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**SOFT SKILLS, STUDY-RELATED FACTORS, WELLBEING, AND
ACADEMIC ACHIEVEMENT IN 10-18 YEARS OLD STUDENTS**

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Introduction

Soft skills are malleable personal characteristics that regulate individuals' behaviors, thoughts, and emotions, enabling them to consequently reach their personal goals and well-being (N. Park et al., 2004; Robles, 2012). Soft skills received great attention in later years because of their impact in the labor market and their relations with positive outcomes in adulthood (Bruna et al., 2019; Deming, 2017; Heckman & Kautz, 2012; Schulz, 2008; World Economic Forum, 2020). Their importance brought many national and international organizations, as well as scholars, at pointing at them as crucial factors for community growth and education that should be sustained and developed since school age (European Commission, 2016; Heckman, 2011; Ministry of Education, University and Research, MIUR, 2018; Pellegrino & Hilton, 2012; World Economic Forum, 2016). Despite this, a clear investigation of the role of soft skills for school-aged students is still missing, and prior research generally focused on the direct link connecting single soft skills to students' academic achievement. For this reason, I will try to fill this gap with a series of studies considering soft skills, academic achievement, and students' wellbeing. In addition, there is great confusion on the terms used to indicate soft skills (e.g., character skills, character strengths, life skills, social and emotional learning competencies, learning mindsets, developmental assets, or noncognitive skills) (D. Park et al., 2017) and on which soft skills should be considered (i.e., a common framework is missing). Heckman and Kautz (Heckman & Kautz, 2012), for example, interchange soft skills and personality factors, while others focus on character (D. Park et al., 2017), interpersonal skills (Pant & Baroudi, 2008), or a mix of these (Velasco, 2012), making it difficult to draw reliable conclusions. To solve this issue, I relied on one specific definition of soft skills and the framework proposed by the World Economic Forum (2016) to categorize and select soft skills.

In particular, the present dissertation comes with a double aim as it mainly follows a research and a practical aim. For what concerns the research part, the project aimed at i) integrating soft skills into more classical models of academic achievement (i.e., studying their relations with study-related

factors) to study the role of soft skills for students' academic achievement and wellbeing and to study the malleability of soft skills, ii) evaluating their relations with the practice of extracurricular activities and planning specific training for soft skills. However, the Covid-19 pandemic disrupted the project plans, and I have not been able to run the two planned studies on i) the relation between soft skills and the practice of extracurricular activities because students could not participate in extracurricular activities anymore during years 2020 and 2021 (such relation was only explored in Study 1 and Study 2) ii) the effect of training for soft skills, because it was not possible to meet the students and follow their activities in person. These two studies were substituted with a deeper theoretical analysis of one of the soft skills: adaptability (i.e., the ability to regulate one's behaviors, emotions, and thoughts efficiently in uncertain situations). Adaptability was chosen because of its unreliable relations found in Study 1 and Study 2 with the variables of interest (i.e., Study 3) and because of the critical role that adaptability might have played in sustaining students during the pandemic in academic and non-academic situations (i.e., Study 4). Finally, the practical part of the work I conducted permitted us to support Pentathlon S.r.l. – the company that funded the PhD – by providing scientific content for their site and developing a section of soft skills empowerment. The project is, in fact, a collaboration between the Department of General Psychology of the University of Padova and Pentathlon S.r.l., a private company that aims at understanding and deepening the concept of soft skills and at measuring and developing soft skills in school-aged students. Consequently, the entire project is a strict collaboration between the two entities and tries to merge practical and research questions into a unitary work.

Structure of the thesis

The first chapter of the thesis covers the theoretical foundation of the following chapters. In **Chapter 1**, an outline of the definition and categorization of soft skills will be provided, also framing soft skills into the academic achievement domain. The model of soft skills proposed by the World Economic Forum (World Economic Forum, 2016) will be presented in detail as it will be adopted as

the model of reference for the rest of the thesis. Study-related factors (in terms of self-regulated learning [SRL] strategies, academic motivation, achievement emotions, and cognitive abilities) will be defined, and their association with soft skills and academic achievement will be deepened. Finally, the concept of life satisfaction and posttraumatic growth will be introduced as essential factors to be considered in students, and their relations with soft skills and the above-mentioned study-related factors will be highlighted.

Chapters 2 to 5 present in detail the four studies conducted. These chapters have a standard structure: rationale of the study, presenting aims and hypotheses, participants, materials, procedure, results, and discussion. An overview of the studies conducted, specifying aims, participants, variables considered, and the graphical representation of the results, is available in Table 1.

