagement; additionally, those who paired with peers with higher engagement levels increased their own behavioral engagement (Kindermann, 1993). Some years later, Kindermann (2007) examined whether the AE of sixth-grade students affiliated to peer groups changed throughout the school year. Findings indicated that students' AE levels were found to be similar to those of their group members. Also, students with higher levels of AE selected larger groups with stable membership. Hence, despite the high student group exchanges (i.e., group member turnover across the year was approximately 40%), groups' engagement profiles remained homogeneous over time, as did the AE of their members. Thus, students with high levels of AE at the beginning of the year continued to be highly engaged over the school year (Kindermann, 2007). Consistent with previous studies, Sage and Kindermann (1999) showed that peer group members might act as socialization agents while contributing to their classmates' engagement in class. Specifically, students highly motivated and engaged in the classroom are likely to enroll in a group in which the members are similarly engaged, benefiting from peers' approval and encouragement of displaying active on-task behaviors. The opposite was found for less engaged students (Sage & Kindermann, 1999). Therefore, through these social contingency patterns, students' peer networks are likely to significantly influence their motivation and engagement in classroom activities (Kinderman, 1993, 2007; Sage & Kindermann, 1999).

Some studies in the sample investigated the relationships between SE, peer acceptance (De Laet et al., 2015; Weyns et al., 2017), and peer support (Li et al., 2010; Patrick et al., 2007). Data showed that students feeling accepted by their peers (De Laet et al., 2015; Weyns et al., 2017) or receiving peer support are likely to engage in classroom activities (Patrick et al., 2007) and perceive themselves as academically competent (Li et al., 2010). Moreover, Chen et al. (2010) and Hughes et al. (2009) analyzed the relationships between peer academic reputation, engagement, and achievement. Findings indicated that the effects of peer academic reputation (i.e., students' reputation within a peer group regarding academic competence) on subsequent engagement were partially mediated by students' perceived academic competence (Chen et al., 2010; Hughes et al., 2009). Additionally, Chen et al. (2010) also found that students with low peer academic reputation may have fewer opportunities to enroll in

challenging classroom activities and work with high achieving students than their counterparts, which is likely to affect their SE. Furthermore, Hughes and Zhang (2007) investigated the effects of *classroom indegree* for ability (the degree to which peer nominations, designating some students as academically competent, were focused on a small number of students and showed consensus) and its relationship with classroom engagement. Findings indicated that students with low achievement were less engaged in classes where students had a more centralized perception (i.e., consensual and focused on a small number of students) of who among their peers were less academically capable than in classes where these perceptions were less centralized. Overall, data indicate that students' perceptions of their peers' competence play a considerable role in students' overall academic life, directly influencing peer acceptance and classroom engagement.

1.4.4.3. Teachers: teacher-student relationships and school engagement

Regarding the quality of teacher-student relationships, studies included in this review reported positive relationships between SE and teacher-student closeness, relatedness, and support (e.g., Hughes et al., 2006; Kindermann, 2007; Liu et al., 2017; Weyns et al., 2017). For example, Rimm-Kaufman et al. (2015) and Martin and Rimm-Kaufman (2015) found that students in highly organized classes and receiving high emotional support from teachers reported high levels of cognitive, emotional, and social (task-related interactions) engagement. In fact, students who feel support and encouragement from their teachers to complete their work and discuss their accomplishments are more likely to engage in schoolwork interactions (Battistich et al., 1997; Furrer & Skinner, 2003; Hughes & Kwok, 2006, 2007; Hughes et al., 2006; Kindermann, 2007; Parsons et al., 2016; Patrick et al., 2007; Skinner & Belmont, 1993; Wu et al., 2010). This latter finding is consistent with data indicating that teacher support is positively associated with peer acceptance and engagement (Gruman et al., 2008; Hughes & Kwok, 2006; Hughes et al., 2006; Liu et al., 2017; Weyns et al., 2017; Wu et al., 2010). In fact, Hughes et al. (2008) found that teacher support in elementary school shapes children's patterns of engagement in learning, which sets the foundation for building positive relationships with subsequent teachers and displaying high levels of learning engagement. Thus, teacher-student relationships are essential to students' development (Hughes & Kwok, 2007; Strambler & Weinstein, 2010). Nevertheless, the inverse pattern of influence should also be considered. For example, Strambler and Weinstein (2010) found that students' psychological disengagement (i.e., the degree to which students identify with non-academic domains) was strongly related to their negative perception of teachers' feedback, a form of teacher support. Furthermore, teacher-student closeness may have a negative effect on SE depending on the teacher's psychological condition (Hoglund et al., 2015). For example, Hoglund et al. (2015) reported

that students close to teachers displaying symptoms of burnout exhibit low levels of SE. Conversely, students who do not have a close relationship with teachers displaying burnout symptoms showed high levels of SE. Interestingly, findings suggest that students' SE does not seem to be related to the teachers' levels of burnout, but rather to the level of closeness between students and teachers with burnout symptoms (Hoglund et al., 2015).

The influence of teacher relationships with students and their parents on classroom engagement was addressed by Hughes and Kwok (2007). Findings showed that both relationships positively influenced students' classroom engagement. However, distinct relationships were identified among students and parents from different ethnic groups. For example, African American students and their parents reported less supportive relationships with teachers when compared to Hispanic or Caucasian students and parents, negatively affecting African American students' classroom engagement (Hughes & Kwok, 2007). In the same line of research, Hughes et al. (2006) found that teachers who extend their support to more students in the classroom increase the probability of reaching more diverse students (e.g., students with low achievement, or learning difficulties). This is particularly important because it may increase students' control over their behaviors in class and offer opportunities for students struggling to learn to have a new start and progress (Hughes et al., 2006).

Student–teacher conflict is also addressed in our sample of papers (Archambault & Dupéré, 2016; Archambault et al., 2016; Bryce et al., 2019; Cadima et al., 2015; De Laet et al., 2015; Dotterer & Lowe, 2011; Hosan & Hoglund, 2017; Kim & Cappella, 2016; Olivier et al., 2018; Wu et al., 2010). Findings show that the higher the teacher-student conflict, the lower the students behavioral (Bryce et al., 2019; Dotterer & Lowe, 2011; Hosan & Hoglund, 2017; Olivier et al., 2018), psychological (Dotterer & Lowe, 2011), and emotional engagement (Archambault et al., 2016; Hosan & Hoglund, 2017). Data indicate that students in conflict with their teachers tend to spend less time engaged in academic tasks (Dotterer & Lowe, 2011; Kim & Cappella, 2016; Olivier et al., 2018) and be less attached to school than their classmates not in conflict with teachers (Archambault & Dupéré, 2016; Hosan & Hoglund, 2017).

1.4.4.4. Teachers: teacher practices and school engagement

Research on teacher practices implemented in the classroom analyzed the influence of teachers' presentation statements (Brophy et al., 1983), time spent on academic instruction (Greenwood, 1991), task-related instructions (Lan et al., 2009), goal orientation practices (Hughes et al., 2011), and classroom conditions and types of activities developed (Blumenfeld & Meece, 1988; Dotterer & Lowe, 2011; Downer et al., 2007; Guo et al., 2011; Parsons et al., 2015, 2016; Raphael et al., 2008) on students SE.

Teachers' procedures during classroom instruction and students' engagement. Brophy et al. (1983) investigated the relationship between teachers' statements when presenting tasks to be completed in class and students' engagement in those tasks. Authors concluded that students' engagement was higher when teachers approached school tasks directly without introduction than when teachers presented a brief explanation of the tasks' requirements (Brophy et al., 1983). Furthermore, researchers have investigated the practices used by teachers to promote their students' AE (e.g., Dolezal et al., 2003; Hughes et al., 2011). For example, Raphael et al. (2008) interviewed and observed teachers' efforts to engage sixth-grade students in class tasks. Findings showed that teachers classified as highly engaging used instructional practices likely to encourage students' engagement, such as monitoring students' participation, scaffolding, modeling problem-solving, and using strategies (Raphael et al., 2008). Moreover, these teachers did not implement any practices likely to undermine students' engagement in class, contrary to moderately and low-engaging teachers (e.g., deliver long and low-level tasks, adopt a negative tone, provide unclear and ineffective feedback, Raphael et al., 2008). Similarly, Dolezal et al. (2003) used classroom observations to identify practices likely to undermine or promote students' AE. Findings indicated that students in classes where teachers' practices were likely to undermine their motivation (e.g., through negative management or speaking loudly) showed low AE. Moreover, students showed moderate AE in classrooms where the difficulty of the assigned tasks was low. In fact, and despite teachers' efforts to set practices likely to motivate students (e.g., creating friendly spaces for students and connecting new content with students' previous knowledge), the low difficulty of the task had a detrimental influence on students' motivation. Lastly, students were highly engaged in classrooms where teachers used strategies to facilitate their motivation (e.g., helping students reflect on their disruptive behavior and providing feedback and praise) and delivered challenging tasks adjusted to their learning skills (Dolezal et al., 2003).

Time spent on academic instruction and students' engagement. Through group comparison, Greenwood (1991) investigated the relationships between time on academic instruction, AE, and achievement gains. The comparison groups were as follows: (i) an at-risk experimental group comprised of students from low-SES backgrounds whose teachers implemented classwide peer tutoring (CWPT; i.e., "an instructional system in which tutor-tutee pairs work together on a classwide basis," p. 525); (ii) an equivalent at-risk control group; and (iii) a non-risk comparison group comprised of students from average to high-SES backgrounds. Teachers from the second and third groups implemented conventional instructional practices. Findings showed that students in comparison groups that spent more time in academic-oriented instruction, particularly the group with CWPT, showed higher levels of AE and better

achievement than their counterparts. Thus, Greenwood (1991) concluded that CWPT was an effective instructional practice to promote students' AE and academic outcomes.

Teachers' approaches to task-related instructions and students' engagement. Adopting a cultural approach, Lan et al. (2009) analyzed the behavioral engagement of first-grade Chinese and American students across mathematics classes. The authors found that throughout the school year, both Chinese and American samples experienced a decrease in their behavioral engagement scores; however, Chinese students displayed higher and more consistent levels of engagement than American students. Lan et al. (2009) suggested several practices that may have contributed to these results, such as task-related instructions and work group size. Researchers did not find significant differences in the number of reactive instructions (i.e., instructions given after student behaviors) provided by American and Chinese teachers; however, the same was not true for proactive instructions (i.e., more complete instructions given before children start a task). Chinese teachers, compared to American teachers, gave more oral behavioral instructions to their students. This proactive, rather than reactive, instructional protocol may have favored Chinese students' engagement. In addition, data indicated that students working in small groups provided evidence for less engagement than counterparts enrolled in whole-class activities. In sum, authors concluded that cultural differences, students' behaviors, and teachers' educational practices, including task-related instructions and work-group size, may influence students' behavioral engagement in the classroom (Lan et al., 2009).

Teachers' goal-oriented practices and students' engagement. The study by Hughes et al. (2011) investigated the relationship between SE and goal orientation. Data show that the more the teachers increased the use of performance-oriented goal practices, the lower the students' behavioral engagement became (Hughes et al., 2011). As authors alerted, this finding is of concern because, as students advance in their grade level, teachers tend to become more focused on guiding them to performance goals (e.g., emphasizing grades and encouraging competition, Hughes et al., 2011). Interestingly, the longitudinal nature of the study allowed for the conclusion that, over the years, students who moved to classrooms where teachers were less focused on practices guided by performance goals increased their behavioral engagement (Hughes et al., 2011).

Classroom settings, academic activities, and teacher-student interactions. Eight papers (Blumenfeld & Meece, 1988; Dotterer & Lowe, 2011; Downer et al., 2007; Guo et al., 2011; Parsons et al., 2015, 2016; Reyes et al., 2012; Wu et al., 2013) investigated various classroom variables influencing students' SE as follows: the conditions presented in classrooms (e.g., classroom quality, instructional contexts, social/ emotional climate; Dotterer & Lowe, 2011; Downer et al., 2007; Guo et al., 2011; Reyes

et al., 2012; Wu et al., 2013), the typology of activities developed (e.g., authentic, collaborative, or challenging tasks; Parsons et al., 2015, 2016; collaborative discussions, Wu et al., 2013) and their difficulty level (Blumenfeld & Meece, 1988), and the nature of interactions between teachers and students (e.g., either emotional or instructional support) required to promote different learning experiences (Dotterer & Lowe, 2011; Guo et al., 2011; Parsons et al., 2016; Reyes et al., 2012). Findings indicated that students are more likely to be engaged in class when (i) the quality of the classroom is high (e.g., teachers provide instructional support to their students, define clear rules, and encourage autonomy; Dotterer & Lowe, 2011; Downer et al., 2007; Guo et al., 2011; Reyes et al., 2012); (ii) students have a positive social/ emotional classroom climate (e.g., teachers are sensitive and responsive to students' needs and classroom chaos; Dotterer & Lowe, 2011; Reyes et al., 2012); (iii) students are integrated into small groups of instruction (Downer et al., 2007; Wu et al., 2013) or individualized work settings (Downer et al., 2007), and also in whole-class group work (Blumenfeld & Meece, 1988; Wu et al., 2013) depending on the task charac teristics (e.g., when tasks have a high difficulty level or are procedurally complex; Blumenfeld & Meece, 1988); and (iv) students perform challenging tasks requiring group discussion and collaboration with peers and support from teachers, all of which offer opportunities for new learnings (Blumenfeld & Meece, 1988; Parsons et al., 2015, 2016; Wu et al., 2013). In fact, elementary students are expected to stay in their seats working, pay attention to their teachers, follow their instructions, and work autonomously, while teachers are expected to help students meet these expectations (Downer et al., 2007; Parsons et al., 2016). For example, while designing classroom tasks for their students, teachers should attend to potentially engaging elements (e.g., using visual content, such as paints, maps, or pictures; alternating individual tasks for student reflection with moments of collaborative discussion with peers; Parsons et al., 2015; Wu et al., 2013), prompt students toward mastery and participation, challenge them, and be responsive to their calls (Blumenfeld & Meece, 1988; Dotterer & Lowe, 2011; Guo et al., 2011).

1.4.4.5. Parents

Six studies in our sample (Bryce et al., 2019; Furrer & Skinner, 2003; Kindermann, 2007; Li et al., 2010; Perdue et al., 2009; Wong et al., 2018) mentioned parents' support and interaction with their children at school. Three out of the six studies examined the mediating role of SE (Wong et al., 2018), or any of the three dimensions (Bryce et al., 2019; Li et al., 2010), in the relationship between parental involvement and students' academic and psychological outcomes. For example, Li et al. (2010) found that emotional and behavioral engagement are strong mediators of the relationship between parental involvement and academic competence. Furrer and Skinner (2003) and Perdue et al. (2009) also investigated the

relationship between SE, parental involvement, and students' academic competence. Findings showed that students with high levels of SE reported close relationships with their parents. In sum, results provided evidence that students whose parents are involved in their learning are likely to show higher perceived competence (Li et al., 2010) and higher levels of SE (Furrer & Skinner, 2003; Kindermann, 2007; Perdue et al., 2009) than their counterparts.

Wong et al. (2018) investigated parental educational involvement at home and in school and found that school-based parental involvement impacts children's prosocial behavior through SE. Additionally, results showed that (i) SE mediated the relationship between home-based parental educational involvement and student's language competence and psychosocial wellbeing, and (ii) the benefits for children reached a plateau when parents were overinvolved in their children's learning outside of school (Wong et al., 2018). Moreover, these authors warned that overly involved parents (i.e., displaying excessive parental control) might undermine their children's motivation to learn, especially in the final years of elementary school (Wong et al., 2018). The study of Bryce et al. (2019) also investigated this topic. Data reported that parental involvement was positively related to reading and mathematics achievement; however, this positive effect was found only in first-grade students (Bryce et al., 2019). Authors suggest that parental efforts to promote their children's autonomy should be indirect, for instance, by encouraging students' academic endeavors (Bryce et al., 2019).

1.4.4.6. School Engagement and School Context

Some of the included articles (Ashiabi, 2005; Cappella et al., 2013; Dornhecker et al., 2015; Gruman et al., 2008; Hastings & Schweiso, 1995; Langhout & Mitchell, 2008; Yang et al., 2018) investigated aspects of the school context in relation to SE. Despite the diverse nature and purposes of these articles, all examined the relationships between characteristics of the school context (i.e., students' school mobility, stand-biased desks, seating arrangements, material hardship, household food insecurity, and hidden curriculum) and students' SE. For example, findings from Gruman et al. (2008) showed that school mobility (changing schools) during elementary school led to a decrease in students' behavioral and AE. Improvements regarding affective engagement (i.e., positive attitudes toward school) were observed over the years.

The role played by the classroom environment on students' engagement was addressed by Dornhecker et al. (2015) and Hastings and Schweiso (1995). Dornhecker et al. (2015) explored the effects of classrooms adopting stand-biased desks (treatment group) and classrooms using the traditional desks and chairs (control group) on students' AE. Findings showed no statistical differences between both groups' AE. The work of Hastings and Schweiso (1995; studies 1 and 2) evaluated the effects of seating

arrangements (i.e., groups and rows for individual tasks) on students' task engagement. In study 1, classes were organized in rows and groups, one for each condition. A similar pattern of results was found in both classes, with students' task engagement being higher in the row arrangement. Grounded on this evidence, a second study was designed to increase the task engagement of three students presenting disruptive behaviors and showing low academic progress. For this purpose, the entire class was rearranged (i.e., all students were seated in rows when performing individual tasks). Findings showed that the changes in the seating arrangements substantially increased the entire class's task engagement as well as contributed to a decrease in the three students' disruptive behavior (Hastings & Schweiso, 1995). Further investigating the characteristics of the school context, Yang et al. (2018) and Ashiabi (2005) examined the relationships between students' material hardship (e.g., insufficient housing, insufficient food, or lack of school supplies) and household food insecurity, respectively, on SE and grade retention. According to these authors, students' SE is negatively affected when they experience material hardship (Yang et al., 2018) and food insecurity, through their impact on students' health and emotional well-being (Ashiabi, 2005). In fact, students from families lacking access to essential and adequate goods face daily hardships, experience higher levels of emotional distress (Ashiabi, 2005), and show a high likelihood of grade retention (Yang et al., 2018). Cappella et al. (2013) investigated how classroom relational structure (i.e., social network equity) predicts students' behavioral engagement. Results indicated that social network equity mitigates the negative relationship between behavioral difficulties and behavioral engagement. In fact, students in classrooms characterized by social network equity were less disengaged than their counterparts (Cappella et al., 2013).

Finally, the role of the hidden curriculum (i.e., values, norms, and beliefs transmitted to students via the structure of schooling) on students' academic disengagement was examined by Langhout and Mitchell (2008). Findings showed that the hidden curriculum is transmitted through the school's disciplinary system, and students are required to demonstrate their engagement following the hidden curriculum's guidelines for school behavior. According to the authors, the disciplinary rules were designed to increase students' AE, but data show that the effect was the opposite for Black and Latino male students. Besides, students who did not behave according to hidden curriculum's norms and values were publicly reprimanded, which further contributed to their disengagement. Therefore, the hidden curriculum could represent a challenge for students, and also for teachers, as it may thwart attempts to create a positive learning environment that respects diversity (Langhout & Mitchell, 2008).

1.4.4.7. Intervention Programs to Promote School Engagement

A total of 17 articles in the sample included intervention programs to promote SE or AE (e.g., Guthrie et al., 2004; McHugh et al., 2016; Schardt et al., 2018).

Reinforcing students' engagement in academic tasks. Martens et al. (1992, 1997) developed two experimental intervention studies with fourth-grade students. Martens et al. (1992) assessed the effect of students' exposure to "variable-interval schedules to social reinforcement contingent on AE" (p. 143). Results indicated that students' AE increased during treatment phases, suggesting that students' behavior (i.e., when engaging in completing an assigned school task) was responsive to the social reinforcement procedures. The second study by Martens et al. (1997) evaluated the effects of three reinforcement histories (i.e., reinforcement procedures provided to students by teachers) on the persistence of task engagement. Results showed effects for all reinforcement histories. Still, the reinforcement history including an instructional control (i.e., when the teacher provided students with instructions on how to behave as well as subsequent reinforcements) showed the highest effect on students' persistence of task engagement (Martens et al., 1997).

Promoting students' reading comprehension and engagement. Six papers (Almasi et al., 1996; Cantrell et al., 2014; Guthrie et al., 1996, 2004; Lutz et al., 2006; Wigfield et al., 2008) addressed the efficacy of reading instructional programs on enhancing students' engagement, strategy use, and reading comprehension. The study of Almasi et al. (1996) explored the nature of students' "engaged reading" and use of comprehension strategies through a literature discussion approach. Results indicated that engagement was observed during the application of comprehension strategies (e.g., selecting and connecting information), highlighting the important role of classroom culture on students' "engaged reading." Authors concluded that students are more highly engaged when provided with the opportunity to respond, share their interpretations, and challenge their colleagues' interpretations and opinions (Almasi et al., 1996).

The work of Cantrell et al. (2014) examined the impact of a supplemental reading course on students' reading engagement. Likewise, Guthrie et al. (1996, 2004), Lutz et al. (2006), and Wigfield et al. (2008) explored how students' enrollment in the reading program, "Concept Oriented Reading Instruction" (CORI, i.e., support for the use of cognitive and motivational processes in reading), affected their engagement and reading comprehension. However, the studies of Guthrie et al. (2004) and Wigfield et al. (2008) went further, comparing CORI against an instructional framework emphasizing strategy instruction (SI, i.e., support for the use of cognitive strategies in reading) and against traditional instruction (TI) in third and fourth-grade classrooms. Findings showed that students' literacy and reading

engagement increased during their participation in CORI (Guthrie et al., 1996; Lutz et al., 2006). Furthermore, regarding group comparisons, students' levels of reading engagement were significantly higher in CORI classrooms than in SI and TI classrooms (Guthrie et al., 2004; Wigfield et al., 2008). Altogether, results indicated that students who received integrated reading-science instructions, or those who benefited from specific training on reading strategies, showed gains in reading strategies and comprehension, as well as in reading motivation, problem-solving, self-efficacy, and learning engagement (Almasi et al., 1996; Cantrell et al., 2014; Guthrie et al., 1996, 2004; Lutz et al., 2006; Wigfield et al., 2008).

Encouraging students' engagement and behavior monitoring. The studies of Herrenkohl and Guerra (1998) and Schardt et al. (2018) addressed the promotion of students' control and awareness of their engagement in school tasks. Schardt et al. (2018) tested the effects of a technology-based self-monitoring intervention (i.e., CellF-Monitor, an application allowing students to control and self-rate their on-task behaviors in class while working independently) on students' AE. Results showed positive effects with students increasing their AE and on-task behavior during independent work time (Schardt et al., 2018). The work by Herrenkohl and Guerra (1998) investigated two classroom interventions to encourage students to build their scientific knowledge. Students in class 1 received specific audience role assignments (i.e., AUDIENCE ROLES) and checked other students' schoolwork (i.e., ROLES). Students in class 2 just checked other students' schoolwork (i.e., ROLES). Findings indicated that students in class 1 were more active in initiating engagement episodes (e.g., monitoring comprehension of content) than students in class 2. A similar pattern of results was found in teachers' approaches to classes, with teachers from class 1 evidencing more emphasis on negotiating and monitoring practices (Herrenkohl & Guerra, 1998).

Promoting students' engagement through teachers evidenced-based practices. To increase teachers' use of evidence-based practices to promote students' AE, Strambler and McKown (2013) designed an action research-based teacher consultation intervention. Findings showed that teachers in the action research groups (treatment group, i.e., teachers participating in consultation sessions to learn evidenced-based practices and how to implement them in class) reported spending more time engaged in group work with their students than teachers in the self-study group (control group, i.e., teachers working independently to learn evidenced-based practices likely to promote SE). Moreover, students in action research classrooms, when compared to counterparts in self-study classrooms, showed higher AE and reading grades (Strambler & McKown, 2013).

Reducing problematic behaviors and increasing students' engagement. McHugh et al. (2016) assessed the effects of the Tooling intervention (i.e., a strategy that encourages students to report instances of their peers' positive behaviors) in decreasing disruptive behaviors in class and increasing classwide AE. Results showed significant decreases in disruptive behaviors as well as significant increases in students' AE during the intervention in all the classrooms enrolled (McHugh et al., 2016).

Two studies assessed the Check-in/Check-out program's effectiveness in improving students' behavioral performance and AE (Miller et al., 2015a, 2015b). Both interventions were effective in reducing problematic behaviors and increasing AE for all participants. Furthermore, Mullender-Wijnsma et al. (2015) examined the effect of physically active academic lessons on AE by comparing results from children with and without social disadvantage. Findings indicated that all children significantly increased their AE. Still, children with socially disadvantaged backgrounds showed lower levels of AE than their counterparts (Mullender-Wijnsma et al., 2015).

Lastly, Rosário et al. (2016, 2017b) investigated the efficacy of two intervention programs in the promotion of SE of children from Gypsy groups. One of the studies (Rosário et al., 2016) designed an after-school program for fourth-grade children from the Gypsy community using a story-tool (i.e., the narrative, "Yellow's trials and tribulations"). This intervention program aimed to develop students' self-regulation strategies (cognitive engagement) and increase school attendance and participation in class (behavioral engagement). Participants showed increases in their cognitive and behavioral engagement (when compared with the control group). Furthermore, the study by Rosário et al. (2017b) assessed the efficacy of an intervention promoting behavioral engagement (i.e., school attendance) and school success in children from the Gypsy community. Throughout four school years, elementary school children from the Gypsy community were called at home and invited to school by youth monitors from within their community. Findings showed that participating students reduced their school absenteeism and improved their classroom behavior, mathematics grades, and school attendance. Authors concluded that both interventions were efficacious in promoting students' behavioral and cognitive SE and school success, while maintaining the Gypsy community's cultural mores (Rosário et al., 2016, 2017b). All things considered, it can be noted that different interventions with diverse natures and purposes showed to be effective in promoting students' SE.

1.4.5. Internal Factors Contributing to Students School Engagement

1.4.5.1. School Engagement, Students' Emotions, Behaviors, and Cognitions

Students' reports on their emotions (i.e., affect, sense of community and belonging), behaviors (i.e., attention in class and individual work), and cognitions (i.e., perceived competence, control, and autonomy) and their influence on engagement were addressed by six studies in the sample (Battistich et al., 1997; Lee & Anderson, 1993; Linnenbrink-Garcia et al., 2011; Patrick et al., 1993; Peterson et al., 1984; Skinner et al., 1990). For example, findings from the study of Linnenbrink-Garcia et al. (2011) showed that students feeling happy or calm during small-group instruction interacted more positively with their group members (i.e., evidence of higher social-behavioral engagement). Conversely, students feeling sad, tired, or tense showed high levels of social loafing (i.e., tendency to reduce effort when working collectively rather than when alone and interact less positively with their group, Linnenbrink-Garcia et al., 2011). Therefore, students' affect significantly impacts their engagement in class. This proposition is consistent with the works of Battistich et al. (1997) and Peterson et al. (1984). For example, Battistich et al. (1997) found a positive association between students' sense of community (i.e., sense of membership and identification with school community) and AE. Students nurturing strong affective ties with other students and their class are more likely to internalize classroom and school values, and therefore, be more academically engaged (Battistich et al., 1997). Moreover, Peterson et al. (1984) examined students' affect (i.e., self-thoughts, interest), cognitive processes (e.g., understanding), and behaviors (i.e., ability to pay attention, listen to the teacher, work individually) during mathematics instruction. Results revealed inconsistencies between data collected from external observations and students' reports on their engagement in class. For example, some students who appeared to be engaged in tasks during class observations self-reported that they were neither engaged in the task nor thinking about the lesson material. Conversely, several students who seemed to be disengaged and off-task to observers reported themselves to be highly engaged, mentioning efforts to relate the new material learned to previous knowledge. Finally, authors concluded that students' reports of their affective thoughts (e.g., negative evaluative self-thoughts) and cognitive processes were more reliable and valid indicators of their engagement and learning than observers' judgments (Peterson et al., 1984). The work of Lee and Anderson (1993) analyzed the patterns of task engagement of 12 students, all taught by the same teachers and using the same materials, and their relationships with students' cognition, motivation, and affect. Findings showed four major patterns clustering students' task engagement: (i) intrinsically motivated to learn science, (ii) motivated to learn science, (iii) task avoidance, and (iv) active task resistance. Two intrinsically motivated (pattern 1) and four motivated (pattern 2) students showed

cognitive and behavioral engagement in most tasks, actively attempting to construct their knowledge while enjoying the process. The six students in the task avoidance and task resistance patterns were inattentive or uninvolved in class activities most of the time, avoiding engaging in classroom tasks. This study highlights the importance of students' idiosyncratic understanding of the academic tasks on their engagement. As reported, students with the same teacher and curriculum may experience and understand academic activities differently and thus engage differently in tasks. Lee and Anderson (1993) concluded that students' experiences of engagement in tasks result from the interaction between the instructional strategies and activities adopted by teachers, as well as students' cognition, motivation, and affect during instruction. Lastly, Skinner et al. (1990) and Patrick et al. (1993) found that students who perceive themselves as autonomous and believe in their capacity (competence) and willingness to determine their success in school are more likely to be behaviorally and emotionally engaged. In fact, competence and autonomy as students' learning needs (as advocated by the self-determination theory, Deci & Ryan, 1985) exert a strong influence on students' classroom behaviors and emotions, consequently influencing their learning (Patrick et al., 1993; Skinner et al., 1990).

1.4.5.2. School Engagement and Students' Retention

The experiences of retained students and the effect of retention on students' SE, perceptions of self-worth, peer relatedness, cognitive competence, and achievement were also investigated (Pierson & Connell, 1992). Results showed that retained students' perceptions of self-worth and peer relatedness did not differ significantly from those of non-retained students in the three comparison groups (i.e., matched-ability, random, and socially promoted students). However, retained students' perceptions of cognitive competence, SE, and academic achievement were significantly lower than those of the random comparison group. Still, these differences were not found in the non-retained matched-ability and socially promoted groups (Pierson & Connell, 1992).

1.4.5.3. School Engagement, Motivational Variables, and Learning

Four articles in the sample were focused on students' reports and perspectives about SE and the relationships between SE and motivational variables such as anxiety, burnout, and learning goals (Cai & Liem, 2017; Deed, 2008; Meece et al., 1988; Salmela-Aro et al., 2016). For example, Cai and Liem (2017) found that students who feel pressured to do mathematics tasks show high anxiety. In contrast, students who engage in mathematics learning and consider it interesting or meaningful tend to be less anxious, think more elaborately, and display more effort and persistence in learning (Cai & Liem, 2017). Contributing further to this topic, Salmela-Aro et al. (2016) identified sixth-grade students' SE (i.e., energy,

dedication, absorption) and burnout (i.e., exhaustion, cynicism, and inadequacy) profiles. Findings showed that about 50% of the students fit in the *engaged in school* profile and scored low in the three school burnout dimensions. However, it is important to highlight that almost half of the students reported feeling some degree of cynicism toward school and reported low levels of SE. Interestingly, these students mentioned that they would invest more in schoolwork and be more academically engaged if they could use more socio-digital technologies at school. Authors concluded that socio-digital technologies could be relevant tools to promote AE in students scoring high in cynicism (Salmela-Aro et al., 2016). Focusing on students' perspectives, Meece et al. (1988) tested a goal mediation model in small group and whole-class activities in which goal orientations mediated the effect of individual variables (i.e., perceived competence, intrinsic motivation, and attitudes toward science) and students' cognitive engagement. Results indicated that students' perceived competence, intrinsic motivation, and attitudes toward science were positively related to task-mastery goals and negatively related to ego/social and work-avoidant goals. Authors reported a stronger effect for small group activities compared to that of whole-class activities. A similar pattern of relationships was found between students' goal orientation and cognitive engagement. Data showed that students with a strong emphasis on task-mastery goals reported higher active cognitive engagement (i.e., "students' use of metacognitive and self-regulation strategies," p. 515) than counterparts with distinct goal orientation. In contrast, students oriented to ego/social goals, aiming to please their teacher or gain social recognition, as well as students oriented to avoid work or minimize their task efforts, reported lower cognitive engagement than their counterparts oriented to task-mastery goals (Meece et al., 1988). Finally, disengaged sixth-grade students' perspectives about learning were also examined (Deed, 2008). Data showed that the participants perceived good learners as quick, smart workers, and able to complete school tasks and achieve high grades. Moreover, this sample of disengaged students defined learning control as the knowledge students are expected to master to complete tasks correctly, understand ideas, and make decisions about their own behavior in class. Interestingly, participants perceived SE as dependent on their own choices, especially regarding the behavioral dimension (Deed, 2008).

1.4.6. Students School Engagement (Action)

1.4.6.1. Student Trajectories of School Engagement

Students' trajectories of SE throughout elementary school and its impact on school variables were also addressed in this review (Archambault & Dupéré, 2016; Archambault et al., 2013; Pagani et al., 2012; Skinner et al., 2016). For example, Skinner et al. (2016) found that students more academically engaged

at the beginning of the year were more likely to use adaptive coping strategies, overcome learning obstacles, and persist in challenging schoolwork as schooling progressed. The opposite was found for disaffected students, as these students were likely to fall back on maladaptive responses throughout the year. These findings allowed for the conclusion that disaffected students were more likely to give up and less likely to re-engage in academic activities due to their maladaptive profile of coping strategies (Skinner et al., 2016). Still, regarding students' persistence and engagement, the work by Archambault et al. (2013) highlighted the developmental stability of students' classroom engagement over the first four years of elementary school. Similarly, the work by Archambault and Dupéré (2016) showed that most of the elementary students enrolled presented high and stable levels of classroom engagement as the school years advanced (third to sixth grade). However, approximately a third of the participating students experienced low patterns of engagement. The authors showed concern about students' declining engagement trajectories due to the likelihood of future academic failure and disruptive behaviors (Archambault & Dupéré, 2016). Lastly, Pagani et al. (2012) found that the higher the children's levels of attention are in kindergarten, the better their chances of showing high or medium classroom engagement trajectories. Authors concluded that improvements in children's attention skills in kindergarten are likely to enhance elementary school behaviors oriented to school tasks (Pagani et al., 2012).

1.4.7. Outcomes of School Engagement

1.4.7.1. School Engagement and Academic Achievement

Twenty-four out of the 102 studies examined the relationships between SE and academic achievement (e.g., Kaiser et al., 2013; Peterson et al., 1984). These 24 studies focused on the academic domains as follows: mathematics (Baroody et al., 2016; Bodovski & Farkas, 2007; Darensbourg & Blake, 2013; Galla et al., 2014; Moller et al., 2014; Peterson & Fennema, 1985; Peterson et al., 1984), reading (Galla et al., 2014; Guo et al., 2011, 2015; Hughes & Zhang, 2007; Kaiser et al., 2013; Kwon et al., 2018; O'Neal, 2018; O'Neal et al., 2019; Reyes et al., 2012), mathematics and reading (Buhs, 2005; Buhs et al., 2006; Darensbourg & Blake, 2013; Galla et al., 2014; Guo et al., 2015; Hughes & Kwok, 2007; Hughes & Zhang, 2007; Hughes et al., 2008; Luo et al., 2009; Portilla et al., 2014; Skinner et al., 1990), and mathematics and English language arts (Strambler & Weinstein, 2010). Note that only the significant results of studies focused on more than one domain were discussed in this section. The overall results can be found at Online Resource 1.

Studies by Galla et al. (2014) and Moller et al. (2014) show that students' engagement, as reported by teachers, is positively related to achievement, and AE can be a strong predictor of

mathematics achievement in elementary school. Darensbourg and Blake (2013) supported this claim by arguing that behavioral engagement significantly influences mathematics achievement in the fourth and fifth grades. In addition, data by Peterson and Fennema (1985) found that students' engagement in four types of activities (i.e., competitive, cooperative, social, and off-task behavior) predicted their mathematics achievement level. Moreover, these authors, as well as Peterson et al. (1984), alerted to the fact that high engagement does not necessarily translate into high achievement. Thus, teachers should consider the type of activities in which students are enrolled. For example, students more engaged in social, non-competitive, and non-cooperative mathematics activities were likely to show low mathematics achievement. Interestingly, these authors also found that the more time boys spent engaged interacting with and being helped by their teacher, the lower their level of mathematics achievement. Data on girls indicated that engaging in cooperative mathematics activities was positively and significantly related to their mathematics achievement. Finally, a significant negative relationship between mathematics achievement and engagement in off-task behaviors was found for boys and girls (Peterson & Fennema, 1985). Consistent with these results, the study by Baroody et al. (2016) showed that student engagement in mathematics was significantly positively associated with students' mathematics achievement, but only when reported by teachers or observers (not when reported by students). Similar results were reported by Bodovski and Farkas (2007), who found a strong positive effect of SE, as perceived by the teacher, on mathematics achievement, specifically on students' achievement growth. These authors also found that the lowest-performing students showed the greatest gains in achievement due to their high engagement in learning. However, the opposite scenario was also true, with disengaged students showing low achievement growth (Bodovski & Farkas, 2007).

Studies examining the relationship between reading achievement and SE also found positive results (Galla et al., 2014; Guo et al., 2015; Hughes & Zhang, 2007; Kaiser et al., 2013; O'Neal et al., 2019; Reyes et al., 2012). For example, Guo et al. (2015) reported that reading achievement in preschool and the third grade predicted behavioral engagement in the first and fifth grades, respectively. However, behavioral engagement did not predict later reading achievement. Results also indicated that the predictive relations were stronger for students from low socioeconomic status (SES) families when compared against students from mid- or high-SES backgrounds (Guo et al., 2015). Additionally, several studies highlighted the key role of AE in mathematics and reading (e.g., Hughes & Zhang, 2007; Luo et al., 2009; Skinner et al., 1990). In general, these studies indicated that SE is a significant predictor of academic achievement (Galla et al., 2014; Hughes & Kwok, 2007; Hughes et al., 2008; O'Neal et al., 2019; Skinner et al., 1990) and is positively related to academic competence (Portilla et al., 2014;

Skinner et al., 1990) and students' long-term scholastic growth (Luo et al., 2009). These associations were further confirmed by Hughes and Zhang (2007), who reported that students with low reading performance and low mathematics achievement were perceived to be disengaged from school by their teachers. In addition, Strambler and Weisntein (2010) found that out of the three facets of psychological disengagement (i.e., academic valuing, academic devaluing, and alternative identification), only academic devaluing was a predictor of poor achievement in English language arts and mathematic domains.

The mediating role of engagement and its predictive effect on achievement was investigated in seven of the included studies (Buhs, 2005; Buhs et al., 2006; Guo et al., 2011; Iyer et al., 2010; Kwon et al., 2018; O'Neal, 2018; Reyes et al., 2012). These studies analyzed the relationships along a set of variables, such as peer victimization/rejection/exclusion (Buhs, 2005; Buhs et al., 2006; Iyer et al., 2010), stress-related feelings (O'Neal, 2018), emotion regulation (Kwon et al., 2018), classroom quality (Guo et al., 2011), classroom emotional climate (Reyes et al., 2012), SE, and achievement. Results revealed that peer victimization/rejection/exclusion was associated with lower levels of academic achievement (in more than one domain) through its effect on students' classroom engagement (Buhs, 2005; Buhs et al., 2006; Iyer et al., 2010). Regarding reading achievement, findings indicated that stress-related feelings affected emotional engagement negatively, which, in turn, negatively impacted future literacy achievement (O'Neal, 2018). Aligning with these results, Kwon et al. (2018) reported that AE mediated the relationship between negative emotionality and emotion regulation and reading achievement. Finally, Guo et al. (2011) and Reyes et al. (2012) showed that classroom quality and emotional climate indirectly influenced students' engagement, which, in turn, predicted reading achievement.

1.5. Discussion

SE has been receiving attention from researchers, especially those interested in further understanding this phenomenon in the context of populations with higher likelihoods of failing or dropping out of school early (e.g., Hirschfield & Gasper, 2011). The current systematic review aims to address and organize the investigations conducted on SE in elementary schools until 2018. This review offers a helpful map of the research designs used over the last 35 years to investigate SE in elementary school. A detailed analysis of data presented in Online Resource 1 presents readers with data analysis and outcomes from each investigation's research. For example, readers may learn that most studies used purposeful and convenience samples and none used random sampling methods. Moreover, through the examination of the Online Resource 2, readers may learn about the methodological approaches used to investigate students' engagement, with teacher-reported engagement being the most frequently used, followed by

student-reported methods and classroom observations. Prior research has found higher correlations between SE and students' reports, as compared to those between SE and teachers' reports (e.g., Hanover Research, 2013; Stroet et al., 2013). Some studies in this review corroborated this statement (Kaiser et al., 2013; Peterson et al., 1984; Skinner & Belmont, 1993; Wu et al., 2013) while referencing how multiple variables can influence external judgments on students' engagement (e.g., informants' knowledge of students' behaviors or students' prior achievement). Therefore, these authors concluded that external judgments might not be sufficiently accurate in capturing students' internal experiences that are only partially revealed in overt behavior. In fact, engagement encompasses internal and observable processes experienced by students on a daily basis, making them the most accurate sources of information for reporting engagement (Hanover Research, 2013; Kaiser et al., 2013; Peterson et al., 1984; Wu et al., 2013). Nevertheless, teachers' reports and classroom observations have still been considered important sources of information (e.g., Baroody et al., 2016; Yang et al., 2018), allowing researchers to gather information about students' behaviors and learning strategies during academic instruction and while solving school tasks. However, these methods have limitations due to the exclusive focus on students' behaviors and observable actions. To overcome the limitations of each method, several studies in our sample used both methods when addressing the various dimensions of students' engagement (e.g., Cadima et al., 2015; Miller et al., 2015a; Schardt et al., 2018). Others combined those methods with students' interviews to further understand the students' perspectives and the underlying processes of engagement (e.g., Almasi et al., 1996; Deed, 2008; Parsons et al., 2015, 2016). However, despite the benefits of using more than one method, some studies used a single methodological approach (e.g., Battistich et al., 1997; Guo et al., 2011; Kindermann, 2007; Rosário et al., 2016).

Data on the engagement measures were also diverse. Despite many studies (e.g., Gruman et al., 2008; Linnenbrink-Garcia et al., 2011; Salmela-Aro et al., 2016) having used distinct measures to assess each of the engagement dimensions selected, others assessed all the engagement dimensions through a unique measure (e.g., Archambault & Dupéré, 2016; Lutz et al., 2006; Perdue et al., 2009). The latter prevents the examination of each dimension's contribution to students' outcomes (Fredricks et al., 2004). Moreover, some authors reported adapting their engagement measures by merging or combining items from preexisting scales. In some cases, these methodological options resulted in the inclusion of items assessing educational constructs (such as motivation; Cantrell et al., 2014; Deed, 2008; Guthrie et al., 1996, 2004) in the engagement measures or in new measures encompassing characteristics from distinct engagement dimensions that prevent the understanding of each dimension's

role in the results (e.g., Cai & Liem, 2017; Blumenfeld & Meece, 1988; Dolezal et al., 2003; Hughes & Kwok, 2006). Additionally, in a few studies, the reports on the engagement indicators assessed were not detailed enough (e.g., Peterson et al., 1984; Pierson & Connell, 1992), which prevented the full comparison of findings against previous research.

The relevance of sources or targets of engagement is an important aspect to consider, pointed to by Fredricks et al. (2004). These authors warned that students' engagement might change in response to the context, type of activities being performed, and subject or content domain targeted; therefore, these aspects should be considered when assessing engagement. Some studies in our sample analyzed these aspects, which enabled the exploration of how elementary students engage in different contexts, activities, and domains.

A detailed analysis of engagement conceptualizations, dimensions, and definitions showed that current data is consistent with the previous literature (see Appleton et al., 2008; Fredricks et al., 2016), stressing the need to further clarify and conceptualize the construct of SE. In most articles of our sample, the engagement definition, key indicators included in each dimension, and measures tapping those indicators were guided by the conceptualizations selected. This was the case even when not all dimensions consistent with the chosen conceptualization were investigated (e.g., Kindermann, 1993; Skinner et al., 1990).

Our analysis of the conceptualizations followed a chronological order (see Figure 4), thus allowing us to understand how conceptualizations changed over the years. The conceptualizations firstly described (e.g., Brophy, 1983; Nystrand & Gamoran, 1991) focused on aspects mainly related to what was later associated with the cognitive dimension of Fredricks et al. (2004). The following conceptualizations extended the range of engagement by adding two novel dimensions (students' behaviors and emotions) as core aspects of SE (Connell, 1990; Connell & Wellborn, 1991; Skinner et al., 2008, 2009; Wellborn, 1991) and introducing the social component of engagement, as students' interactions in the classroom were addressed (Newmann, 1992; Newmann et al., 1992). Responding to the emergent call to understand students' engagement in specific domains and during classwork, different conceptualizations addressing engagement in reading (Guthrie & Wigfield, 2000) and engagement in schoolwork (Salmela-Aro & Upadyaya, 2012) were identified. Moreover, some authors combined different conceptualizations to address their purposes and goals (e.g., Guo et al., 2011; Lutz et al., 2006; Pagani et al., 2012). Therefore, as years advanced, researchers have used different conceptualizations of SE, which translated into the use of different methods and instruments. These research efforts aimed to better capture the multidimensionality of SE may help explain the large variability of terms and features

addressed in the included studies. However, these distinct angles, indicators, and measures to approach SE may prevent comparing research findings and reaching a consensus in the literature regarding the construct of SE.

The seminal work of Fredricks et al. (2004) represents SE as a meta-construct with three dimensions that co-occur. Despite this conceptualization being considered a reference in the SE field (Sinatra et al., 2015), not all studies in the sample used the Fredricks et al.'s (2004) conceptualization. For this reason, as previously reported (e.g., Fredricks et al., 2016), new terms (e.g., *effortful engagement, classroom engagement*), dimensions (e.g., *psychological engagement*), and definitions emerged in the last decades, contributing to the significant increase in the variability of the SE construct (Wang & Fredricks, 2013; Wang & Holcombe, 2010). Moreover, even studies adopting the Fredricks et al.'s (2004) conceptualization did not always consider and assess the three SE dimensions (e.g., Dotterer & Lowe, 2011; Kaiser et al., 2013; Kim & Cappella, 2016; Li et al., 2010). For example, a considerable number of studies analyzed only the behavioral or academic dimension of engagement. The reasoning for not simultaneously investigating the three dimensions of SE is manifold. For instance, the need to (i) deepen the knowledge on the role of students' behavioral engagement in the first years of schooling, which is particularly relevant as this dimension is the most emphasized in elementary school (e.g., Hughes et al., 2008; Rosário et al., 2017b; Skinner & Belmont, 1993), and (ii) find the balance between different assessment sources' strengths and weaknesses. For example, behavioral and academic engagement are less exposed to inferential processes of the evaluator due to their focus on students' academic behaviors, as compared to emotional or cognitive engagement (Cadima et al., 2015; Olivier et al., 2018; Wu et al., 2010). Despite the merit of these reasons, not simultaneously investigating the three dimensions conflicts with the multidimensionality of the construct, and, consequently, caution is needed while interpreting findings. As Sinatra et al. (2015) alerted, due to the entwined nature of SE, the absent dimensions are likely to influence the measured ones. Therefore, as the findings of the present review show, the claim by Fredricks et al. (2016) on the need for (i) presenting clear definitions for SE, and (ii) showing coherence between the conceptualization selected for and the instruments used to measure SE, is still ongoing.

Evidence presented in this review was organized into four main categories grounded on the SSMMD model (Skinner et al., 2008). The variables investigated in the sampled papers, their relationships, the outcomes, and the interventions aimed at promoting SE and SE trajectories were analyzed. Data on the role of peers and teachers on elementary school students' SE suggest that peer relationships and the quality of teacher-student relationships significantly influence students' SE. Interestingly, for both cases, researchers found that the impact of these relationships on SE could be

either positive or negative. Addressing peer relationships, the variables that have shown positive and negative influences on SE were as follows: peer culture (Lynch et al., 2013), friendship quality (Hosan & Hoglund, 2017; Perdue et al., 2009), social status norms (Shin, 2017), near-seated peers (Gremmen et al., 2018), natural peer groups and networks (Kindermann, 1993, 2007; Sage & Kindermann, 1999), peer victimization (Archambault et al., 2016; Iyer et al., 2010), peer exclusion (Buhs et al., 2006), peer rejection (Buhs, 2005), peer acceptance (De Laet et al., 2015; Weyns et al., 2017), and peers' perceptions of competence (Chen et al., 2010; Hughes & Zhang, 2007; Hughes et al., 2009). All studies concluded that when peer relationships are characterized by victimization, exclusion, rejection, conflict, or low acceptance, students are at a greater risk of developing negative attitudes toward school (Archambault et al., 2016; Iyer et al., 2010), aggressive behavior (Shin, 2017), and school avoidance (Buhs, 2005; Buhs et al., 2006), as well as of displaying low SE (Hosan & Hoglund, 2017; Hughes & Zhang, 2007; Kim & Cappella, 2016; Olivier et al., 2018). In fact, the nature of peer relationships, the nearness of students' seating arrangements, and the quality of friendships (e.g., be friend or not-friend; be kind or aggressive) have a great impact on students' AE (Gremmen et al., 2018; Kindermann, 1993, 2007; Lynch et al., 2013; Perdue et al., 2009; Sage & Kindermann, 1999). Literature addressing teacher-student relationships found that the following variables showed an impact on students' SE: teachers' psychological condition (Hoglund et al., 2015), students' closeness to teachers (Furrer & Skinner, 2003; Parsons et al., 2016; Patrick et al., 2007; Portilla et al., 2014; Rimm-Kaufman et al., 2015; Skinner & Belmont, 1993; Wu et al., 2010), teacher support (Battistich et al., 1997; Hughes & Kwok, 2006, 2007; Hughes et al., 2006; Kindermann, 2007), and teacher-students conflict (Archambault & Dupéré, 2016; Archambault et al., 2016; Bryce et al., 2019; Cadima et al., 2015; De Laet et al., 2015; Hosan & Hoglund, 2017; Kim & Cappella, 2016; Olivier et al., 2018; Wu et al., 2010). Altogether, these findings point to the need for actively monitoring ongoing peer and teacher-student influences (e.g., Gremmen et al., 2018). The information learned from this active monitoring process is expected to help detect negative impacts on SE as early as possible and organize evidence-based practices to promote students' SE and well-being.

Research on teachers' educational practices likely to favor student engagement in learning tasks was also analyzed. For example, teachers aiming to promote SE are expected to provide in-class support for students (Dotterer & Lowe, 2011; Guo et al., 2011; Raphael et al., 2008; Skinner et al., 2008; Wu et al., 2013), promote students' curiosity and will to learn through the implementation of diverse instructional practices in class (e.g., Blumenfeld & Meece, 1988; Dolezal et al., 2003; Downer et al., 2007; Hughes et al., 2011; Lan et al., 2009; Parsons et al., 2015, 2016), and model their engagement in learning (Hughes et al., 2008; Raphael et al., 2008). Globally, findings stress that students benefiting

from their teachers' support and responsiveness are likely to make clear efforts to improve their learning through investing time, commitment, and persistence in their schoolwork (Krause & Coates, 2008; McGrath & Bergen, 2015; Reyes et al., 2012; Skinner et al., 2008).

Several studies in the sample addressed the relationships between parents' involvement in their children's schoolwork and their children's SE. Findings showed that SE mediated the relationship between parents' involvement and their children's academic competence, psychosocial well-being, and achievement (Bryce et al., 2019; Wong et al., 2018). However, some studies found a direct and positive relationship between SE and student-parent relatedness (Furrer & Skinner, 2003; Kindermann, 2007; Perdue et al., 2009). For example, Estell and Perdue (2013) found that students whose parents provided supportive behaviors and were socially involved presented higher levels of SE than their counterparts. Grounded on the corpus of research on parental involvement, Mo and Singh (2008) and Sylva et al. (2008) advocated for the importance of parental support (e.g., emotional understanding of their children's problems). In addition, Fletcher et al. (1995) defended parental involvement and support as determinant factors of children's success in school. For reference, prior research shows that parents who are overly involved in their children's learning outside of school may undermine their children's motivation to learn (Wong et al., 2018) and, subsequently, compromise their autonomy (Bryce et al., 2019) and development of self-regulation learning strategies (Rosário et al., 2017a).

The role of the school context as a large umbrella subsuming a set of variables (e.g., SES of the students' families, cultural characteristics, and school values and norms) important in promoting students' SE was also addressed (e.g., Dornhecker et al., 2015; Hastings & Schweiso, 1995; Langhout & Mitchell, 2008). Findings show that school mobility, material hardship, household food insecurity, and hidden curriculums have been shown to undermine students' SE. Conversely, class seating arrangements (i.e., seating students in rows) have been shown to increase students' SE.

A few papers in the sample presented intervention programs aimed at promoting SE (e.g., Cantrell et al., 2014; Guthrie et al., 1996, 2004; McHugh et al., 2016). Globally, results indicate a wide range of possible ways to improve SE using distinct frameworks and approaches varying in complexity. For example, while some interventions can be easily implemented in schools and require low resources (e.g., Rosário et al., 2017b), others require specific and high resources (e.g., Schardt et al., 2018; Wigfield et al., 2008) or high control of the environment (e.g., Martens et al., 1992, 1997). When selecting the intervention design to implement in schools, prior research indicates the need to consider the target population's characteristics, the context where the intervention will take place, and the resources available (Rumberger & Lim, 2008). Besides, as Wang et al. (2011) alerted,

school-based programs should integrate strategies from the three SE dimensions to increase their effectiveness. This finding is particularly important because a close examination of students' SE trajectories indicates that many students show declining SE trajectories throughout elementary school (e.g., Archambault & Dupéré, 2016; Archambault et al., 2013; Skinner et al., 2016). According to prior research, these declining SE trajectories could be explained by different reasons, such as students' development periods (e.g., adolescence; Mahatmya et al., 2012), students' personal features (e.g., race/ethnicity, income, gender, or academic domain; Fredricks, 2014; Hill et al., 2008), and the characteristics of their educational environments (e.g., Shernoff, 2013). These propositions stress the importance of students' actions and commitment to learning; still, schools and educators are also expected to play an essential role in providing students with opportunities to engage in classwork (Skinner & Pitzer, 2012). Throughout schooling, students' learning needs are constantly changing, which poses ongoing challenges to their engagement and, subsequently, their educational contexts. Educators who want to act as facilitators of students' learning and engagement (Christenson et al., 2008; Sinclair et al., 2003) are expected to consider adjusting the educational environments and their educational practices to their students' needs (e.g., Fredricks, 2014). For example, educators could consider promoting students' emotions, experiences (e.g., retention), and needs for autonomy, competence, and relatedness (Lee & Anderson, 1993; Linnenbrink-Garcia et al., 2011; Patrick et al., 1993; Pierson & Connell, 1992; Skinner et al., 1990). Educators could achieve this by providing students with opportunities to feel competent and in control of their learning (e.g., through means of presenting varied and challenging activities; Cheon & Reeve, 2015) and to experience good and meaningful relationships with peers, teachers, and other school educators (e.g., through group-work or extracurricular activities; Cheon & Reeve, 2015; Jang et al., 2016).

In our sample of papers, an important set of motivational variables, such as learning goals (Meece et al., 1988), students' anxiety (Cai & Liem, 2017), students' burnout (Salmela-Aro et al., 2016), and the typology of classroom activities (Deed, 2008; Meece et al., 1988; Salmela-Aro et al., 2016), showed close relationships with SE and students' self-efficacy for learning. This corpus of data is relevant as it draws attention to the role played by these variables in the SE process. For example, researchers and educators could consider learning students' perspectives on their SE (e.g., Cai & Liem, 2017; Deed, 2008; Parsons et al., 2015, 2016; Peterson et al., 1984) and use this knowledge to set pedagogical strategies to promote SE (e.g., using socio-digital technologies in school, Salmela-Aro et al., 2016; or specialized training for teachers working with students showing disengaged behaviors, Cheon & Reeve, 2015).

Finally, the evidence presented in this review is consistent with findings from other school levels (Gottfried et al., 2007; Heng, 2014; Hirschfield & Gasper, 2011) and indicates that SE and academic achievement are positively associated. Overall, SE may be considered a strong predictor of academic achievement in elementary school (Baroody et al., 2016; Galla et al., 2014; Hughes & Zhang, 2007; Moller et al., 2014) and is positively related to academic competence (Portilla et al., 2014; Skinner et al., 1990). These propositions are consistent with other research works, stating that students' school experiences undertake a prominent position in the development of their SE (Wang & Holcombe, 2010). In fact, students with low engagement in school are likely to lose their interest in studying, which could have a detrimental impact on achievement, and ultimately result in an early dropout from school (Li & Lerner, 2011; Wonglorsaichon et al., 2014).

1.6. Recommendations for Future Practices

Grounded on the relevance of the current findings and their implications to the practical field, in this section, we highlight a few lessons learned and further discuss recommendations for practice. Due to its impact on students' school achievements and well-being, SE is key in organizing researchers' and educators' work in the school context (Li & Lerner, 2011; Wong et al., 2018). Therefore, educators and school administrators are expected to map the characteristics of the school context likely to promote or undermine students' SE. For example, educators may consider creating checklists with these characteristics to regularly check and update information and set into motion initiatives aimed to control their impact on students' SE. This corpus of information, gathered from literature, is expected to help develop in-class activities, create programs tailored to students' educational needs, and set out training courses for teachers and parents.

Following the sampled studies, we briefly summarize practices likely to promote SE in elementary school that educators could consider implementing into their daily activities. Firstly, acknowledging that teacher support plays a crucial role in the promotion of students' actual and forthcoming SE levels (De Laet et al., 2015), school administrators and educators could consider further examining the support (e.g., type and frequency) provided by teachers to elementary students in and outside of class. We have learned from literature that when students' needs are taken into consideration by teachers at school (Cappella et al., 2013) and other educational interveners at home, such as parents or caregivers (Bryce et al., 2019; Li et al., 2010; Wong et al., 2018), their SE is expected to grow. Moreover, support fitted to the personalized needs of elementary students, hopefully later extending to the following years of compulsory education, may be a strategy to invert decreasing SE trajectories throughout schooling (Skinner et al., 2016). The current sample of papers presents a diverse set of strategies delivered in

schools to enhance students' SE. For example, there are strategies focused on providing support to students from diverse ethnic backgrounds (Hughes & Kwok, 2007) and newcomer students and their families as they adapt to classes and school. Literature reported that ethnically diverse and newcomer students who perceive themselves as welcomed and receive attention and support from their teachers are expected to become engaged in school (Gruman et al., 2008; Hughes & Kwok, 2007).

Another relevant aspect that emerged in the reviewed literature is the role played by emotion on students' SE. Teacher support is potentially a powerful strategy for the promotion of SE; however, it can also negatively impact SE (Gruman et al., 2008; Hoglund et al., 2015), for instance, through support preventing students from growing in autonomy (Bryce et al., 2019). Additionally, due to students' role in their counterparts' SE (Archambault et al., 2016; Buhs et al., 2006; Chen et al., 2010; Kindermann, 1993, 2007), educators may consider monitoring students' relations with their peers (Gremmen et al., 2018). Following this line of reasoning, school administrators may wish to organize activities likely to strengthen these relationships, such as sports competitions with class teams or show and tell sessions opened to the school community. Moreover, educators interested in promoting students' SE should consider students' rights (Hughes & Zhang, 2007) and interests (Parsons et al., 2015, 2016) while designing school activities. For example, educators could create spaces and opportunities to listen to students' perspectives on their feelings about school and reports on their goals, learning processes, and learning needs (Deed, 2008; Linnenbrink-Garcia et al., 2011; Meece et al., 1988; Patrick et al., 1993; Salmela-Aro et al., 2016; Skinner et al., 1990). For example, educators can interview students to learn their interests and thoughts while completing classroom tasks (Lee & Anderson, 1993; Parsons et al., 2015, 2016) and encourage them to use a behavior chart in class to promote the evaluation, monitoring, and control of their in-class behaviors and engagement (Langhout & Mitchell, 2008). What is more, as Downer et al. (2007) and Parsons et al. (2015, 2016) alerted, teachers could consider designing class activities to make the learning experience enjoyable and the classroom environment non-threatening. For example, teachers may consider including hands-on activities and exercises in their academic routines (Mullender-Wijnsma et al., 2015), providing brief proactive instructions to prevent students' frequent mistakes and low investment (Brophy et al., 1983; Lan et al., 2009). In addition, teachers could organize small-group teaching areas (Lan et al., 2009) or whole-class group working areas in class to promote students' collaboration and willingness to solve high difficulty exercises (Blumenfeld & Meece, 1988; Wu et al., 2013). Furthermore, teachers could also emphasize focusing on the learning process by providing instructional support (Dotterer & Lowe, 2011; Parsons et al., 2015, 2016) likely to help students progress (e.g., providing individualized feedback; Cunha et al., 2019; Dolezal et al., 2003; Hughes et al., 2011;

setting a classwide peer tutoring system, Greenwood, 1991; setting in-class technology-based self-monitoring interventions, Schardt et al., 2018; promoting metacognitive reasoning in class, Blumenfeld & Meece, 1988; Raphael et al., 2008; Rosário et al., 2016; and promoting students' learning commitment using story tools, Rosário et al., 2016). This is crucial information that may help school administrators and educators set pedagogical training to promote in-class practices to foster student SE (e.g., promotion of students' questioning; type and frequency of homework feedback; Cunha et al., 2019).

Finally, school administrators and parent associations could consider organizing school-based training on good practices for promoting SE. The translation of extant research data on SE into useful information and the discussion with teachers and parents of evidence-based strategies likely to enhance students' SE is expected to raise awareness on the complexity of the SE processes and foster supportive behaviors aimed to favor children SE.

1.7. Limitations and Future Research Directions

To ensure that the studies selected are of high quality and prevent publication bias, we followed Cochrane's guidelines and the PRISMA statement while developing the search strategy addressed in this review. However, the current review is constrained by a few limitations that should be acknowledge. Despite our strategy, which involved a careful and intentional selection of keywords and databases (see search strategy section) and reference checking of the studies included from database searches, we are not able to guarantee full access to all data on this domain (e.g., all studies focusing on students' engagement in specific subjects, such as reading, science, or others). Reasons may be related to the exclusion of overly specific terms in our search query (e.g., reading engagement), as previously mentioned, but also with the diversity of terms used by researchers in their works. As highlighted in the "Results" section, distinct engagement terms, definitions, and dimensions were used, which could hardly be encompassed by a balanced search query respecting the systematic searches recommendations (see Bramer et al., 2018; Gusenbauer & Haddaway, 2020; Salvador-Oliván et al., 2019). The technical characteristics of the databases selected may have also contributed to explaining potentially missing works. However, the three databases selected meet all the necessary requirements to perform a systematic review and are recommended as principal research systems (see Gusenbauer & Haddaway, 2020).

SE has been greatly investigated in recent years at different school levels and with different purposes. Still, most of the studies found did not match the purpose of the present review because they were related to other school levels or focused on students with specific developmental disorders and, therefore, were not included. Another limitation of this review is related to the publication bias (i.e., studies

with non-significant results are rarely submitted or accepted for publication); hence, the published literature on SE may be unrepresentative of the set of completed studies within the domain, which may limit conclusions.

Following a multidimensional understanding of the concept and for the purpose of this investigation, we combined either the broad construct or its dimensions as specific keywords for the search (e.g., school engagement, cognitive engagement, and behavioral engagement). This option aimed to capture a greater number of studies investigating students' SE, at least in one of its dimensions. Still, we believe researchers should consider the need to clarify the concept of SE and the terms used to approach each dimension (Christenson et al., 2012). As explained in previous sections, the definition and measurement of some emergent terms (e.g., *effortful engagement*, *classroom engagement*) and dimensions (e.g., *social and psychological engagement*) are still uncertain. The same is true for the role played by the theoretical framework on the conceptualization and definition of engagement. Therefore, further investigation should address these aspects by analyzing their relevance and contribution to the field. This call for researchers' attention is not new and not solely focused on SE in elementary school. Throughout the years, several authors have pointed to the need to examine the definitions and measures of SE to clarify this research topic (Appleton et al., 2008; Fredricks et al., 2004, 2016). In fact, due to inconsistencies in the approach to engagement, other constructs, such as motivation (e.g., Cantrell et al., 2014; Guthrie et al., 1996, 2004) or self-regulation (e.g., Patrick et al., 2007; Rosário et al., 2016), are being included in the realm of SE (Fredricks et al., 2016). Moreover, as the present review's findings have pointed out, research on SE is moving away from the original framework focused on understanding school completion and dropout to a more preventive approach. This important challenge to the nature of the concept is expected to be addressed in future research.

Finally, as previously reported, our investigation allows readers to learn the methodological designs used in SE research in elementary schools throughout the last 35 years (see Online Resource 1). A detailed analysis of data and the conclusions drawn alert the need to conduct experimental studies on the topic. These studies would allow for the investigation and discussion of causal factors influencing the students' engagement processes. What is more, future research on SE in elementary schools may consider other robust analytics and designs. For example, using a randomized control trial with a mixed methods design would allow for the exploration of causal inferences and advance understanding of the processes by which interventions impact students' engagement; it could also help identify variables mediating the relationships between treatment and outcomes. An important contribution of the present systematic review was the identification of shortcomings that could be addressed in future research. For

example, additional research is needed to explore the relationship between SE and parental support, as well as to further examine which types of parenting skills are best promoted to improve children's SE. Future studies may also consider addressing the topic of teacher-student (McGrath & Bergen, 2015) and staff-student relationships (e.g., Huang et al., 2007) by investigating practices and in-class strategies likely to improve students' SE (e.g., the use of intentional questioning to promote critical thinking, Hand et al., 2018; or the use of strategies to help students cope with academic buoyancy, Martin, 2013). Additionally, further research is needed to deepen the understanding of how intervention programs could be designed to successfully increase elementary students' SE. Researchers could consider the context where the intervention would take place, the characteristics of the target population, the type and duration of the intervention, and its specific aims. Finally, students' perceptions, experiences, and SE trajectories across elementary school could merit researchers' attention. Further investigation of these topics would allow researchers to identify variables affecting students' SE and school paths. To conclude, following the notice by Sinatra et al. (2015), we suggest that future studies could consider examining the dimensions of SE consistent with the conceptualization of the chosen construct (e.g., the three dimensions for Fredricks et al., 2004 conceptualization) due to SE's multidimensional nature. Only by addressing the big picture will researchers and practitioners foster students' learning and well-being in the school context.

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1.8. References

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1.9. Online Resource 1

Summary of studies included in this systematic review

Reference; country;	Sample Number of participants (ethnic composition); age; school grade level (design; sampling method; analysis)	Purpose and Main Results	Topic to which the study contributes[a]
Almasi et al. (1996); USA	*N* = 46 students (92% white and 50% qualified for free or reduced priced lunch); 9 years of age; 4th grade. (longitudinal design; purposeful sample; analyses not reported)	**Purpose:** "to gain an understanding of engagement as fourth graders and their teachers attempted to construct meaningful interpretations during classroom discussions of literature." (p. 107) **Results:** "Engagement occurred when students and teachers used interpretive tools to select, connect, and organize information in the text to construct meaningful interpretations. The context of the literary act and the culture of the classroom influenced engaged reading. There were cognitive, metacognitive, and motivational components to the engagement observed." (p. 107)	(A3)
Archambault and Dupéré (2016); Canada	*N* = 831 students (85.5% was born in Canada); M_{age} = 9.7 years; 3rd to 6th grade. (longitudinal design; purposeful sample; multiple-process growth mixture modeling)	**Purpose:** "to model student trajectories of behavioral, affective, and cognitive engagement" (p. 1) **Results:** "Although a large majority of children presented a stable and high level of engagement on the three dimensions over time, more than one third of them showed a lower or changing level of engagement as the years progressed. These students were more likely to be boys and to be perceived by teachers as being less engaged. They also present more learning or behavioral problems and share less positive relationships with teachers." (p. 1)	(A1.2), (C1)
Archambault et al. (2013); Canada	*N* = 1145 students (ethnic composition not reported); Age not reported; 1st through 4th grade. (multi-wave longitudinal design; purposeful sample; structural equation modeling)	**Purpose:** "to conduct a more in-depth examination of the links between classroom engagement and teacher-student relations and address their developmental course from first grade through fourth grade." (p. 1) **Results**: "results show developmental continuity in classroom engagement and teacher-student relations from grades 1 through 4, beyond the influence of confounding child factors (sex, kindergarten cognitive skills, and second grade achievement) and family factors (such as maternal education). Although they were both relatively stable over time, closer relations with teachers showed comparatively less stability than classroom engagement. That is, classroom engagement showed the most developmental continuity from one grade to the next." (p. 1)	(C1)
Archambault et al. (2016); Canada	*N* = 333 students (ethnic composition not reported); M_{age} = 10.83 years, *SD* = 0.767 years; 5th and 6th grade. (multi-wave longitudinal design; purposeful sample; path analysis)	**Purpose:** Examine "the unique and joint effects of peer victimization and conflicts with teachers on student behavioral and affective engagement across the school year" (p. 207) **Results:** "peer victimization was not a significant predictor of students' affective engagement, whereas conflicts with teachers were negatively associated with this outcome, but for girls only. Moreover, experiencing contentious relationships with teachers did not play a moderating role in the association between victimization and the affective dimension of engagement. However, conflictual relationships with teachers did moderate the	(A1.1), (A1.2)

		link between boys' victimization and the behavioral dimension of engagement such that greater behavioral adjustment was evidenced by boys who had low levels of peer victimization only if they also reported low levels of conflict with the teacher." (p. 207)	
Ashiabi (2005); USA	*N* = 11.614 students (1747 blacks, 9402 whites, and 465 other racial groups); M_{age} = 8.39 years, SD=1.69; 6 to11 years of age; grades not reported. (cross-sectional design; purposeful sample; path analyses)	**Purpose:** "examine a model linking household food insecurity, child health, and emotional wellbeing to school engagement." (p. 3) **Results:** "(i) the proposed model fit the data quite well; (ii) food insecurity predicted health status, emotional well-being, and negatively predicted school engagement; (iii) health status predicted emotional well-being, and negatively predicted school engagement. Finally, emotional well-being negatively predicted school engagement. Results of mediation analyses showed that food insecurity had a significant indirect effect on emotional well-being via its effect on health status, and a significant indirect effect on school engagement via its effects on health status and emotional well-being." (p. 3)	(A2)
Baroody et al. (2016); USA	*N* = 387 students (21% qualified for free or reduced priced lunch, and 41% Caucasian); *M* = 10.47 years; 5th grade; *N* = 63 fifth grade mathematics teachers (cross-sectional design; convenience sample; moderation analyses)	**Purpose:** "describe the contributions of engagement during mathematics instruction on fifth graders' social skills and achievement." (p. 1) **Results:** "All three approaches to measuring engagement were significantly associated with students' social skills in math class. Teacher-reported student engagement and observer-reported student engagement were significantly associated with students' mathematics achievement, but student-reported engagement was not significantly associated with achievement. Moderation analyses revealed that associations between math engagement and outcomes were no different for boys than girls." (p. 1)	(D1)
Battistich et al. (1997); USA	*N* = 24 elementary schools (26% are members of minority groups); age not reported; 3rd to 6th grade. (longitudinal design; purposeful sample; multivariate analyses of variance and structural equations modeling)	**Purpose:** To describe "an ongoing program of research on schools as caring communities" (p. 137); "the intervention (called The Child Development Project; CDP) attempted to enhance prosocial development" (p. 138). **Results:** "The findings indicate that sense of school community can be enhanced for both students and teachers, that it is associated with a wide range of positive outcomes for both, and that the potential benefits of enhancing school community may be greatest in schools with large numbers of economically disadvantaged students. At the same time, it is noted that enhancing community has the potential for producing negative as well as positive outcomes, and that the content of the community values is of critical importance." (p. 137);	(A1.2); (B1)
Blumenfeld and Meece (1988); country not reported	*N* = 194 students (ethnic composition not reported); Age not reported; 4th through 6th grade; *N* = 4 fifth grade science teachers (cross-sectional design; purposeful sample; Analysis of variance and qualitative analyses)	**Purpose:** "explore the effects of tasks and teacher behavior together as they relate to differing patterns of student involvement and cognitive engagement." (p. 238) **Results:** "student involvement did not differ significantly by difficulty of cognitive content, type of social organization, or procedural complexity of tasks. In addition, cognitive engagement was similar for tasks judged as low and high in cognitive difficulty, although students reported using more strategies in the latter situations. Cognitive engagement was lower during small-group work and when tasks were procedurally complex. Qualitative analyses of patterns of teacher behavior suggest that when teachers pressed for mastery as well as	(A1.2)

		for participation, students' cognitive strategy use was higher, and that the importance of particular behaviors for maintaining this engagement varied according to the lesson." (p. 235)	
Bodovski and Farkas (2007); USA	*N* = 13.043 students (ethnic composition not reported); Age not reported; Kindergarten to 3rd grade. (longitudinal design; purposeful sample; regression analyses)	**Purpose:** Examine "achievement growth through third grade and the effects of teacher-reported time on mathematics instruction and student engagement (as perceived by the teacher) on such growth." (p. 115) **Results:** "students who began with the lowest achievement also showed the least growth over this period. Students in the two highest skills groups had similar growth, and the highest levels of growth. Students in the lowest group received the most time on instruction but had the lowest engagement with instruction. Time on instruction increased achievement for all students equally, but the effect of engagement was strongest among the lowest-performing group. The lower engagement of the lowest-performing group explained more than half of their lower achievement growth in grades K–3." (p. 115)	(D1)
Brophy et al. (1983); USA	*N* and ethnic composition not reported; age not reported; 4th, 5th and 6th grade classrooms. (cross-sectional design; convenience sample; computing point biserial correlation coefficients)	**Purpose:** Investigate "the possibility that expectations about classroom tasks that teachers communicate to students in the process of presenting those tasks might affect student engagement in the tasks." (p. 544) **Results:** "student engagement was generally higher when teachers moved directly into tasks than when they began with some presentation statement. Within the subset of tasks that were begun with teacher-presentation statements, those presentation statements classified as likely to have negative effects on student engagement were associated with lower student engagement, but there was no corresponding tendency for teacher-presentation statements classified as likely to have positive effects on student engagement to be associated with high rates of student engagement." (p. 544)	(A1.2)
Bryce et al. (2019); USA	*N* = 1031 students (80% Caucasian, 13% African American, 5% Hispanic, and 2% "other"); M_{age} = 6.99, SD = 0.29 at G1; M_{age} = 10.72, SD = 0.31) at G5; 1st and 5th grade. (longitudinal design; purposeful sample; longitudinal path model)	**Purpose:** "examine indirect associations between parents' and teachers' academic influences (i.e., direct parental involvement, the student–teacher relationship, instructional support) and achievement (reading and math) through behavioral engagement." (p. 492) **Results:** "indirect associations linking direct parental involvement (positively, 1st grade only), student–teacher conflict (negatively, both grades), and instructional support (positively, both grades) to achievement via behavioral engagement, after accounting for the co-occurrence of parents' and teachers' academic influences and other child characteristics." (p. 492)	(A1.2), (A1.3)
Buhs et al. (2006); USA	N= 380 children (ethnic composition was 17.4% African American, 77.1% Caucasian, 1.6% Hispanic, and 3.9% other); 5 - 11 years of age; Kindergarten to 5th grade. (Longitudinal design; purposeful sample; structural equations modeling analyses)	**Purpose:** Investigate, through a structural model, if chronic peer exclusion and chronic peer abuse "mediate the link between children's early peer rejection, later classroom engagement, and achievement." (p.1) **Results:** "Peer exclusion and abuse were expected to predict changes in 2 forms of school engagement (classroom participation and school avoidance), and changes in both forms of engagement were expected to predict changes in achievement. (...) distinct forms of peer maltreatment and classroom engagement mediate the link between early peer rejection and changes in children's achievement. Early peer rejection was associated with declining classroom participation and increasing school avoidance, but different forms of chronic peer maltreatment mediated these relations. Whereas chronic peer exclusion principally mediated the link between	(A1.1); (D1)

		peer rejection and classroom participation, chronic peer abuse primarily mediated the link between rejection and school avoidance." (p. 1) Thus, "chronically excluded children were more likely to exhibit an increase in classroom disengagement." (p.8) Still, "higher peer acceptance scores were indirectly associated with increases in classroom participation, decreases in school avoidance, and increases in achievement scores." (p. 8)	
Buhs, E.S. (2005); USA	N= 378 students (ethnic composition: 18.3% African-American, 78.6% Caucasian, 1.1% Hispanic and 1.9% other); Age not reported; Fifth grade. (Short-term longitudinal design; purposeful sample; Linear Mediation model)	**Purpose:** "evaluate two process-oriented models linking peer rejection and negative peer treatment to children's self-concept, school engagement and adjustment." (p. 407) **Results:** "Both structural models linked peer rejection, victimization, and exclusion to children's self-concept, classroom engagement, and change in achievement (...) The model evaluations indicated that peer rejection predicted both exclusion and victimization and that these forms of peer treatment, in turn, predicted academic self-competence." (p. 407) "The model estimation produced significant indirect effects for children's peer acceptance/rejection scores on academic self-competence and engagement and the residualized achievement scores. Additionally, exclusion and victimization were significant indirect predictors of engagement, via the pathway through academic self-competence and of the residualized achievement scores. Academic competence was also indirectly linked to achievement via the path through engagement." (p. 419)	(A1.1); (D1)
Cadima et al. (2015); Belgium	*N* = 145 children (ethnic composition not reported); *M* = 6 years, *SD* = 3 months; kindergarten and 1st grade; (short-term longitudinal design; purposeful sample; multilevel analyses)	**Purpose:** Examine "cross-grade patterns of behavioral engagement in learning over kindergarten and first grade and the contributions of child inhibitory control and facets of the classroom context (i.e., teacher–child relationship quality, perceived peer–teacher conflict, and classroom organization) to behavioral engagement over this period." (p. 1) **Results:** "inhibitory control, closer teacher–child relationships and lower levels of perceived peer–teacher conflict contributed to higher levels of behavioral engagement in kindergarten, which in turn combined with the quality of classroom organization in first grade to predict both observed and teacher-reported engagement in first grade." (p. 1)	(A1.2)
Cai and Liem (2017); Singapura	*N* = 491 students (51% Chinese, 23% Malay, 17% Indians, and 9% classified as Others (e.g., Eurasians, Filipino); *M* = 11 years, *SD* = 0.87; 4th to 6th grade. (cross-sectional design; convenience sample; Mediational path analysis)	**Purpose:** "to understand the 'what' and the 'why' of student engagement by investigating the 'aims' that students pursue through engagement (i.e., their achievement goals) and the 'reasons' driving such engagement (i.e., their motivation)." (p.131) **Results:** "whilst autonomous motivation (AM) was associated with greater effort/persistence, heightened elaboration, and lower anxiety, controlled motivation (CM) was associated with higher anxiety. Although self-based goals strengthened the positive direct effects of AM on effort/persistence and elaboration, and channeled the adaptive effects of CM on these two engagement outcomes, this goal type also heightened the effect of CM on anxiety and cancelled out the benefits of AM in reducing anxiety." (p. 131)	(B3)