Chapter 2 presents the first study that examines the relation of soft skills, SRL strategies, academic motivation, and cognitive abilities with academic achievement. Soft skills will be treated as a direct predictor of SRL strategies and academic motivation that should, in turn, favor students' academic achievement.

Chapter 3 introduces life satisfaction and achievement emotions into the model proposed in the first study to measure the association between soft skills and more qualitative aspects of students' lives, thus painting a more holistic and informative picture of the students. A Bayesian approach will be used to directly test and replicate the results obtained in the first study: soft skills only have an indirect relation with academic achievement. In addition, the associations between soft skills and both achievement emotions and life satisfaction will be evaluated.

Given that it was impossible to continue with the studies about soft skills' malleability, Studies 3 and 4 were planned from the results previously obtained. To deepen the results obtained in the first two studies and question some unreliable association between single soft skills and the other variable considered, **Chapter 4** focuses on adaptability (one of the soft skills previously considered). After a brief theoretical definition of the construct, its relations with achievement emotions, SRL strategies,

motivational factors, life satisfaction, and academic achievement will be examined in a large sample of school-aged students. Here again, I hypothesize that adaptability, in line with soft skills in general, will promote positive study-related factors that mediate its relationship with academic achievement. At the same time, however, adaptability was expected to relate to students' life satisfaction directly.

Chapter 5 is the last empirical chapter and is situated within the Covid-19 pandemic (given that the study was conducted between September 2020 and June 2021, a period that was characterized by pandemic restrictions). Study 4 will longitudinally focus on the role of adaptability in promoting a positive adaptation to the Covid-19 restrictions for what concerns school (i.e., keeping engagement high and adjusting one's SRL strategies to obtain higher academic achievement) and post-traumatic growth in school-aged students.

Chapter 6 shifts the attention from the research questions to the practical application of the project. Here I will briefly outline how the research work has been integrated within the Pentathlon S.r.l. project, which takes the form of an organized set of services provided through an online platform to students, parents, and teachers. The three functionalities of the platform that were explicitly linked to my work and to the empirical questions we addressed will be presented.

Finally, **Chapter 7** offers a general discussion of the relevant results obtained and concludes about the role of soft skills for students.

Table 1. Overview of four studies conducted

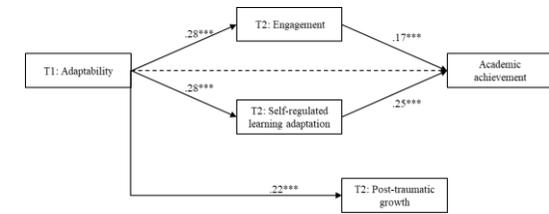
Study and aims	Participants (final samples)	Variables considered	Graphical representation of the results
<p>Study 1 – cross-sectional. The study aims to examine the association between soft skills and academic achievement when also considering study-related factors in the model. The hypothesis being that soft skill’s effect on academic achievement is fully mediated. The association between soft skills and extracurricular activities will also be explored.</p>	<p>460 students $M_{age} = 13.68$ ($sd = 2.51$)</p>	<p>Soft skills Cognitive abilities Academic motivation SRL strategies Academic achievement Extracurricular activities</p>	<p>Path diagram for Study 1 showing relationships between Extracurricular activities, Soft skills, Cognitive abilities, Self-regulated learning strategies, Academic motivation, and Academic achievement. Path coefficients: Extracurricular activities to Soft skills (.15*), Extracurricular activities to Cognitive abilities (-.04), Soft skills to Cognitive abilities (.06), Cognitive abilities to Soft skills (.46*), Soft skills to Self-regulated learning strategies (.51*), Cognitive abilities to Self-regulated learning strategies (.23*), Self-regulated learning strategies to Academic motivation (.20*), Cognitive abilities to Academic motivation (.04*), Cognitive abilities to Academic achievement (.21*), Academic motivation to Academic achievement (.20*), and Extracurricular activities to Academic achievement (.31*).</p>
<p>Study 2 – cross-sectional. The study aims to replicate the results obtained in Study 1 using a Bayesian approach and extend the model to more qualitative aspects of students’ lives, such as achievement emotions, and life satisfaction. The hypothesis being that soft skills directly promote achievement emotions, and life satisfaction. The association between soft skills and extracurricular activities will also be explored.</p>	<p>603 students $M_{age} = 13.53$ ($sd = 1.91$)</p>	<p>Soft skills Cognitive abilities Academic motivation SRL strategies Achievement emotions Academic achievement Life satisfaction Extracurricular activities</p>	<p>Path diagram for Study 2 showing relationships between Extracurricular activities, Soft skills, Cognitive abilities, SRL strategies, Positive/Negative emotions, Academic motivation, Life satisfaction, and Academic achievement. Path coefficients: Extracurricular activities to Soft skills (.16), Extracurricular activities to Cognitive abilities (-.17), Soft skills to SRL strategies (.38), Soft skills to Positive emotions (.54*), Soft skills to Negative emotions (-.19*), Cognitive abilities to SRL strategies (.30), Cognitive abilities to Positive emotions (.16), Cognitive abilities to Negative emotions (-.16), SRL strategies to Academic motivation (.19), Positive emotions to Academic motivation (.29), Negative emotions to Academic motivation (-.17), Academic motivation to Academic achievement (.21), Academic motivation to Life satisfaction (.17), Positive emotions to Life satisfaction (.16), Negative emotions to Life satisfaction (-.17), and Extracurricular activities to Academic achievement (.31).</p>
<p>Study 3 – cross-sectional. The study aims to examine the association between adaptability (which showed unreliable results in Study 1 and 2), study-related factors, academic achievement, and life satisfaction. The hypothesis being in line with the other two studies: the relation with academic achievement, but not the one with life satisfaction, is fully mediated by study-related factors.</p>	<p>1083 students $M_{age} = 13.37$ ($sd = 1.97$)</p>	<p>Adaptability Academic motivation (self-efficacy) SRL strategies Achievement emotions Academic achievement Life satisfaction</p>	<p>Path diagram for Study 3 showing relationships between Adaptability, SRL strategies, Achievement emotions, Academic self-efficacy, Life satisfaction, and Academic achievement. Path coefficients: Adaptability to SRL strategies (.33***), Adaptability to Achievement emotions (.40***), Adaptability to Academic self-efficacy (.27***), SRL strategies to Life satisfaction (.05), Achievement emotions to Life satisfaction (.07*), SRL strategies to Academic achievement (.11***), Achievement emotions to Academic achievement (.30***), Academic self-efficacy to Life satisfaction (-.01), and Academic self-efficacy to Academic achievement (.19***, .38***).</p>