Cantrell et al. (2014); USA	*N* = 462 intervention group and 389 control group (ethnic composition not reported); age not reported; 6th grade. (pretest–posttest research design and causal-comparative design; purposeful sample; hierarchical linear models)	**Purpose:** Examine "the impact of a supplemental reading course on sixth-grade students' reading engagement and performance as compared with students in a control group." (p. 36) **Results:** "Participating students reported significantly higher levels of strategy use, intrinsic motivation, extrinsic motivation, and self-efficacy as compared with the control group." (p. 36) "students who participated in supplemental instruction exhibited higher levels of cognitive engagement at the end of the intervention than they exhibited at the start of the intervention. There was no significant impact on students' reading performance" (p. 36)	(A3)
Cappella et al. (2013) USA	*N* = 80 low-income students (86 % Latino, 9 % Black, and 3% mixed/other; all eligible for free/reduced lunch); *M* = 9.23 years, *SD* = 1.20; 2nd to 5th grade. (short-term longitudinal design; convenience sample; hierarchical linear models)	**Purpose:** "examine the role of the classroom peer context in the behavioral engagement of low-income students (N = 80) in urban elementary school classrooms" (p.367) **Results:** "children with more behavioral difficulties or less academic motivation in the fall were less behaviorally engaged in the spring." (p.374) "classrooms with more equitably distributed and interconnected social ties—social network equity—had more behaviorally engaged students in the spring, especially in classrooms with higher levels of observed organization (i.e., effective management of behavior, time, and attention). Moreover, social network equity attenuated the negative relation between student behavioral difficulties and behavioral engagement, suggesting that students with behavioral difficulties were less disengaged in classrooms with more equitably distributed and interconnected social ties." (p.367)	(A2)
Chen et al. (2010); USA	*N* = 543 relatively low achieving children (118 African American, 211 Hispanic, and 189 Caucasian); *M* = 6.57 years at Year 1; 1st grade. (longitudinal design; purposeful sample; structural equation models – latent variable)	**Purpose:** Investigate the effects of peer acceptance and peer academic reputation (PAR) on students' engagement and achievement and understand the process by which peer relationships affect achievement. **Results:** The effect of PAR on engagement was partially mediated by perceived academic competence. The effect of perceived academic competence on achievement was partially mediated by engagement. In the context of PAR, peer acceptance did not contribute to the mediating variables or to achievement.	(A1.1)
Darensbourg and Blake (2013); USA	*N* = 167 students (African American racial/ethnic identity); *M* age = 8.62 years; *SD* = 0.42; 3rd to 5th grade (longitudinal design; convenience sample; structural equation modeling).	**Purpose:** Explore how achievement values (i. e. task values) and behavioral engagement (reported by teachers) affect the academic attainment of an academically at-risk sample of African American students in late elementary school. **Results:** Achievement values do not have a significant influence on engagement or achievement (reading and math) of African American students in late elementary school. Behavioral engagement marginally predicted reading achievement at later waves when prior levels of behavioral engagement and achievement were controlled. Behavioral engagement predicted math achievement when prior math achievement was controlled. Thus, behavioral engagement significantly influenced math achievement from Grades 4 to 5.	(D1)
De Laet et al. (2015); Belgium	*N* = 586 children (ethnic composition not reported); M_{age} = 9.26 years at wave 1; 4th to 6th grade. (longitudinal design;	**Purpose:** Examine "how relationships with teachers and peers jointly shape the development of children's behavioral engagement in late elementary school." (p.2)	(A1.1), (A1.2)

	convenience sample; latent growth curve analysis and cross-lagged panel mediation analysis)	**Results:** Behavioral engagement was positively associated with peer acceptance and teacher-child support, and negatively associated with peer popularity and teacher-child conflict. Physical and relational aggression were moderately positively correlated and were negatively associated with peer acceptance, teacher-child support (in Grade 6) and behavioral engagement, and positively associated with peer popularity and teacher-child conflict. Children who experienced more teacher-child support in Grade 4 or who experienced increasing levels of teacher support from Grades 4 to 6 generally showed less steep declines in behavioral engagement. In addition, being more liked by classroom peers in Grade 4 predicted less steep declines in behavioral engagement.	
Deed (2008); Australia	*N* = 9 students (ethnic composition not reported); age not reported; 6th grade. (multiple case study; purposeful sample; thematic analysis)	**Purpose:** Examine "the perspective of disengaged Grade 6 male students about learning." (p.3) **Results:** "The boys perceived good learners as quick, smart workers who could achieve high grades; and that being in control was about knowing how to do set tasks." (p. 3)	(B3)
Dolezal et al. (2003); USA	*N = 9* teachers. *N* = 9 classrooms (nearly 200 students, mostly white); age not reported; 3rd grade. (grounded theory research design; purposeful sample; grounded theory)	**Purpose:** "Nine grade 3 teachers in 8 Catholic schools were observed and interviewed, and student work was collected to determine how the teachers motivated students." (p. 239) **Results:** "Teachers were classified into 3 levels: low, moderately, and highly engaging. In the 3 classrooms characterized by low engagement, teachers were observed to use many practices that undermined motivation**.** The 4 moderately engaging teachers used many potentially motivating practices in their classrooms but assigned tasks that were low in difficulty. Teachers in the 2 highly engaging classrooms used many potentially motivating practices and required students to complete tasks that were appropriately, cognitively challenging." (p. 239)	(A1.2)
Dornhecker et al. (2015); USA	*N* = 282 students (Black, Hispanic, Asian and White); age not reported; 2nd, 3rd and 4th grades. (longitudinal design; convenience sample; hierarchical linear model)	**Purpose:** "to investigate the effects of standing behavior on student engagement in elementary classrooms by comparing classrooms that adopted stand-biased desks to classrooms that utilized traditional seated desks and chairs." (p. 274) **Results:** "The engagement of the treatment classrooms was compared with the engagement of the control classrooms. Both groups showed general increases in their academic engagement over time. Stand-biased desks do not seem to result in adverse effects on academic engagement when used in elementary classrooms." (p. 271)	(A2)
Dotterer and Lowe (2011); USA	N = 1014 students (77% white and 23% child of color); M_{age} = 11 years; 5th grade. (longitudinal design; purposeful sample; multi-group structural equation model).	**Purpose:** To examine the relationship between the classroom context, school engagement, and academic achievement among elementary students. **Results:** "student–teacher conflict, social/emotional climate, and instructional quality were not related to psychological engagement among struggling learners; however, student–teacher conflict and social/emotional climate were related to psychological engagement among non-struggling learners." (p. 1654). Psychological engagement (as well as behavioral engagement) was positively related to academic achievement. "Adolescents who were in classrooms that were higher in instructional quality, had a more positive social/	(A1.2)

		emotional climate, and were lower in student–teacher conflict were more likely to be engaged in learning" (p. 1655) and (...) "to report feeling positive toward their school and trying hard in school" (p.1655). "Struggling students who were in classrooms characterized by high instructional quality, positive social/emotional climate, and less conflict with teachers, were observed as being more attentive during class and engaged in learning. However, behavioral engagement was not in turn related to academic achievement. Further, behavioral engagement did not mediate the association between classroom context and academic achievement." (p. 1656).	
Downer et al. (2007); USA	*N* = 955 students (783 European American, 115 African American, and 57 other); age not reported; 3rd grade. (cross-sectional design; purposeful sample; hierarchical regression analyses)	**Purpose:** Examine "the way in which two facets of the classroom environment (classroom quality and instructional contexts) and children's risk for school problems combine to predict children's behavioral engagement in third-grade." (p. 413) **Results:** "children were more likely to be engaged within small groups and during analysis-inference instruction than in large group activities, individualized work settings, and basic skills instruction. Classroom quality and children's risk status were also uniquely associated with behavioral engagement." (p. 413)	(A1.2)
Furrer and Skinner (2003); country not reported	*N* = 641 students (95% Caucasian, 5% Hispanic, African American, Asian, or mixed race or other); Age not reported; 3rd through 6th grade. (longitudinal design; purposeful sample; regression and cumulative risk analyses)	**Purpose:** Investigate if "children's reports of relatedness predicted changes in classroom engagement over the school year." (p. 148) **Results:** "relatedness to parents, teachers, and peers each uniquely contributed to students' engagement, especially emotional engagement. Girls reported higher relatedness than boys, but relatedness to teachers was a more salient predictor of engagement for boys. Feelings of relatedness to teachers dropped from 5th to 6th grade, but the effects of relatedness on engagement were stronger for 6th graders." (p. 148)	(A1.1), (A1.2), (A1.3)
Galla et al. (2014); USA	*N* = 135 students (46% Caucasian, 24% mixed race/ethnicity, 17% Latino, 8% Asian, and 4% African American.); 5-12 years of age, M_{age} = 8.40 years, *SD* = 1.54 years; Kindergarten to 6th grade. (longitudinal design; convenience sample; Multilevel modelling)	**Purpose:** Examine the effortful engagement (volitional involvement in learning activities) and academic self-efficacy's intra- and inter-person effect on academic performance. **Results:** Within-person change in effortful engagement and academic self-efficacy scores predicted concomitant within-person change in reading test scores. "Participants with higher between-person levels of effortful engagement had higher initial reading test scores" (p.295), and math test scores, "whereas participants with higher between-person levels of academic self-efficacy showed a faster rate of increase in math test scores across elementary school.(...) At the between-person level, effortful engagement mediated the association between academic self-efficacy and both reading and math test scores, although no support was found for mediation at the within-person level." (p.295)	(D1)
Greenwood (1991); country not reported	*N* = 416 students (ethnic composition not reported); M_{age} = 6.7 years; 1st through 3rd grade. (longitudinal design; purposeful sample; factorial and multivariate analysis of variance)	**Purpose:** "the effects of time spent in academic instruction and time engaged on elementary students' academic achievement gains" (p. 521) **Results:** "significant group differences in the time spent in academic instruction, engagement, and gains on the subtests of the Metropolitan Achievement Test that favored the experimental and comparison groups over the control group" (p. 521) were found.	(A1.2)

Gremmen et al. (2018); Netherlands	*N* = 559 students (96.4% born in the Netherlands); M_{age} =10.65 years, range=8–12; 4th to 6th grade. (short-term longitudinal design; purposeful sample; longitudinal social network analysis)	**Purpose:** "examine whether students' near-seated peers influence their academic achievement and engagement." (p. 44) **Results:** "students' academic engagement and achievement got better when friends scored better, and vice versa, regardless of their physical position in the classroom. In contrast, near-seated peers who were not befriended got more diverse scores over time." (p. 42)	(A1.1)
Gruman et al. (2008); USA	*N* = 1003 students (82% European American, 7% Asian/Pacific Islander, 4% Hispanic, 4% African American, and 3% Native American.); age not reported; 2nd through 5th grades. (longitudinal design; convenience sample; growth curve analyses – hierarchical linear modeling)	**Purpose:** "to explore how mobility during the elementary school years might undermine or erode the skills and attitudes that typically lead to successful school outcomes [school engagement]." (p. 1836) **Results:** "changing schools during the elementary school years predicts declines in classroom participation and academic performance" (p.1846) "but not positive attitude toward school. [indicators of school engagement]" (p. 1833). "the number of school changes a child experienced increased the strength of the relationship between teacher support and attitude toward school" (p. 1845). "children's perceptions of teacher support had a positive influence on the growth trajectories for children's classroom participation and positive attitudes toward school." (p. 1847)	(A1.2), (A2)
Guo et al. (2011); USA	*N* = 1364 students (24% of the children were ethnic minority group); age not reported; 3rd grade. (longitudinal design; purposeful sample; structural equation modeling)	**Purpose:** "to examine the relations among children's engagement, classroom quality, and students' third-grade reading, controlling for family SES, and students' Grade 1 reading ability." (p. 3) **Results: "**SEM results revealed that controlling for family socio economic risk and students' first-grade reading achievement, classroom quality significantly, and positively predicted children's behavioral engagement, which in turn predicted greater reading achievement. Higher levels of children's behavioral engagement were associated with higher reading achievement." (p. 1) "Grade 3 teacher emotional support was significantly and positively correlated with children's third-grade attention, self-reliance, and reading achievement. Similarly, Grade 3 teacher instructional support was also positively associated with children's third-grade attention, self-reliance, and reading achievement." (p. 5) "First-grade reading skills significantly predicted third-grade engagement and reading skills" (p. 5)	(A1.2); (D1)
Guo et al. (2015); USA	*N* = 1160 students (4% American, 12.9% African American, 4.7% Hispanic, 1.6% Asian, and 0.4% Native American); age not reported; 1st, 3rd and 5th grade. (longitudinal design; purposeful sample; cross-lagged structural equation models)	**Purpose:** Examine "the cross-lagged relations between behavioral engagement and reading achievement in elementary school and whether these cross-lagged relations differed between low-socioeconomic status (SES) and mid- or high-SES students." (p. 332) **Results:** "reading achievement in preschool predicted subsequent behavioral engagement in 1st grade and reading achievement in 3rd grade predicted subsequent behavioral engagement in 5th grade. However, behavioral engagement did not significantly predict later reading achievement". (p. 332) "The strength of relations was stronger for low-SES students." (p. 332)	(D1)

Guthrie et al. (1996); USA	*N* = 140 students (African American, Hispanic, Asian, and Caucasian and 35–60% qualified for a free or reduced-fee lunch); age not reported; 3rd and 5th grade. (pretest–posttest design; convenience sample; quantitative and qualitative analyses)	**Purpose:** To describe "changes in literacy engagement during 1 year of Concept-Oriented Reading Instruction (CORI)" (p. 307) **Results:** "According to 1-week performance assessments in the fall and spring, students gained in the following higher order strategies: searching multiple texts, representing knowledge, transferring concepts, comprehending informational text, and interpreting narrative. Children's intrinsic motivations for literacy correlated with cognitive strategies at .8 for Grade 5 and .7 for Grade 3. All students who increased in intrinsic motivation also increased in their use of higher order strategies. A sizeable proportion (50%) of students who were stable or decreased in intrinsic motivation failed to progress in higher order strategies." (p. 307)	(A3)
Guthrie et al. (2004); USA	*N* = 148 students (CORI classrooms; 22% Afircan American, 2% Asian and 76% Causcasian) and 213 students (SI classrooms; 22% Afircan American, 5% Asian and 73% Caucasian); age not reported; 3rd grade. (pretest–posttest design; purposeful sample; Analysis of covariance)	**Purpose:** To investigate "the extent to which an instructional framework of combining motivation support and strategy instruction (Concept-Oriented Reading Instruction—CORI) influenced reading outcomes for third-grade children." (p. 403); "In the first study, we compared this framework to an instructional framework emphasizing Strategy Instruction (SI), but not including motivation support. In the second study, we compared CORI to SI and to a traditional instruction group (TI), and used additional measures of major constructs." (p. 403) **Results: "**In both studies, class-level analyses showed that students in CORI classrooms were higher than SI and/or TI students on measures of reading comprehension, reading motivation, and reading strategies." (p.403)	(A3)
Hastings and Schweiso (1995); United Kingdom	Study 1: *N* = two classes (62 students predominantly white); nine to 11 years of age; primary classes. Study 2: *N* = 21 students (from a variety of ethnic backgrounds) and 3 students (whose behavior was individually monitored); 7 to 8 years of age; primary classes. (Both studies: ABA quasi-experimental design; purposeful sample; mean task engagement analysis)	**Purpose:** Study 1 - "Two primary classes, neither of which normally sat in groups or rows for individual task work, took part. In parallel ABA designs, one class moved from rows to groups to rows and the other from groups to rows to groups. "(p. 279); Study 2 - was designed "to increase the time on-task of three individually disruptive pupils and employing seating in rows for individual task work" (p. 279) **Results:** Study 1 - **"**In both classes, on-task behaviour was higher in the rows arrangement, with the effect being most marked for children who were least on-task when seated in groups." (p.279); Study 2 – **"**produced a similar pattern of outcomes: class mean time on-task increased substantially, while the time on-task of the three target pupils increased dramatically." (p. 279)	(A2)
Herrenkohl and Guerra (1998); USA	*N* = 24 students (ethnic composition not reported); age not reported; 4th grade (ethnographic participant observation design; purposeful sample; discourse analysis)	**Purpose:** "examine if the intellectual roles and corresponding audience roles would encourage student engagement more effectively than the use of the intellectual roles." (p. 431) **Results:** "Students in the ROLES + AUD ROLES class were more active in initiating engagement episodes of every type than students in the ROLES class. Teacher-initiated engagement episodes demonstrated a different pattern, with the teacher initiating more negotiating and monitoring comprehension episodes in the ROLES + AUD ROLES class and more coordinating theories and evidence episodes in the ROLES class." (p. 432)	(A3)

Hoglund et al. (2015); Canada	*N* = 461 students (ethnic composition not reported); M_{age} = 6.9 years, *SD*= 1.19; Kindergarten to third grade; N = 65 teachers; *M age* = 37.38 years, SD=11.17; Kindergarten to 3rd grade.(short-term longitudinal design; pseudorandom sample; multilevel growth models)	**Purpose:** Investigate change and variability "over one school term in children's social adjustment (relationship quality with teachers and friends) and academic adjustment (school engagement, literacy skills)" (p. 337) and examine how these co-varied over time with each other, and "with aggregate externalizing behaviors, adjusting for a set of teacher and classroom" (p341) features. **Results:** Average levels of relationship quality with teachers and friends remained stable while school engagement and literacy skills increased significantly over the term. Children who had a not so close relationship with more burned-out teachers, aggregate externalizing behaviors predicted greater increases in teacher–child relationship quality, school engagement, and literacy skills over the term. Children who had a closer relationship with "less burned-out teachers, individual externalizing behaviors were associated with lower concurrent levels of school engagement." (p. 349) Children who were in a closer relationship "to less supportive and organized classrooms, aggregate externalizing behaviors were associated with greater increases over the term in school engagement" (p. 349) and literacy skills, as well as with higher concurrent levels of friendship quality and school engagement.	(A1.1), (A1.2)
Hosan and Hoglund (2017); Canada	*N* = 461 low-income students (50.5% Caucasian, 12.5% First Nations, 10.3% Black or African Canadian, 8.8% Southeast or East Asian, 6.6% South or West Asian, 6.3% Latin American, and 5.0% multiple ethnicities); M_{age} = 6.9 years, *SD* = 1.19; Kindergarten to 3rd grade. (longitudinal design; purposeful sample; autoregressive and cross-lagged path analyses)	**Purpose:** Examine "three competing models assessing the directional associations between the quality of children's relationships with teachers and friends (i.e., closeness and conflict) and their emotional and behavioral school engagement (i.e., the relationship-driven, engagement-driven, and transactional models)." (p. 201) **Results:** "In support of the relationship-driven model, closeness with friends and conflict with teachers and friends predicted prospective emotional engagement. In support of the transactional model, friendship closeness and teacher–child and friendship conflict transacted with behavioral engagement over the school term. Higher emotional engagement and, unexpectedly, friendship conflict predicted higher prospective academic skills. Associations between relationship closeness and behavioral engagement were significant for older children only." (p. 201)	(A1.1), (A1.2)
Hughes et al. (2009); USA	*N* = 664 students (42% Euro-American, 25% African American, 27% Hispanic, and 5% Other); *M*=7.57 years; *SD* = .38 years; 1st grade to 3rd grade (longitudinal design; purposeful sample; one-way MANOVA)	**Purpose:** Investigate the effects of Peer Academic Reputation (PAR) on effortful engagement (participants' engagement in the classroom) and academic achievement among students academically at-risk. **Results:** "SEM analyses found that Year 2 PAR predicted Year 3 teacher" (p.182) rating of effortful engagement and reading achievement test scores (but not math), "above the effects of prior scores on these outcomes." (p.182) Furthermore, the effect of PAR on effortful "engagement and achievement was partially mediated by the effect of PAR on children's academic self-concept." (p. 182)	(A1.1)
Hughes et al. (2008); Texas	*N*= 671 academically at-risk children (34.9% White, 36.7% Hispanic, 23.5% African American, and 4.9% Asian/Pacific Islander); M age at entrance to first grade= 6.57 years, *SD* = 0.38 years; 1st grade	**Purpose:** Test an indirect model of the effect of teacher–student relationship quality (TSRQ) "on first-grade children's academic achievement over a 3-year period, beginning when children were in the first grade." (p.2) The conceptual model, test if Year 2 effortful engagement mediates "the association between Year 1 TSRQ and Year 3 reading and math skills." (p.1) **Results:** "TSRQ at earlier waves (e.g., TSRQ at Year 1) predicted student effortful engagement at later waves (e.g., engagement at Year 2), with controls for the prior level of effortful engagement (e.g., engagement at Year	(A1.2)

	(longitudinal design; purposeful sample; structural equation models).	1). Similarly, effortful engagement at earlier waves" (p.10) predicted student achievement (reading and mathematics) at later waves, with controls for prior levels of achievement. To summarize, effortful engagement predicted achievement and the "effect of effortful engagement on achievement was invariant across developmental periods for both reading and math." (p.12)	
Hughes et al. (2011); USA	*N* = 497 students (37% White, 41% Hispanic, 18% African American, and 4% other ethnicities); age not reported; 2nd to 5th grade. (longitudinal design; purposeful sample; autoregressive latent trajectory models)	**Purpose:** Investigate "growth trajectories for classroom performance goal practices and for student behavioral engagement across grades 2 to 5". (p. 1) **Results:** "On average, teacher use of performance goal practices increased and students' behavioral engagement declined across the four years." (p. 1) "as students move into classrooms with a new teacher with less emphasis on performance goal practices, they become more behaviorally engaged in school. Gender did not moderate these results." (p. 1)	(A1.2)
Hughes et al. (2006); Texas	*N* = 509 students (1 Native American, 18 Asian/Pacific Islander, 117 African American, 194 Hispanic, 171 Caucasian, and 8 other); M_{age} = 6.57 years, SD = 0.39 years; 1st and 2nd grade. (longitudinal design; purposeful sample; hierarchical linear modeling).	**Purpose:** "to examine the joint and unique contributions of normative teacher support (an aspect of classroom context) and individual teacher–student support on first and second grade children's peer acceptance, sense of school belonging, and academic engagement." (p. 449). **Results:** "teacher support (...) appeared to be a significant predictor for students' learning engagement. Students enjoying greater individual teacher support were reported by their teachers to be more engaged in learning. In addition, normative teacher support (...) made a unique contribution, above individual teacher support and the covariates, to the prediction of students' learning engagement. Students in classrooms characterized by higher teacher support were more engaged in learning." (pp. 456-457).	(A1.2)
Hughes and Kwok (2006); Texas	*N* = 360 students (59.7% eligible for free or reduced lunch); M_{age} = 6.57, SD= 0.35 years; 1st grade. (longitudinal design; purposeful sample; latent variable structural equation modeling).	**Purpose:** "Using latent variable structural equation modeling, we tested a theoretical model positing that the quality of the teacher– student relationship in first grade predicts children's peer acceptance the following year, controlling for children's previous externalizing problems and peer acceptance. We also expected that children's classroom engagement would mediate the effect of teacher–student relationship quality on peer acceptance." (p. 465) **Results:** "Engagement fully mediated the effect of teacher support on subsequent peer acceptance." (p. 465); "teacher-perceived engagement significantly and completely mediated the short term relation between teacher support and peer acceptance" (p. 476)	(A1.2)
Hughes and Kwok (2007); Texas	*N* = 443 students (104 African American, 176 Hispanic, and 163 Caucasian); M_{age} = 6.05 years, SD = 0.63 years; 1st grade. (longitudinal design; purposeful sample; latent variable structural equation modeling)	**Purpose:** "to examine the associations between student background variables, the quality of early school relationships (i.e., student–teacher and parent–teacher relationships), and changes across academic years in measured academic ability in a diverse sample of first-grade children at risk for school difficulties because of relatively low literacy skills." (p. 42) **Results:** "African American children and their parents, relative to Hispanic and Caucasian children and their parents, had less supportive relationships with teachers. These differences in relatedness may be implicated in African American children's lower achievement trajectories in the early grades." (p. 39); "Moreover, the positive	(A1.2); (D1)

		effects of both relationship constructs on teacher-rated child engagement indicated that both relationship constructs are associated with higher child engagement. In turn, child engagement had a substantial and positive longitudinal impact on students' academic performances" (p. 45)	
Hughes and Zhang (2007); USA	*N* = 291 students (39.5% Hispanic, 36.1% Caucasian, 21% African-American, 1.7% Asian/ Pacific Islander, 0.3% Native American/Alaskan Native, and 1.4% other); M_{age} = 6.55 years, *SD* = 0.33 years; 1st grade (longitudinal design; purposeful sample; hierarchical linear modeling analyses).	**Purpose:** Examine the effects of classroom indegree (i.e. the degree to which peer nominations as academically capable show high consensus and focus on a relatively few number of children in a classroom) on children's peer acceptance, teacher-rated classroom engagement, and self-perceived cognitive competence. **Results:** "Classroom indegree moderated the associations between children's achievement and classroom engagement. Children with lower ability, relative to their classmates, were less accepted by peers and less engaged" (p.400) in school. This was true when these children were enrolled "in classrooms in which students' perceptions of classmates' abilities converged on a relatively few number of students" (p. 400), compared to classrooms in which peers' perceptions were more dispersed. High indegree was associated with lower self-perceived cognitive competence regardless of ability level.	(A1.1), (D1)
Iyer et al. (2010); USA	*N* = 390 students (40.50% Latino and 44.90% White); 6 - 10 years of age; 1st to 4th grade (longitudinal design; purposeful sample; structural equation modeling).	**Purpose:** Evaluate if "peer victimization and effortful control are both predictive of academic achievement through the effects on school engagement." (p. 375) **"Results:** "School engagement mediated the relations between peer victimization and academic achievement, as well as between effortful control and academic achievement." (p.361)	(A1.1); (D1)
Kaiser et al. (2013); Germany *(Note:only study 1 was included due to the sample characteristics)*	*N* = 1135 students (ethnic composition not reported); M_{age} = 12.63 years, SD = 0 .55; 6th grade. *N* = 52 teachers; M_{age} = 42.78 years, SD = 11.16. (cross-sectional design; purposeful sample; structural equation modeling)	**Purpose:** To examine "the accuracy of teacher judgments of student reading achievement and reading engagement in the field. Furthermore, we analyzed how students' reading achievement was associated with teacher judgments of their reading engagement, and how their reading engagement related to teacher judgments of their achievement." (p. 77) "whether students' achievement influences teachers' judgments of their engagement (as a proxy for motivation) and vice versa." (p. 73) **Results:** "Structural equation modeling revealed an effect of student achievement on teacher judgments of student engagement and an effect of student engagement on teacher judgments of student achievement - above and beyond the association of each student characteristic with teacher judgments of that characteristic." (p. 73)	(D1)
Kim and Cappella (2016); country not reported	*N* = 111 children (95% Latino, 3% Black, and 2% mixed/other; 99% eligible for free/reduced lunch) M_{age} = 7.91years, *SD* = 2.10 years; kindergarten to 5th grade. (longitudinal design; purposeful sample; multilevel analysis)	**Purpose:** "the unique and combined contribution of individual relationships and quality of classroom interactions on behavioral engagement among low-income Latino students" (p. 20) **Results:** "individual relationships with teachers and peers and classroom quality, each independently predicted behavioral engagement. Moreover, high-quality classrooms buffered the negative influence of students' difficulties in individual relationships on behavioral engagement." (p. 20)	(A1.1), (A1.2)

Kindermann (1993); USA	*N* = 109 students (ethnic composition not reported); age not reported; 4th and 5th grades. (longitudinal design; purposeful sample; multiple regression analyses)	**Purpose:** "to examine the extent to which natural and changing peer affiliations can be studied as contexts for the development of children's motivation in school." (p. 971) **Results: "**Longitudinal analyses of a 4th-grade classroom across the school year indicated continuity in the motivational composition of peer groups, despite considerable changes in individual memberships. Evidence was found for motivationally based group selection across time and for group socialization of individuals' engagement." (970)	(A1.1)
Kindermann (2007); USA	*N* = 366 children (ethnic composition not reported); 11- to 13- years of age; 6th grade. (longitudinal design; purposeful sample; structural equation modeling)	**Purpose:** To examine "whether the engagement of a child's peer group members at the start of the school year could predict the development of that child's own engagement versus disaffection across the school year." (p. 1187) **Results:** "children who were more similar to their group tended to be more engaged." (p. 1195) "Engaged students were members of groups that were similarly engaged (...) and not much different from the students themselves" (p. 1194). "Group homogeneity persisted over time. Although children exchanged about 40% of their initial group members, children who were highly engaged in the fall remained to be with highly engaged groups in the spring (...) and there was moderate stability in the groups' engagement profiles" (p. 1194). Thus, children's engagement could be predicted by the engagement composition of their initial peer groups. Teacher and parent involvement (reported by students) were both predictors of children's engagement in the spring, being parent involvement also positively related to academic achievement.	(A1.1); (A1.2); (A1.3)
Kwon et al. (2018); USA	*N* = 199 students (50% Black, 40% White, and 10% Hispanic, Asian, and Native American); M_{age} = 10 years, *SD*=1 year; 3rd through 6th grade. (longitudinal design; purposeful sample; cross-lagged path analyses)	**Purpose:** Test "the bidirectional relations between negative emotionality, emotion regulation, and achievement" and "if academic engagement mediated the link from negative emotionality and emotion regulation" (p. 33) to reading achievement. **Results:** "significant directional effects from negative emotionality and emotion regulation to achievement, but not vice versa. Also, results supported that the link from negative emotionality and emotion regulation to achievement was mediated through academic engagement." (p. 33)	(D1)
Lan et al. (2009); China and USA	*N* not reported (in China sample 100% of the students are Chinese; students from US: 90% Caucasian, American-born and 10% African American and Asian); *M age*= 6.5 years in U.S. and 6 years in China; 1st grade. (cross-sectional design; purposeful sample; latent growth analyses)	**Purpose:** Investigate "variation in students' behavioral engagement across mathematics classes in China and the United States." (p. 198) **Results:** "behavioral engagement declined over time, although the drop-off was dramatically sharper in American classrooms relative to Chinese classrooms. In addition, larger group size and the timing of teacher instructions (given before versus after the behavior) were significantly associated with increased engagement." (p. 198)	(A1.2)

Langhout and Mitchell (2008); USA	*N* = 21 low-income students (50% White and 50% Black or Latino/a); age not reported; 2nd grade; *N* = 1 teacher. (ethnographic participant observation design; purposeful sample; latent growth curve analysis)	**Purpose:** Examine "how academic disengagement (being off task, unenthusiastic and uncurious about learning) is facilitated by the hidden curriculum (the values, norms and beliefs transmitted via the structure of schooling), and mediated by race, ethnicity and gender for students." (p. 593) **Results:** "students were required to show their engagement in particular ways that related to control and conformity. When they did not, they were reprimanded, which led to academic disengagement and the transmission of the hidden curriculum's message that school was not a place for them. This process was especially salient for Black and Latino boys, which indicated that the hidden curriculum was institutionalized. (...) the hidden curriculum was a structural limitation for the teacher, as she was often thwarted in her attempts to create an academically engaging learning environment." (p. 593)	(A2)
Lee and Anderson (1993); USA	*N* = 12 students (8 white, 2 Hispanic, and 2 African-American students); age not reported; 6th grade (multi-method case study; convenience sample; analyses of verbal reports and ratings)	**Purpose:** "First, what patterns of students' task engagement existed as the students engaged in academic tasks in science classrooms? Second, how were patterns of students' task engagement related to factors involving the students' cognition (i.e., science knowledge and achievement), motivation (e.g., goals in science class), and affect (e.g., attitudes toward science)?" (pp. 587-588) **Results: "**Four major patterns of task engagement emerged" (p. 594), such as: intrinsically motivated to learn science, motivated to learn science, task avoidance, and active task resistance.	(B1)
Li et al. (2010); USA	*N* = 1710 students (57.6% European American, 15.1% Latino/a, 5.0% African American, 2.5% Native American, 4.4% Asian American, and 3.9% multiethnic); M_{age} = 12.13 years, *SD* = .68 years; 5th grade. (multi-wave longitudinal design; convenience sample; structural equation modeling)	**Purpose:** "to test the hypothesis that ecological (...) and personal assets (...) positively predict adolescents' academic competence"; to hypothesize that "school engagement mediates the positive effect of ecological and personal assets on academic competence."; To examine "the dynamics between the behavioral and emotional types of school engagement." (p.804) **Results:** "Personal and ecological assets had indirect effects on later academic competence, via behavioral and emotional school engagement. Behavioral and emotional school engagement predicted academic competence differently. Emotional engagement was indirectly linked to academic competence, via behavioral engagement. Behavioral and emotional engagement also had different individual and contextual antecedents." (p.801)	(A1.1), (A1.3)
Linnenbrink-Garcia et al. (2011); country not reported	Study 1: *N* = 138 students (84.4% Caucasian, 11.1% African–American, 1.5% Asian and 3% mixed); age not reported; 4th and 5th grade. Study 2: *N* = 192 students (54.2 % African-American, 43.8% Caucasian, 1.6% Native American and 0.5% Hispanic); age not reported; 5th and 6th grade. (cross-sectional design; purposeful sample; structural equation modelling [study 1]; cross-lagged analyses [study 2]).	**Purpose:** "Two studies (...) were conducted to investigate how upper-elementary students' affect during small group instruction related to their social-behavioral engagement during group work." (p. 13) **Results:** "Across both studies, negative affect (feeling tired or tense) was associated with higher rates of social loafing. Neutral to deactivated positive affect, such as feeling happy or calm, was positively related to positive group interactions, while deactivated negative affect (tired) was negatively associated with positive group interactions. Follow-up cross-lagged analyses to examine reciprocal relations suggested that positive group interactions altered affect on subsequent group tasks, but affect was not related to changes in positive group interactions. These quantitative findings were supplemented with a qualitative analysis of six small groups from Study 2. The qualitative analyses highlighted the reciprocal and cyclical relations between affect and social-behavioral engagement in small groups." (p. 13)	(B1)

Liu et al. (2017); China	*N* = 869 Chinese students; *M age* = 10.65 years, SD = 1.23 years; 3rd to 5th grade. (cross-sectional design; purposeful sample; structural equation models)	**Purpose:** "examine the multiple mediating effects of academic self-efficacy and positive academic emotions (enjoyment and relief) in the relations between teacher support and academic engagement (cognitive, behavioral and emotional aspects) within a math class." (p. 1) **Results:** "teacher support exerted a direct and significant impact on the three aspects of math engagement. Both academic self-efficacy and enjoyment mediated the relations between teacher support and the three aspects of math engagement, whereas relief did not mediate such relations. Moreover, teacher support affected math engagement through multiple paths from academic self-efficacy to both enjoyment and relief. Relief displayed a smaller effect on the three aspects of math engagement than enjoyment did." (p. 1)	(A1.2)
Luo et al. (2009); USA	*N* = 480 students (22.3% African American, 37.1% Hispanic, 35.4% Caucasian, and 5.3% other); M age = 6.57; *SD* = .37; 1st to 4th grade (longitudinal design; purposeful sample; K-means clustering with random starts and latent growth models)	**Purpose:** "to identify theoretically and practically meaningful subtypes of engagement in first grade based on a multimethod assessment of behavioral and psychological engagement." (p. 4) **Results:** "Four theoretically and practically meaningful clusters were identified and labeled as cooperative (n = 95), resistive (n =96), enthusiastic (n = 188), and disaffected (n = 101)." (p.1) "The cooperative group was the most popular among peers, followed by the enthusiastic group. The disaffected and resistive groups had more emotional symptoms than the cooperative and enthusiastic groups." (p.1) "For reading, the cooperative and enthusiastic groups outperformed the resistive and disaffected groups at the beginning. However, the growth rate was similar across engagement types. For math, the engagement types did not differ at the beginning. However, the cooperative group developed at a faster rate and had higher math achievement by fourth grade than the other types" (p.1).	(D1)
Lutz et al. (2006); USA	*N* = 12 students (2 African American, 3 Hispanic American, and 7 European American); age not reported; 4th grade (pre and post intervention design; convenience sample; ANOVAs and post-hoc comparisons and bivariate correlations)	**Purpose:** "examine how the complexity of the literacy tasks in the classrooms bears on relations between engagement and reading comprehension outcomes." (p. 3) **Results:** "Students in 3 classes—2 in which students received integrated reading–science instruction and 1 in which they received traditional instruction—demonstrated moderate to high engagement in learning. However, students in the integrated instruction classes gained more in Reading comprehension and reading strategy use during the 12 weeks of the study than did students in the traditional instruction class." (p.3)	(A3)
Lynch et al. (2013); USA	*N* = 1718 students on first period of data collection (51% European American, 17.8 % Hispanic, 7.6 % African American, .4 % American Indian, 3.8 % Asian American, and 2.9 % multiethnic); M_{age} = 10.99, SD = 0.01; 5th grade. (longitudinal design; purposeful sample; hierarchical linear modeling)	**Purpose:** "to assess whether there is a relationship between school peer culture and individual academic outcomes" (p. 9) such as individual grades and school engagement. **Results:** "above and beyond a variety of individual, familial, peer, and school characteristics that have previously been associated with academic outcomes, aspects of behavioral peer culture are associated with individual achievement while components of both relational and behavioral peer culture are related to school engagement" (p. 6); "as the behavioral and relational components of peer culture become more positive, student engagement also increases." (p. 14)	(A1.1)

Martens et al. (1997); country not reported	*N* = 2 students (ethnic composition not reported); 9 and 10 years; 4th grade. (ABCDBCD design; purposeful sample; mean percentage difference)	**Purpose:** Examine "the effects of three reinforcement histories on the persistence of task engagement" (p. 569) **Results:** "The reinforcement history that contained an instructional control component produced the greatest persistence in student engagement." (p. 569)	(A3)
Martens et al. (1992); USA	*N* = 2 students (Experiment 1) and 27 students (Experiment 2); ethnic composition not reported; 9 and 10 years (Exp. 1) and M age = 9 years (Exp. 2); 4th grade. (ABCDE case study - experiment 1; alternating treatments design – experiment 2; purposeful sample; experimental and applied behavior analysis)	**Purpose:** "In Experiment 1, students were exposed to variable- interval schedules of social reinforcement contingent on academic engagement." (p. 143) In Experiment 2, control over student engagement by two of the reinforcement schedules were examined within an alternating treatments design." (p. 143) **Results:** In Experiment 1, "Hermstein's equation account for 99.1% and 87.6% of the variance in student engagement, respectively." (p. 143) In Experiment 2, similar results were found.	(A3)
Martin and Rimm-Kaufman (2015); USA	*N* = 387 students (143 Caucasian, 118 Hispanic American, 65 Asian American, 23 African American, 19 multi-racial, and 19 had missing data); *M* = 10.5 years, *SD* = 0.37; 5th grade; *N* = 73 teachers. (cross-sectional design; purposeful sample; multi-level models)	**Purpose:** "(a) to examine the contribution of math self-efficacy to students' perception of their emotional and social engagement in fifth grade math classes, and (b) to examine whether high quality teacher-student interactions compensate for students' low math self-efficacy in contributing to engagement." (p. 369) **Results:** "students initially lower in math self-efficacy reported lower emotional and social engagement during math class than students with higher self-efficacy. However, in classrooms with high levels of teacher emotional support, students reported similar levels of both emotional and social engagement, regardless of their self-efficacy. No comparable findings emerged for organizational and instructional support." (p. 359)	(A1.2)
McHugh et al. (2016); USA	*N* = 64 students (48 African American, 4 Hispanic and 12 Caucasian); target students' age = 7 or 8 years; 2nd and 3rd grades; *N* = 3 teachers. (ABAB withdrawal design; purposeful sample; visual analysis)	**Purpose:** "to assess the effects of the Tootling intervention on decreasing classwide and individual target students' disruptive behavior as well as increasing classwide and individual target students' academic engagement in lower elementary, general education classrooms using a criterion number of tootles that could reasonably be attained daily, thus potentially allowing more immediate and frequent access to reinforcement." (p. 332) **Results:** "results demonstrated decreases in disruptive behaviors and increases in academically engaged behaviors during intervention phases as compared to baseline and withdrawal phases in all classrooms. Effect sizes were moderate to large for all comparisons." (p. 332)	(A3)
Meece et al. (1988); USA	*N* =275 students (ethnic composition not reported); Age not reported; 5th and 6th grade. (cross-sectional design; purposeful sample; structural equation analysis)	**Purpose:** "test the validity of a goal mediational model for conceptualizing the influence of individual and situational variables on students' cognitive engagement" (p. 514) **Results:** "students who placed greater emphasis on task-mastery goals reported more active cognitive engagement. In contrast, students oriented toward gaining social recognition, pleasing the teacher, or avoiding work reported a lower level of cognitive engagement." (p. 514)	(B3)

Miller et al. (2015a); USA	*N* = 4 students (3 African American and 1 Caucasian); age not reported; Kindergarten through 4th grade (ABAB withdrawal design; single case; non-overlap of all pairs and Tau U)	**Purpose:** To provide an empirical demonstration of the effects of Check-in/Check-out (CICO) within SWPBIS (School-wide positive behavior interventions and support) on students' academic engagement and disruptive behavior. **Results:** All students reduced the frequency of disruptive behaviors and increased academic engagement, which were associated with CICO.	(A3)
Miller et al. (2015b); USA	*N* = 3 students (African American); age not reported; 2nd, 4th, and 6th grades (ABAB withdrawal design; purposeful sample; visual analysis of level, trend, and stability of problem behavior)	**Purpose:** Evaluate the effectiveness of Check-in/Check-out (CICO) for improving behavioral performance of three students referred for Tier 2 behavioral supports. **Results:** Through direct observation of students' behavior was observed an increase of academic engagement and a decrease of problematic behaviors for all target students.	(A3)
Moller et al. (2014); USA	*N* = 5360 students (White, Black and Latino/a); age not reported; 1st, 3rd, and 5th grade. (longitudinal design; purposeful sample; cross-classified growth models)	**Purpose:** Investigate how Collective Pedagogical Teacher Culture (i.e., professional community) "moderates the relationship between engagement and mathematics achievement for students of different racial/ethnic groups in elementary school." (p. 1) **Results:** "Academic engagement is a strong predictor of mathematics achievement in all grades and for all racial groups" (p.14). The students that obtained higher results in mathematics were the most attentive, persistent, independent, flexible, and organized students. Students without these skills are highly disadvantaged and this disadvantage cumulates over time. Additionally, school organizational culture moderated the relationship between engagement and achievement.	(D1)
Mullender-Wijnsma et al. (2015); Netherlands	*N* = 86 children (ethnic composition not reported); *M* = 8.2 years, *SD* = 0.65 years; 2nd and 3rd grades (within-subject design; purposeful sample; multilevel modeling)	**Purpose:** Examine the effect of physically active academic lessons on academic engagement of socially disadvantaged students and students non-socially disadvantaged. The "relationship between lesson time spent in moderate to vigorous physical activity and academic engagement was examined." (p. 1) **Results:** Socially disadvantage students evidenced lower time-on-task than students without the disadvantage, being the differences noted in different moments. All students evidenced significant increases on the time-on-task (academic engagement) on the post-intervention condition. On average, students "were exercising in moderate to vigorous physical activity during 60% of the lesson time" (p. 1); however, "no significant relationships were found between percentage of moderate to vigorous physical activity during the intervention and time-on-task [academic engagement] in the post-intervention lessons." (p. 1)	(A3)
O'Neal (2018); USA	*N* =172 low-income students (75% Latina/o, 14% Black, 8% Asian and 3% other ethnic minority); M_{age} = 9.47 years old; 3rd, 4th and 5th grades. (short-term longitudinal study; purposeful sample; structural equation modeling)	**Purpose:** "identify how stress impacts later literacy achievement via the mediators of grit and emotional engagement." (p. 1) **Results:** "Stress had a negative impact on later literacy achievement via the mediator of engagement, but not via the mediator of grit." (p. 1)	(D1)

O'Neal et al. (2019); USA	*N* = 142 students (75% Latina/o, 14% Black, 9% Asian, and 2% White)); Mage = 9.47 years; 3rd, 4th, and 5th grades. (short-term longitudinal design; purposeful sample; latent variable path analysis and structural equation models)	**Purpose:** "to examine the functioning of the grit measure; grit's relation to emotional engagement; and grit's prediction of later literacy achievement, above and beyond emotional engagement, among dual language learners." (p. 598) **Results:** "student- and teacher-reported grit scores were reliable and fit the two-factor construct, and grit overlapped with engagement. We found that teacher-reported engagement and student- and teacher-reported grit perseverance of effort (grit-pe) were significant sole predictors of Time 2 literacy achievement; teacher-reported engagement, not grit, remained a significant sole predictor even when controlling for Time 1 literacy achievement. When including grit-pe, grit consistency of interests, and engagement in the same model, student-reported grit-pe was the only significant predictor of Time 2 literacy achievement, without Time 1 literacy as a control." (p. 598)	(D1)
Olivier et al. (2018); Canada	*N* = 582 students (ethnic composition not reported); *M age* = 11.04 years, *SD* = 0.72; 5th and 6th grade; *N* = 44 teachers. (longitudinal design; convenience sample; latent profile analysis)	**Purpose:** "to identify whether there are distinct adjustment profiles among fifth and sixth graders." (p. 31) **Results:** We found four profiles among girls and three profiles among boys. "compared to students with a well-adjusted profile, having a non-adjusted profile was associated with negative changes in teacher-reported behavioral engagement. Girls with an Externalizing Problem/Student–teacher Conflict profile or an Internalizing Problems/Peer Isolation profile also showed negative changes throughout the school year in their self-reported behavioral engagement and in academic achievement." (p. 28)	(A1.1), (A1.2)
Pagani et al. (2012); Canada	*N* = 1369 students (ethnic composition not reported); Age not reported; Kindergarten through 6th grade. (longitudinal design; purposeful sample; growth curve modelling)	**Purpose:** "examine the relationship between children's kindergarten attention skills and developmental patterns of classroom engagement throughout elementary school" (p. 715) **Results:** "Higher levels of kindergarten attention were proportionately associated with greater chances of belonging to better classroom engagement trajectories compared to the lowest classroom engagement trajectory. In fact, improvements in kindergarten attention reliably increased the likelihood of belonging to more productive classroom engagement trajectories throughout elementary school, above and beyond confounding child and family factors." (p. 715)	(C1)
Parsons et al. (2015); USA	*N* = 6 students (ethnic composition not reported) and one teacher; age not reported; 6th grade. (year-long case study; convenience sample; analyses not reported)	**Purpose:** "What makes literacy tasks engaging or disengaging based on observations of and interviews with students." **Results:** "students reported disengagement when tasks were difficult or confusing. In particular, a mismatch between text complexity and student ability was often mentioned as interfering with engagement." (p. 227) "Students were not engaged in tasks that required little involvement." (p. 228) "Low-involvement, worksheet-type tasks fail to engage students because they violate students' need for relatedness, competence, and autonomy." (p. 228)	(A1.2)

Parsons et al. (2016); USA	*N* = 6 students (5 Hispanic and 1 African American); age not reported; 6th grade. (year-long case study; purposeful sample; factorial ANOVA)	**Purpose:** Examine "students' behavioral, affective, and cognitive engagement in integrated literacy and social studies tasks." (p. 1) **Results:** Students were more engaged in authentic, collaborative, challenging, student directed, and sustained tasks. "students reported that they were engaged in tasks that included collaboration, new learning, and teacher support." (p. 1)	(A1.2)
Patrick et al. (1993); USA	N = 264 students (ethnic composition not reported); M age = 8.3 years, SD = .45 years;3rd, 4th and 5th grades (cross-sectional design; purposeful sample; Multiple regression analyses)	**Purpose:** "the contribution of perceived control and autonomy to children's self-reported behavior and emotion in the classroom" (p. 781) **Results:** "Multiple regression analyses revealed unique effects of autonomy over and above the strong effects of perceived control. In addition, both sets of perceptions (and their interaction) were found to distinguish children who were active but emotionally disaffected from those who were active and emotionally positive. Specific predictions were also tested regarding the effects of (a) control attributions to 5 causes and (b) 4 reasons for task involvement that differed in degree of autonomy on children's active (vs. passive) behavior and 4 kinds of emotions: boredom, distress, anger, and positive emotions." (p. 781)	(B1)
Patrick et al. (2007); USA	*N* = 602 students (95% – 98.3% European American); age not reported; 5th grade. (cross-sectional design; purposeful sample; structural equation modeling)	**Purpose:** Examine "whether 5th-grade students' perceptions of the classroom social environment (teacher support, promotion of mutual respect, promotion of task-related interaction, student support) were related to their engagement in the classroom (self-regulation and task-related interaction) and whether those relations were mediated by personal motivational beliefs." (p. 83) **Results:** "Teacher support, promotion of interaction, and student support were related to both types of engagement, and those relations were fully or partially mediated by motivational beliefs. Relations with promoting mutual respect were not significant." (p. 83)	(A1.1), (A1.2)
Perdue et al. (2009); USA	*N* =1022 students (784 non-Hispanic White/European American, 122 Black/African American, 64 Hispanic, 13 Asian, 1 Native American, or 38 otherwise specified); Age not reported; 3rd to 5th grade. (longitudinal design; purposeful sample; hierarchical regression analysis)	**Purpose:** Explore "the influences of childhood peer relationships in the third grade predicting school engagement at Grade 5." (p. 1084) **Results:** "peer friendship quality, support from friends, and aggressive behavior toward peers all uniquely relate to school engagement." (p. 1084)	(A1.1), (A1.3)
Peterson and Fennema (1985); USA	*N* = 432 students (ethnic composition: mainly white students); age not reported; 4th grade. *N*= 36 teachers. (split-plot design; purposeful sample; partial correlations)	**Purpose:** Identify "the classroom activities that were related to the low-level and high-level mathematics achievement of boys and girls" (p. 309) and observe the students' engagement/ nonengagement in mathematics activities. **Results:** No significant differences were found between boys and girls in either mathematics achievement or in observed engagement/nonengagement in mathematics activities.	(D1)

Peterson et al. (1984); country not reported	*N* = 38 students (29 white and 9 minority students) age not reported; 5th grade. (pretest–posttest design; convenience sample; correlations and Kendall's Tau coefficient)	**Purpose:** To investigate "students' reports of attention, understanding, cognitive processes and affect during mathematics instruction" (p. 487) **Results:** "Although observed off-task behavior was significantly and negatively related to student performance on seatwork problems and the final achievement test, observed student engagement in mathematics was not related to final achievement. Also, neither off-task nor engaged behavior was a consistent predictor of reported cognitive processes." (p. 505)	(B1); (D1)
Pierson and Connell (1992); USA	*N* = 238 students (majority white); age not reported; 3rd through 6th grade. (cross-sectional design; purposeful sample; multivariate and univariate analyses of variance)	**Purpose:** "to inform educators of the impact of grade retention on self-perceptions, academic performance, and engagement in school in samples of students from working-class and middle-class families." (p. 300) **Results:** "Retained students did not differ significantly from the comparison groups in perceptions of self-worth or peer relatedness but had significantly lower perceptions of cognitive competence than the random sample. Retained students did not perform as well academically as the random sample but performed just as well as the matched ability sample and better than the socially promoted sample. The retained sample's effort grades were significantly lower than the random sample's but no different than those of the other samples." (p. 300)	(B2)
Portilla et al. (2014); USA	*N* = 338 students (43% Caucasian,19% African American, 11% Asian, 4% Latino, 22% multiethnic, and 2% "other."); *M age* at kindergarten entry = 5.31 years, *SD* = 0.32, Kindergarten to 1st grade. (longitudinal design; convenience sample; path analysis models).	**Purpose:** Investigate the dynamic interplay between teacher–child relationship quality and children's functioning (inattention and impulsive behaviors, school engagement, and teacher–child relationship quality) "across kindergarten and first grade to predict academic competence in first grade." (p. 1915) **Results:** School engagement is positively related to teacher-child closeness and with academic competence in the first grade and negatively related to inattention, impulsivity, and conflict. Conflict and low self-regulation jointly predicted decreases in school engagement, which in turn predicted first-grade academic competence (math and reading domains).	(D1)
Raphael et al. (2008); USA	*N* = 9 classrooms (ethnic composition not reported); age not reported; 6th grade; *N* = 9 teachers (Caucasian). (grounded theory research design; purposeful sample; cross-case analyses)	**Purpose:** "to observe how teachers differed in their attempts to engage students, with the goal of recording every practice each teacher used, and to determine whether each teacher was successful in producing engagement." (pp. 63-64) **Results:** "The teachers used a variety of instructional practices, with some teachers producing greater engagement than others. We classified 3 teachers as highly engaging (i.e., at least 90% of students were engaged at least 90% of the time), 4 teachers as moderately engaging (at least 50% of students engaged at least 50% of the time), and 2 teachers as low engaging (i.e., less than 50% of students engaged less than 50% of the time). Compared to the moderately engaging and low-engaging teachers, highly engaging teachers used many instructional practices that had the potential to encourage academic engagement (e.g., scaffolding, encouraging strategy use) and did nothing that might undermine engagement (e.g., expressing frustration, providing ineffective or unclear feedback)." (p. 61)	(A1.2)

[1]Reyes et al. (2012); USA	*N* = 1399 students (33% Black/African American, 29% Hispanic, 25% White/non-Hispanic, 12% Asian/Pacific Islander, and 2% multiracial or Native/Aboriginal); age not reported; 5th and 6th grades. (nested design; purposeful sample; multilevel mediation modeling)	**Purpose:** To examine "the link between classroom emotional climate and academic achievement, including the role of student engagement as a mediator." (p. 1) **Results:** "multilevel mediation analyses showed that the positive relationship between classroom emotional climate and grades was mediated by engagement, while controlling for teacher characteristics and observations of both the organizational and instructional climates of the classrooms. Effects were robust across grade level and student gender." (p. 1) "higher ratings of student engagement were associated with higher grades" (p. 8) "Teachers' teaching efficacy was associated positively with student engagement (...), and years teaching at school was negatively associated with engagement." (p. 8)	(A1.2); (D1)
Rimm-Kaufman et al. (2015); USA	*N* = 387 students (33% qualified for free or reduced priced lunch, and 31% English language learners); M_{age} = 10.47, *SD* = 0.37; Fifth grade; *N* = 63 fifth grade mathematics teachers (longitudinal design; purposeful sample; multilevel modeling)	**Purpose:** Examine concurrent teacher–student interaction quality and students' engagement in mathematics classrooms and understand "how teacher–student interaction quality relates to engagement differently for boys and girls." (p. 170) **Results:** Students that received higher emotional support in classrooms, and that were enrolled in more organized classes, reported higher cognitive, emotional, and social engagement. Interaction effects "were present for student-reported engagement outcomes but not in observed or teacher-reported engagement. Boys (but not girls) in classrooms with higher observed classroom organization reported more cognitive and emotional engagement. In classrooms with higher instructional support, boys reported higher, but girls reported lower, social engagement." (p. 170) Students in classrooms with higher levels of classroom organization appeared more behaviorally engaged than students in classrooms with lower levels of organization.	(A1.2)
Rosário et al. (2016); Portugal	*N* = 35 Gypsy children; 10 to 12 years of age; 4th grade. (longitudinal design; purposeful sample; multivariate analysis repeated measures)	**Purpose:** "the efficacy of an extra-class program, eighteen weeks long, to promote the behavioral and cognitive engagement (self-regulated learning, SRL) of Gypsy children from fourth grade." (p. 84) **Results:** "The findings show the efficacy of the program for promoting behavioral engagement and enhancing SRL strategies." (p.84).	(A3)
Rosário et al. (2017); Portugal	*N* = 30 Gypsy children; age range from 6 to 11 years; 2nd, 3rd and 4th grade. (longitudinal design; purposeful sample; mixed model method with repeated measures)	**Purpose:** Assess "the efficacy of a four-year intervention to promote Gypsy children's behavioral engagement and school success." (p. 554) **Results:** The intervention was efficacious on promoting Gypsy children's behavior engagement and academic success.	(A3)
Sage and Kindermann (1999); country not reported	*N* = 25 students (18 European descendent); age not reported; 5th grade. (cross-sectional design; convenience sample; repeated measures analysis of	**Purpose:** "the present study examines social contingencies as one such mechanism in school settings. The focus is on children's developing school motivation or engagement in the classroom" (p. 146) **Results:** "The more students were motivated, the more likely they were to receive approval from peer group members following their active on-task behaviors. The less students were motivated, the more they received disapproval from non members following their disruptive off-task behaviors. These contingency patterns	(A1.1)

	variance and sequential and regression analyses.)	constitute learning conditions that can be seen as a mechanism through which a child's peer group members can influence that child's school motivation." (p. 143)	
Salmela-Aro et al. (2016); Finland	*N* = 759 students (ethnic composition not reported); age ranges from 12 to 13 years; 6th grade. (cross-sectional design; purposeful sample; latent profile analysis)	**Purpose:** "examine what profiles of school engagement (i.e., energy, dedication, absorption) and school burnout (i.e., exhaustion, cynicism, inadequacy) can be identified among elementary school children" (p. 704) **Results:** "almost half (46%) of the elementary students felt some degree of cynicism towards school, thereby supporting our gap hypothesis: these groups of cynical students reported that they would be more engaged at school if socio-digital technologies were used at school." (p. 704)	(B3)
Schardt et al. (2018); USA	*N* = 4 students (3 African American and 1 Hispanic); age ranges from 8 to 10 years; 3rd through 5th grade. (single-case-design study; single case; visual analysis)	**Purpose:** "investigate the effects of a technology-based self-monitoring intervention on elementary students' academic engagement during independent work time." (p.1) **Results:** "Visual analyses illustrated positive effects of the CellF-Monitor on academic engagement and on-task behavior" (p. 1)	(A3)
Shin (2017); South Korea	*N* = 736 students at wave 1 (405 5th and 331 6th graders) and 677 at wave 2 (339 5th and 338 6th graders); ethnic composition not reported; age not reported. 5th and 6th grade. (cross-sectional design; purposeful sample; attrition analysis)	**Purpose:** "to gain insights into adolescents' classroom peer climate by examining both types of peer norms (i.e., descriptive and status norms) on academic and social behaviors in the classroom." (p. 3) **Results:** "descriptive norms for disruptive, relational aggressive, and bullying behavior became more positive over time across the school year. Status norms displayed distinct pattern for each social status. Although admired was associated with academic engagement and prosocial behavior, popularity and leader were associated with both positive and negative behaviors in both academic and social domain. Further, when adolescents increased their level of behaviors that are perceived to be important (i.e., associated with positive status norms) in their classrooms, they gained elevated social status over time across the school year." (p. 1)	(A1.1)
Skinner and Belmont (1993); USA	*N* = 144 children (94% Caucasian, 6% African American); age ranges from 7.99 years to 11.99 years; 3rd, 4th and 5th grade; *N* = 14 teachers (longitudinal design; purposeful sample; correlational and path analyses)	**Purpose:** Examine "the effects of 3 dimensions of teacher behavior (involvement, structure, and autonomy support) on children's behavioral and emotional engagement across a school year." (p. 571) **Results:** "teacher involvement was central to children's experiences in the classroom and that teacher provision of both autonomy support and optimal structure predicted children's motivation across the school year. Reciprocal effects of student motivation on teacher behavior were also found. Students who showed higher initial behavioral engagement received subsequently more of all 3 teacher behaviors." (p. 571)	(A1.2)
Skinner et al. (1990); USA	*N* = 220 students (ethnic composition not reported); age ranges from 9 to 12 years; 3rd to 5th grade; *N* = 12 teachers. (cross-sectional design; purposeful sample; correlational and path analyses)	**Purpose:** "the process by which children's perceived control contributes to their engagement in school and their academic performance." (p. 29) **Results:** "Correlational and path analyses were consistent with a process model which predicted that children's perceived control (self-report) influences academic performance (grades and achievement test scores) by promoting or undermining active engagement in learning activities (as reported by teachers) and that teachers positively influence children's perceived control by provision of contingency and involvement (as reported by students." (p. 22)	(B1); (D1)

Skinner et al. (2016); USA	*N* = 880 children (95 % Caucasian, 5% nonwhite); age not reported; 4th through 6th grade. *N* = 53 teachers. (longitudinal study; purposeful sample; structural analyses)	**Purpose:** Examine "whether engagement in the classroom shapes students' academic coping, and whether coping in turn contributes to subsequent persistence on challenging tasks and learning, which then feed back into ongoing engagement." (p. 2099) **Results:** "the profile of coping responses, rather than any specific individual way of coping, was most centrally connected to changes in engagement and persistence." (p. 2099)	(C1)
Strambler and Mckown (2013); country not reported	*N* = 309 students (177 White, 83 Black, 31 mixed race, 10 Asian, and 5 Latino); age not reported; kindergarten to 5th grade. (group-randomized design; purposeful sample; hierarchical linear modeling)	**Purpose:** "group-based action research framework aimed at increasing teachers' use of evidence-based practices and promoting student engagement." (p. 94) **Results:** "Teachers in the action research group reported using more group-based instruction than self-study teachers. Students with initial low engagement and low reading grades demonstrated greater gains in these outcomes in action research classrooms than self-study classrooms." (p. 87)	(A3)
Strambler and Weinstein (2010); USA	*N* = 111 students (48% African American and 51% Latino); age not reported; 1st to 5th grade. (cross-sectional design; purposeful sample; structural equation modeling)	**Purpose:** Examine "dimensions of psychological disengagement as predictors of achievement and teacher-rated behavioral engagement over the course of a school year" (p. 155) **Results:** "on average, students exhibited moderate levels of academic devaluing and high levels of academic valuing. There were largely no grade differences for any constructs and African Americans had higher alternative identification than Latinos. Given equal prior achievement, greater alternative identification predicted lower behavioral engagement and only the devaluing of academics consistently predicted poorer outcomes on language arts and math scores. In contrast, academic valuing was not found to be predictive of behavioral engagement or achievement" (p.155). "Higher perceived negative teacher feedback predicted more devaluing of academics and at the level of a trend, greater perceived teacher care at a classroom level predicted less devaluing." (p. 155)	(A1.2), (D1)
Weyns et al. (2017); Belgium	*N* = 586 children (ethnic composition not reported); *M age* = 9.26 years, SD = 0.52 years; 4th to 6th grade. (three-wave longitudinal design; purposeful sample; omnibus multigroup analysis)	**Purpose:** Investigate how teacher support, peer acceptance, and engagement "mutually impact one another over time." (p. 4) **Results:** "unique longitudinal effects of both peer acceptance and teacher support on engagement, and of peer acceptance on teacher support. No reverse effects of engagement on peer acceptance or teacher support were found." (p. 1)	(A1.1), (A1.2)
Wigfield et al. (2008); USA	*N* = 315 students (68% Caucasian, 20% African American, 5% Hispanic, 4% Asian, and 4% other); 4th grade; *N* = 23 teachers. (pretest–posttest design; purposeful sample; multivariate analyses of variance)	**Purpose:** To compare "how Concept-Oriented Reading Instruction (CORI) (support for cognitive and motivational processes in reading), strategy instruction (support for cognitive strategies in reading), and traditional instruction in fourth-grade classrooms differentially influenced students' reading comprehension, strategy use, and engagement in reading." (p. 432) **Results:** "Students experiencing CORI were significantly higher than both comparison groups on reading comprehension, reading strategies, and reading engagement. When students' level of reading engagement was statistically controlled, the differences between the treatment groups were not significant. We infer that the level	(A3)

		of students' reading engagement during classroom work mediated the instructional effects on reading outcomes." (p. 432)	
Wong et al. (2018); Hong Kong	*N* = 507 students (ethnic composition not reported); 8 years of age; 3rd grade. (cross-sectional design; convenience sample; path analysis)	**Purpose:** Examine "the associations of parental educational involvement at home and in school with academic performance and psychological health." (p. 1) **Results:** "home-based parental educational involvement was positively associated with children's language competence and psychosocial wellbeing, and the associations were linked through engaging children with school. However, the benefits reached a plateau at higher level of parental involvement in children's learning at home. School-based parental involvement had an indirect effect on children's prosocial behavior through school engagement." (p. 1)	(A1.3)
Wu et al. (2010); USA	*N* = 706 students (23% African American, 38% Hispanic, 34% Caucasian, and 5% others); Age not reported; 2nd and 3rd grade. (longitudinal design; purposeful sample; latent growth curve model)	**Purpose:** "investigate the developmental consequences of second- and third-grade students' reports of Teacher–student relationship quality" (p. 361) **Results:** Four types of relationships were identified "based on the consistency of child reports of support and conflict in the relationship with reports of others: Congruent Positive, Congruent Negative, Incongruent Child Negative, and Incongruent Child Positive." (p. 357) "Group membership predicted growth trajectories for teacher-rated engagement and standardized achievement scores over the following three years, above prior performance. The predictive associations between child reports of teacher support and conflict and the measured outcomes depended on whether child reports were consistent or inconsistent with reports of others." (p. 357)	(A1.2)
Wu et al. (2013); USA	Study 1: *N* = 122 students (88% European Americans, 9% Hispanic Americans and 3% African Americans); age not reported; 4th grade (quasi-experimental design; purposeful sample; regression analyses) Study 2: *N* = *359* students (46% European Americans, 35% Hispanic Americans, 16% African Americans and 3% other); age not reported; 4th and 5th grade. (quasi-experimental design; purposeful sample; hierarchical linear modeling)	**Purpose:** "Study 1 examined students' moment-by-moment engagement during collaborative peer-managed small-group discussions in comparison to conventional teacher-managed whole-class discussions. Study 2 evaluated the long term effects of discussions on self-reported motivation." (p. 622) **Results:** "Student self-ratings of engagement as well as adult ratings of engagement during a 6-min episode of one discussion had relatively high correlations with student self-reported interest and engagement several months later. Girls reported greater interest and engagement than boys in both conventional and collaborative discussions and were rated as more engaged by both themselves and adults; however, boys showed a greater boost in interest from collaborative discussions. Talkative children reported greater interest and engagement than less talkative children. Low-ability children put a higher value on discussion than high-ability children." (p. 622)	(A1.2)
Yang et al. (2018); USA	*N* = 4329 students (59% African American and 38% White and 3% others); age not reported; kindergarten to 5th grade.	**Purpose:** Examine "the relationship between material hardship, school engagement, and grade retention" (p. 25) among at-risk elementary school children.	(A2)

(longitudinal design; purposeful sample; multilevel analysis)	**Results:** "42.34% of children in the sample repeated at least one grade over the four school years examined in this study. Material hardship was associated with a greater likelihood of grade retention, and this association was partially mediated by levels of school engagement."

Note. [a](A) – External factors that contributes to SE; (A1) - The role of class peers, teachers, or parents on SE; (A1.1) – Class Peers; (A1.2) – Teachers; (A1.3) – Parents; (A2) SE and the school context; (A3) Intervention programs to promote SE; (B) Internal factors that contributes to SE; (B1) SE, students' emotions, behaviors, and cognitions.; (B2) SE and students' retention; (B3) SE, motivational variables and learning; (C) Students SE (Action); (C1) Student trajectories of SE; (D) Outcomes of SE; (D1) SE and academic achievement.

1.10. Online Resource 2

Engagement conceptualizations, dimensions, definitions, theoretical frameworks, engagement assessment methods and measures used in the sampled studies

Reference	Conceptualization of engagement	Definition of the engagement dimensions examined in each study	Theoretical framework	Engagement assessment methods	Engagement measures
Almasi et al. (1996)	*Nystrand and Gamoran (1991)*	*(Cognitive) Engagement (during reading)* – "sustained personal commitment to creating understanding while one reads (Nystrand & Gamoran, 1991)." (p. 108); "state of deep involvement and personal commitment" (p. 108)	Not applicable.	- Interviews [students and teachers]. - Classroom observations [students].	- Stimulated Recall Interview Protocol with students and semi structured interviews with teachers. - Videotapes, field notes and lesson transcriptions from classroom observations.
Archambault and Dupéré (2016)	*Fredricks et al. (2004)*	*Behavioral engagement* – "refers to students' behavioral disposition and conduct when approaching and undertaking school-related activities (McDermott, Mordell, & Stoltzfus, 2001). Such behaviors include compliance to classroom and school instructions and rules (e.g., attendance, politeness) and effort, involvement, and participation in classroom work and discussions" (pp. 1-2). *Affective engagement* – "refers to students' feelings, attitudes, interests, and perceptions when approaching school-related activities" (p. 2). *Cognitive engagement* – "students' use of self-regulation strategies to plan and monitor their learning" (p. 2).	Not applicable.	- Student self-reported. - Teacher-reported.	- School Engagement Dimensions Scale (Archambault and Vandenbossche-Makombo 2013) assessing behavioral, affective, and cognitive engagement [student-reported]. - Seven-item questionnaire from Pagani et al. (2012) assessing behavioral engagement [teacher-reported].
Archambault et al. (2013)	*Fredricks et al. (2004)*	*Classroom engagement* – "quality of student involvement with classmates and teachers (Finn, 1989; Ladd et al., 2000; Skinner & Belmont, 1993; Skinner et al., 2009, 1990)" (p. 2)	*Attachment theory*	- Teacher-reported.	- Seven-item questionnaire (retrieved from Pagani et al. 2010) assessing classroom engagement.
Archambault et al. (2016)	*Fredricks et al. (2004)*	*Behavioral engagement* – "refers to student conduct when approaching school-related tasks (McDermott, Mordell, & Stoltzfus, 2001). More specifically, it concerns students' level of attention, effort, and participation in classroom-related activities and the degree to which they conform to classroom and school rules" (p. 208).	Not applicable.	- Student self-reported.	- School Engagement Dimensions Scale (eight items; Archambault and Vandenbossche-Makombo 2013) assessing behavioral engagement.

		Affective engagement – "refers to student attitudes and interest regarding classroom-related activities, as well as their feeling of belongingness to their school (Goodenow, 1993; Watt, 2004). As such, school belonging can be more specifically defined in terms of students' perceptions of acceptance, respect, and inclusion in the school environment" (pp. 208-209).			- Socioeducational Environment Questionnaire (four items; Janosz et al. 1998) assessing affective engagement.
Ashiabi (2005)	Not reported.	*School engagement* – "(i) regular participation in classroom and school activities, and (ii) feelings a child has that he/she belongs in the school setting and values school-relevant outcomes (Finn 1993; Goodenow 1993)." (p. 4)	Not applicable.	- Household-reported.	- Four-item questionnaire (i.e., 'child cares about doing well in school', 'child only works on schoolwork when forced to', 'child does just enough to get by', 'child always does homework) assessing school engagement'.
Baroody et al. (2016)	*Fredricks et al. (2004)*	*Student Engagement (in math class)*– *'*refers to students' involvement and participation in tasks or activities" (p.1); "attention, focus, and on-task behaviors" (p. 3)	*Self-Systems framework*	- Student self-reported. - Teacher-reported. - Classroom observations [students].	- Students: Six-item questionnaire [student-reported] adapted from prior studies measuring cognitive engagement in math class (e.g., Meece 2009; Rowley et al. 2009; Skinner and Belmont 1993) - Eight-item questionnaire [teacher-reported] adapted from Connell and Wellborn (1991). - Student Observed Engagement Measure (a time sampling and global rating system from Ponitz et al. 2009).
Battistich et al. (1997)	Not reported.	*Academic engagement* – "student active participation in learning, on-task behavior" (p. 141)	Not applicable.	- Classroom observations [students].	- Classroom observations of students' behaviors.
Blumenfeld and Meece (1988)	Not reported.	*Cognitive engagement* – "defined as the proportion of high-level strategies appropriate to the task that the child checked for each lesson." (p. 240); "dimensions of self-regulated learning such as attention, connecting, planning, and monitoring along with use of help-seeking and effort-avoidant strategies." (239)	Not applicable.	- Students self-reported.	- Checklist assessing students' use of learning strategies [21 items].
Bodovski and Farkas (2007)	*Newmann (1992)*	*Student engagement* – "involves three components: learning-related work habits (active participation, persistence at tasks, completing	Not applicable.	- Teacher-reported.	- Approaches to learning scale from the original Early Childhood Longitudinal Study (1998) dataset (six items)

		work, taking challenging classes), cognitive behaviors (attention, problem solving), and emotions (enthusiasm, interest)" (p. 118).			
Brophy et al. (1983)	Not reported.	*Student engagement (in tasks)* – "level of effort, sustained concentration, persistence, enjoyment, goal setting, etc.)" (p.545).	Not applicable.	- Classroom observations [students].	- Individualized classroom observations (index of student task engagement; Borg 1980)
Bryce et al. (2019)	*Fredricks et al. (2004)*	*Behavioral engagement* – "involves attending to the learning environment and is important for achievement" (p. 492); "Behaviorally engaged children demonstrate their active engagement within the classroom by – participating in lessons, acting in accordance with teachers' expectations, and demonstrating compliance; children show passive engagement by paying attention to the learning context" (p. 493).	*Stage-environment fit model*	- Classroom observations [students].	- Classroom Observation System (based on NICHD ECCRN 2002).
Buhs et al. (2006)	Not reported.	*Classroom engagement/disengagement* – "classroom participation and school avoidance" (p.1); "The constructs used to represent aspects of classroom disengagement were termed classroom participation and school avoidance. Classroom participation encompassed two aspects of children's classroom behavior that have been termed *autonomous* and *cooperative* participation" (p.3); *Autonomous participation* refers to classroom behaviors that are characterized by initiative or self-directedness (e.g., starting activities, working independently, seeking challenges), and *cooperative participation* refers to classroom behaviors that are conducted in a socially responsible manner (i.e., adhering to classroom rules and role expectations; see Ford, 1985; Wentzel, 1991). *School avoidance* was defined as the degree to which children expressed a desire to avoid school and engaged in school-avoidant behaviors." (p. 3).	*Context-self-action-outcome model*	- Teacher-reported.	- Teacher Rating Scale of School Adjustment (Birch and Ladd 1997).
Buhs (2005)	Not reported.	*Classroom engagement* – "children's classroom participation" (p. 415).	Not applicable.	- Teacher-reported.	- Teacher Rating Scale of School Adjustment (Birch and Ladd 1997).
Cadima et al. (2015)	*Fredricks et al. (2004)*	*Behavioral engagement (in learning)* – "student's active involvement in the classroom tasks, including complying with classroom rules and routines, completing tasks responsibly, persisting and concentrating on tasks, and exhibiting self-directed behavior" (p. 2).	*Systemic-ecological model of engagement*	- Teacher-reported.	- Teacher Rating Scale of School Adjustment (Birch and Ladd 1997).

				- Classroom observations [students].	- Behavior Assessment System for Children - Student Observation Scale (Reynolds and Kamphaus 1992).
Cai and Liem (2017)	*Fredricks et al. (2004)*	*Student engagement* – "is a 'meta' construct comprising its affective, behavioral, and cognitive dimensions (Fredricks et al., 2004). Whilst affective engagement represents students' feelings during the learning process (e.g., joy, anxiety), behavioral engagement refers to students' overt involvement in learning and academic tasks (e.g., persistence, class participation), and cognitive engagement indicates thinking strategies students use to process the information learnt (e.g., memorization, elaboration)" (p.133).	*Self-determination theory*	- Students self-reported.	- Anxiety subscale of the Achievement Emotion Questionnaire (Pekrun et al. 2002) assessing affective engagement. - Effort and Perseverance subscale of Student Approaches to Learning Instrument (Marsh et al. 2006) assessing behavioral engagement. - Elaboration subscale of the Goal Orientations and Learning Strategies Survey (Dowson and McInerney 2004) assessing cognitive engagement.
Cantrell et al. (2014)	*Guthrie and Wigfield (2000)*	*Cognitive engagement (in reading)* - "The cognitive component of reading engagement suggests that effective readers make strategic choices within the reading context and use procedural and conditional knowledge to determine how and when to apply comprehension strategies as they read" (p. 37). *Motivational engagement (in reading)*– "consists of the reader's goals, values, and beliefs related to the reading task, text, and context" (p. 37).	*Self-determination theory*	- Students self-reported. - Interviews [students]	- Metacognitive Awareness of Reading Strategies Inventory (Mokhtari and Reichard 2002) assessing cognitive engagement. - Motivation to Read Questionnaire (Wigfield and Guthrie 1997) assessing motivational engagement. - Think aloud interviews.
Cappella et al. (2013)	*Fredricks et al. (2004)*	*Behavioral engagement* – "attention, participation, and effort in academic activities" (p.367); the observable act of students being involved in learning; it refers to students' participation in academic activities and efforts to perform academic tasks" (p. 368); "the presence of active (e.g., writing, reading aloud) or passive engagement (e.g., listening to teacher, looking at worksheet) during academic activities." (p. 372)	*Social capital theory; Systems theories of social processes*	- Classroom observations [students].	- The Behavioral Observation of Students in Schools (Shapiro 2004).
Chen et al. (2010)	*Skinner et al. (2008)*	*Engagement - Behavioral engagement* and E*motional engagement (in the classroom)*-Not defined.	Not applicable.	- Students self-reported. - Teacher-reported.	- 18-item scale based on Skinner et al. (1998) assessing behavioral and emotional engagement [student-reported].

					- 18-item questionnaire adapted from Skinner, Zimmer-Gembeck and Connell (1998) assessing behavioral engagement [teacher-reported].
Darensbourg and Blake (2013)	*Fredricks et al. (2004)*	*Behavioral Engagement* – "effort, persistence, concentration, and interest" (p.1050)	Not applicable.	- Teacher-reported.	- Engagement scale (10 items; Skinner et al. 1998).
De Laet et al. (2015)	*Fredricks et al. (2004)*	*Behavioral Engagement* – "on-task behavior, homework attitude, and concentration in the classroom" (p. 1292)	*Bronfenbrenner's bio-ecological model*	- Students self-reported.	- Dutch School Questionnaire (Smits and Vorst 1990).
Deed (2008)	*Fredricks et al. (2004)*	*School Engagement* – "incorporates behavioural, affective and cognitive components of student approaches to school" (p. 3); "school connectedness, student motivation and learning confidence" (p.4); "behaviour, such as participation, task focus, willingness to exert effort and rule-breaking; emotional reaction to tasks, teacher and peers; and cognitive investment, such as asking questions, taking responsibility for learning, choices made about content, task or assessment, concentration and reaction to difficulty or failure." (p. 6)	Not applicable.	- Interviews [students] - Classroom observations [students].	- Students' interviews [including students' drawings of robots that are good at learning]. - Classroom observations of students' behaviors.
Dolezal et al. (2003)	Not reported.	*Academic engagement* – "high degree of on-task behavior with tasks that are appropriately, academically demanding (i.e., students can do them with some effort) and worthwhile for students (i.e., pertinent to important content in the elementary curriculum)" (p. 243).	Not applicable.	- Classroom observations [teachers and students].	- Classroom observations of teachers practices and students' academic engagement (entire classes' engagement was assessed).
Dornhecker et al. (2015)	Not reported.	*Academic engagement* – "active engagement (e.g., answering a question, raising a hand, participating in active discussion), passive engagement (e.g., attentive toward the lesson but the child does not take an active role in instructional activities)" (pp. 4-5)	Not applicable.	- Classroom observations [students].	- The Behavioral Observation of Students in Schools (Shapiro 2010).
Dotterer and Lowe (2011)	*Fredricks et al. (2004)*	*School engagement* – "describes students' feelings, behaviors, and thoughts about their school experiences" (p. 1652) *Psychological engagement (affective and cognitive engagement)* – encompasses aspects of "both affective engagement (connectedness,	*Developmental / ecological model*	- Student self-reported. - Classroom observations [students].	- What I Think About School Questionnaire (20 items) assessing psychological engagement [student-reported]. - Classroom Observation System (NICHD ECCRN 2002) assessing behavioral engagement.

		belonging) and cognitive engagement (perceived competence, motivation)" (p. 1654). *Behavioral engagement* – "includes students' observable actions or performance." (p. 1652); "the degree to which students are actively engaged in learning (i.e., paying attention, on-task)" (p. 1654).			
Downer et al. (2007)	*Fredricks et al. (2004)*	*Behavioral engagement* - "When children participate in activities, raise their hands in response to a question, show attention toward the teacher or are actively involved in a reading or writing exercise, they are showing evidence of behavioral engagement" (pp. 414-415).	*Bioecological model; Social ecology - Person X Environment interactions*	- Classroom observations [students].	- Classroom Observation System (NICHD ECCRN 2002).
Furrer and Skinner (2003)	*Wellborn (1991)*	*Engagement (in the classroom)* – "Engagement refers to active, goaldirected, flexible, constructive, persistent, focused interactions with the social and physical environments" (p. 149); *Behavioral engagement* - "students' effort, attention, and persistence during the initiation and execution of learning activities" (p. 153); *Emotional engagement* – "students' emotional involvement during learning activities" (p. 153) *Disaffection* – "individuals are alienated, apathetic, rebellious, frightened, or burned out, turn people away from opportunities for learning." (p. 149)	*Self-system model of motivational development; Attachment theory*	- Student self-reported. - Teacher-reported.	- The Engagement vs. Disaffection Scale: 16-items [teacher-reported] and 24-item [student-reported] assessing behavioral and emotional engagement.
Galla et al. (2014)	*Fredricks et al. (2004)*	*Effortful engagement* – "volitional involvement in learning activities and included behaviors such as effort, persistence, attention, and class participation" (p.296).	*Social-cognitive theory*	- Teacher-reported.	- Effortful Control scale of the Children's Behavioral Questionnaire, Very Short Form (12 items; Putnam and Rothbart 2006). - Behavioral Engagement scale from the Rochester Assessment Package for Schools (8 items; Skinner et al. 2009; Wellborn and Connell 1987).
Greenwood (1991)	Not reported.	*Engagement* – "defined as active, academic responding"; "a composite of the seven separate behaviors"; "it does not include students' attention" (p. 525).	*Carroll's time-based model of school learning*	- Classroom observations [students].	- The Code for Instructional Structure and Student Academic Response (Stanley and Greenwood 1981) – observational system.

Gremmen et al. (2018)	Not reported.	*Academic engagement* – "posture', 'working according to plan', 'self-confidence', 'social behavior', 'motivation for school', 'concentration', 'understanding of contents', 'speed', 'listening', and 'eagerness to learn'." (p.45)	*Social learning theory*	- Teacher-reported.	- 10-item scale assessing academic engagement.
Gruman et al. (2008)	Not reported.	*School engagement* – "academic, affective, and behavioral facets of school success" (p.1836). *Academic facet of SE* – "academic performance in three core curricular areas - reading, math, and language" (p. 1836). *Affective dimension of SE* – "children's attitudes toward school" (p. 1836). *Behavioral facet of SE* – "participation and cooperation skills" (p. 1836).	*Developmenta l science framework*	- Teacher-reported.	- Nine-item scale (based on Walker and McConnell 1988) assessing classroom participation. - Four-item scale (adapted from Hawkins & Catalano 1990 and Kusche & Greenberg 1988) assessing a child's attitude toward school. - Teacher ratings of academic performance in language arts, math, and reading.
Guo et al. (2011)	*Fredricks et al. (2004); Rimm-Kaufman et al. (2002)*	*(Behavioral) Engagement* – "the level of children's attention and self-reliance" (p. 2); "attention (the extent to which the child attended to the learning activities) and self-reliance (the extent to which the child demonstrated initiative, focus, autonomy, and leadership)" (p. 4)	*Ecological developmental approach*	- Classroom observations [students].	- Classroom Observation System (NICHD ECCRN 2002).
Guo et al. (2015)	*Fredricks et al. (2004)*	*Behavioral engagement* – "multidimensional construct that includes the manifestation of several skills, including involvement (i.e., time on task; Greenwood, 1991; Ponitz et al., 2009), attention, and selfreliance" (p. 333); "Involvement indicates the extent to which children are engaged in learning opportunities, such as how much time is spent in learning (Greenwood, 1991). Attention captures the extent to which children concentrate on what the teacher is doing (Ponitz et al., 2009) and reflects the level of persistence, orientation, and focus on tasks" (p. 333); "Self-reliance reflects "the degree to which the child displays autonomy, self-regulation, and personal initiative in the classroom" (Rimm-Kaufman et al., 2002" (p. 333).	*Negative feedback cycle of early reading failure*	- Classroom observations [students].	- Classroom Observation System (NICHD ECCRN 2002).
Guthrie et al. (1996)	*Newmann, Wehlage and Lamborn (1992)*	*Literacy engagement* – "defined as the integration of intrinsic motivations, cognitive strategies, and conceptual learning from text" (p. 307)	Not applicable.	- Classroom observations [students]. -Interviews [students].	- Performance assessment of engaged reading and literacy processes through tasks performed by students in classroom (observation of videotaped classes).