Study 4 – longitudinal.

The study aims to examine the longitudinal association between students' adaptability and scholastic and nonscholastic outcomes during the Covid-19 pandemic. The hypothesis being the adaptability might have sustained students during such a complex and uncertain situation.

435 students
 $M_{age} = 13.27$
($sd = 2.13$)

Adaptability
SRL strategies (adaptation)
Engagement
Academic achievement
Posttraumatic growth



1. Theoretical background

1.1. Soft skills: definition and frameworks

The term ‘soft skills’ indicates a broad, multidisciplinary set of individuals’ characteristics that are malleable and that regulate behaviors, thoughts, and emotions in the individuals, consequently enabling them to reach personal goals and wellbeing in different situations (N. Park et al., 2004; Robles, 2012). The broad term ‘soft skills’ posits its roots in McClelland’s work (see McClelland, 1973) on the practical need to acquire competencies rather than intelligence. Despite the long time passed since this work and the agreement on the importance of soft skills for, among the others, success, happiness, and satisfaction in adulthood (Andrews & Higson, 2008; Deming, 2017; Fernandez & Liu, 2019; Heckman & Kautz, 2012; Ritter et al., 2018; Robles, 2012; Schulz, 2008; Winstead et al., 2009; World Economic Forum, 2020), there is still much debate around this concept. Indeed, soft skills are often named differently, with other terms being used such as basic, personal, or character skills, socioemotional competencies, or personal qualities (Chamorro-Premuzic et al., 2010; Dolce et al., 2020; D. Park et al., 2017). Soft skills also often represent different conceptual underpinnings. With, for example, Heckman and Kautz interpreting them as trainable personality traits (Heckman, 2011; Heckman & Kautz, 2012), and others referring to them as competencies or abilities (Chamorro-Premuzic et al., 2010; Leveson, 2000) that refer to different areas such as skills needed for interpersonal relationships (Pant & Baroudi, 2008), task-management, self-awareness, or more of these abilities together (Bennett et al., 1999; Dolce et al., 2020; Velasco, 2012). A third cause of debate is how soft skills are categorized and selected (see Bhagra & Sharma, 2018 for a review). Soft skills, in fact, are usually listed from sets of desired characteristics that are intended to promote job success and that are functional to both the employee and the employer, or that are supposed to encourage high levels of social participation, wellbeing and individuals’ life satisfaction and growth (Andrews & Higson, 2008; European Commission, 2016; McClelland, 1973; Peterson & Seligman, 2004; Robles, 2012; Schulz, 2008; Taylor, 2005; World Economic Forum, 2016, 2020). It should also

be noted that these categorizations and definitions generally come from the labor market or economics and do not consider the educational setting or academic achievement, which are the focus of my work. For this reason, a different approach was needed, and not all the soft skills might apply well.