					- Appraisal of students' motivations for literacy through semi structured interviews (13 questions).
Guthrie et al. (2004)	*Guthrie and Wigfield (2000)*	*Engagement (in reading)*– "joint functioning of cognitive comprehension strategies and motivational processes" (p. 406)	Not applicable.	- Classroom observations [students]. - Students self-reported engagement (i.e., motivation). - Interviews [teachers].	- Classroom observations of students' comprehension strategies (e.g., elicitation of background knowledge, student questioning, searching for information). - Motivation for Reading Questionnaire (Wigfield and Guthrie 1997). - Interviews about (observed and videotaped) class sessions.
Hastings and Schweiso (1995)	Not reported.	*Task engagement: Students' Behavior* – "On-task' included attending to work, collecting resources, attending to or interacting with teacher, following instructions, helping another child or looking at their own work. 'Off-task' behaviour included being out of seat without justification, distracting other children, queuing, turning round in seat, making unnecessary noise, hindering other children, looking away from their work and not attending to the teacher." (pp. 282-283)	Not applicable.	- Classroom observations [students].	- Study 1: Observation schedule and a short questionnaire. - Study 2: Observation schedule based on ORACLE research (Galton, Simon and Croll 1980).
Herrenkohl and Guerra (1998)	*Nystrand and Gamoran (1991)*	*Student engagement (in science)* – "engagement involves the generation, manipulation, and discussion of ideas in a public forum. (...) student engagement is, in large part, an act of constructing, monitoring, clarifying, and challenging perspectives within the classroom context" (p. 433).	*Model of cognitive functioning*	- Discourse analysis of classroom interactions [teachers and students].	- Recording teachers and students discourse practices. - Assessment of teachers and students' interactions in the classroom context.
Hoglund et al. (2015)	Not reported.	*School Engagement - Emotional and Behavioral engagement* – Not defined.	*Ecological systems; Dynamic systems; Developmental systems; Job*	- Student self-reported.	- Emotional (five-item) and behavioral (five-item) subscales of the School Engagement Questionnaire (Furrer and Skinner 2003; Skinner, Kindermann and Furrer 2009).

			demands–resources		
Hosan and Hoglund (2017)	Not reported.	*Emotional engagement* – "refers to children's affective attitudes in the classroom, including their interest and enjoyment" (p. 202). *Behavioral engagement* – "refers to children's participation in learning activities, including their effort and attentiveness" (p. 202).	*Self-determination theory; Attachment theory; Dynamic systems theory*	- Student self-reported.	- Emotional (five-item) and behavioral (five-item) subscales of the School Engagement Questionnaire (Furrer and Skinner 2003).
Hughes et al. (2009)	Not reported.	*Academic/Effortful Engagement* – Not defined	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004)
Hughes et al. (2008)	*Fredricks et al. (2004)*	*Effortful Engagement* – "refers to the volitional, or effortful, aspect of involvement in instructional activities and includes trying hard, not giving up in the face of difficulty, and directing one's attention to instructional activities" (p.11). *Conduct (antisocial) engagement* – Not defined.	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004). - 24-item questionnaire adapted from the California Child Q-Sort (Caspi et al. 1992)
Hughes et al. (2011)	Not reported.	*Behavioral engagement* – "defined in terms of time on task, persistence or effort on learning tasks, or cooperative engagement" (p. 5).	*Self-determination theory; Achievement goal theory*	- Teacher-reported.	- Grade 2: Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004). - Grades 3, 4 and 5: 18-item questionnaire (Skinner et al. 1998).
Hughes et al. (2006)	Not reported.	*Learning (or classroom or academic) engagement* – "effort, attention, persistence, and cooperative participation in learning" (p. 453)	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence

					scale (Conduct Problems Prevention Research Group 2004)
Hughes and Kwok (2006)	Not reported.	*Classroom engagement* - – "effort, attention, persistence, and cooperative participation in learning" (p. 471)	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004)
Hughes and Kwok (2007)	*Fredricks et al. (2004)*	*Engagement – "cooperative participation, conformity to classroom rules and routines, self-directedness, persistence, and effort"* (p. 41) *Classroom (or academic) engagement* – "effort, attention, persistence, and cooperative participation in learning" (p. 43)	*Transactional theory*	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004)
Hughes and Zhang (2007)	Not reported.	*Classroom engagement* – "effort, attention, persistence, and cooperative participation in learning" (p.406)	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004)
Iyer et al. (2010)	Not reported.	*School engagement* – *'*being able to work independently, as well as enthusiastically engaging in classroom learning activities" (pp. 363-364); "students' independent and enthusiastic participation" (p. 369)	Not applicable.	- Teacher-reported. - Students self-reported.	- Five items assessing students' independent behavior and two items assessing enthusiastic participation in classroom [teacher-reported]. - Seven items adapted from the School Liking and Avoidance Questionnaire (Ladd et al. 1997) assessing school avoidance attitudes [student-reported]. .
Kaiser et al. (2013)	*Fredricks et al. (2004)*	*Behavioral engagement* – "classroom participation (...) involvement in learning and academic tasks. Engaged behavior includes effort, persistence, concentration, attention, asking questions, and contributing to class discussion (Birch & Ladd, 1997; Finn, Pannozzo, & Voelkl, 1995; Skinner & Belmont, 1993)." (p. 75); "engagement in activities concerning reading" (p. 75)	Not applicable.	- Student self-reported. - Teacher-reported.	- Four items assessing students' engagement in reading activities [student-reported]. - Two items assessing judgements of student's engagement in reading-related activities [teacher-reported].

Kim and Cappella (2016)	*Fredricks et al. (2004)*	*Behavioral engagement* – "represents the behavioral aspects of academic engagement (e.g., participation in classroom activities; efforts to carry out academic tasks), including the degree and extent to which students are involved in classrooms and schools (Finn & Zimmer, 2012; Fredricks et al., 2004). Because it captures the way students interact with the classroom or school learning environment (e.g., materials, activities, people), it has been examined as a proximal outcome of students' academic development" (p. 21).	*Risk and Protection framework*	- Classroom observations [students].	- The Behavioral Observation of Students in Schools (Shapiro 2004).
Kindermann (1993)	*Wellborn (1991)*	*Behavioral engagement (in the classroom)* – *'*Engagement includes sustained involvement in learning activities; children who are engaged select tasks at the border of their competencies, initiate action when given the opportunity, and exert effort and concentration in the implementation of learning tasks." (p. 971)	Not applicable.	- Teacher-reported. - Student self-reported.	- 10-item scale (from Skinner et al. 1990; Wellborn 1991) [teacher-reported]. - 10-item scale from Skinner and Belmont (1993) [student-reported].
Kindermann (2007)	*Fredricks et al. (2004)*	*Academic engagement (in the classroom)* – "engaged behaviors, including effort exertion, trying hard, and persistence, as well as indicators of mental effort, such as attention and concentration. This aspect of engagement has also been referred to as academic behavior, on-task behavior, or class participation (Fredricks et al., 2004). The conceptualization also includes engaged emotions, such as enthusiasm, interest, and enjoyment." (p. 1187)	*Theories of motivation*	- Teacher-reported.	- 14-item scale assessing behavioral and emotional components (Wellborn 1991).
Kwon et al. (2018)	*Skinner et al. (2009)*	*Academic/behavioral engagement* – "effortful participation and persistence in learning activities (Skinner, Kindermann, & Furrer, 2009)." (p. 34); "We focused on behavioral engagement that concerns children's effort, attention, and persistence in learning (e.g., in my class, this student works as hard as he/she can; when I explain new material, this student listens carefully)." (p. 36).	Not applicable.	- Teacher-reported.	- Five-item scale from Skinner et al. (2009).
Lan et al. (2009)	*Fredricks et al. (2004)*	*Behavioral Engagement* – "On-task behavioral engagement is observable in the classroom, especially with younger children, and includes active behaviors, such as asking or answering questions; and passive behaviors, such as listening and writing" (p. 200).	Not applicable.	- Classroom observations [students].	- Observation of classroom engaged behaviors (Rimm-Kaufman et al. 2005).
Langhout and Mitchell (2008)	*Skinner and Belmont (1993)*	*Academic engagement* – "is present when students are behaviourally and positively emotionally involved in the learning activity at hand. In other words, students are on task and enthusiastic, optimistic and curious about learning" (p. 595).	Not applicable.	- Student self-reported. - Interviews [teachers].	- Behavior chart analysis [student-reported]. - Structured interviews with teachers and fieldnotes.

		Academic disengagement – "being off task, unenthusiastic and uncurious about learning" (p. 593).			
Lee and Anderson (1993)	*Brophy (1983)*	*Task Engagement (in science classrooms):* *Cognitive engagement – "self-initiated cognitive engagement,* included those situations in which students were observed initiating activities to understand science better without solicitation from the teacher, expanding their thinking beyond the lesson content, and engaging in tasks beyond the requirements or expectations of the classroom. (...) *cognitive engagement,* included those situations in which, within the scope of lesson content and classroom requirements, students demonstrated strategies to achieve scientific understanding as they tried to integrate their personal knowledge with scientific knowledge and apply scientific knowledge to understand the world around them." (p. 590). *Behavioral engagement – "*whenever students appeared attentive and involved in class activities" (p. 590).	*Conceptual Change in Science*	- Classroom observations [students]. - Interviews [students].	- Classroom observations of students use of strategies and behaviors. - Semi-structured interviews with students.
Li et al. (2010)	*Fredricks et al. (2004)*	*Behavioral engagement* – "refers to involvement in school-based activities or to the absence of disruptive behaviors" (p. 803). *Emotional engagement* – "entails positive emotional reactions to the school, the teacher, and schoolmates" (p. 803).	Not applicable.	- Student self-reported.	- Seven items from the Profiles of Student Life: Attitudes and Behaviors (Leffert et al. 1998) assessing behavioral and emotional engagement.
Linnenbrink-Garcia et al. (2011)	*Fredricks et al. (2004)*	*Social-behavioral engagement* – "social forms of engagement around academic tasks, including participation with classmates as well as the quality of social interactions" (p. 13); "social loafing and quality of group interactions. Social loafing refers to the tendency for individuals to reduce effort when working collectively rather than alone, leading to disengagement from the group task (Karau & Williams, 1995). Quality of group interactions refers to the way in which group members support or undermine each other's participation" (pp.13-14).	*Affective circumplex model (Feldman Barrett and Russell 1998).*	- Student self-reported.	Scales developed for Study 1 and 2: - The social loafing scale (four items) and the positive group interaction scale (four items).
Liu et al. (2017)	*Fredricks et al. (2004)*	*Academic engagement (in math)* – "describes the degree to which students engage themselves in learning- related activities, including behavioural, affective and cognitive engagement that underlie students' connectedness to academics" (p. 1).	Not applicable.	- Student self-reported.	- The Math Engagement scale (Wang et al. 2016): cognitive (eight items), behavioral (eight items), emotional (10 items) and social engagement (seven items).

Luo et al. (2009)	*Fredricks et al. (2004)*	*Academic/behavioral engagement* – "effort, attention, persistence, and cooperative participation in learning" (p.381). *Psychological engagement* – "motivational processes that drive "the direction, intensity, and quality of one's energies" (p. 381).	Not applicable.	- Teacher-reported.	- Eight items from the Conscientiousness scale from the Big Five Inventory (John and Srivastava 1999) and two items from Social Competence scale (Conduct Problems Prevention Research Group 2004)
Lutz et al. (2006)	*Fredricks et al. (2004); Guthrie and Wigfield (2000)*	*Engagement in learning* – "students' behavioral, cognitive, affective, and social involvement in instructional activities with their teachers and classmates" (p. 3). *Behavioral engagement* – "as active participation in academic activities as demonstrated through attention, persistence, and asking and answering questions" (p. 5). *Cognitive engagement* – "encompassing mental investment in learning, effortful strategy use, and deep thinking" (p. 5). *Affective engagement* – "positive affective reactions toward teachers, classmates, and school" (p. 5). *Social engagement*– "exchange of interpretations of text and other ideas about reading and writing with peers in a "community of literacy" as important social behaviors of students who are engaged in reading" (p. 5).	Not applicable.	- Classroom observations [students].	- Student Engagement Rubric composed by four point-scales assessing behavioral, cognitive, affective, and social engagement (observed in videotaped sessions).
Lynch et al. (2013)	Not reported.	*School engagement – Not defined.*	*Dishion's theory of deviancy training (Poulin et al. 1999)*	- Student self-reported.	- Four-item scale assessing engagement in school-related behaviors.
Martens et al. (1997)	Not reported.	*Student (task) engagement* – "child being actively involved in completing an assigned task and oriented toward work materials" (p. 569).	Not applicable.	- Classroom observations [students].	- Checklist assessing students' (task) engagement in four different conditions.
Martens et al. (1992)	Not reported.	*Student academic engagement* – "The child is actively involved in completing an assigned task and is oriented toward work materials for an entire 10-s interval" (p. 145).	*Matching theory*	- Classroom observations [students].	- Classroom observations assessing students' engagement in four reinforcement phases.

Martin and Rimm-Kaufman (2015)	*Fredricks et al. (2004)*	*Emotional engagement* – "refers to the emotions (i.e., enjoyment, interest, and pleasure) experienced when pursuing a particular subject or school-related task (Mahatmya, Lohman, Matjasko, & Farb, 2012). Students who are emotionally engaged enjoy the feeling of solving problems and find the material interesting." (p. 360). *Social engagement* – "refers to the social interactions students have as part of academic instruction (Patrick et al., 2007; Rimm- Kaufman et al., 2015). Students demonstrate social engagement through their active participation in positive exchanges with peers that are connected to the instructional content of the lesson. For example, a student may demonstrate social engagement by working in a group to help one another solve a particular problem in class or by sharing instructional materials (e.g., math manipulatives) with other students" (p. 360).	*Person-environment fit theory*	- Student self-reported.	- Five items adapted from Kong, Wong, and Lam (2003) and Skinner and Belmont (1993) assessing emotional engagement. - Four items from Patrick et al. (2007) assessing social engagement.
McHugh et al. (2016)	Not reported.	*Academic engagement / Academically engaged behavior* – "defined as the student actively involved or participating in independent seatwork, group activities, and/or attending to teacher instruction, which may have required vocalizations relevant to the task" (p. 338).	Not applicable.	- Classroom observations [students].	- Classroom observations of students' engaged behavior.
Meece et al. (1988)	Not reported.	*Active cognitive engagement* – "students' reported use of metacognitive and self-regulation strategies" (p.515). "Strategies (...) included regulating attention and effort, relating new information to existing knowledge, and actively monitoring comprehension" (p. 515). *Superficial cognitive engagement* – "students' use of strategies to complete their work with minimal effort expenditure" (p. 516)	*Goal Orientations: mastery versus ability focused; learning versus performance; task-involved versus ego-involved*	- Student self-reported.	- 15-item scale assessing cognitive strategies and self-regulated learning dimensions [active and superficial cognitive engagement].
Miller et al. (2015a)	Not reported.	*Academic Engagement: Appropriately engaged behavior (AEB)* – "(a) looking at the teacher during instruction, (b) working with a peer when instructed to do so, (c) reading silently or writing to complete assignments when instructed to do so, (d) participating in a teacher-	*Tiered prevention framework*	- Classroom observations [students]. - Teacher-reported.	- Classroom observation partial interval recording system (Hawken and Horner 2003) assessing students' appropriately engaged behavior.

		approved activity following the completion of work, or (e) talking with the teacher about academic work." (p. 125)			- Daily Behavior Report Cards with a point system for rating students' behaviors (Chafouleas et al. 2002) [teacher-reported].
Miller et al. (2015b)	Not reported.	*Academic Engagement* – "Exhibiting any of the following behaviors for seven consecutive seconds: Looking at the teacher during instruction, working with a peer when instructed to do so, reading silently or writing to complete assignments when instructed to do so, participating in a teacher-approved activity following the completion of work, or talking with the teacher about academic work" (p.31)	*Tiered prevention framework (e.g., School-wide positive behavior interventions and support)*	- Classroom observations [students]. - Teacher-reported.	- Classroom observations of students' behaviors. - Daily Behavior Report Cards with a point system for rating students' behaviors (Chafouleas et al. 2007) [teacher-reported].
Moller et al. (2014)	*Newmann (1992)*	*Academic Engagement* – "task participation, persistence, and completion" (p. 1515); "child's attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization." (p.1520)	Not applicable.	- Teacher-reported.	- Approaches to learning scale (six items) from the original Early Childhood Longitudinal Study (1998) dataset.
Mullender-Wijnsma et al. (2015)	Not reported.	*Academic Engagement (in the classroom)* – "time spent focusing on academic tasks (time-on-task)" (p. 2)	Not applicable.	- Classroom observations [students].	- Classroom observations using time sampling (Grieco et al. 2009), assessing students' time-on-task.
O'Neal (2018)	*Skinner et al. (2008)*	*Emotional engagement* – "how students react emotionally, in a positive manner, to school. Interest and enthusiasm in learning at school are examples of emotional engagement" (p. 4).	*The ecological developmental model (that incorporates Bronfenbrenner's ecological model and risk and resilience models)*	- Teacher-reported.	- Five-item emotional engagement subscale of the Engagement versus Disaffection with Learning Scale (Skinner et al. 2008).
O'Neal et al. (2019)	*Skinner et al. (2008)*	*Emotional engagement* – "interest and enjoyment of academic learning (Skinner et al., 2008)" (p. 603)	*Socioemotional competence models*	- Teacher-reported.	- Five-item emotional engagement subscale of the Engagement vs. Disaffection with Learning scale (Skinner et al. 2008).

Olivier et al. (2018)	*Fredricks et al. (2004)*	*Behavioral engagement* – "students' observable actions; students who are behaviorally engaged tend to participate in class, listen to their teacher, follow instructions, and put effort into schoolwork" (p. 29)	*Model of adjustment development*	- Student self-reported. - Teacher-reported.	- The Behavioral Engagement subscale from the Dimensions of School Engagement Scale (Archambault and Vandenbossche-Makombo 2014) [student-reported]. - Eight-item scale from the Quebec Longitudinal Study of Child Development (Pagani et al. 2010) [teacher-reported].
Pagani et al. (2012)	*Fredricks et al. (2004); McClelland et al. (2006); Li-Grining et al. (2010)*	*Classroom engagement* – "refers to observable and measurable child characteristics during learning-related activities that occur in instructional settings" (p. 717). *Classroom engaged students* – "child who is self-confident, cooperative, self-controlled, compliant and follows teacher instructions, and who contemplates effective decisions and completes work on time and independently" (p. 717). *Classroom engagement behaviors* – "Plays and works cooperatively with other children at a level appropriate for age; Demonstrates self-control; Shows self-confidence; Follows directions; Completes work on time; Works independently; Capable of making decisions; and Follows rules and task instructions" (p. 718).	Not applicable.	- Teacher-reported.	- Eight-item scale assessing children's classroom engagement behaviors (Pagani, Fitzpatrick, Archambault, and Janosz 2010).
Parsons et al. (2015)	*Fredricks et al. (2004)*	*Engagement (in literacy tasks)* – "Affective engagement emphasizes interest, enjoyment, and enthusiasm. Behavioral engagement relates to effortful participation. Cognitive engagement encompasses strategic behavior, persistence, and metacognition" (p. 224)	*Self-determination theory*	- Classroom observations [students]. - Interviews [students].	- Engagement rating scales (adapted from Lutz et al. 2006) to rate students' behavioral, affective, and cognitive engagement in classroom. - Post observation interviews assessing students' affective and cognitive engagement.
Parsons et al. (2016)	*Fredricks et al. (2004)*	*Engagement* – "is conceptualized as a meta-construct that includes behavioral, affective, and cognitive dimensions (Fredricks et al., 2004). Behavioral engagement is defined as the degree to which student are observably attending to and participating in instructional activities. Affective engagement is defined as the degree to which students report interest, efficacy, or enthusiasm. Cognitive engagement is defined as the degree to which students report making connections or using strategies within instructional activities" (pp. 2-3).	*Self-determination theory*	- Classroom observations [students]. - Interviews [students].	- Time-interval observation (adapted from Lutz et al. 2006) assessing four levels of behavioral engagement in classroom. - Semi structured interviews assessing students' perceptions of affective and cognitive engagement.

Patrick et al. (1993)	*Wellborn (1991)*	*Behavioral engagement* – "children's effort, persistence, attention, and participation during the initiation and completion of learning activities" (p. 785) *Emotional engagement* – "emotions they felt in school (...) bored (e.g., *tired, bored,* and *sleepy),* worried (e.g., *scared, nervous,* and *worried),* sad (e.g., *sad* and *unhappy),* bad (e.g., *bad* and *terrible),* and angry (e.g., *mad* and *angry)*" (p. 785)	*Self-determination theory*	- Student self-reported.	- 18-item self-report scale tapping students' behaviors (Wellborn 1991; Wellborn and Connell 1987). - 35-item self-report scale tapping students' emotions in the school.
Patrick et al. (2007)	*Fredricks et al. (2004)*	*Cognitive engagement (in classroom)* – "students' reported use of self-regulation strategies" (p. 83), such as: "plan, monitor, and regulate their cognition" (p. 87) *Behavioral engagement (in classroom)* – "interaction about academic tasks with peers" (p. 94); "students answered questions, explained content, and shared ideas about math with classmates" (p. 87)	*Achievement goal theory*	- Student self-reported.	- Six-item measure of self-regulation strategies (e.g., Ryan and Patrick 2001) assessing cognitive engagement. - Five-item measure of students' task-related interactions (developed for this study) assessing behavioral engagement.
Perdue et al. (2009)	*Fredricks et al. (2004)*	*School engagement* – "the affective (e.g., likes school), behavioral (e.g., finishing homework), and cognitive (e.g., self-efficacy, motivation) investments that a child makes in school at both the classroom and schoolwide level" (p. 1084).	*Ecological systems theory*	- Student self-reported.	- 20-item measure of behavioral, affective, and cognitive components of school engagement (adapted from Simons, Johnson, Conger, and Elder 1998).
Peterson and Fennema (1985)	Not reported.	*Student engagement (in classroom activities)* – Not defined.	Not applicable.	- Classroom observations [students].	- Engaged Time Observation Instrument.
Peterson et al. (1984)	Not reported.	*Student behavioral engagement (in mathematics)* – "behaviors indicative of engagement in the mathematics task (listens to teacher and works individually) "(p. 492)	*Active teaching model*	- Classroom observations [students]. - Interviews [students].	- Observation system adapted from Peterson and Janicki (1979). - Stimulated-recall interviews with students after observations.
Pierson and Connell (1992)	Not reported.	*Student engagement* – Not defined.	*Self-systems processes model*	- Teacher-reported.	- Card ratings of students' effort.
Portilla et al. (2014)	*Fredricks et al. (2004)*	*School Engagement* – "behavioral (i.e., participation in extracurricular activities), emotional (i.e., positive and negative feelings and reactions toward school, teachers, peers), or cognitive (i.e., willingness to invest	*Transactional model of development*	- Parent-reported.	- School Engagement subscale from the MacArthur Health and Behavior Questionnaire (Armstrong and Goldstein 2003): an eight-item

		in learning difficult skills and comprehension of complex ideas; Fredricks et al., 2004)" (pp. 1917-1918).		- Teacher-reported.	scale tapping attitudes and emotions toward school [parent-reported], and an eight-item scale tapping school liking and classroom behaviors [teacher-reported].
Raphael et al. (2008)	Not reported.	*Student engagement* – Not defined.	Not applicable.	- Classroom observations [students].	- Formal scans took place every 10 to 15 minutes or when classroom activities changed to note what students were doing and determine the proportion of students who were on task.
Reyes et al. (2012)	*Fredricks et al. (2004)*	*Student engagement* – "Engaged students are attentive and participate in class discussions, exert effort in class activities, and exhibit interest and motivation to learn" (p. 1)	*Self-determination theory*	- Classroom observations [students]. - Student self-reported.	- Classroom Assessment Scoring System (Pianta, La Paro, and Hamre 2008) assessing students' engagement through videotaped class sessions. - The Engagement vs. Disaffection Scale (Furrer and Skinner 2003).
Rimm-Kaufman et al. (2015)	*Fredricks et al. (2004)*	*Student engagement (in math class)* – "Behavioral engagement refers to paying attention, completing assigned work, participating in teacher-sanctioned learning opportunities, and showing an absence of disruptive behaviors. Cognitive engagement refers to a willingness to exert effort to understand content, work through difficult problems, and manage and direct their attention toward the task at hand. Emotional engagement refers to feelings of connection to content, interest in learning, and enjoyment of solving problems and thinking about content (Fredricks et al., 2004)" (pp. 2-3); "Social engagement (termed "task-related interaction" by Patrick, Ryan, & Kaplan, 2007) refers to students' day-to-day social exchanges with peers that are tethered to the instructional content" (p. 3)	*Self-system model of motivational development*	- Classroom observations [students]. - Student self-reported. - Teacher-reported.	- Classroom Observation System (based on NICHD ECCRN 2005). - 15-item questionnaire adapted from several measures (e.g., cognitive, and emotional from Skinner and Belmont 1993, and social engagement from Patrick et al. 2007) [student-reported]. - Eight-item version of the student engagement questionnaire used by Wu, Hughes, and Kwok (2010) and Skinner et al. (2008) [teacher-reported].
Rosário et al. (2016)	*Fredricks et al. (2004)*	*Behavioral engagement* – "Behavioral engagement involves observable, less-inferential indicators. It includes students' actions and practices toward school and learning. For example, active participation in classes (e.g., asking questions in class), involvement in learning and academic tasks (e.g., effective effort to learn), and participation in extracurricular activities (e.g., reading sessions in the library)." (p. 85); "school attendance and participation in class" (p. 86)	*Social cognitive framework*	- Classroom observations [students].	- Item-level descriptors to assess behavioral engagement adapted from Lee and Brophy (1996) and from The Behavioral Observation of Students in Schools (Shapiro 2004). - Item-level descriptors to assess cognitive engagement adapted from Helme and Clarke (2001) and Lee and Brophy (1996).

		Cognitive engagement – "cognitive engagement encompasses students' investments in academic tasks and dispositions toward learning. It typically describes how students use self-regulation and metacognitive strategies to meet their self-set goals and master school content (e.g., interest in learning, goal setting, and regulation of school behavior) (p. 85); "use of SRL strategies" (p. 86)			
Rosário et al. (2017)	*Fredricks et al. (2004)*	*Behavioural engagement* – "when students attend school on time, contribute to classroom discussions and demonstrate that they are following the teacher's instructions" (p. 557).	Not applicable.	- Students from Gypsy communities' attendance at class. - Teacher-reported.	- Gypsy children's non-attendance at class (monthly collected by schools' secretariat). - Four-item questionnaire assessing students' classroom behavior (adapted from Rosário et al. 2016).
Sage and Kindermann (1999)	Not reported.	*Student (behavioral) Engagement* – Not defined.	*Learning theoretical peer influence mechanism*	- Teacher-reported.	- 24-item questionnaire (Wellborn 1991) assessing behavioral engagement.
Salmela-Aro et al. (2016)	*Salmela-Aro and Upadyaya (2012)*	*School engagement* – "a combination of energy, dedication and absorption" (p. 705); "energy refers to high levels of vigour and energy while studying. Dedication is characterized by a positive cognitive attitude towards studying in general, a perception of studying as meaningful, and experiencing a sense of significance, enthusiasm, challenge and inspiration. Absorption is characterized by being fully concentrated and happily engrossed in one's studying so that time passes quickly" (p. 705).	*Schoolwork engagement*	- Student self-reported.	- Schoolwork Engagement Inventory (Salmela-Aro and Upadyaya 2012) measuring students' Energy, Dedication and Absorption in relation to school.
Schardt et al. (2018)	Not reported.	*Academic engagement* – "active and passive on-task behaviors" (p. 1).	Not applicable.	- Teacher-reported. - Classroom observations [students].	- Direct Behavior Rating–Single Item Scale (3 items; Chafouleas et al. 2012) [teacher-reported]. - The Behavioral Observation of Students in Schools (Shapiro 2004).
Shin (2017)	Not reported.	*Academic engagement* – "adolescents' academic and social behaviors" (p. 30).	*Social learning theory*	- Student self-reported.	- Rochester assessment of intellectual and social engagement (Skinner and Belmont 1993).

Skinner and Belmont (1993)	*Wellborn (1991)*	*Student engagement:* *Behavioral engagement* – "students' effort, attention, and persistence during the initiation and execution of learning activities" (p. 575) *Emotional engagement* – "emotional reactions in the classroom: interest (vs. boredom), happiness (vs. sadness), anxiety, and anger" (p. 575)	*Basic psychological needs*	- Student self-reported. - Teacher-reported.	- 29 items assessing behavioral and 36 items assessing emotional engagement (Wellborn 1991) [student-reported]. - 38 items for behavioral and 24 items for emotional engagement (Wellborn 1991) [teacher-reported].
Skinner et al. (1990)	*Connell (1990); Connell and Wellborn (1991)*	*(Behavioral and emotional) Engagement* - "children's initiation of action, effort, and persistence on schoolwork, as well as their ambient emotional states during learning activities" (p. 24) "the extent to which that student actively participated in class (e.g., When in class, this student participates in class discussions; When in class, this student just acts like he/she is working) and (...) the student's emotional tone when in class (e.g., When in class, this student seems happy; When in class, this student seems bored)." (p. 25)	*Self-system model of motivational development*	- Teacher-reported.	- 10-item scale assessing behavioral and emotional engagement (Wellborn and Connell 1987).
Skinner et al. (2016)	*Skinner et al. (2009)*	*Behavioral engagement* – "effort, attention, persistence in learning activities" (p.2104). *Emotional engagement* - "enthusiasm, involvement, interest" (p. 2104).	*Model of motivational resilience*	- Student self-reported. - Teacher-reported.	- Five items for behavioral and six items for emotional engagement subscales of the School Engagement Questionnaire (Skinner et al. 2009) [student-reported]. - Five items for behavioral and emotional engagement (Skinner et al. 2009) [teacher-reported].
Strambler and Mckown (2013)	*Fredricks et al. (2004)*	*Student engagement* – "engagement consists of at least behavioral and psychological dimensions (Finn, 1989; Glanville & Wildhagen, 2007). Behavioral engagement tends to refer to student actions that demonstrate a commitment to academics such as school attendance and participation in academic and extracurricular activities. Psychological engagement is often referred to as one's feelings toward and connection with school along with their valuing of and identification with academics" (p. 88).	*Action research framework*	- Student self-reported. - Teacher-reported.	- Six-item subscale of the Research Assessment Package for Schools (Institute for Research and Reform in Education 1998) assessing behavioral engagement [student-reported]. - An open-ended measure adapted from the Twenty Statements Test (Kuhn and McPartland 1954) and a closed-ended measure assessing students' identification with academics [psychological engagement – student-reported]. - Student Participation Questionnaire (Finn, Folger and Fox 1991) [teacher-reported].

Strambler and Weinstein (2010)	*Fredricks et al. (2004)*	*Behavioral engagement* – "following classroom rules and norms" (p. 158); "listens to and follows directions," "completes classwork," and "completes homework" (p. 158); "behaviors associated with work habits" (p.158) *Psychological engagement and disengagement* - "The emotional/psychological domain of engagement involves affective responses to school, that include school bonding or alienation, achievement valuing, degree of liking school, and identification" (p. 155); "alternative identification, or the degree to which students identify with non-academic domains" (p. 158).	Not applicable.	- Student self-reported. - Teacher-reported.	- 15-item questionnaire: Seven items capturing alternative identification and eight items tapping students' value and devalue of academic learning [psychological engagement and disengagement – student-reported]. - Five items assessing behavioral engagement [teacher-reported].
Weyns et al. (2017)	Not reported.	*Engagement* – "on-task behavior, homework attitude, and attention in the classroom" (1143)	Not applicable.	- Student self-reported.	- Dutch School Questionnaire (Smits and Vorst 1990).
Wigfield et al. (2008)	*Guthrie and Wigfield (2000); Fredricks et al. (2004)*	*Engagement (in reading)* – "is the joint functioning of motivational processes and cognitive strategies during reading comprehension (Guthrie & Wigfield, 2000)." (p. 432); "engaged reading as a multidimensional construct including cognitive, motivational, and behavioral characteristics" (p. 437) such as: "(a) reads often independently (behavioral), (b) reads favorite topics and authors (motivation–intrinsic), (c) distracts easily in self-selected reading (motivation–intrinsic reverse coded), (d) works hard in reading (cognitive–effort), (e) is a confident reader (motivation self-efficacy), (f) uses comprehension strategies well (cognitive–strategies), (g) thinks deeply about the content of texts (cognitive–conceptual orientation), and (h) enjoys discussing books with peers (motivation–social)" (p. 437).	Not applicable.	- Teacher-reported.	- The Reading Engagement Index-Revised (REI-R) composed by items from REI correlated with the Motivations for Reading Questionnaire (Wigfield and Guthrie 1997).
Wong et al. (2018)	*Fredricks et al. (2004)*	*School engagement* – "students' involvement with schooling, academics, or learning" (p.1545). Comprise two aspects: *behavioral dimension* – "children's effort and participation in school" (p. 1547); and a*ffective dimension* – "children's attitudes and enjoyment at school" (p. 1547).	Not applicable.	- Student self-reported.	- Student Engagement Scale (10 items; Fredricks et al. 2004) assessing school (behavioral and affective) engagement.
Wu et al. (2010)	Not reported.	*Behavioral engagement* – "engagement refers to students' effortful and cooperative involvement in the classroom (i.e., working hard,	Not applicable.	- Teacher-reported.	- 11-item questionnaire adapted from the Student Engagement Questionnaire (Skinner et al. 1998).

		persisting in the face of failure, and/or complying with classroom rules; Hughes & Kwok, 2006)" (p. 363).			
Wu et al. (2013)	*Fredricks et al. (2004)*	*Emotional engagement (also called interest)* – "refers to emotional experience within the learning environment (...) includes only energized positive emotional states experienced as enthusiasm, interest, enjoyment, or excitement (Graesser & D' Mello, 2012; Skinner, Kindermann, & Furrer, 2009)." (p. 622) *Behavioral engagement* – "active participation in academic tasks" (p. 622)	*Disequilibrium theory*	<u>Study 1:</u> - Student self-reported. - Classroom observations [student and adults]. <u>Study 2:</u> - Student self-reported.	- Self-report questionnaire (Three questions: how interesting the story was, how interesting the discussion was, and how engaged you were during the discussion) assessing emotional and behavioral engagement. - Moment-by-moment real-time dynamic measure – Observation of videotaped discussions [student and adult ratings]. <u>Study 2:</u> - Two items measuring emotional engagement and four measuring behavioral engagement.
Yang et al. (2018)	Not reported.	*School engagement* – "a multidimensional concept with core aspects related to the learning process including cognitive (e.g., student persistence, self-regulated efforts toward learning; Frederick & Hauser, 2008), affective-emotional (e.g., student interest, enjoyment, boredom, school belonging; Pekrun & Linnenbrink-Garcia, 2012), and behavioral dimensions (e.g., school attendance, active participation within school; Skinner & Pitzer, 2012)" (p. 26).	Not applicable.	- Teacher-reported.	- Four-item questionnaire assessing students' lack of engagement in the classroom (i.e., no desire to learn, not prepared daily, frequently has no homework, and exhibits little curiosity).

Chapter 2

Be SMART: Promoting Goal Setting With Students At-risk of Disengaging From School Through a Mentoring Program[3]

[3] Submitted to an international peer reviewed journal

2. Be SMART: Promoting Goal Setting With Students At-risk of Disengaging From School Through a Mentoring Program

Abstract

Mentoring is a very popular tool used in many educational contexts. Over the years, many schools have been implementing mentoring programs to improve the academic adjustment of disengaged students at-risk of early school leaving. Addressing students older than 12 years old with at least two school retentions, the Portuguese Ministry of Education implemented mentoring sessions in the public schools as a universal educational policy. In this context, a school-based mentoring program to promote SMART goal setting skills through the training of self-regulation was implemented with elementary and middle school students at-risk of early dropout. A multiple case study was conducted to examine how students' goals (academic and non-academic) and SMART goal setting processes may change after their enrolment in the mentoring program. Students' goals were collected in two moments, pre- and post-intervention. Data indicated that most students at risk for school leaving set more academic and less non-academic goals post-intervention. However, a granular analysis showed that a group of older students (17 years old) did not set any academic goal for the following years in both moments; and just younger students (aged between 12 and 16 years old) integrated SMART characteristics in their academic goals. Findings add to extant literature on the topics of mentoring and goal setting. Limitations and future research directions as well as implications for practice are provided.

Keywords: mentoring intervention, SMART goal setting, self-regulated learning, "at-risk" students, elementary and middle school students.

2.1. Introduction

Mentoring has become a popular educational support practice for students in compulsory education (Jablon & Lyons, 2021; Lyons et al., 2019). Mentoring characterizes an educational process that may occur in academic or non-academic environments, where mentors are expected to provide support and guidance to a mentee in a particular topic (e.g., time management and study strategies, vocational guidance, violent behaviors) throughout the duration of the mentoring process (e.g., Jekielek et al., 2002; Johnson & Lampley, 2010; King et al., 2002; Núñez et al., 2013). Over the last decades, many schools have been implementing mentoring programs to improve the academic adjustment of students at-risk of early school leaving (e.g., Laco & Johnson, 2019; Larose et al., 2020) and disengaging from education (Meltzer et al., 2020). The growing use of mentoring programs in schools may be related to data showing

the positive impact of this tool on various student related variables, such as: students' autonomy and self-regulation (Núñez et al., 2013), self-efficacy (McDaniel & Besnoy, 2019), academic performance (Leidenfrost et al., 2014; Morisano et al., 2010), school attendance (Johnson & Lampley, 2010), and on the development of meaningful relationships (McDaniel & Besnoy, 2019). However, the impact of mentoring on the promotion of goal setting skills has received little attention from researchers. Focusing on the learning processes, a goal characterizes what students are pursuing to achieve, regulating their action (Locke et al., 1981). Hence, a focus on goals as the aim of students' actions, would help to further extend our understanding on how mentoring programs can help improve students' ability to set and attain goals (Schunk, 2003). This may be particularly relevant for the case of students at risk of early school dropout, who are prone to avoid thinking about their future and likely to show difficulties to set goals (Higley et al., 2016)

In sum, goal setting is key in the promotion of behavioral change (Bovend'Eerdt et al., 2009), and therefore is expected to help maintain students at-risk of early school leaving enrolled in compulsory education (Rowe et al., 2017). With the purpose of promoting students' SMART goal setting skills through self-regulation training, a school-based mentoring program was designed and implemented with elementary and middle school students at-risk of early dropout. The SMART goal model (e.g., Bowman et al., 2015; Doran, 1981) provides a relevant theoretical framework for the current research, and guided the research questions, data collection and analysis.

2.1.1. Students At-risk of Early School Dropout

The term "at-risk" is commonly used to describe students facing a vast number of problems such as low socioeconomic status, emotional and behavioral problems, grade retention, absenteeism, academic struggle, low achievement, violence, substance abuse, teenage pregnancy, and/or lack of parental guidance to face developmental tasks (Converse & Lignugaris/Kraft, 2009; Keating et al., 2002).

In the school setting, "at-risk" students are frequently understood as those academically underprepared showing low school engagement (Wang & Fredricks, 2014). Research findings and ad hoc reports from school educators warn of the impact of students' exposure to environmental and familial risk factors on the development of learning deficits and educational needs. For example, students facing these hardships are likely to be at risk of school failure and dropout (Jozefowicz-Simbeni, 2008; McDaniel & Yarbrough, 2016). In addition, these students may show a tendency to make impulsive decisions (Mazzotti et al., 2013) and a strong desire for instant gratification, which prevents them from setting long-term goals (Kaufman & Bradby, 1992). Not surprisingly students at-risk of school leaving tend to struggle to adjust their behaviors to social and academic expectations (Mazzotti et al., 2013). In fact, literature

has indicated that students at-risk are likely to display antisocial behaviors (Converse & Lignugaris/Kraft, 2009), show lack of interest towards school (Hirschfield & Gasper, 2011), low commitment with learning and, consequently, display low effort towards school activities (Rosário et al., 2019; Wang et al., 2011).

2.1.2. Mentoring as an Intervention Strategy for Students At-risk of Early Dropout

Mentoring programs have been considered a valuable tool to enhance youth positive development (e.g., Jekielek et al., 2002) and reduce their disruptive and antisocial behaviors (Converse & Lignugaris/Kraft, 2009; Rhodes et al., 2002). For the purposes of the current study, we follow DuBois et al. (2002) and Eby et al. (2008) perspectives on mentoring. Accordingly, mentoring may be understood as a process in which an adult, usually a teacher, provides guidance and support to youth, to help them develop valuable skills in academic (e.g., study strategies) and non-academic areas (e.g., personal problems and relationships). Previous research has shown that mentoring programs are educational interventions particularly fitted to the students at-risk of early school leaving needs and problematic behaviors (Caldarella et al., 2009; Dappen & Isernhagen, 2006; Holt et al., 2008; Komosa-Hawkins, 2012; McDaniel & Yarbrough, 2016).

Mentoring at-risk youth was initially developed to address problems in disadvantaged communities (Keating et al., 2002; Rhodes et al., 1999). Nevertheless, for the last twenty-five years schools have been using mentoring programs to prevent youth problematic behaviors and early school leaving (Dappen & Isernhagen, 2006; Foster, 2001; Rhodes et al., 2002). Reasons are manifold. For instance, pedagogical and organizational reasons, such as: i) reach a high number of students at risk of early school leaving in a safe environment; ii) positive attitude of parents or guardians towards the participation of their children on mentoring interventions occurring in the school; iii) the school environment provides a secure setting likely to encourage volunteers to enroll in mentoring activities; and iv) the support provided by the school setting to better attend diversity and inclusion; but also economic reasons, such as: i) the enrollment of teachers from the school as mentors allows to achieve a more cost-effective mentoring program and ii) the close connections that school-based programs usually have with the local communities favors an effective management and use of the resources available (Dappen & Isernhagen, 2006; Foster, 2001).

Mentoring interventions are expected to set the ground for the development of an empathic bond between mentor and mentee. Mentors are expected to be responsive to the individual needs of their mentees (Lampley & Johnson, 2010), and mentees to be available to receive help and support tailored to their needs (Johnson & Lampley, 2010). Still, many students at-risk of early school leaving struggle to participate in mentoring programs and engage in trusting relationships; which may be related to the

distressed backgrounds and the emotional and behavior challenges they face in their daily living (Grossman & Rhodes, 2002; Higley et al., 2016). To cope with these obstacles, mentors are expected to follow a supportive and caring approach likely to overcome students' sense of apprehension and distrust (Higley et al., 2016), and to establish a meaningful relationship with the mentees (Lindt & Blair, 2017). In fact, as Higley et al. (2016) report, mentors who develop a consistent and positive relationship with their mentees are likely to set an emotionally safe ground to help them explore goals, strengths, and disquiets, while building a strong sense of the self.

In sum, literature stresses the use of mentoring programs as a strategy to promote school success and students' well-being (DuBois et al., 2002, 2011; Eby et al., 2008; McDaniel & Yarbrough, 2016). Data on the impact of mentoring programs for students at-risk of early school leaving are very promising. For example, extant research indicates that at the end of mentoring programs participants showed: higher academic performance (Johnson & Lampley, 2010; Núñez et al., 2013), fewer absences from school (Jekielek et al., 2002), more positive attitudes towards school (Herrera et al., 2011; Jekielek et al., 2002), fewer occurrences of hitting behavior and violence towards others (Jekielek et al., 2002; King et al., 2002), higher self-confidence (Aseltine et al., 2000), higher self-esteem (Kolar & McBride, 2011), and better relationships with school, teachers, peers, and family (Aseltine et al., 2000; Jekielek et al., 2002; King et al., 2002).

2.1.3. Mentoring to Promote Goal Setting Skills Through Self-regulation

International reports (e.g., OECD, 2012) have repeatedly alerted to the various challenges (e.g., adjusting to new learning environments, becoming more autonomous and able to regulate learning) faced by elementary and middle school students as schooling progresses, particularly those at-risk of early school leaving. To face these challenges, extant literature indicates the need to promote students' agency and self-regulated learning (SRL; Rosário et al., 2017) while encouraging them to adopt an active approach to learning (Moeller et al., 2012). SRL may be understood as an active and cyclical process in which students are expected to set goals, and manage behaviors, thoughts, and emotions to attain them (Rosário et al., 2012; Zimmerman, 2008). Students who self-regulate their actions are likely to proactively control their behaviors and manage their cognitive and motivational processes to achieve their goals (Rosário et al., 2016). Furthermore, prior research indicates that students who self-regulate their learning towards goals, generally are engaged in schoolwork, motivated to perform school activities and display efforts to achieve better results (Núñez et al., 2015; Zuffianò et al., 2013). Contrarily, students at-risk of early school dropout are likely to lack SRL competencies (e.g., capacity to manage learning; Bruhn et al., 2016), and the needed support to improve their learning skills autonomously (Carroll et al., 2013;

Johnson & Lampley, 2010; Lampley & Johnson, 2010). To this end, several SRL processes have been receiving the researchers' attention, among which goal setting (Bruhn et al., 2016; Carroll et al., 2013; Chase et al., 2013). Goal setting is considered a key variable in self-regulation (Locke & Latham, 1990, 2002; Schunk, 2003). In fact, goal setting is a complex process requiring the activation of self-regulation skills, such as i) setting a (proximal or distal) goal; ii) defining strategies to support the course of action towards the goal; iii) implementing the selected strategies, and iv) monitoring the progress towards the self-set goal (e.g., Arslan, 2014). Therefore, goal setting is likely to trigger an internal commitment allowing students to increase their effort (Clark et al., 2020; Locke & Latham, 1990, 2002) and enhance their motivation (Schunk, 2003) towards a particular output.

One relevant framework for goal setting is the SMART goal model (Bovend'Eerdt et al., 2009; Doran, 1981). This model consists in an acronym embodying the characteristics that goals should comprise to increase their chance of being accomplished (Lawlor, 2012; Rubin, 2002). S.M.A.R.T. stands for *Specific*, *Measurable*, *Attainable, Realistic/Relevant* and *Time-bound*; goal characteristics that learners need to master and include in the goal setting process (Lawlor, 2012; Werle Lee, 2010). Following the acronym, goals are expected to be *Specific*, being a good description of what is being pursued (e.g., including information regarding who, what, where, and how; Bowman et al., 2015; Lawlor, 2012). Moreover, goals must be *Measurable* to be accomplished, entirely or partially. This characteristic includes the details on how goal completion is measured, allowing students to track their progress towards the end (Bowman et al., 2015; Lawlor, 2012). *Attainable*, indicates that goals should represent a challenge, but still are expected to match students' skills and available resources (Lawlor, 2012). The following letter represents two distinct characteristics: *Realistic* and *Relevant*. The former characteristic indicates that goals should be achievable (Hawkins et al., 2020; Werle Lee, 2010); individuals are expected to anticipate and make efforts to overcome possible constraints to attain goals (e.g., consider what needs to be done and the time needed; adjust their schedule). The letter R also stands for *Relevant.* Goals are expected to be meaningful and focused on the students' needs (Lawlor, 2012). What is more, this attribute is likely to encourage individuals' efforts towards attainment (Werle Lee, 2010). Finally, the last letter stands for Time-bound. This characteristic refers to setting a clear deadline to complete the goal (Hawkins et al., 2020). Having a clear *Time-bound* helps students move towards the goal as well as measure their success within a time frame (Bowman et al., 2015; Hawkins et al., 2020; Werle Lee, 2010). All five characteristics are interrelated and needed for the goal to be SMART (Stonehouse, 2018). In sum, SMART conveys practical and concrete actions to help learners plan and implement clear steps to attain desired outcomes (Aghera et al., 2018; Conzemius & O'Neill, 2009). This goal model has been successfully employed

across multiple disciplines (e.g., medicine, Aghera et al., 2018; health care and rehabilitation, Bowman et al., 2015; education, Muñoz-Olano et al., 2017; sports and physical activity, Swann et al., 2020) and has proven to be helpful in enhancing goal-setting skills (Doran, 1981; Dotson, 2016; Rubin, 2002).

2.2. The Current Study

Literature on goal setting interventions has been showing promising results in mitigating risk factors (Carroll et al., 2013; McDaniel & Besnoy, 2019; Swann et al., 2020), and improving students' academic engagement (e.g., Rowe et al., 2017) and students' outcomes (Lawlor, 2012; Morisano et al., 2010). Still, school-based goal-setting interventions designed to address the needs of students at risk of school leaving are still limited (e.g., Bruhn et al., 2016; Rowe et al., 2017).

Interventions on goal setting may be useful tools to help students improve their commitment with school work, because as Bandura (1977) warns, students who consecutively fail to achieve their goals may become discouraged and abandon the process of setting expectations for the future. Drawing on previous data from mentoring and SMART literatures; the current study set a school-based intervention using mentoring as a tool to train students on the foundations of SMART. These efforts are expected to help students set goals tailored to their abilities and resources (e.g., specific, difficult enough to be challenging, but attainable goals, Cabral-Márquez, 2015; Fried & Slowik, 2004; Locke & Latham, 1990, 2002; Schunk, 2003), and improve students engagement with learning. As Lawlor (2012) warns, students who follow the SMART model while setting their goals, feel confident throughout the process and increase the likelihood of reaching them. Moreover, the feeling of accomplishment resulting from goal attainment may extend students goal setting ability beyond the school context (e.g., home, friendships), allowing students to gain greater control over their behavior, learning and life. In sum, the current study was driven by the theoretical framework of the SMART goal model and supported by the body of literature showing the positive impact of interventions focused on goal setting on at-risk students' behavioral change (e.g., Carroll et al., 2013; Swann et al., 2020). Targeting elementary and middle school students at-risk of school failure, we aimed to analyze the impact of participating in a school-based mentoring program focused on the promotion of goal setting skills through SRL training. Specifically, we examined how students' goals (academic and non-academic) and SMART goal setting processes may change after their enrollment in the mentoring program.

2.3. Contextual Setting

To prevent students at risk of early school leaving the Portuguese Ministry of Education set the educational policy "Specific Mentoring Support" (*Despacho Normativo n.º 4-A/2016*, 2016). This universal

educational policy was focused on supporting elementary and middle students struggling to learn with learning competencies to help them overcome school failure, and hopefully maintain their enrollment in school. All students in the Portuguese public schools fitting inclusion criteria (see below) were expected to benefit from mentoring support throughout the school year.

The present study was conducted in a public school located in a rural school district in the north of Portugal. The reason for the selection of this school was their high number of students: (i) from disadvantaged backgrounds, (ii) showing academic difficulties, and (iii) experiencing academic failure (e.g., school retentions) throughout their school path. In other words, the school selected allowed to reach a pool of elementary and middle school students at-risk of school leaving and dropout.

2.4. Method

2.4.1. Participants

The sample recruitment and selection process followed Robinson's (2014) four-point approach to qualitative sampling. Therefore, the sample universe was defined by the inclusion and exclusion criteria (step 1). Eligibility requirements set by the 'Specific Mentoring Support' policy to enroll in mentoring support were as follows: i) students from the 5th to the 9th grade with two or more school retentions; ii) students showing academic behaviors and school records below the school expectations (e.g., needing help to develop study habits and work routines); and iii) students in need of support to develop personal and social skills (e.g., emotional self-regulation, communication and interrelationship skills) needed to cope with school educational challenges and demands.

The sample size fitted the case study methodology requirements (step 2), and the recruitment process followed the convenience sampling technique (step 3). The school enrolled helped in the process of sample sourcing (step 4), by identifying students meeting eligibility requirements, establishing contacts with students' families (i.e., parents or caregivers) and providing information about the study (e.g., informed consent). No financial rewards or incentives were delivered to the school or to the participants for enrolling in this study.

Forty-nine students met the educational policy's criteria and were invited to participate in the program. From these, twenty-seven families filled in informed consents agreeing on their children's participation (response rate of 55.1%). Throughout the intervention process, 13 students (48.1% of the 27 students enrolled in the program) left the program due to reasons, such as: family reallocated in distant neighborhoods, prolonged disease, and changes in parental consent. Finally, 14 elementary and middle school students (51.9% of the 27 students enrolled initially in the program; M_{age} = 15; SD = 1.60,

ranging from 12 and 17) participated in all sessions of the program and filled in the required data at the four time points (pre- and post-program). All the families of these students were from low socioeconomic backgrounds, and therefore all students were receiving free lunch, as reported in schools' office data. Table 1 presents descriptive information about students (cases).

Table 1 - Descriptive information about the cases

Students	*Gender*	*Age*	*Grade Level*	*Retentions*
Case 1	M	12	5th grade	2
Case 2	M	13	6th grade	2
Case 3	F	13	6th grade	2
Case 4	F	14	7th grade	2
Case 5	M	14	7th grade	2
Case 6	M	14	7th grade	2
Case 7	M	15	7th grade	3
Case 8	F	17	8th grade	3
Case 9	M	16	8th grade	3
Case 10	M	16	9th grade	2
Case 11	M	17	9th grade	3
Case 12	F	17	9th grade	3
Case 13	F	17	9th grade	2
Case 14	F	16	9th grade	2

2.4.2. Procedures

A mentoring intervention was conducted along two school terms (i.e., six months, 20 weekly sessions) with elementary and middle school students at-risk of early school leaving. The 45-minutes weekly sessions were included into the students' schedule as an extra learning support activity. For the purposes of the current study, a maximum of four students were assigned to each mentor. Finally, four mentoring groups were created to accommodate the 14 participants (i.e., two groups were made up of four elements and the other two of three elements). Students were grouped with counterparts in the same or in the following grade level. The two groups of four elements were composed by students from the 7th and 9th grades, respectively, while one of the groups of three elements was composed of 5th and 6th graders (one and two, respectively), and the other of 8th and 9th graders (two and one, respectively). The four mentors completed a training course in mentoring (5 three-hour sessions) prior to the beginning of the program and received ongoing supervision (seven monthly sessions of 90 minutes length) delivered by the first and the last authors throughout the implementation of the program.

To ensure the trustworthiness of the intervention, the 20 sessions of the program were scripted in a detailed protocol conveyed to the mentors (see annex 1 for an example of a session's protocol). This protocol encompasses sessions' goals, strategies to approach with mentees, examples of questions to introduce and explore the topics, activities to perform within the session, and the support materials (e.g., story-tools, videos, comics) for each session. Additionally, at the end of each session, mentors were asked to score their adherence to the protocol on a 23-item rating scale adapted from (Green et al., 2021) and to fill in a session record sheet reporting data on the session (e.g., ad hoc comments of the mentees, aspects in need to be (re)addressed in the following session and reasons why; topics or examples that captured mentees attention) and on their mentees' goal for the week. The record sheets were built to help monitor mentors' protocol adherence and to assess the fidelity of content (Mowbray et al., 2003). The overall fidelity to protocol ranged from 85% to 95% across sessions for the four groups.

2.4.3. Mentoring Program Structure

The present mentoring program was designed to promote SMART goal setting processes through the training of SRL strategies (e.g., strategic planning, self-monitoring, self-reflection) likely to help them assume an agent role in their learning process (Doran, 1981). Following the SRL literature and acknowledging ad hoc teachers reports on their educational practices with at-risk students, the 20 weekly sessions of the mentoring program addressed six SRL strategies (i.e., goal setting and planning, environment structuring, take notes and monitoring, rehearsing and memorizing, seeking help/assistance, and self-evaluating) out of the 14 presented by Zimmerman and Martinez-Pons (1986). The first session introduced the program and set the foundations for the mentor-mentee relationship. The following 18 sessions were organized to help students learn and train the six SRL strategies selected (three sessions for each strategy). Finally, the last session was dedicated to make an overview of the lessons learned throughout the program, and to build take-home messages. In the protocol for each session (except for the first), mentors were instructed to promote the application of this set of strategies to several educational situations, such as: classroom context, individual study, and completion of assignments (e.g., homework). However, mentors were encouraged to adjust the examples suggested or further elaborate on the topics discussed to meet their mentees needs.

Goal setting, despite being specifically addressed in three sessions, as the remaining strategies, was also trained throughout the program as a transversal strategy. For example, at the end of each session, students worked with mentors to set a SMART goal likely to guide their academic efforts for the following week. The students' process to achieve the goal (e.g., strategies to overcome academic

procrastination or hardships) as well as the outputs reached were analyzed and discussed at the beginning of each session.

2.4.4. Measures

Life maps were used to encourage students to represent their life goals and aspirations before and after implementing the mentoring program. This method was adapted from previous studies (e.g., Bagnoli, 2009; Thomson & Holland, 2002), as a visual research method to facilitate verbal expression while providing students with a schematic perspective of their future journey (Worth, 2011).

For the purpose of this study, life maps diagrams were partnered with a structured script of open-ended questions focused on exploring students' academic and non-academic goals and aspirations considering three time-bounds (one year, three years, and five years). Data were gathered regarding students plans to accomplish goals, and their perceived likelihood of attaining each goal. Sample questions from the script include: "What do you want to achieve in your life in one/three/five year(s)?", "How likely are you to accomplish this goal in one/three/five year(s)? Why?".

2.4.5. Data Analysis

Aiming to capture relevant information from data, NVivo 10 software was used to assist data analysis (Bazeley, 2006). Following Hsieh and Shannon (2005) a directed content analysis was performed. Participants statements (goals) were coded in a deductive flow, using the domain (i.e., academic and non-academic) and the SMART framework (i.e., Specific, Measurable, Attainable, Realistic and Time-bound) according to the codebook (see annex 2). Data patterns were explored between and within cases, using software tools to search through the data. Concretely, cluster analysis technique and queries (e.g., matrix coding query) were used to explore and identify the patterning of linkages (Bazeley, 2006). Students' demographic data (i.e., age and educational level) were considered as attributes in the analysis. The number of references and the number of cases were considered to summarize patterns in data. The frequency of occurrence of each category was described according to the Cooper and Rodgers's (2006) scoring scheme: 'All' = 100%, 'nearly all' = 100% - 2 participants, 'most' = 50%+1 to 100%-2, 'around half' = 50%+1 participants, 'some' = 3 to 50%+1 participants, 'a couple' = 2 participants, and 'one' = one participant.

To ensure the reliability of findings (Lincoln & Guba, 1985), the full content of students' goals in both pre and post moments were coded by two researchers independently. Later, the two researchers discussed the differences found so that they could reach a consensus. The consistency of coding was assessed by Cohen's kappa coefficient; kappa coefficient was .91, which is considered very good

according to Landis and Koch (1977). To illustrate data captured, support discussion points, and to add validity to results, verbatim quotes of students reported goals were included.

2.5. Results

Students' goals were analyzed to match this study purpose. Therefore, this section presents an overview of the variations in the number and domain (i.e., academic, non-academic) of the goals set by students for the three time-bounds, followed by the presentation of the two clusters resulting from the cluster analysis run. Findings regarding each cluster are presented in two separated subsections, each reporting the number and domain of the goals for each time-bound and analyzing the integration of SMART characteristics from pre to posttest. The differences and similarities within participant's goals across clusters and time-bounds are also highlighted.

2.5.1. Students' Goals Overview

From pre to posttest, we found a slight increase in the number of reported academic goals (i.e., from 16 to 19), and a decrease of non-academic goals (i.e., from 27 to 22). A more nuanced analysis comparing the three time-bounds revealed differences in the number of academic and non-academic goals set across time. Specifically, in both moments (pre and posttest) we found a decreasing tendency in the number of academic goals set, with students establishing fewer academic goals as the distance to the time-bound increased (e.g., from 9 goals [one year], 4 goals [three years] and 3 goals [five years] in the pretest; to 11 goals [one year], 7 goals [three years] and 1 goal [five years] in the posttest). Congruently, the opposite trend was found for non-academic goals in both data collection moments. Globally, for the more proximal time-bound, students reported a lower number (8 pre and 3 posttest) of non-academic goals (e.g., personal or family goals) when compared to those set in the more distant time-bounds (11 pre and 10 posttest goals). In sum, findings show that, at the end of the program, most students reported more academic goals for the nearest time-bound and more non-academic goals for the further time-bound.

When exploring patterns across cases, the cluster analysis technique allowed to identify two clusters based on coding similarity (see Figure 5). The first cluster grouped 10 students at-risk of school leaving (7 boys and 3 girls), with ages ranging between 12 and 16 years old, enrolled in elementary and middle school years (5th to 9th grade). The second cluster grouped 4 students at-risk of school leaving (3 girls and 1 boy) all with 17 years old and enrolled in middle school years (8th and 9th grade). Age emerged as the potential segmentation variable. Results are presented below layered by clusters.

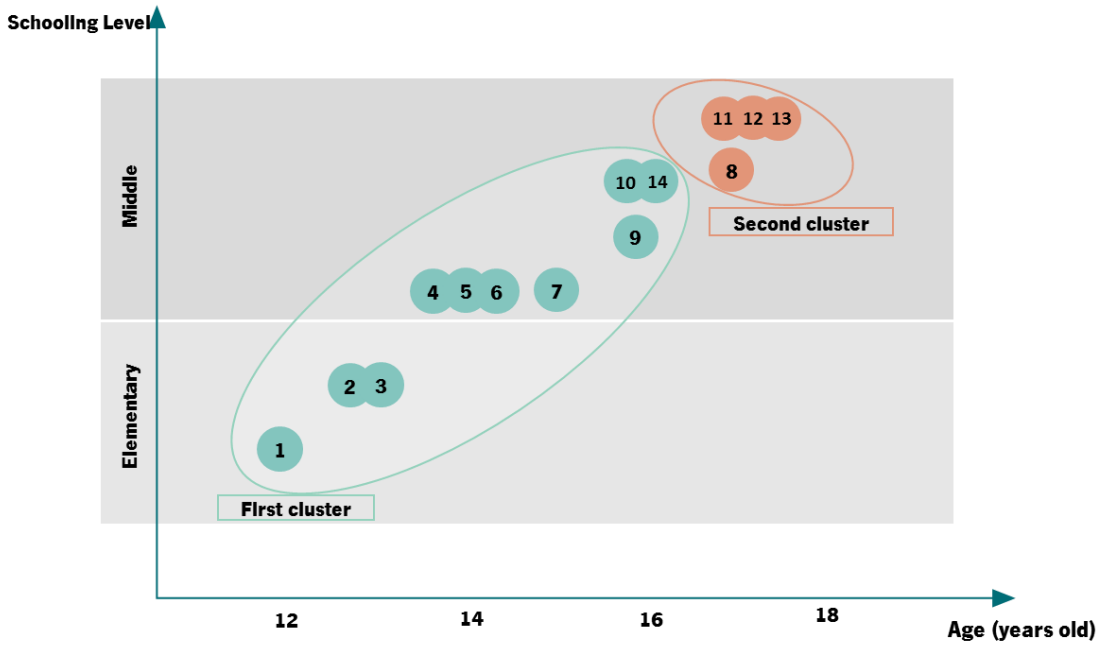

Figure 5 - Cluster diagram. Cases clustered by coding similarity.

Note: First cluster, 10 at-risk students; aged between 12 and 16 years old; enrolled in compulsory school, more specifically, 5th to 9th grade. Second cluster: 4 at-risk students; with 17 years old; enrolled in 8th and 9th grade.

2.5.2. First Cluster Data

Regarding the first time-bound, data indicate that students tend to set more academic goals at the end of the mentoring program (posttest). The following example illustrates this finding by presenting the goals set by Case 6 at pre (non-academic goal) and posttest (academic goal).

"[In 1 year, with 15 years old] *my goal is to take the motorbike driver's license" (Case 6, 14 years-old, pretest)*

"[In 1 year, with 15 years old] *my goal is to continue studying, be in 8th grade" (Case 6, 14 years-old, posttest)*

In fact, students seem to have slightly changed the domain of the goals set for the future, with academic goals assuming a more prominent role at the end of the program. Concretely, the academic nature of the goals set by students in the posttest may suggest their increased awareness of the relevance of finishing compulsory education to get a professionalizing degree and to learn the skills needed for job success, as the following cases illustrate.

"[In 1 year, with 17 years old] *my goal is to be in high school enrolled in the visual arts course." (Case 14, 16 years-old, posttest)*

"[In 1 year, with 15 years old] *my goal is to be enrolled in the first year of a hairdressing professional course* [professionalizing degree] *" (Case 4, 14 years-old, posttest)*

Still, it is important to note that this tendency to set more academic goals in the posttest was more perceptible in the first time-bound. Regarding the three-year time-bound, we found similar variations in the domain of students' goals, with some students shifting some non-academic goals to academic ones from pre to posttest, as Case 10 illustrates

"[In 3 years, with 19 years old] *my goal is to keep playing in my football team." (Case 10, 16 years-old, pretest)*

"[In 3 years, with 19 years old] *my goal is to complete the professional sports coach course* [professionalizing degree]." *(Case 10, 16 years-old, posttest)*

Nevertheless, at the posttest the number of academic and non-academic goals was balanced. Interestingly, some students showed interest and intention to maintain their school enrollment (e.g., in high school), while others reported to be more focused on pursuing other personal or professional achievements.

"[In 3 years, with 16 years old] *my goal is to be enrolled in the 10th grade of high school" (Case 2, 16 years-old, posttest)*

"[In 3 years, with 16 years old] *my goal is to be national taekwondo champion" (Case 1, 13 years-old, posttest).*

[In 3 years, with 19 years old] *my goal is to get a part-time job". (Case 9, 16 years-old, posttest)*

While considering the five-year time-bound, students' goals in pre and posttest were exclusively non-academic, as the following example illustrates.

"[In 5 years, with 19 years old] *my goal is to work in McDonalds to start earning my own salary" (Case 6, 14 years-old, pretest)*

"[In 5 years, with 19 years old] *my goal is to take the driver's license" (Case 6, 14 years-old, posttest)*

At this time-bound most students will have reached adulthood and see themselves outside the compulsory education. Goals like get a driver's license, play and win medals or trophies in sports competitions (e.g., football, kickboxing, taekwondo) or get a job (e.g., personal trainer, hairdresser, house builder) were shared by most of the students grouped in the first cluster.

"[In 5 years, with 21 years old] *my goal is to get a job to support my own needs" (Case 9, 16 years-old, posttest)*

"[In 5 years, with 21 years old] *my goal is to be part of a professional football team" (Case 10, 16 years-old, posttest)*

"[In 5 years, with 20 years old] *my goal is to work in civil construction" (Case 7, 15 years-old, posttest*)

The analysis of the SMART characteristics of the goals set by students grouped in the first cluster showed differences in the academic domain, when compared across both data collection moments (note that these students only set academic goals in the first two time-bounds). Regarding non-academic goals, no meaningful differences were found across data collection moments. For this reason, only the analyses on the academic goals are presented below.

Specific

When comparing the goals set across both data collection moments, there is a significant increase in the number of goals codified as *specific* (from 7 to 12). Moreover, around half students set non-specific goals in the pretest, while nearly all participants set specific goals in the posttest, as the following example illustrates.

"[In 1 year, with 17 years old] *my goal is to get a professionalizing course" (Case 10, 16 years-old, pretest)*

"[In 1 year, with 17 years old] *my goal is to enter the professional sports coach course* [professionalizing degree]*." (Case 10, 16 years-old, posttest)*

Measurable

The number of goals codified under this characteristic slightly increased from pre to posttest (from 7 to 11). Despite globally this difference could be understood as non-expressive, an intra-case analysis revealed that a couple of cases considered this characteristic in their academic goals in posttest. For example, *Case 2* set a non-measurable goal at pretest but a measurable one at posttest.

"[In 1 year, with 14 years-old] *my goal is to study and advance to the next school year." (Case 2, 13 years-old, pretest)*

"[In 1 year, with 14 years-old] *my goal is to be enrolled in the 7th grade." (Case 2, 13 years-old, posttest)*

Attainable

No differences were found in the number of goals set by students at both moments, considering the likelihood of attaining each goal. However, a detailed analysis shows that some students increased the likelihood assigned to their goals from 'likely' in the pretest to 'highly likely' in the posttest, as the following example illustrates.

"[In 1 year, with 15 years-old] *my goal is to study and advance to the 8th grade."* [The likelihood of achieving this goal is] *"50%, because my grades are improving." (Case 4, 14 years-old, pretest)*

"[In 1 year, with 15 years-old] *my goal is to be enrolled in the first year of a hairdressing professional course*. [The likelihood of achieving this goal is] *"100%, because I will move to another school to enroll in that course." (Case 4, 14 years-old, posttest)*

Realistic

The number of goals codified as *realistic* increased substantially (i.e., from 7 to 15) from pre to posttest. A similar increase was found regarding the number of cases, with around half of the students setting *realistic* goals in pretest, while all students set *realistic* goals at posttest. The following case illustrates this difference.

"[In 3 years, with 16 years-old] *my goal is to be a good student".* [The likelihood of achieving this goal is] *"80%, because every year I try more" (Case 3, 13 years-old, pretest)*

"[In 3 years, with 16 years-old] *my goal is to pass the 9th grade exams."* [The likelihood of achieving this goal is] *"90%, because to pass the exams I have to be focused on studying." (Case 3, 13 years-old, posttest)*

Time-bound

Students were asked to set goals for three time-bounds; these goals were coded as "*possible"* whenever it was possible to the students achieving the goals at that time-bound (i.e., the goal set was possible to be attained considering students age and school level). Data showed that no meaningful differences were found in the number of cases and goals codified as "*possible*" across data collection moments. Comparing across cases, we found that most of the students set *possible* goals in the pretest while all the participants included this characteristic in the goals set in the posttest.

For example, *Case 14*, a student enrolled in the 9th grade set the following goal in the pretest:

"[In 3 years, with 19 years-old] *my goal is to get in higher education to study a Cinema course". (Case 14, 16 years-old, pretest)*

This student three years later would be in the 12th grade in case of no school retentions. Therefore, this goal was coded as non-possible. The following goal set by *Case 5*, in posttest, illustrates a *possible* goal:

"[In 1 year, with 16 years-old] *my goal is to be enrolled in a professional course." (Case 5, 15 years-old, posttest)*

2.5.3. Second Cluster Data

The goals set by the four students grouped in the second cluster prior to and at the end of the program, were exclusively non-academic for the three time-bounds, which may suggest their lack of interest to be engaged in school in the following years. When compared with their younger counterparts in the first

cluster, these students have a longer school trajectory marked by academic failure and grade retention and did not seem to perceive school as an option for their future. Consistently, their goals are focused, essentially, on personal, professional, and familiar aspects, as the following examples of the *Case 12* (pre and posttest) illustrate.

"[In 1 year, with 18 years old] *my goal is to get a driver's license." (Case 12, 17 years-old, pretest).*

"[In 1 year, with 18 years old] *my goal is to have my own car." (Case 12, 17 years-old, posttest).*

"[In 3 years, with 20 years old] *my goal is to travel to New York." (Case 12, 17 years-old, pretest)*

"[In 3 years, with 20 years old] *my goal is to be working in a clothing store." (Case 12, 17 years-old, pretest)*

"[In 3 years, with 20 years old] *my goal is to be working" (Case 12, 17 years-old, posttest)*

"[In 5 years, with 22 years old] *my goal is to work and live with my boyfriend/husband." (Case 12, 17 years-old, pretest)*

"[In 5 years, with 22 years old] *my goal is to live with my boyfriend/husband." (Case 12, 17 years-old, posttest)*

Within this cluster, when comparing goals across data collection moments, no meaningful differences were found regarding SMART characteristics. In other words, the characteristics found in goals set in the pretest were similar to those found in the posttest as the following example focused on the characteristic *specific* illustrates.

"[In 1 year, with 18 years old] *my goal is to get driver's license and have a car" (Case 13, 17 years-old, pretest)*

"[In 1 year, with 18 years old] *my goal is to get driver's license and have my own car" (Case 13, 17 years-old, posttest)*

2.6. Discussion

Grounded on prior research advocating for the inclusion of goal setting in interventions targeting behavioral change (e.g., Carroll et al., 2013; Swann et al., 2020), the current study developed a school-based mentoring program focused on promoting SMART goal setting through the training of SRL with students at-risk of school failure. Students' goals in both data collection moments (pre and post intervention) were analyzed considering the number and domain (i.e., academic or non-academic), and the SMART characteristics included.

Current findings indicate that the mentoring program contributed to changes in number and domain of the students' goals. Concretely, at the end of the program, most students increased their

number of academic goals, which might suggest their intention to keep their enrollment in school in the following years. These general results are consistent with previous research on mentoring and goal setting highlighting school-based mentoring and goal setting instruction as effective methods to improve students' positive attitudes toward school (Herrera et al., 2011; Portwood et al., 2005). For example, extant literature indicates that effective goal setting may encourage students to focus on specific and relevant ongoing outcomes which may help them deal with future challenges and achieve their goals (Nordengren, 2019; Stronge & Grant, 2009). Consistent with this proposition, at the end of the program, most of the participating students seemed to be more aware of their present academic situation and of what they need to do to develop the skills required to face future academic and professional challenges. However, and as Nordengren (2019) warns, not all students perceive goals and their relevance in life in a similar way. Current findings are in line with this statement while reporting that not all participants evidenced changes in their goals considering number and domain nor reported goals stating their willingness to maintain their engagement in school in their near future. In fact, at the end of the program, meaningful changes in the number and domain of the goals set were only found in the first cluster (i.e., 12 through 16 years-old students). However, goals stressing first cluster students' intention for staying enrolled in school seem to be limited to the first two time-bounds (i.e., one and three years), which correspond to the time needed by most of these students to complete compulsory education or reach adulthood. When considering the five-year time-bound data on the pool of goals set shows a focus on personal and professional achievements. We did not find academic goals within this time-bound.

Interestingly, the latter pattern was also evidenced in the goals set by the students in the second cluster (i.e., 17 years-old students) in the three time-bounds (note that in the first time-bound these students would be reaching adulthood). In fact, all their goals were focused on personal and professional accomplishments non-related with school. Altogether, current findings suggest that participating students (first and second cluster) struggling to learn and at risk of school dropout hold instrumental perspectives on the value of being enrolled in school until the end of compulsory education or reaching the age of majority (both occurring at 18 years-old). In other words, these students seem to be understanding school enrollment as a required condition that, after conclusion, will allow them to pursue and achieve life' goals other than academic ones. In fact, reaching adulthood was a frequent and subtle reference underlying the goals set by students from the two clusters at both moments of data collection. Adulthood seems to be a relevant milestone in these students' lives, representing the end of their obligation to attend school and, simultaneously, the beginning of a new phase of their lives, in which they have legal control over

their actions (e.g., vote, get a job; Hill et al., 2011; Kover & Worrell, 2010; Salmela-Aro, 2009; Salmela-Aro et al., 2007).

In sum, global data encompassing the whole sample indicates an increase of the number of the academic goals set at the end of the program when comparing with those set prior at the beginning of the program. Still, a granular analysis focused on the goals set by the participants in the two clusters revealed a distinct picture. Younger participants (first cluster) set academic goals addressing progression in schooling until complete compulsory education or until reaching adulthood while their older counterparts (second cluster) with ages proximal to the end of the required age of school attendance (18 years old) set goals of a non-academic nature. These distinct data, according to the lens used, suggest the need to consider analyzing data not as a whole but rather using granular layers to capture the nuances of the goal setting process (Bazeley, 2006; Hsieh & Shannon, 2005).

The use of three time-bounds (i.e., one, three and five years) to explore students' goals showed to be relevant for the purposes of the current study. These predefined time-bounds allowed to help students prospecting themselves in a short, medium and long term (Thomson & Holland, 2002; Worth, 2011) while reflecting upon the relevance of time when thinking about (or planning) their future (Thomson & Holland, 2002). What is more, these three time-bounds allowed to compare students' goals and analyze inter- and intra-case differences between data collection moments.

Regarding SMART goal setting, results indicate that, at the end of the program, students from the first cluster integrated SMART characteristics in their academic goals, but not in non-academic goals; whereas students in the second cluster did not show evidence of meaningful changes in the goal setting characteristics. The academic focus of the program (e.g., use of school-related examples to discuss the foundations of SMART goal setting and SRL), may help to explain these findings. In fact, the program addresses SMART goal setting through the training on a set of SRL strategies (e.g., environment structuring); moreover, mentors were purposefully trained to help students understand and apply those strategies in diverse academic settings (e.g., in class, during individual study and while completing school assignments). Therefore, students in the first cluster could have included SMART characteristics in their academic goals because of their training in setting academic goals during the mentoring sessions, but also due to their focus on progressing in school expressed in the goals set for the first two time-bounds. Consistent with literature (Kover & Worrell, 2010; Miller et al., 1999; Salmela-Aro et al., 2007), students may have understood the instrumentality of SMART for their school purposes, which may help explain findings. Interestingly, these same students did not include SMART characteristics in their non-academic goals; reasons may be manifold. For example, students may i) find that SMART characteristics are to be

used only in school-related achievements, because these characteristics were learned in a school-based intervention; ii) find irrelevant to apply SMART characteristics to non-academic goals; or iii) lack information on how to transfer the goal setting contents acquired in the program to set non-academic goals (e.g., familiar, professional). This intriguing finding suggests the need to redesign the program to include examples of non-academic goals, and also opportunities to help students transfer the knowledge acquired to contexts other than school.

Altogether, current results support prior research advocating the development of school-based interventions (e.g., mentoring programs) to mitigate students' risk factors (McDaniel & Besnoy, 2019; Swann et al., 2020); but also corroborates Rowe et al. (2017) warnings on the importance of acknowledging the individual characteristics and needs of the students at-risk of school leaving (e.g., educational needs, expectations) likely to prevent them from engaging in the school-based programs and progress. As we found, students' age at the time of their enrollment in the mentoring program emerged as an important characteristic that should be taken in consideration when setting interventions with students at-risk of school leaving. For example, students in the second cluster whose age was near adulthood (i.e., 17 years-old) reported goals and life plans exclusively centered on personal and professional achievements and did not use the SMART characteristics trained throughout the intervention. In fact, students' misfit age indicating the cumulative academic failure experiences may negatively affect students learning development (Rimm-Kaufman et al., 2015), and willingness to display efforts to invest in learning (e.g., Rimm-Kaufman et al., 2015; Wang et al., 2011; Wang & Holcombe, 2010). All considered, current data support extant research (e.g., Hirschfield & Gasper, 2011) while advocating the need to set interventions with students at risk of school failure and dropout the sooner the better. Prior research (e.g., Holt et al., 2008; Yazzie-Mintz, 2007) found that at-risk students' school engagement start declining during elementary school years, decreasing as students grow older and the required age of school attendance approaches (i.e., 18 years old). In fact, students struggling to learn and experiencing school failure as schooling progresses are expected to show low engagement in school activities (e.g., Li & Lerner, 2011) and the prospects of these students to aspire future achievements outside of school increases (Hirschfield & Gasper, 2011; Rimm-Kaufman et al., 2015; Wang & Fredricks, 2014).

2.7. Limitations and Future Research

Along with the contributions of the present study, there are some limitations to be acknowledged. First, a small sample of students at-risk of early school leaving (and mentor-teachers), participated in all the sessions of the mentoring program. However, current figures are still higher than those of the national reports on the educational policy implementation. Data from the Portuguese ministry of education (IGEC,

2018) show that 12% of the students at risk of early school dropout never attended a mentoring session, and 39% dropped-out without attending 50% of the sessions. Note that there are no official data regarding the number of students who participated in all sessions, but anecdotal evidence provided by the corpus of educational inspectors who accessed the efficacy of this policy in the schools indicate that approximately 19% attended all the sessions. Still, current results should be taken as exploratory. Future studies could consider enrolling a larger sample while expanding the present study to schools from distinct geographic areas aiming to reach larger samples of students at-risk of early school leaving, with different school and life experiences.

Moreover, in the current study, all students were asked to set goals for three time-bounds (i.e., one, three and five years). As discussed, these time-windows were helpful to compare students' goals and learn inter- and intra-case differences between pre and post moments; still, we wonder whether the outputs of the goal setting process (e.g., content and nature of students' goals; inclusion of SMART characteristics in students' goal) could have been distinct if students could select the time-bounds for their goals. Future studies could consider allowing students to choose the time-bounds fitted to their goals; these data are expected to provide further understanding of the students at risk goal setting processes.

Furthermore, and unfortunately, we did not compare the results of these students with those of counterparts in a control group. For this reason, we cannot be sure that our sample of students would perceive school differently, have more academic goals or perform better in SMART goal setting than students in the potential control group. Students enrolled in mentoring programs have the opportunity to learn and practice academic and non-academic skills while reflecting upon their future, with the help of a mentor. However, the mentoring experience does not always translate into change. For example, some students, while mentees, might consider the content of mentoring sessions irrelevant for their life and, therefore, do not engage. On the other hand, students might engage in mentoring sessions, learn, or improve some skills (e.g., relational, goal setting skills) and, still, have difficulties to apply and transfer those skills to other contexts (e.g., professional contexts and relationships). Additionally, students and mentors' engagement in the sessions might also be valuable variables to help explain distinct outputs. Thus, future research should consider including both experimental and control groups while assessing the use and transfer of the skills trained in the mentoring program to contexts other than school; and students' and mentors' engagement in the sessions to learn the role of this variable in students' goal setting process.

Finally, it is also worth noting that data collection was exclusively focused on students' self-reported goals. To further understand "at-risk" students' experiences resulting from home and school

interactions, future studies could consider gathering mentors and school records, but also family reports on their children's goals.

2.8. Practical and Educational Implications

Even considering the above mentioned limitations, the results of this study highlight some educational implications for designing school-based mentoring interventions focused on goal setting. The implementation of the current school-based mentoring program highlighted two aspects that merit researchers' attention: mentors' lack of experience in mentoring and the need to address the individual characteristics and needs of the students (e.g., educational needs, expectations). Due to the novelty of the "Specific Mentoring Support" Portuguese policy, all the teachers enrolled in delivering mentoring activities were facing the challenge of being a mentor for the first time. In the training sessions, all reported feeling discomfort being a mentor of students at risk of early dropout due to their lack of experience. Thus, to help teachers in their role as mentor and support their practices toward achieving the program goals, the training and the monitoring sessions throughout the duration of the program were crucial (e.g., Ambrosetti, 2014; Darling-Hammond, 2006). In fact, a positive atmosphere was created during the monitoring sessions allowing mentors to express their feelings and concerns as well as to share and discuss their mentor experiences with other mentors and supervisors. However, despite being relevant, the training and support provided may be insufficient to ensure the success of the mentoring program. As literature (e.g., Larose, 2013; Lejonberg & Christophersen, 2015) indicates mentor-related variables should be acknowledged. For example, mentors' relational skills, affective commitment to the mentor role, self-efficacy, and willingness to invest time and effort in the unpredictable mentoring process, are variables extremely important that could largely influence the quality and effectiveness of mentoring interventions. For this reason, these variables should be considered when recruiting mentors and performing "mentor-mentee matches".