To overcome this issue, for this dissertation, I will adopt the definition of soft skills as malleable personal qualities that regulate emotions, behaviors, and cognition, enabling us to achieve our goals (N. Park et al., 2004; Robles, 2012). This definition differs from the original ones mainly based on soft skills' relations with job outcomes, or, in general, with success. In fact, the definition adopted focuses on the personal aspects that soft skills regulate (emotional, behavioral, and cognitive), and it gives the opportunity to deeply reflect on the psychological processes underlying success (and wellbeing) in people with a high level of soft skills, also referring to different contexts including educational and academic ones. I will also adopt the framework for soft skills proposed by the World Economic Forum (World Economic Forum, 2016). In fact, despite many authors, institutions, and organizations promote the development of soft skills since school age and provide upgrading paths to be integrated into typical academic curricula (e.g., European Commission, 2016; Heckman, 2011; Ministry of Education, University and Research, MIUR, 2018; Pellegrino & Hilton, 2012), the list of to-be-considered soft skills generally comes from a labor market analysis, as previously mentioned. On the contrary, the World Economic Forum model (World Economic Forum, 2016) binds learning and job requests into a single model, coming up with a tripartite framework. This includes a branch for character qualities (e.g., curiosity, adaptability), a branch for literacy (e.g., math, science, languages), and one for competencies (e.g., problem solving, communication, creativity). All these soft skills were already defined in the psychological literature as single constructs, allowing us to understand and precisely define the specific soft skills, also considering their relations with academic and non-academic outcomes. In addition, this model is similar to many of the other models in its tripartite structure (see, for instance, Pellegrino & Hilton; 2012, N. Park et al., 2017; Schulz, 2008), and it is quite concise. Finally, between the three branches of the model, I will only consider the

character qualities branch that includes six soft skills: adaptability, curiosity, initiative, leadership, perseverance, and social awareness. Here are their definitions:

- *Adaptability* refers to the capacity to constructively regulate psycho-behavioral functioning in response to new, changing, or uncertain circumstances, conditions, and situations (Martin, 2017; Martin et al., 2012, 2013).
- *Curiosity* refers to the desire to learn and discover that drives people to explore and acquire new information. A curious person feels engaged and interested whenever they see an opportunity for learning or experiencing something new (Berlyne, 1960; Kashdan et al., 2018).
- *Initiative* refers to the tendency to intentionally improve oneself and describes individuals who tend to be ready for growth, plan it, know how to use and allocate resources for growth, and intentionally decide to engage in activities to grow (Robitschek, 1998; Robitschek et al., 2012).
- *Leadership* refers to the ability to influence others and help them contribute to a group's success (Peterson & Seligman, 2004).
- *Perseverance* refers to the inclination to work hard even when facing difficulties. It entails working strenuously, keeping interest and effort over time despite failures, setbacks, adversity, and plateaus (Duckworth et al., 2007).
- *Social awareness* refers to an individual's sense of responsibility for the community and their ability to interact with other people in a socially, culturally, and ethically appropriate way (Peterson & Seligman, 2004; World Economic Forum, 2016)