As previously mentioned, the individual characteristics and needs of students at-risk of school dropout (e.g., educational needs, expectations) should also be considered when implementing mentoring programs (Rowe et al., 2017). Due to the diverse characteristics and problems above mentioned regarding the definitions of "at-risk students" presented in the literature (e.g., Converse & Lignugaris/Kraft, 2009; Keating et al., 2002), the samples collected are, usually, heterogeneous. This means that students may share some aspects, that provides them the "at-risk" status (e.g., grade retention track-record, a vulnerable background, and emotional or behavioral problems), but may also be dissimilar from their counterparts on aspects, such as nearness-to-adulthood, interests, expectations, and future aspirations. For this reason, and despite the careful planning of the mentoring sessions and the

flexible approach recommended when implementing mentoring programs, within an 'one size fits all' approach, some activities might not be meaningful or particularly fitted to all students' needs, experiences, and expectations. For example, in the current study, older students (second cluster), when compared to younger students (first cluster), may have not recognize in a similar way the instrumentality of the activities and strategies developed in the sessions; or comprehend how useful these activities might be in the future (especially for those aiming to leave school after turning 18 years old), and may not identify themselves with their school peers (typically younger students), which could prevent them from engaging in school-related initiatives. This lack of willingness to participate and cooperate with school could have a detrimental impact in students' motivation and engagement in school activities, and consequently, in their personal development (Caldarella et al., 2009; Rowe et al., 2017).

Finally, current data provide support to the need of extending the goal setting practices to the school curriculum. Due to the importance of this strategy in the quality of the learning process, goal setting should be transversely addressed as a key learning strategy (Nordengren, 2019), being embedded by teachers in the different subjects of the curriculum (Rowe et al., 2017). In fact, as reported by prior research (e.g., Nordengren, 2019; Núñez et al., 2013), goal setting is more likely to be successful when students integrate this strategy in their daily living, connecting learning with personal development.

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2.10. Annex 1.

Example of a session protocol

Session goal: Introduction to strategic planning

Introduction (10 minutes)

- Previous organizer.

Mentors start the session by asking students about the topic(s) covered in the previous sessions, aiming to help students remember previous activities and contents acquired.

[Examples of questions:

- So, do you remember what we talked about in the previous session? What was the activity performed? What was the story about? Who was the main character? What did we learn? Can you clarify your thoughts? According to the narrative, why can planning be an important tool?]

Development (25 minutes)

- Reading and exploring the narrative "The stones and the bottle" *.

All students should be encouraged to participate in the reading. Parts of the story may be distributed to all elements of the group, including the mentor. After reading, the mentor should emphasize specific excerpts or dialogues (e.g., re-reading with intonation and vivacity) to help students understand the narrative and the underlying messages. In some cases, image analysis may also be useful for students with reading difficulties or with a low vocabulary.

- Activity of consolidation: Discussion of the narrative content

Mentors are expected to organize students' discussion and reflection through purposeful questioning. When appropriate, mentors could exemplify the activity proposed and provide personal examples to model students' participation and engagement in the activities

[Examples of questions for mentors' use while performing the activity:

- Now it is time to think about what happened in the narrative plot and fill in this form to help *Testas* (main character) in his homework. As *Testas*, let us imagine what this bottle represents in your life...
- What goes into the bottle first? [The big stones, ok]. Why?
- Now, please think about your life. What comes first for you; stones, gravel, sand, water? (e.g., family, parents, friends, school, sports)
- And the gravel, that is, the smallest stones, what does it represent in your life? And the sand? And the water? (e.g., school, study, goals, my behaviors, cell phone, sports)
- What would happen if we fill the bottle with gravel, sand and water, leaving the big stones to the end?]

Conclusion/ Closing note (10 minutes)

- Take-home message

Mentors should discuss with students about their conclusions on the topics discussed, while promoting the transference of the contents acquired to their own learning and life contexts. Lastly, each student is invited to write a take-home message. This message starts with "Today I learned...".

Example: "Today I learned that in my life there are more and less important things, but in the right order, there is a place for everything."

- SMART Goal for the week

[The session ends with students setting a SMART goal for the week.]

Each student fulfils a form with two main questions:

- My goal for the following week is ...
- To achieve my goal, I will/ need to...

* https://www.youtube.com/watch?v=cPgMeKfQFq8&ab_channel=MindfulPractices

2.11. Annex 2

Codebook

Codebook

Category	Subcategory	Description
Domain	Academic	Goals related to students' educational path (e.g., finishing high school, getting a school degree), school success (advance to the next school year), academic achievement, academic tasks (e.g., finishing math homework) and learning.
	Non-academic	Goals related to life achievements (e.g., buy a house or a car, travel), transversal competencies (e.g., get the driving license), and family goals (e.g., get married, have children).
SMART goals' characteristics	*Specific*	Goals are coded as *specific* when defining exactly what is being pursued (i.e., clearly present what students' want to achieve with details, e.g., how and where). Goals are coded as *non-specific* when students present what they want to achieve without providing any specific detail on how they are going to attain those self-set goals.
	Measurable	Goals are coded as *measurable* when including a measure (e.g., frequency or duration) to track students' progress toward goals accomplishment. Goals are coded as non-*measurable* when they do not present any measure to track the progress.
	Attainable	Goals are coded as *attainable* (or not) according to the probability (from 0 to 100%) assigned by students to accomplish each goal. Unlikely (*not attainable*): The likelihood of achieving the goal ranging from 1% to 49%. Likely (*attainable*): The likelihood of achieving the goal ranging from 50% to 89%. Highly likely (*attainable*): The likelihood of achieving the goal ranging from 90% to 100%.
	Realistic	Goals are coded as *realistic* when students' justifications for considering their goals attainable (i.e., the probability assigned to attain each goal) include what they need to do, possible constraints and schedule time to work on the goal. Goals are coded as *non-realistic* when students do not present possible constraints, or the time needed to work on the goals.
	Time-bound	Goals are coded as *possible* when are tangible considering students' school level and/or students' age at the time-bound defined (i.e., when students' school level and/or age do not prevent goal accomplishment) For example, for a student currently enrolled in the eighth grade, the following goal "Next year, I will be in the 9th grade" is coded as possible. Goals are coded as *non-possible* when students' school level and/or students' age at the time-bound defined for the goal do not allow students to accomplish them. For example, "in three years I will be in the University", that goal could not be possible to attain if the student is currently enrolled in the seventh grade. Note, this student three years later would be in the 10th grade, in case of no school retentions.

Note: A description of what should be considered for the 'Relevant' category of the SMART acronym was intentionally not provided. As each participating student defined their own goals, the relevance category does not require further attention.

Chapter 3

Elementary Students First School Transition: Effectiveness of a School-based Group Mentoring Program Promoting Students' Engagement and Self-regulation[4]

[4] Submitted to an international peer reviewed journal

3. Elementary Students First School Transition: Effectiveness of a School-based Group Mentoring Program Promoting Students' Engagement and Self-regulation

Abstract

School transitions are labelled as challenging events in students' academic path likely to negatively affect students' development and engagement in school. Grounded on extant research advocating for the need to act preventively, school-based mentoring programs emerge as an appropriate response to provide students with developmental and instructional support during school transitions. Using a two-factor multivariate quasi-experimental design, the present study assessed the effectiveness of a group mentoring program designed to promote elementary students' self-regulation, school engagement and goal setting during their first school transition. Participants were 330 elementary students in four schools randomly assigned to treatment or control conditions. Students' self-reported measures were collected in four moments. Results indicated that participating in the group mentoring program led to improvements in all dependent variables. The effect size was larger than the reported in prior intervention studies when considering all dependent variables simultaneously. However, when considered individually, the effect sizes were medium, small, or null depending on the dependent variable. Similar findings were found regarding the differences observed between both experimental and control groups from posttest to the follow-up and considering the number of mentoring sessions completed (i.e., six and twelve sessions). Lastly, and contrary to expectations, the efficacy of our program was not influenced by students' level of mathematics prior knowledge. In conclusion, our findings underscore the relevance of group mentoring programs in addressing elementary students' engagement and self-regulation needs to help them face the challenges of school transition. Limitations are acknowledged. Future research and educational implications for designing mentoring programs are provided.

Keywords: elementary students, school transitions, school engagement, self-regulated learning, school-based group mentoring program

3.1. Introduction

Throughout schooling, students face many school transitions (i.e., moves between schools; Andrews & Bishop, 2012). Literature has shown that these school transitions are of great importance, due to their expected impact on students' development (Wang & Amemiya, 2019) and school engagement (SE; Eccles et al., 1993). In fact, as students make multiple school transitions, their SE declines significantly, which

might ultimately lead to school dropout (particularly in high school; Wang & Amemiya, 2019). These data are consistent with UNESCO (2015) reports stressing the need to promote SE and self-regulation learning (SRL) as early as possible to minimize the negative impact of school transitions on students' academic path. Adopting a multidimensional conceptualization of SE (Fredricks et al., 2004) and drawing on the Zimmerman's SRL Model (2000, 2002) , the current study aims to add literature by assessing the effectiveness of a school-based mentoring program designed to help fifth grade elementary students (first of the two-year final cycle of elementary school in Portugal) dealing with the challenges of their first school transition.

3.1.1. School Engagement

Labelled as an antidote for early school leaving (see Fredricks et al., 2004; Martins et al., 2021; Tarabini et al., 2015), SE has been transversely used to address several educational problems (e.g., low achievement, behavior problems, school alienation and dropout) and to promote students' persistence, in particular while facing school challenges (Fredricks et al., 2004; Reschly & Christenson, 2012). We follow Fredricks et al. (2004) while understanding SE as a meta-construct comprising three distinct but interrelated dimensions – behavioral, emotional, and cognitive. *Behavioral engagement* encompasses students' overt actions toward school and learning (e.g., completing homework, participating in school-related activities; Fredricks et al., 2004); *emotional engagement* includes students' positive and negative emotional reactions to class, academic tasks, teachers, and peers; and their sense of belonging to, and identification with school (Fredricks et al., 2004; Reschly & Christenson, 2012). Lastly, *cognitive engagement* refers to students' cognitive efforts in learning, including the use of deep learning strategies, self-regulation, and value of schoolwork (Fredricks et al., 2004; Rosário et al., 2016). The SE multidimensionality allows a thorough characterization of how students behave, feel, and think school (Pino-James et al., 2019), which helps to identify students more or less committed to learning (Fredricks et al., 2019), but also to design tailored interventions addressing students in need of support and at risk of disengaging from school (Balfanz et al., 2007; Heppen & Therriault, 2008).

SE is a protective factor for the development of students learning processes likely to prompt them to invest time and effort in learning and to help them overcome obstacles on their school path (Skinner et al., 2016; Skinner & Pitzer, 2012; Wang & Fredricks, 2014). In fact, extant research shows that students engaged in school and class, are likely use adaptive coping strategies to deal with difficulties, to persist, recover from setbacks and to reengage with challenging schoolwork (Santos et al., 2021; Skinner et al., 2016; Skinner & Pitzer, 2012). Contrarily, disengaged students, are likely to use maladaptive

responses to school challenges (Skinner et al., 2016) and to show learning trajectories marked by unsuccess (Appleton et al., 2008; Luo et al., 2009).

3.1.2. School Transitions and it's Impact on School Engagement

Throughout schooling, with the increasing complexity of the curriculum contents, students are likely to face diverse academic and personal challenges significantly impacting their development and engagement in school (Wang & Amemiya, 2019). In fact, school transitions are understood as one of the most impacting challenges faced by students throughout schooling (see McQuillin & Lyons, 2016). These ongoing processes of change (e.g., advancement of learning, difficulty, and ongoing need of adjustment) occurring over compulsory education, are critical periods for students' development (Eccles et al., 1993; Wang & Amemiya, 2019) while representing both times of vulnerability and opportunity (Santos et al., 2021). Prior research addressing students' school experiences and development (e.g., Eccles et al., 1993; Schenk et al., 2021) indicates that students during school transitions often experience a mismatch between their developmental and educational needs (e.g., responsibility, autonomy, self-regulation) and the opportunities provided by the school environment to fulfill them. Moreover, through experiencing multiple school transitions as schooling progresses, students are exposed to peer comparison and to competition (e.g., through students rankings of academic achievement) and pressure to succeed academically (Wang & Amemiya, 2019; Wang & Hofkens, 2020). What is more, over school transitions students' are confronted with higher school expectations with repercussions in their psychological functioning (Benner & Graham, 2009), academic motivation and engagement (Hartono et al., 2019; Rudolph et al., 2001).

3.1.3. Promoting School Engagement and Self-regulation Following School Transitions Through Group Mentoring

Extant literature has shown that students' SE starts to decline in elementary school years (Mireles-Rios & Romo, 2010; Rumberger & Lim, 2008) when the first school transition occurs; for this reason, literature suggests that this may be an optimal period for interventions targeting students' SE (Wang & Amemiya, 2019). Moreover, early school experiences set the ground for the long-term process of school (dis)engagement (Perdue et al., 2009; Reschly & Christenson, 2012).

Recent studies have shown positive results of school-based interventions on students' academic success and SE (Blackwell et al., 2007; Lin-Siegler et al., 2016; Walton & Cohen, 2011); however, as Wang and Amemiya (2019) reports, these interventions do not specifically address key-aspects of school transition (e.g., students' feelings and beliefs about the new school and their new colleagues). In fact, in

their transition to final years of elementary school (fifth and sixth grade) students face diverse changes in their school environment that could hardly be addressed in a single intervention. Examples of these changes are as follows: (i) larger and more formal schools (Eccles & Roeser, 2011; Santos et al., 2021), (ii) classes with an increased number of students (Evans et al., 2005), (iii) increased number of school subjects and teachers (Wang & Hofkens, 2020), (iv) increased demand for self-regulation skills and academic enabling behavior to cope with the school tasks (e.g., organize the study schedule, plan and prioritize the tasks to be done; Rosário et al., 2016), and (v) decreased opportunities to develop close and meaningful relationships with teachers (Wang & Amemiya, 2019; Wood & Mayo-Wilson, 2012). To help students deal with these educational challenges, extant literature indicates the need to promote students' SE (e.g., Wang & Amemiya, 2019), and self-regulated learning (SRL; Rosário et al., 2017) while encouraging them to assume an agent role in learning (Moeller et al., 2012). Following Zimmerman's model (2008), SRL is understood as a dynamic learning process with three cyclical and interdependent phases (i.e., forethought, performance or volitional control, and self-reflection; for full description see Zimmerman, 2008) in which students control their behaviors, thoughts, and emotions to attain self-set goals (Rosário et al., 2012). This process enables students to be responsible and autonomous in their educational path, particularly when facing difficulties and challenges posed by compulsory education (Rosário et al., 2015). In fact, training in SRL strategies provides students with the necessary skills to persist through difficulties while facing school challenges successfully (e.g., Bandura, 2005). Importantly, prior research has been showing that students with SRL training improve their motivation to engage in school and to display efforts to achieve better results (Núñez et al., 2015; Rosário, Högemann, et al., 2019; Zuffianò et al., 2013).

Extant literature has been reporting that one important mode to promote students' SE as well as to deliver training on SRL strategies is through school-based mentoring programs (Janosz et al., 2019; Meltzer et al., 2020; Núñez et al., 2013). For the purpose of this research, mentoring is understood as a process implying the development of a relationship between a supportive adult and one or several students to help them handle the transition from childhood to adulthood (DuBois & Karcher, 2005; DuBois & Keller, 2017; Eby et al., 2008). Throughout this process, the mentor is expected to provide students (mentees) ongoing guidance, instruction, and encouragement (Eby et al., 2008; Rhodes, 1994; Rhodes et al., 2002). In fact, the flexibility and responsive nature of the mentoring approaches allows comprising both developmental (e.g., building supportive and emphatic relationships) and instrumental factors (e.g., developing self-regulation skills, goal setting) in a unique intervention, while addressing the diverse needs of students (e.g., Lyons et al., 2019). In sum, school-based mentoring programs may be used as a

preventive response to support students through school transitions (DuBois & Karcher, 2005; DuBois & Keller, 2017; Herrera, 2004). Importantly, literature on mentoring and engagement has also been emphasizing the peers' role and influence in students' learning and development (e.g., Chan et al., 2020; Martins et al., 2021) beyond the well-established role of the mentors (Schenk et al., 2021). For example, Kuperminc et al. (2020) highlighted the importance of connecting students with both, caring adults and peers (in group mentoring), to increase their resilience. Following the same line of thought, SE research (see Martins et al., 2021 systematic review) reported that students with a strong peer network (Kim & Cappella, 2016), displaying high-quality friendships and receiving support from their peers (Lynch et al., 2013; Perdue et al., 2009) are more engaged in school and are more likely to succeed academically than their counterparts. Grounded on this corpus of knowledge, group mentoring emerges as a well-suited method to promote students' positive development (Chan et al., 2020).

3.2. Purpose of the Current Study

The final years of elementary school (5th and 6th year) may represent a great challenge for many students. For example, in Portugal, students progressing from fourth to fifth grade experience their first transition to a larger school (e.g., school comprising students from 5th to 9th grade). This transition poses social and academic challenges to elementary students that suddenly are expected to deal with an increased number of subjects content focused (e.g., History, English language) and respective teachers, new classmates and school dynamics (Eccles & Roeser, 2011; Santos et al., 2021), which requires higher levels of autonomy and responsibility (e.g., managing a card to buy food in the school cafeteria; Rosário et al., 2015). However, interventions targeting elementary students' developmental and instructional learning needs during school transitions are still lacking (Wang & Amemiya, 2019). Moreover, as most research on mentoring follows the traditional approach (i.e., one mentor to one mentee; (DuBois et al., 2002; Meltzer et al., 2020; Rhodes & DuBois, 2008), investigation on the effects of group mentoring in the promotion of students' positive development is still limited (Chan et al., 2020). All considered, the current study aims to add to both research areas (SE and group mentoring) by assessing the effectiveness of a school-based group mentoring program targeting elementary school students experiencing their first school transition (5th grade). The variables chosen for this intervention (i.e., SRL, SE and goal setting; GS) were selected based on literature recommendations for future research (e.g., Martins et al., 2021) and on their potential impact on students' academic success and psychological well-being (Eccles et al., 1993; Eccles & Roeser, 2011; Hong et al., 2020).

Considering the results of previous intervention studies and the extant literature, four hypotheses were set as follows:

H1: students in the experimental group are expected to show higher levels of SRL strategies, cognitive, behavioral, and emotional SE, and GS than the students in the control group. In addition, and considering data from previous studies with elementary students (e.g., Allen & Hancock, 2008; Boulware-Gooden et al., 2007; de Boer et al., 2018; Dignath et al., 2008; Michalsky et al., 2009; Stoeger & Ziegler, 2008, 2010; Tracy et al., 2009; Van Keer & Vanderline, 2010), the effect size at the posttest is expected to be moderate ($d \approx 0.50$);

H2: considering the results of previous intervention studies with elementary students of this age (e.g., de Boer et al., 2018), it is hypothesized that the differences between groups observed at the posttest persist in the follow-up measurement, collected three months post intervention;

H3: previous meta-analysis (Dignath et al., 2008; Hattie et al., 1996) seem to indicate that the effectiveness of intervention programs, in the short and long term, is not significantly related to the number of sessions held. According to these authors, no findings showing the longer the intervention the more effective their results were found. Drawing on these meta-analyses data, the effect of the group mentoring program at six weeks (half of the intervention) is expected to be similar to that of the complete intervention (posttest);

H4: based on prior research (e.g., Claessens & Engel, 2013; De Corte et al., 2011; Zhao & Ding, 2019), the effectiveness of the mentoring program will be significantly different depending on the students' level of mathematics prior knowledge. Specifically, it is hypothesized that the improvement observed in students' SRL strategies, SE, GS will be higher the lower the level of pretest mathematics knowledge.

3.3. Method

The current study was approved by the Portuguese Ministry of Education and the ethical committee of the University of Minho (CEICSH 069/2019).

3.3.1. Participants

Eight public schools in the north of Portugal agreed to enroll in the study. However, due to their involvement in school-based projects that could influence the results of our study, four schools were excluded.The remaining four schools were enrolled in our study. From these, two schools (8 fifth grade classes, 4 classes from each school, n=162) were randomly assigned to the experimental group and implemented the mentoring program, and the other two (8 fifth classes, 3 classes from one and 5 from

another school, *n*=168) were assigned to the control group following a school-as-usual approach. Following ethical considerations, the schools assigned to the control group, at the end of the study, were provided with a compact version of the program and a short training for future mentor-teachers.

Parents of all participating students were informed about the study (i.e., voluntary participation, mentoring program contents, evaluation moments, and data confidentiality), and all authorized their children's enrollment. In total, the participants consisted of 330 fifth grade students (51.6% boys) from 16 classes, aged between 9 and 12 (M_{age} = 10.03; *SD* =0.83. The mentors (*N* =17) were elementary school teachers working in the schools enrolled. Most were female (*n* = 16; 94.1% female) with 24.2 years of teaching experience on average (*SD* =9.1) ranging between 15 and 41 years.

3.3.2. Procedures

The *Compass* mentoring program was delivered in 12 biweekly 45-minute sessions. Mentoring sessions were included into the curriculum of students from the experimental group. Students in the control group followed the curriculum as usual. While the program was twelve-sessions long, the full cycle of the mentoring program took approximately 28 weeks, because of the biweekly sessions and school holidays or events that precluded mentoring some weeks. For the purposes of this study, all classes in the experimental group were organized in four groups (ranging between four and six students), each assigned to a mentor. Mentors' recruitment occurred in the participating schools through a 1-hour session comprising: (i) presentation of the program and schedule, (ii) requirements to be a mentor (i.e., training course, supervision meetings) and (iii) a final question-and-answer moment. The description of the mentoring program, the procedures adopted to train, support, and monitor mentors while implementing the program, as well as efforts made to ensure treatment integrity are described in the following sections.

3.3.2.1. Description of the *Compass* Mentoring Program

The *Compass* mentoring program was purposefully designed for this study. This program uses narratives - a powerful strategy to intervene with students (Rosário et al., 2016; Rosário, Núñez, et al., 2019; Wang & Amemiya, 2019), and includes four recommended practices (i.e., sequenced, active, focused, and explicit activities; SAFE) for effective skills training (see Durlak et al., 2010 meta-analysis). Hence, the *Compass* mentoring program encompasses a set of educational narratives extracted from *Testas' (Mis)adventures* five-book collection (Rosário, 2002a, 2002b, 2002c, 2003, 2004), aiming to foster students' reflection on their learning strategies and engagement in school. Throughout the intervention, *Testas*, the main character of the narratives, describes how he handles school challenges in the 5th grade (i.e., setting goals, time management) and how he thinks, feels, and behaves at home and school (e.g.,

efforts to engage in school tasks; manage time to do homework and play; and seek help from parents and teachers to solve problems). Along these narratives, *Testas* tells his learning experiences throughout the school year (e.g., reflections on their own process of engagement, on how school activities can become interesting or on the efforts made to apply SRL strategies into practice). Therefore, *Testas* works as a role model with which students may share some similarities and through which they may learn vicariously how to cope with transition challenges (Mussweiler, 2003).

Moreover, to foster mentees engagement, in the mentoring sessions *Testas* uses various engaging resources (Parsons et al., 2015; Wu et al., 2013), such as short funny videos (extracted from animated films), cartoons and activities (e.g., origamis, (inter)national proverbs), structured according to the SAFE acronym (Durlak et al., 2010). In fact, interventions are more effective when SAFE, including: (i) a step-by-step approach of training (sequence, S), (ii) opportunities to students practice the new skills (active, A), (iii) sufficient time and attention to learn and train (focused, F), and iv) clear and specific learning goals (explicit, E; Durlak et al., 2010). The program resources were orchestrated to help students practice the strategies and contents learned while transferring them into their daily lives' challenges (Rosário et al., 2017).

Grounded on previous findings on interventions using story-tools (e.g., Högemann et al., 2017; Núñez et al., 2013; Pereira et al., 2021; Rosário et al., 2017; Rosário, Núñez, et al., 2019) the sessions of the current program were scripted in a detailed protocol as follows: all mentoring sessions, except for the first, began with mentors prompting mentees to recall the contents acquired in the previous session. Then, mentors and mentees took turns to read the narrative from *Testas' (Mis)adventures* selected for the session. During the reading, small breaks were taken to ensure that mentees were following the story plot and understanding the main messages of the narrative (see Högemann et al., 2017; Rosário et al., 2017). Afterwards, through intentional inquiry, mentors prompted mentees to analyze and reflect on the content of the narrative (i.e., students are expected to spontaneously share their thoughts with the group to deepen their reflection on the topic approached). Subsequently, to practice the transfer of the contents learned, students performed a consolidation activity individually or in group. These activities were intended to help students experience and reflect on the importance of applying the new contents (e.g., SE and SRL strategies) in real-life situations. Finally, at the end of each session, through a take home message, mentees were invited to revisit the contents learned, and, with the mentors help, set a goal to guide their efforts for the following weeks. Students' efforts to achieve the goal (e.g., strategies used to overcome obstacles) and the outputs reached were discussed at the beginning of each session.

3.3.2.2. Mentors' Ongoing Training and Monitoring

Mentors' training and support are key requirements for the success of mentoring interventions (DuBois et al., 2011; Spencer, 2007). As stated by Herrera et al. (2013), mentors who benefit from consistent training and support while implementing mentoring programs show high-quality relationships with mentees. Grounded on this knowledge, a 60h *blended* training course was designed to provide mentors (experimental group) with training on mentoring processes. Training included face-to-face (28 hours) and online asynchronous training hours (32 hours). This format (*blended*) was the most fitted to the mentors' variable schedule, allowing them to explore the resources delivered (i.e., manuals of the theoretical modules, explanatory videos) at their own pace.

As recommended by literature (Dignath et al., 2008) this course is theoretical framed (social cognitive theory) and works the declarative and procedural knowledge of every learning strategy, while training metacognitive and motivational processes. The training course is composed of 4 theoretical modules as follows: (i) mentoring process and relationship development strategies (e.g., building an empathic bond, active listening, recognition of relationship stages), (ii) types of knowledge (i.e., declarative, procedural, and conditional knowledge) and school engagement, (iii) motivational processes and learning; and (iv) self-regulation processes (e.g., strategic planning, self-monitoring, self-reflection; Rosário et al., 2016; Zimmerman, 2002, 2008) and strategies (e.g., goal setting and planning, rehearsing and memorizing). Each module included both face-to-face and asynchronous training hours.

Additionally, to help mentors feel more comfortable in their mentor role, a few presential sessions were dedicated to the training of mentor approaches (e.g., simulation of a mentoring session). Following the successful completion of the *blended* training course with a mention of "Very Good" or "Excellent" (September 2018), mentors were matched with one or more mentee-groups. Finally, to monitor program implementation, the training team set monthly group meetings (with approximately 60 minutes length) with mentors. These group discussions were crucial to help mentors develop mentor-mentee relationships and improve mentors' approaches to promote students' SE, SRL and GS.

3.3.2.3. Treatment Integrity

Several procedures were adopted to ensure the treatment integrity. Specifically, prior to the implementation of the mentoring program, all mentors received a dossier with (i) the protocol for each session detailing the activities and resources as well as the time for each step of the session (see program description section); and (ii) session's record sheets to mentors fulfill at the end of each session, reporting the activities performed, obstacles/challenges faced, and eventual deviations to the protocol. Additionally, two procedures were adopted during program implementation to check for integrity of the protocol: (i)

random observations of 30% of the sessions were conducted by two researchers using an observation grid (specifically built for this purpose) based on the protocol for the sessions ; and (ii) monthly group meetings were organized with the mentors (experimental group) to provide ongoing support. In these meetings, the session record sheets were analyzed and discussed, and mentors had the opportunity to voice their perspective on the mentees development and to receive individualized feedback.

Observation data allowed to conclude that, despite the slight adjustments made to meet mentees' needs (e.g., the examples provided were tailored to each group of students), all mentors followed the sessions' protocol and completed all activities. At final, the adherence to the protocol (Mowbray et al., 2003) based on observations indicates a high treatment fidelity, ranging from 90% to 96% across sessions for all groups.

3.3.3. Instruments and Measures

A four-wave gathering of data from self-report measures (i.e., students' SRL strategies, behavioral, emotional, and cognitive SE, and goal setting) was conducted across one school year (September 2018 to September 2019) to assess the mentoring program.

3.3.3.1. School Engagement

Students' engagement in school was assessed through the School Engagement Scale (Fredricks et al., 2005; Lippman & Rivers, 2008). This scale comprises 14 items concerning the behavioral, emotional, and cognitive dimensions by Fredricks et al. (2004). Four items were used to assess students' behavioral engagement, e.g., "I pay attention in class" and "I follow the rules at school."; five items were used to assess students' emotional engagement, e.g., "I feel happy in school" and "I am interested in the work at school."; and the remaining five items were used to assess students' cognitive engagement, e.g., "I check my schoolwork for mistakes" and "I read extra books to learn more about things we do in school." Students rated their engagement on a five-point Likert scale ranging from 1 (never) to 5 (always). The Cronbach's alphas for the four moments (pretest, intermediate, posttest and follow-up) were .85, .87, .88, and .88, respectively.

3.3.3.2. Self-regulation Learning Strategies

The SRL Strategies Inventory (Núñez et al., 2013; Rosário et al., 2010) was used to assess students' use of SRL strategies. This inventory comprises nine strategies, representing the three phases of the SRL process: Planning (e.g., "I make a plan before I begin an assignment/activity. I think about what I am going to do and what I need to complete it."), Execution (e.g., "I select a calm place where I can be

concentrated to study.") and Evaluation (e.g., "I compare the grades I received with the goals I set for that subject."). The items were scored on a five-point Likert scale ranging from 1 (never) to 5 (always). The Cronbach's alphas for the four moments (pretest, intermediate, posttest and follow-up) were .80, .83, .85, and .84, respectively.

3.3.3.3. Students' Goal Setting

Students' goal setting were assessed through a six-item scale (see McNeal & Hansen, 1999) querying the frequency with which students set goals, plan how to achieve their goals, persist, and think about their future (e.g., "When I set a goal, I think about what I need to do to achieve that goal.", "Once I set a goal, I don't give up until I achieve it." and "I think about what I would like to be when I become an adult"). The items were scored on a five-point Likert scale ranging from 1 (never) to 5 (always). The Cronbach's alphas for the four moments (pretest, intermediate, posttest and follow-up) were .78, .77, .77, and .79, respectively.

3.3.3.4. Students' Level of Mathematics Prior Knowledge

Mathematics is a core subject in students' curriculum, playing an important role in students' long-term learning and life (e.g., Rittle-Johnson, 2017). In fact, through learning mathematics students acquire thinking, comprehension, and problem-solving skills (Akhter & Akhter, 2018), that will allow them to make well-founded judgments and decisions when adults (OECD, 2012, 2013; Zhao & Ding, 2019). Based on prior research reporting the impact of mathematics knowledge on students' progress and development as engaged and reflective citizens (Claessens & Engel, 2013; De Corte et al., 2011; OECD, 2013; Zhao & Ding, 2019), the current study includes this variable to analyze their potential influence on the intervention effectiveness. Grounding on the work of Pagani et al. (2001), we built a rubric to assess students' level of mathematics prior knowledge based on students' prior mathematics achievement, that in Portuguese compulsory education ranges from 1 (poor) to 5 (excellent). Data for every student was provided by the teacher from the 4th grade based on students' mathematics classification at the end of the (fourth) year (June 2018). Finally, students whose grades were 4 or 5 were rated as having "*high math knowledge*"; students whose grades were 3 were rated as having "*medium math knowledge*"; and students whose grades were 1 or 2 were rated as having "*low math knowledge*".

3.3.3.5. Covariates

Students' sex and age were controlled as covariates because their relationship with SE (e.g., Hospel & Galand, 2016; Lietaert et al., 2015; Santos et al., 2021) and SRL (e.g., Dignath et al., 2008; Zimmerman & Martinez-Pons, 1990) is likely to interfere with the results. For example, prior studies indicated that

girls, when compared with boys, tend to be more engaged in school (Archambault & Dupéré, 2017; Azevedo et al., 2019; Burns et al., 2019; Rimm-Kaufman et al., 2015) and use more SRL strategies (Zimmerman & Martinez-Pons, 1990). Regarding age, prior studies indicate that older students, when compared with younger students, tend to show low levels of SE (e.g., Archambault & Dupéré, 2017; Burns et al., 2019; Santos et al., 2021), and use less SRL strategies (e.g., Azevedo et al., 2019).

3.3.4. Design and Analysis

A two-factor multivariate quasi-experimental design with three levels of one classification variable (i.e., level of mathematics prior knowledge) and two of another treatment variable (i.e., experimental and control groups) was followed. Specifically, to examine whether the students enrolled in the mentoring program showed higher levels of SRL strategies, SE (behavioral engagement, BE; emotional engagement, EE; cognitive engagement, CE) and GS than their counterparts, 330 participants (162 in experimental group and 168 in control group) were classified according to their levels of mathematics prior knowledge (low–medium–high). Data for the five dependent variables (i.e., SRL, BE, EE, CE, and SG) were collected at baseline (pretest, T0), in the middle of the intervention (T1), at the end of intervention (posttest, T2), and three months after the end of the intervention (follow-up, T3).

In the present investigation, a multivariate regression model with two covariates (i.e., age and sex) measured at baseline was used to analyze data. Following Diggle (1988) and Littell et al. (2000), to improve the efficiency of the inferences about the fixed effects and provide better estimates of standard errors of estimated parameters, a data-driven strategy was used to move toward a simpler structure by eliminating predictors or (co)variances that did not appear to be related to the dependent variables. After selecting the most parsimonious model, the effects of the fitted model were tested. The next step was to investigate data to further interpret the nature of specific differences, particularly those related to the interaction effects. To this aim we examined significant simple-effects contrasts, both multivariate and univariate. This model assumes that the outcome measurements follow a multivariate normal distribution and exhibit a common covariance structure. Mardia's skewness and kurtosis measures, as implemented in SAS PROC CALIS (Version 14.3; SAS Institute, 2020), were used to test multivariate normality, and a likelihood ratio test was used to assess whether the variances and covariances were equivalent for the three populations (low, medium, and high math prior knowledge).

The multivariate regression model was implemented by fitting an unstructured (UN) covariance structure with parameters estimated by maximum likelihood (ML) estimation as implemented in SAS PROC MIXED (Version 14.3). Effect size was measured following a standardized mean-difference effect size (d) as described by Vallejo et al. (2019). To interpret the effect sizes, we used the criterion by

Cohen (1992), which defines an effect to be small when $d = 0.20$, medium when $d = 0.50$, and large if $d = 0.80$. Although Cohen (1992) did not explicitly consider multivariate regression models, the same guidelines are also appropriate.

3.4. Results

3.4.1. Descriptive Analyses

Prior to data analysis, we examined the distribution of the dependent variables across time for the three levels of mathematics prior knowledge. As shown in Table 2, the skewness values are globally within the range (i.e., ± 1) of what is considered a reasonable approximation to the normal curve. Kurtosis data, depending on the time in which measurements were collected, show that some variables are moderately leptokurtic (i.e., its central peak is a bit higher than that of a normal distribution). In sum, considering all the moments we concluded that the values for skewness and kurtosis were within allowable limits, and proceeded with the analysis.

Table 2 - Descriptive statistics for dependent variables across time under each level of mathematics knowledge

	Low math prior knowledge				Medium math prior knowledge				High math prior knowledge			
	M	*SD*	*SK*	*KUR*	*M*	*SD*	*SK*	*KUR*	*M*	*SD*	*SK*	*KUR*
Self-Regulation Learning Strategies (SRL)												
T0 (pretest)	3.58	0.59	-0.23	-0.49	3.74	0.69	-0.23	-0.89	4.04	0.61	-0.76	0.62
T1 (intermed.)	3.57	0.70	-0.69	0.51	3.84	0.68	-0.91	1.19	4.08	0.63	-1.14	2.20
T2 (posttest)	3.52	0.79	-0.33	-0.15	3.81	0.69	-0.89	0.97	4.10	0.56	-0.93	1.58
T3 (follow-up)	3.56	0.66	0.21	-0.53	3.77	0.69	-0.83	0.60	4.02	0.64	-0.96	1.34
Behavioral Engagement (BE)												
T0 (pretest)	3.88	0.83	-0.93	1.35	4.16	0.72	-1.08	1.04	4.47	0.52	-1.61	3.71
T1 (intermed.)	3.90	0.81	-1.10	1.96	4.17	0.68	-0.75	-0.51	4.44	0.61	-1.78	3.37
T2 (posttest)	4.01	0.62	-1.15	3.00	4.29	0.61	-1.33	1.33	4.44	0.56	-1.95	4.97
T3 (follow-up)	4.02	0.64	-0.57	0.11	4.24	0.60	1.13	0.86	4.44	0.53	-1.28	1.18
Emotional Engagement (EE)												
T0 (pretest)	3.51	0.88	-0.53	0.01	3.84	0.83	-0.85	0.50	3.94	0.73	-0.76	0.84
T1 (intermed.)	3.56	0.80	-0.67	-0.02	3.86	0.75	-0.73	0.29	3.94	0.66	-0.63	0.21
T2 (posttest)	3.78	1.00	-0.85	-0.38	3.94	0.83	-0.56	-0.63	4.06	0.79	-1.14	1.27
T3 (follow-up)	3.59	1.05	-0.45	-0.64	3.79	0.84	-0.19	-0.21	4.04	0.83	-1.11	7.71
Cognitive Engagement (CE)												
T0 (pretest)	2.87	0.93	0.36	-0.10	3.21	0.77	-0.44	0.01	3.40	0.78	-0.45	-0.13
T1 (intermed.)	2.97	0.87	-0.01	-0.25	3.34	0.80	-0.50	-0.07	3.57	0.78	-0.54	-0.19
T2 (posttest)	3.22	0.78	-0.49	0.06	3.31	0.81	-0.66	0.28	3.57	0.77	-0.42	-0.04
T3 (follow-up)	3.14	0.90	-0.33	-0.33	3.33	0.87	-0.30	-0.53	3.41	0.87	-0.58	-0.10
Goal Setting (GS)												
T0 (pretest)	3.86	0.79	-0.51	-0.24	3.98	0.68	-0.66	-0.17	4.22	0.62	-0.94	0.50
T1 (intermed.)	3.88	0.76	-0.52	-0.54	3.98	0.63	-0.60	0.34	4.10	0.69	-1.11	1.63
T2 (posttest)	3.95	0.63	-0.54	0.36	4.05	0.62	-0.53	-0.56	4.08	0.64	-1.28	3.55
T3 (follow-up)	3.82	0.79	-0.85	0.71	3.99	0.72	-1.36	3.02	4.18	0.64	-0.95	1.04

3.4.2. Regression Analyses

Current study has two objectives, analyze: (a) whether students in the experimental group, compared to counterparts in the control group, show significantly higher levels of SRL strategies, SE, and GS after the intervention, and in the follow-up; and (b) whether these results are different while considering their level of mathematics prior knowledge. The analysis of the main and interaction effects was carried out from a multivariate and univariate approach. Therefore, results are presented in two sections: (1) multivariate regression analyses, and (2) univariate regression analyses.

3.4.2.1. Multivariate Regression Analyses

Table 3 shows the results of the multivariate regression analysis. Before analyzing the main effects and the interaction between the factors, it is worth pointing out the positive effects of incorporating age and sex as covariates. Both variables turned out to be significantly associated with the variability of the dependent variables (age: $F(5, 2669) = 3.82$, $p < .01$; sex: $F(5, 2654) = 3.74$, $p < .01$). Therefore, controlling for the effects of these covariates, we found statistically significant differences between the mentoring and control groups averaged across the four measurements for the five dependent variables when considered simultaneously ($F(5, 2633) = 6.70$, $p < .001$). As expected, we found differences between the levels of mathematics prior knowledge averaged across the data collection moments by simultaneously considering all dependent variables ($F(10, 2395) = 5.92$, $p < .001$). Consequently, participants' use of SRL strategies, SE and GS differ when considering the mathematics prior knowledge levels. However, note that the pattern of change is similar for the treatment groups i.e., there was no significant interaction between the two main effects (i.e., experimental-control and level of math prior knowledge), which indicates that the effectiveness of the intervention program is independent of the students' level of mathematics prior knowledge.

In addition, there was a significant ($F(15,6113) = 2.85$, $p < .001$) increase in the mean response over time after averaging across the treatment groups and simultaneously considering all dependent variables. Importantly, there was a significant ($F(15, 6113) = 4.43$, $p < .001$) difference between the mentoring and control groups over time when considering the five dependent variables simultaneously. Therefore, participants' performance changed over time; however, this pattern of change is not similar for the two treatment conditions (experimental and control).

Table 3 - Results of fitting taxonomy of multivariate regression models (top panel) and simple effects contrasts (bottom panel)

	Model A					Model B[a]			
Fixed Effect	df_N	df_D	F	Pr > F	Fixed Effect	df_N	df_D	F	Pr > F
Age	5	2666	3.57	.0032	Age	5	2669	3.82	.0019
Sex	5	2652	3.71	.0024	Sex	5	2654	3.74	.0023
Group	5	1349	4.45	.0005	Group	5	2633	6.70	<.0001
Math Knowledge	10	2021	5.65	<.0001	Math Knowledge	10	2395	5.92	<.0001
Group × Math	10	2036	1.18	.3000					
Time	15	1403	1.98	.0139	Time	15	6113	2.85	.0002
Group × Time	15	1403	3.60	<.0001	Group × Time	15	6113	4.43	<.0001
Math × Time	30	2568	0.95	.5445					
Group × Math × Time	30	2568	1.09	.3377					
Goodness-of-fit (-2ML-LF/AIC/ BIC /Parameters)									
	11436.0/11710.0/12230.5/137					11512.7/11646.7/11901.3/67			

Time	Group	_Group	*Estimate*	SE	DF	t Value	p > |t|	| *d* |
T0 (pretest)	Control	Experimental	-0.0292	.0805	961	0.36	.7161	–
T1 (intermed.)	Control	Experimental	-0.1893	.0781	914	2.42	.0156	0.44
T2 (posttest)	Control	Experimental	-0.2804	.0762	1037	3.68	.0002	0.79
T3 (follow-up)	Control	Experimental	-0.1146	.0813	920	1.41	.1589	–

See note to Table 2. df_N = numerator degrees of freedom; df_D = denominator df; ML-LF = Maximum likelihood log-likelihood function; AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria. SE = Standard error. [a]Both likelihood ratio tests and information criteria (i.e., AIC and BIC) allow us to conclude that Model B provides a better fit than Model A and also that other omitted models.

We further examined whether the change over time was different for participants in the experimental or in the control group, controlling for the age and sex effects. The simple effect comparisons of group × time least-squares mean estimates, and their test statistics presented in bottom panel of Table 3, shows significant differences between the treatment groups (control versus experimental) in two time points (i.e., middle (T1) and end of the intervention (T2)). Table 3 also shows the effect sizes for simple effect contrasts; specifically, the *d* values for the significant contrasts ranged from near to moderate in the middle of the intervention ($d = 0.44$) to large at the end of intervention ($d = 0.79$).

3.4.2.2. Univariate Regression Analyses for Each Dependent Variable

A set of follow-up univariate regression analyses were conducted to determine which of the five dependent variables were responsible for the significant omnibus test of group by time. Table 4 includes results of the hypotheses tests for each dependent variable. All fixed effects and random effects are presented, still, only the interaction data is discussed.

Table 4 shows that (except for Behavioral Engagement) the significant two-way interactions level between treatment and time was ≥ 0.02 for all outcome variables. Therefore, the null hypothesis (no interaction between treatment groups and time) was rejected.

Table 4 - Results of univariate regression analyses for each dependent variable (left panel, tests of fixed effects; right panel, tests of random effects)

Self-Regulated Learning Strategies (SRL)									
Fixed Effects					Random Effects				
Effect	df_N	df_D	F-value	Pr > F	VC	Estimate	SE	Z-value	Pr > Z
Age	1	329	2.72	.0998	τ_{00}	0.2427	0.0224	10.82	<.0001
Sex	1	328	2.99	.0850	$\sigma^2_{(Low)}$	0.2049	0.0239	8.59	<.0001
Group	1	320	5.12	.0083	$\sigma^2_{(Medium)}$	0.1999	0.0142	14.12	<.0001
Math Knowledge	2	331	19.39	<.0001	$\sigma^2_{(High)}$	0.1440	0.0097	14.86	<.0001
Time	3	953	1.61	.1867					
Group × Time	3	953	3.67	.0121					
Behavioral Engagement (BE)									
Fixed Effects					Random Effects				
Effect	df_N	df_D	F-value	Pr > F	VC	Estimate	SE	Z-value	Pr > Z
Age	1	296	2.00	.1587	τ_{00}	.1885	.0187	10.10	<.0001
Sex	1	299	2.32	.1285	$\sigma^2_{(Low)}$	.3238	.0371	8.72	<.0001
Group	1	297	6.61	.0285	$\sigma^2_{(Medium)}$	.1992	.0142	14.02	<.0001
Math Knowledge	2	127	25.06	<.0001	$\sigma^2_{(High)}$	.1502	.0101	14.90	<.0001
Time	3	875	1.42	.2357					
Group × Time	3	875	0.39	.7604					
Emotional Engagement (EE)									
Fixed Effects					Random Effects				
Effect	df_N	df_D	F-value	Pr > F	VC	Estimate	SE	Z-value	Pr > Z
Age	1	306	5.93	.0154	τ_{00}	.3638	.0335	10.85	<.0001
Sex	1	294	3.85	.0157	$\sigma^2_{(Low)}$	.3763	.0441	8.55	<.0001
Group	1	302	13.85	.0002	$\sigma^2_{(Medium)}$	.2281	.0162	14.08	<.0001
Math Knowledge	2	125	6.12	.0029	$\sigma^2_{(High)}$	.2431	.0163	14.90	<.0001
Time	3	947	5.36	.0012					
Group × Time	3	947	7.89	<.0001					
Cognitive Engagement (CE)									
Fixed Effects					Random Effects				
Effect	df_N	df_D	F-value	Pr > F	VC	Estimate	SE	Z-value	Pr > Z
Age	1	333	0.44	.5068	τ_{00}	.3591	.0336	10.68	<.0001
Sex	1	330	8.28	.0043	$\sigma^2_{(Low)}$	.3915	.0451	8.68	<.0001
Group	1	331	7.64	.0060	$\sigma^2_{(Medium)}$	.2886	.0204	14.17	<.0001
Math Knowledge	2	336	9.37	<.0001	$\sigma^2_{(High)}$	.2506	.0171	14.67	<.0001
Time	3	972	7.61	<.0001					
Group × Time	3	972	9.09	<.0001					
Goals Setting (GS)									
Fixed Effects					Random Effects				
Effect	df_N	df_D	F-value	Pr > F	VC	Estimate	SE	Z-value	Pr > Z
Age	1	332	0.98	.3229	τ_{00}	0.1252	0.0163	7.66	<.0001
Sex	1	326	0.74	.3896	$\sigma^2_{(Low)}$	0.3819	0.0443	8.62	<.0001
Group	1	327	1.64	.2009	$\sigma^2_{(Medium)}$	0.3099	0.0216	14.35	<.0001
Math Knowledge	2	322	7.50	.0007	$\sigma^2_{(High)}$	0.2980	0.0199	14.95	<.0001
Time	3	986	0.43	.7319					
Group × Time	3	986	3.44	.0164					

See notes to Tables 2 and 3. VC = component variances; SE =Standard error; τ_{00} = Between-subject variance; σ^2 = Within-subject variance.

The following step was to examine whether the change was different for the two treatment conditions across time. Linear combinations of means were estimated and compared for this purpose using the LSMEANS statement of the PROC MIXED. The least-squares means are estimates of the two

groups evaluated at T0, T1, T2 and T3 moments. As indicated in Table 5, for SRL strategies and EE the means of treatment groups were significantly different at T1 (middle of the intervention), at T2 (end of intervention), and T3 (follow-up). However, for CE and GS the means for the treatment conditions (i.e., control and experimental) were significantly different at the T1 and T2, but not at T3. Table 5 also displays the effect sizes for groups by time across the four outcome variables. In this study, the effect size estimates for the effect of interaction were small to moderate. Figure 6 helps to illustrate the conclusions of the analysis.

Table 5 - Simple effect comparisons of group × time least-squares means for each dependent variable

Self-Regulated Learning Strategies (SRL)								
Effect Level	Group	_Group	Estimate	SE	df_D	|t| Value	Pr > |t|	|*d*|
T0 (pretest)	Control	Experimental	-0.0074	0.0724	624.1	0.10	.9183	–
T1 (intermed.)	Control	Experimental	-0.1708	0.0724	624.1	2.36	.0186	0.26
T2 (posttest)	Control	Experimental	-0.1770	0.0724	624.1	2.44	.0148	0.27
T3 (follow-up)	Control	Experimental	-0.1942	0.0724	624.1	2.68	.0075	0.30
Emotional Engagement (EE)								
Effect Level	Group	_Group	Estimate	SE	df_D	|t| Value	Pr > |t|	|*d*|
T0 (pretest)	Control	Experimental	-0.1342	0.0865	581.1	1.55	.1212	–
T1 (intermed.)	Control	Experimental	-0.2383	0.0865	581.1	2.76	.0060	0.30
T2 (posttest)	Control	Experimental	-0.4889	0.0865	581.1	5.65	<.0001	0.62
T3 (follow-up)	Control	Experimental	-0.2186	0.0865	581.1	2.53	.0118	0.28
Cognitive Engagement (CE)								
Effect Level	Group	_Group	Estimate	SE	df_D	|t| Value	Pr > |t|	|*d*|
T0 (pretest)	Control	Experimental	0.0005	0.0897	663.9	0.01	.9957	–
T1 (intermed.)	Control	Experimental	-0.2712	0.0897	663.9	3.03	.0026	0.33
T2 (posttest)	Control	Experimental	-0.4110	0.0897	663.9	4.58	<.0001	0.51
T3 (follow-up)	Control	Experimental	-0.1358	0.0897	663.9	1.51	.1307	–
Goal Setting (GS)								
Effect Level	Group	_Group	Estimate	SE	df_D	|t| Value	Pr > |t|	|*d*|
T0 (pretest)	Control	Experimental	0.0420	0.0737	992.6	0.57	.5693	–
T1 (intermed.)	Control	Experimental	-0.1628	0.0737	992.6	-2.21	.0274	0.24
T2 (posttest)	Control	Experimental	-0.1491	0.0737	992.6	-2.02	.0435	0.23
T3 (follow-up)	Control	Experimental	0.0082	0.0737	992.6	-0.04	.9119	–

See notes to Tables 2, 3, and 4.

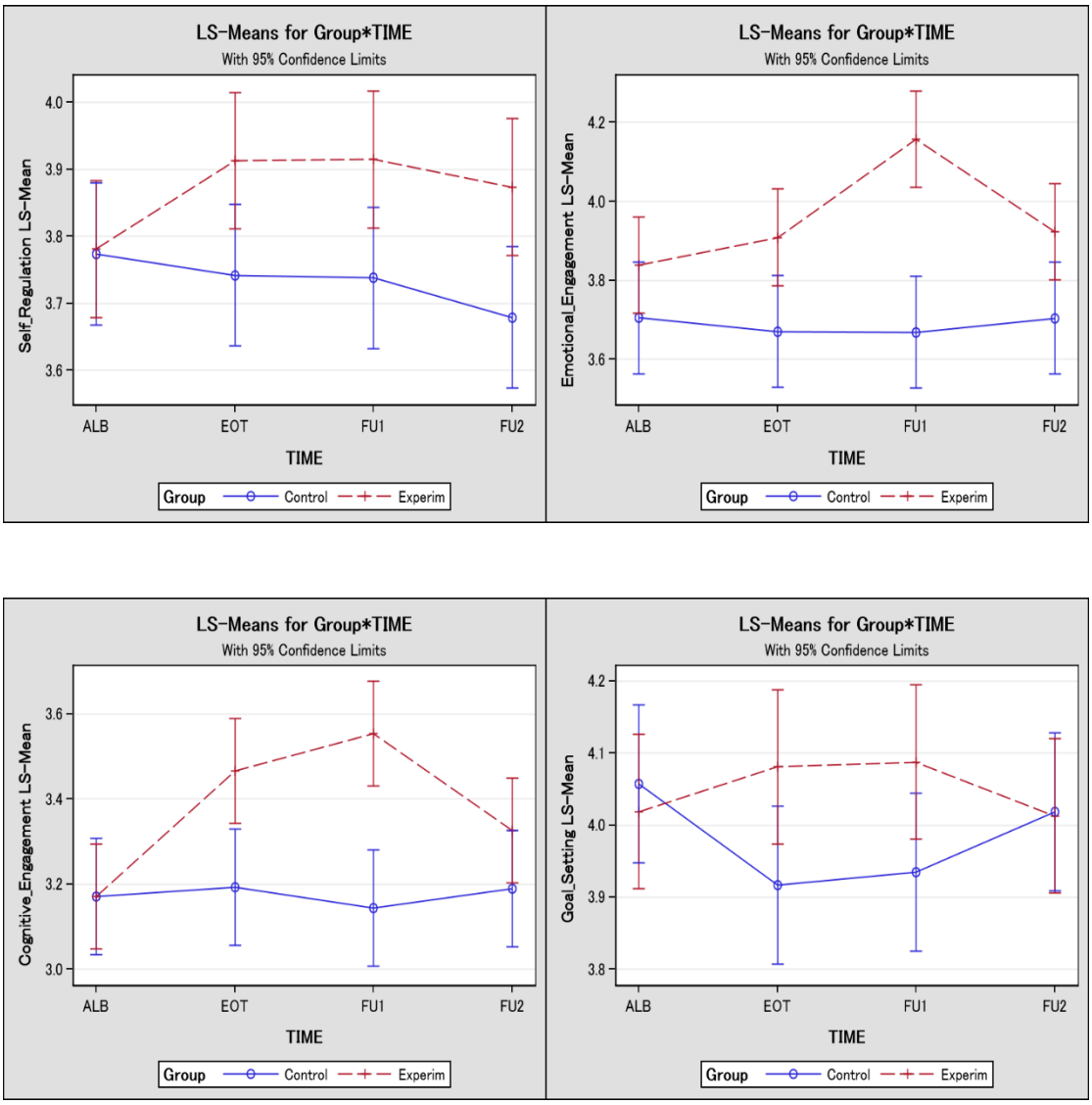

Figure 6 - Plot of LS means Self-Regulated Learning, Emotional Engagement, Cognitive Engagement, and Setting Goals for Group × Time.

3.5. Discussion

The current study aims to respond to prior research (e.g., DuBois & Karcher, 2005; DuBois & Keller, 2017; Herrera, 2004) warnings for the need of using school-based interventions addressing specific aspects of school transition (e.g., helping students deal with school challenges in an adaptive way). Specifically, adopting a two-factor multivariate quasi-experimental design, the current study aims to assess the effectiveness of a group mentoring program (*Compass*) in the promotion of SRL strategies, SE (BE, EE, and CE), and GS during students first school transition; and to analyse whether the efficacy of the group mentoring program is influenced by students' level of mathematics prior knowledge.

In general, current findings support our first hypothesis indicating that the mentoring program was effective in their purposes. In fact, at the posttest (T2), students who participated in the mentoring program showed significantly higher levels of SRL strategies, BE, EE, CE, and GS than students from the

control group, either considering the five dependent variables (DVs) simultaneously or individually. These findings are consistent with those from prior studies (e.g., Allen & Hancock, 2008; Boulware-Gooden et al., 2007; de Boer et al., 2018; Dignath et al., 2008; Michalsky et al., 2009; Stoeger & Ziegler, 2008, 2010; Tracy et al., 2009; Van Keer & Vanderline, 2010). While considering the five DVs simultaneously, data at the posttest (T2) indicate that the differences between both groups were statistically significant $p < .001$ with an effect size close to large ($d = 0.79$); a focus on data for every variable individually considered indicate that, except for GS, the other four DVs presented differences statistically significant (SRL $p < .01$; EE $p < .001$; CE $p < .01$; BE $p < .05$), with a medium effect size for EE and CE, a small for SRL strategies and GS and null for BE (see Table 5). Importantly, findings suggest the relevance of discussing the different layers of results. In fact, effects of all DVs taken as a whole report that the effect size of the mentoring program is large; however, when the effects of DVs are considered individually, the effect size is medium, small, or null. Prior literature on mentoring programs (e.g., Eby et al., 2008; Núñez et al., 2013) has found that the effect size of the school-based interventions is related with the interventions design, the context of implementation, the assessment methodology, and the measured outcomes. For example, as Eby et al., (2018) warns school-based interventions outputs may differ as a function of the dependent variable measured, which may help explain literature mixed results. We believe that current differences in the effect sizes when considering the DVs simultaneously and individually may be explained by the entwined nature (Sinatra et al., 2015) and the reciprocal dynamic of the SE dimensions (i.e., every change in a dimension is likely to affect the others; Hong et al., 2020; Li & Lerner, 2011). As Sinatra et al. (2015) warns when SE dimensions are considered in isolation their mutual influence is not captured and the multidimensional nature of the concept is not acknowledged. This may be the case of current results regarding SE dimensions when considered individually. A similar situation could also be found regarding data on SE and SRL (Stefansson et al., 2018). According to prior research, the SE and SRL constructs, despite being distinct, overlap in some key features (Boekaerts, 2016; Eccles, 2016). In fact, both SRL and SE are conceptualized as multidimensional constructs, encompassing students' behaviors, emotions, and cognitions (Stefansson et al., 2018; Wolters & Taylor, 2012). Besides, prior studies have been consistent while substantiating the close relationship between SE dimensions and SRL strategies (among which GS; e.g., Fredricks et al., 2004; Martins et al., 2021). For example, prior studies showed that students engaged in school are likely to use SRL strategies to achieve their self-set learning goals (e.g., Fredricks et al., 2004; Zimmerman, 2002); but also that SRL skills are important to help students persevere when dealing with school challenges and stay engaged in school (Wang et al., 2021). Therefore, the theoretical overlapping aspects as well as the close relationships between all DVs

may contribute to explain our findings; specifically, the medium, small, and null effect sizes found for the DVs individually considered.

Moreover, we also hypothesized that the differences observed between both experimental and control groups (i.e., H1) would persist in the follow-up (H2). Data are distinct when the five DVs are considered simultaneously or individually. The former indicates that the differences found between groups were not statistically significant, despite favoring the experimental group (see Table 2, effect size of the comparison at T3). Therefore, contrary to our expectations and previous findings (e.g., de Boer et al., 2018), the effect of the mentoring program (large at the posttest, T2) did not maintain at follow-up (T3). When considering the DVs individually, results are various (see Table 5 and Figure 6). The differences observed in the posttest (T2) regarding SRL strategies and EE were maintained after three months (T3, with a medium effect size); therefore, the hypothesis was confirmed for these variables. However, for the other DVs (i.e., CE and GS), the differences found at the follow-up (T3) were minimal and not statistically significant. Interestingly, these mixed results are consistent with literature on elementary students (e.g., Brunstein & Glaser, 2011; Carretti et al., 2014; Stoeger et al., 2014). In fact, prior research has been reporting mixed findings regarding students' enrollment in school-based interventions, with some studies showing improvements in follow-up (e.g., Carretti et al., 2014; Desoete et al., 2003; Van Keer & Verhaeghe, 2005), while others showing a decrease (e.g., Brunstein & Glaser, 2011; Stoeger et al., 2014; Van Keer & Verhaeghe, 2005; Wright & Jacobs, 2003). Recent studies have suggested that such differences might be related to the possibilities offered to students to apply, or not, the strategic contents learned in the program (e.g., Jansen et al., 2019; Manalo et al., 2017; Núñez et al., 2022). For example, students who can practice the strategic contents learned in class or in the family context (e.g., plan a trip to the beach and prepare a backpack; make a cake recipe [SRL]) are likely to maintain the gains of the program over time (Manalo et al., 2017; Núñez et al., 2022). What is more, our follow-up data collection matched with the beginning of the following school year (i.e., sixth grade) after school summer vacations. For two and a half months (Portuguese school summer vacations), students interrupted their school routine and the opportunities to practice contents learned in class (e.g., pay attention and participating in class, setting goals for every subject, organizing the school schedule), which could have led to the decreases found at the follow-up (T3). Moreover, the academic nature and the group modality of our mentoring program can also help explain current findings. Over the mentoring sessions, the majority of the consolidation activities were designed to be applied in the school setting (e.g., checking homework assignments to identify mistakes, plan the study for subject assessments [CE]; setting goals for the following week and for each subject [GS]), for this reason, students may find difficult to apply and transfer

these contents to daily activities outside school (e.g., home-related tasks; Núñez et al., 2022). Additionally, as children throughout the program were provided support from a mentor and a peer group while learning and performing mentoring activities, some students may struggle to work autonomously while applying the new contents learned (Kuperminc et al., 2020; Lynch et al., 2013). Altogether, both school summer vacations and the difficulty to transfer the new knowledge to daily activities autonomously may translate in students non-using and non-practicing the new competencies, which may concur to explain minimal score differences found after three months (i.e., follow-up, T3).

Furthermore, we hypothesized (H3) that the effect of the mentoring program at six weeks (T1) would be similar to that of the complete program (T2). Again, the conclusions differ depending on whether we consider the five DVs simultaneously or individually. When considering the DVs simultaneously, contrary to the findings of prior studies (Dignath et al., 2008; Hattie et al., 1996), we found that the more the number of sessions, the higher the effects of the mentoring program. Data in Table 3 show that after six mentoring sessions the effect size of the program was close to medium (d = 0.44), while at the end (i.e., 12 sessions), the effect size was large (d = 0.79). Therefore, considering the effect of the mentoring program on the set of the five DVs, we can conclude that the program was more efficacious after 12 weeks than after six weeks. Still, we cannot state whether this positive finding would be maintained for a version of the Compass program with more than 12 sessions. According to prior studies (e.g., Dignath et al., 2008; Hattie et al., 1996) school-based interventions with a higher number of sessions (e.g., 40, 60, 90 sessions) were not more effective than shorter ones (e.g., 4, 8, 11). Authors explained that participants enrolled in shorter interventions are less likely to lose interest prior to the end of the intervention. Moreover, these studies also showed that the lower the number of months (e.g., 1 or 2 months) of the intervention the higher their effect sizes. Current data add to this discussion by stressing the need to consider not only the number of sessions but also the length of the program. For example, despite the short number of sessions (according to Dignath et al., 2008), our program developed over a considerable length of time (the full cycle of the mentoring program took 28 weeks, see procedure section). Therefore, we believe that accurate judgments on the efficacy of the program should consider both characteristics (number of sessions and length) of the intervention programs.

When considering the DVs individually, we found different results depending on the DV examined. Specifically, (see Table 5) while for SRL strategies and GS the small effect size does not grow after 6 sessions [SRL: 0.26 (T1) and 0.27 (T2); GS: 0.24 (T1) and 0.23 (T2)], for EE and CE the effect size of the mentoring program improved from small to medium [EE: 0.30 (T1) and 0.62 (T2); CE: 0.33 (T1) and 0.51 (T2)]. Therefore, we can conclude that for SRL strategies and GS, a higher number of sessions did

not result in more gains; still, for EE and CE, the 12 sessions were important to increase the effect of the mentoring program. A possible explanation for the latter results may lie in the ongoing support provided to students throughout elementary school. Literature has been reporting the importance of teacher, peers and parents support on students' development and engagement in school (Bryce et al., 2019; Lynch et al., 2013; Perdue et al., 2009; Rimm-Kaufman et al., 2015). In fact, students who feel supported and encouraged while completing their assignments and facing academic challenges are more likely to engage emotionally and cognitively in school activities (Martin & Rimm-Kaufman, 2015; Martins et al., 2021; Rimm-Kaufman et al., 2015). Acknowledging that all students were facing their first transition to a new school, and for that reason needed further support, completing the 12 sessions of the mentoring program could have been important to help them adapt to the new school challenges. Importantly, a granular analysis on the effects for each variable, provides interesting data likely to help researchers and educators on their practice. More sessions can be usefull to help students facing their first school transition on their emotional and cognitive engagement (e.g., through using non-controling behaviors; encouraging self-determination); however, being supported over more time might encourage children to function in response to external regulation (e.g., from teachers, parents; Núñez et al., 2022) which may compromise their autonomy (Bryce et al., 2019; Wong et al., 2018) and the development of SRL and GS (Rosário et al., 2017). This may help explain the small effects found for SRL and GS variables.

Lastly, we were also interested in learning whether the impact of the mentoring program in students' SRL strategies, SE (BE, EE, and CE), and GS differed according to the students' level of mathematics prior knowledge. Contrary to previous data (e.g., Claessens & Engel, 2013; Zhao & Ding, 2019), our results showed that the pattern of change in the five DVs through T0 to T3 is similar for the three groups of students (i.e., low, medium, and high level of mathematics prior knowledge). In other words, the effectiveness of the mentoring program does not seem to depend on the students' level of mathematics prior knowledge. A possible explanation for these findings may ground on the responsive nature of the current program. The program is non-subject focused and aims to provide students with support responsive to their educational and motivational needs during their first school transition (Lyons et al., 2019; Wang & Amemiya, 2019); these efforts may have potentiated students' development and engagement in school in such a way that their level of mathematics prior knowledge did not influence program effectiveness.

3.6. Limitations and Future Research

Despite their strengths (e.g., a two-factor multivariate quasi-experimental design, the mentors training on developmental relationships, and instrumental activities directly relevant to students' learning and

academic path), this study should be considered in the context of its limitations. First, findings are based on a small sample, gathered in a few schools; future research could consider replicating this study in a larger sample with national and international students.

Second, as previously stated, the variables of this study were assessed through students' reports of their SRL strategies, SE, and GS. Although self-report is the most direct way to measure internal processes (as SE), caution is needed when interpreting findings and establishing inferences. Future studies could consider using a multi-method approach, such as self-reports, interviews, and observational methods to better capture micro aspects of students' engagement (e.g., engaged behaviors, strategies used) in the mentoring sessions and to further understand the relationship among the variables assessed. In addition, gathering data from multiple sources (such as, mentors, teachers, parents, peers, and school records) compared to students' reports would also contribute to interpret findings. For example, these data would provide more insight into the mentor-mentees dynamic relationship (e.g., the stages through relationships move) and the program implementation process, allowing to better understand how mentor-mentee interactions influence the developmental and instrumental aspects of mentoring (e.g., McQuillin et al., 2013).

Third, the impact of the mentoring program in other school-related variables such as academic achievement and school attendance was not addressed in this study. Previous studies on school-based mentoring reported mixed results regarding the impact of mentoring programs in these school-related variables (e.g., Grossman & Rhodes, 2002; Johnson & Lampley, 2010; Kolar & McBride, 2011; Núñez et al., 2013); for this reason, it would be important to further research this topic.

Lastly, as our intervention consists in a group-mentoring program; future research could consider exploring aspects of the mentoring groups likely to influence the effectiveness of the intervention. For example, by examining how the composition of the mentoring groups (e.g., gender or racial composition, number of students) and the characteristics of group process (e.g., group cohesion, sense of belonging and identification) affect the impact of the program on students' outcomes. These data would be helpful to inform future group mentoring designs to maximize their potential effectiveness.

3.7. School and Educational Implications

Findings from the present study have practical implications for the design and implementation of group mentoring interventions in schools. For example, as suggested by research (e.g., Durlak et al., 2010; Lyons et al., 2019; Pereira et al., 2021; Rosário et al., 2010), the sessions of the *Compass* program include SAFE activities to help students learn and train SRL strategies (e.g., goal setting), and also narratives modeling students' behavioral, emotional, and cognitive engagement in school activities.

Moreover, the detailed protocols for the 12 sessions were purposefully scripted to support mentors and mentees work (e.g., clear goals to achieve in each session; ongoing monitoring of the quality of the mentoring process) while reducing the ambiguity that may characterize developmental mentoring programs (e.g., just spending time together to get to know each other) (e.g., Lyons et al., 2019; Mcquillin & Lyons, 2016). Considering these aspects when designing a mentoring program is crucial to increase their potential effectiveness in improving students' outcomes.

Furthermore, acknowledging DuBois et al. (2002) warning that an inadequate implementation of the program prevents positive effects, and may even display adverse effects, the mentors' training to implement the program as well as the monitoring and support of their work were core aspects of the current study. Grounded on this knowledge, current mentors were provided with ongoing training on both developmental and instrumental components (i.e., establishing and maintaining mentoring relationships and applying instrumental activities) and support through the monitoring meetings along the program implementation. The monthly meetings to monitor mentors work and mentees progress, as well as the observation sessions allowed to check for program integrity and helped identify aspects in need of improvement (e.g., design strategies to help students arrive on time at school, adjust sessions activities to ensure that all mentees follow the contents of the program and achieve the goals set for each session). In sum, these procedures (i.e., mentors training and monitoring) and the practical implications retrieved from the implementation experience highlight: i) the importance of providing mentors and mentees with structure along the mentoring sessions (i.e., setting specific goals and tasks to perform in sessions; training specific competencies), and ii) the need for mentors (together with the monitoring team) to adopt a flexible in-session approach likely to reach all mentees.

Lastly, the current study allows to shed further light on the importance of the school environment in the effectiveness of mentoring programs. For example, throughout the year, mentors and mentees struggled to find a quiet and stable room at the school to run the mentoring groups, and for that reason some sessions were slightly delayed. Therefore, given the importance of the context in the promotion of students' SE (Reschly & Christenson, 2012; Skinner & Pitzer, 2012), future school-based interventions should check for school conditions and resources to implement group mentoring programs (e.g., McQuillin et al., 2011).

3.8. Conclusions

This study adds to literature by providing evidence that the *Compass*, a school-based group mentoring program comprising both developmental and instrumental aspects of mentoring is efficacious in promoting students SE, SRL strategies and GS. These results reinforce the claim that SE and SRL should

be promoted as early as possible to prevent losses in students' learning, especially those resulting from school transitions. Supporting elementary students' efforts to engage in school and class activities and equipping them with SRL strategies and GS skills, may help them deal with the challenges of school transition in an adaptive way.

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Conclusion

Conclusion

"Never underestimate the power of dreams and the influence of the human spirit. We are all the same in this notion: The potential for greatness lives within each of us."- Wilma Rudolph

World change and evolution, particularly their fast pace, is prompting schools and educators to display increasing efforts in reforming and adjusting their educational practices (Kennedy & Sundberg, 2020). In fact, students need to be prepared and equipped with transversal skills to be able to face the emergent challenges that schooling and life may present to them.

Over the last decades, schools have been integrating mentoring programs in their educational practices (Jablon & Lyons, 2021; Lyons et al., 2019), aiming to improve students' academic adjustment (e.g., Laco & Johnson, 2019; Larose et al., 2020) and hopefully reverse their declining engagement trajectories (Meltzer et al., 2020). However, (inter)national data still highlight the persistence of these negative trends. Therefore, aiming to respond to the identified avenues of literature and practice, the current dissertation set two main goals: (i) to understand what factors may contribute to maintain students' disengagement over the compulsory years of education although the known efforts displayed by educators and researchers, and (ii) to acknowledge what have already been done, as well as what has not yet been addressed in prior school interventions to promote successful and engaged academic trajectories of elementary students. We believe that bridging research and practice is crucial to attain these goals and to promote students' development in a sustained way.

Overall, the current research findings are in line with the literature on both mentoring and engagement, targeting students in compulsory education. Alongside the findings depicted in each work, some core aspects could be considered when addressing students at-risk of early school leaving or in school transitions. These aspects are synthesized and integrated below in order to answer the overarching questions and goals that supported this project.

Regarding elementary students' school engagement, the first study [chapter 1], allowed to detail and synthesize valuable information on the antecedents and outcomes of school engagement. By subsuming 35 years of research on the topic this work allowed to examine the role of external (i.e., peers, teachers, and parents; school interventions and school context) and internal factors (i.e., students emotions, behaviors, retention experiences and motivational variables) as facilitators but also as inhibitors of students' engagement; as well as to learn about the school engagement trajectories of students in early years of elementary school, the variables assessed and the relationships between school engagement and academic achievement in multiple subjects. Moreover, this study highlighted the importance of

grounding research and practice on robust theoretical conceptualizations and frameworks to guide research approaches (e.g., targeting all school engagement dimensions due to their reciprocal influence, carefully selecting the sources and methods of data collection) and support the interpretation of findings. This knowledge allowed us to partially meet our second goal (described above) and was crucial to inform the third study [chapter 3].

The second study [chapter 2] emerged to respond to the national need to rescue students at-risk of school leaving from their maladaptive school trajectories. Despite the remediation efforts displayed, over the years, by schools and policymakers to fill this gap and keep students enrolled in school, (inter)national data keeps these students in the crosshairs of interventions. Therefore, informed by literature substantiating the importance of goal setting in the promotion of behavioral change, we developed a school-based mentoring program promoting SMART goal setting skills through the training of self-regulation. Our ultimate purpose was to learn students' goals and future perspectives, particularly to explore whether school enrollment is part of their short-, medium- and long-term future; and to uncover potential changes after their participation in the mentoring program. The qualitative design allowed us to identify the nature of students' goals (i.e., academic and non-academic) as well as the integration of the SMART characteristics. Findings revealed changes in the number and domain of the goals set by students from pre to posttest, favoring the academic domain (i.e., higher number of academic goals); but also, in the integration of the SMART characteristics, that occur exclusively in the academic goals set. The granular analysis also showed differences between the goals set by younger and older students (i.e., just younger students - aged between 12 and 16 years old - set academic goals and integrated SMART characteristics in their goal setting practices; older students -17 years old - only set non-academic goals and did not integrate the SMART characteristics in their goals). In sum, findings highlighted students' instrumental perspectives on the value of being enrolled in school while underscored the importance of considering students' individual characteristics (i.e., students' age at the time of their enrollment in the mentoring program) and school experiences (e.g., cumulative academic failure experiences) when setting school-based interventions, particularly in the case of students at-risk of early school leaving. In fact, when students are provided with support in advanced stages of their school journey, they might already have (and frequently do) associated problems (e.g., academic difficulties, school retentions, familiar and financial concerns) that prevent their engagement (Rowe et al., 2017) and impair their ability to successfully respond to the mentoring intervention (McLaughlin et al., 2013).This study findings meet our first goal, substantiating the limitations of the remediation approaches adopted by schools in the

promotion of students' school engagement through mentoring support; while underscoring the need to act preventively to potentiate students retention in school for longer periods.

The interconnection of the knowledge gathered from these studies [chapter 1 and 2] lead to our third study [chapter 3], a preventive approach providing elementary students with mentoring support during a critical period in their development (i.e., their first school transition). The Compass group mentoring program - a hybrid model of mentoring, were based on the notion that the relationship with a caring adult is important for students' adaptation to the new school but also function as vehicle for realizing instructional activities that allows students to develop and train other skills (DuBois & Karcher, 2005). Therefore, our program was purposefully designed to provide elementary students with support tailored to their developmental and instructional needs during school transition; and adopted several procedures to ensure the fulfillment of students' needs (e.g., mentors training and monitoring; protocoled mentoring sessions and embedding SAFE activities, Durlak et al., 2010; mentors flexible approaches to let students learn at their own pace). The quantitative nature of the study allowed us to assess the efficacy of the program. Results indicated improvements in self-regulated learning, school engagement, and goal setting in students enrolled in the program; while supporting the findings presented in chapters 1 and 2. In fact, the development of school-based interventions theoretically and empirically supported and addressing engagement in their multidimensional perspective [chapter 1] as well as their implementation in early years of compulsory school [chapter 3], before the emergence of problem solving maladaptive patterns or the accumulation of failure experiences [chapter 2]revealed to be core aspects in the promotion of successful academic trajectories and, ultimately, in the fight against school dropout.

We aspire to have achieved the goals set, however we recognize that this work does not represent an end in itself. There are still several aspects to be explored and educational practices to be implemented in addition to those included in the current project. Therefore, in the next topics, we describe some practical implications and research limitations that can be addressed in future works.

Lessons Learned: Practical Implications for Schools

The knowledge retrieved from the systematic review [chapter 1] together with the experience of implementation of the two mentoring programs [chapters 2 and 3] is of great richness as it provides information on key aspects that maximize the quality and sustainability of mentoring interventions with a minimum external support. Therefore, some of major implications and lessons learned from the implementation of the current project are described as follows:

- Mentor selection. Frequently, schools do not have resources to hire teachers to be full-time mentors, which lead them to select mentors within their school staff (Janosz et al., 2019). This

procedure translates into a low-cost solution that fits school needs while providing students with the support needed. However, by constantly having to switch between the roles of teacher and mentor, mentor-teachers may feel overloaded with all the work (i.e., classes, assessment moments, mentoring session planning); which may compromise their performance as mentors (Janosz et al., 2019). Therefore, the academic load of the mentor-teachers should be considered when selecting mentors to play the mentor role.

- School mobilization and support network. School strategy when approaching mentoring interventions should also be considered. Therefore, while ensuring the needed resources to implement the program (e.g., quiet rooms, session activities and materials), schools should involve and inform all school staff about the mentoring program. This procedure may help reduce teachers' resistance to be mentors and/or to collaborate with mentors during the program implementation (e.g., providing mentors with feedback/information from targeted students progresses or setbacks; Janosz et al., 2019). Moreover, schools could consider assigning specific teams to run the projects embraced. In the case of mentoring programs this strategy is even more relevant since it allows to create a group support with which mentors could share their experiences, reflect upon their role, seek help, and discuss new strategies to meet their students' educational needs. This network group support would allow to develop a positive atmosphere in school (where mentors can further improve their skills); otherwise, mentors could feel isolated and unsupported.
- Mentors' training, support, and monitoring. Mentors' ongoing training and support are fundamental aspects to maximize the quality of the programs' implementation (DuBois et al., 2011; Spencer, 2007). Sometimes mentors can feel overwhelmed by the severity and diversity of students' needs, feeling hopeless. To help teachers feel more confident and competent to support their mentees, is important to offer them preimplementation training and support (e.g., simulation of mentoring sessions), focusing both relationship building and instrumental skills (e.g., Janosz et al., 2019; Lyons et al., 2019). Moreover, to support mentors during the implementation process as well as to ensure treatment fidelity is important to provide them with scripted protocols to follow while performing mentoring sessions (e.g., comprising the materials and activities to be performed and the goals to be achieved in each session). These protocols help to standardize mentors' approaches while providing structure to their task.

In sum, schools could consider integrating these practices and lessons learned in future mentoring interventions to increase their potential effectiveness in the promotion of students' engagement and adaptive academic trajectories.

Limitations and Future Research

Along with the scientific contributions, the current project was constrained by some limitations that should be acknowledged. First, and despite the efforts to reach larger samples, capturing distinct geographic areas and targeting heterogeneous populations of (at-risk) students, the findings of the current project, specifically of chapters 2 and 3, are based on elementary and middle-school students enrolled in schools located in the north of Portugal. This limitation was difficult to circumvent for different reasons such as, the time-consuming qualitative methodology [chapter 2], the high-levels of dropout that prevail when targeting at-risk students for school interventions [chapter 2] and the resistance of parents and guardians in allowing their children to enroll in school-based mentoring programs [chapter 2 and 3]. Moreover, the increasing number of project proposals and interventions presented to schools to help them provide differentiated and adjusted responses to their students, together with their limited and overloaded resources (e.g., teachers) to carry out the projects, lead to an unavailability and saturation of the schools. It would be important for school administrators to reflect on this issue in order to balance the number of projects and resources, and consequently their success.

Furthermore, and grounded on prior research indicating that students' reports of their internal processes (e.g., school engagement, self-regulation strategies used) are more accurate (and therefore best-fitted to our purposes) than external reports (e.g., teachers, Kaiser et al., 2013; Stroet et al., 2013), our studies [chapter 2 and 3] relied on students' self-reports (i.e., questionnaires, self-set goals). However, including and triangulating data through other methods and from other sources of information could also be of interest. Despite not being addressed in the works presented, we also performed interviews with the enrolled students, mentors, and class directors [chapters 2 and 3] that will be examined in future studies. However, we still believe that the perspective of parents and peers as well as school records and students' observations (while in mentoring sessions), could also have contributed to deep our understanding of the underlying processes of mentoring (e.g., mentor-mentees and peer relationships) and students' engagement (e.g., engaging aspects of interventions and classes). Future research may address these or explore other ways and targets to collect data.

Finally, future studies could consider including parents on school-based mentoring programs. Despite the efforts displayed in the current project to inform and engage parents in their children school life (e.g., elaborating awareness-raising actions to explain the purposes of the studies, the content covered

in mentoring programs, the role of mentors, between others), they seem to be insufficient to fill this gap. For this reason, future studies may consider targeting parents together with their children when designing mentoring interventions (e.g., afterschool interventions to meet both parents and students' schedule). In fact, parents are important models for their children and through participating or collaborating with the mentor can help model their engagement behaviors, follow the contents approached and support their children while applying and transferring the skills learned to other contexts (e.g., home).

Altogether, these data may contribute to better understanding students' engagement in school and school-based programs and identify how to increase the potential effectiveness of school-based mentoring interventions.

Final Remarks

As priorly mentioned, mentoring is a flexible and promising tool applied in diverse settings to reach manifold purposes (DuBois et al., 2011; McDaniel & Yarbrough, 2016). However, and even when properly implemented, the expectations for their impact on students' academic pathways, should be moderated. As Rhodes et al. (2002) refer "too often, mentoring cannot make up for years of accumulated failure of the educational system and scars from other failures of family, community, and the economy. Mentoring alone is not a magic wand." (p. 154).

The findings depicted in the current project consider and underscore the importance of the attempts and distinct efforts made by schools, educators, and policy makers over the last decades to support students in their school journey. However, also reiterate the need to tailor interventions responsive to students' individual characteristics and experiences in early years of elementary school. In fact, despite sharing a similar educational path (i.e., compulsory education), integrating similar school programs (with the same subjects) and facing similar academic challenges, students still have different perspectives about school and distinct learning trajectories.

Hand in hand with the schools and educators fostering students' positive development, this project contributed to equip students with the necessary skills to assume an agent role in their life and to deal with the emergent challenges in an adaptive way. This way, students are prepared to take the reins of their school path and find their way to success (in school and in life); because only by being an agent [being their own compass], students could be able to set their route and the strategies needed to keep on track to reach their destination, their greatness.

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