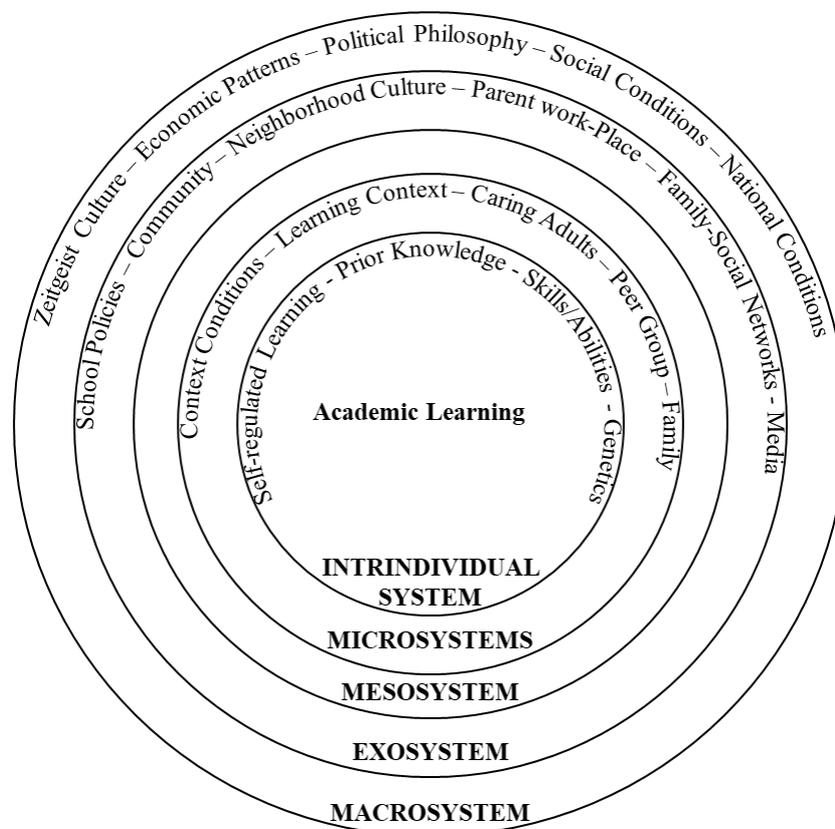
1.2. A global framework for soft skills and study-related factors in academic achievement

Academic achievement is a widely used indicator of scholastic performance. It has proved crucial to people's careers, and scholars paid great attention to it (Spinath, 2012). Research on academic achievement generally focused on its predictors, trying to individuate both internal

individual differences able to promote academic achievement and external or environmental factors (e.g., socioeconomic status, school climate) that could promote it (Kuh et al., 2006; York et al., 2015). For what concerns internal individual differences, Ben-Eliyahu and collaborators (Ben-Eliyahu, 2019; Ben-Eliyahu & Bernacki, 2015) recently proposed to consider an intraindividual system to understand better the relations between students' characteristics and their academic achievement (see Figure 1.1). In particular, such an intraindividual system should include all the internal factors driving the "individual's trajectory through development" (Ben-Eliyahu, 2019 p. 85), considering, for example, the emotional and affective aspects of learning. The factors considered by the authors range from school-specific characteristics, such as SRL strategies, academic motivation, and emotions (that I will define below), to cognitive abilities and even genetics information (Ben-Eliyahu, 2019). Among these factors, they also included personal skills – what I now aim to consider in such a model in terms of soft skills. The intra-individual system thus provides a good theoretical foundation for integrating soft skills along with other individual characteristics involved in academic achievement since soft skills encompass the individual's general qualities. Adopting such a large model might prove important because considering the interrelations between different parts of the intra-individual system could help us better understand the underlying mechanisms that promote learning and performance. Indeed, considering the different aspects separately could highlight only direct relations with academic achievement without really understanding the mechanism that could favor it in the very end.

In the following paragraphs, I will present some of the more important study-related factors linked to higher academic achievement and discuss the associations between soft skills and academic achievement, also considering the plausible interrelations that might occur between all these components of the intraindividual system.

Figure 1.1 The intraindividual system of learning (adapted from Ben-Eliyahu, 2019)



1.2.1. Study-related factors and academic achievement

Among the best predictors of academic achievement included in the intraindividual system, SRL strategies, academic motivation, and cognitive abilities proved as three of the most important (Huang, 2011; Richardson et al., 2012; Roth et al., 2015; Winne & Nesbit, 2010).

1.1.1.1. Cognitive abilities

Cognitive abilities, in particular, include the skills involved in thinking, memorizing, and processing information from study materials and are considered the strongest direct predictors of academic achievement (Roth et al., 2015). General intelligence, in terms of abstract reasoning or fluid intelligence, is recognized as the best predictor of academic achievement among the various cognitive abilities (Roth et al., 2015). Large and positive relations have also been found for what concerns

working memory, spatial abilities, and problem solving, for example (Friso-van den Bos et al., 2013; Greiff et al., 2012; Greiff & Neubert, 2014; Lubinski, 2010; Peng et al., 2016; Stieff & Uttal, 2015; Wai et al., 2009). These factors, even if having specific properties, can generally converge to form a single general g factor (Johnson & Bouchard, 2005) that, following the categorization of Richardson and collaborators, represents what students *can* do (Richardson et al., 2012).

1.1.1.2. *Self-regulated learning strategies*

SRL strategies are a fundamental aspect of learning that represents *how* students approach their learning materials (Richardson et al., 2012). In particular, SRL strategies refer to the active process in which students carry out, plan, monitor, adapt, and self-evaluate their learning activities (Panadero, 2017). Students' use of SRL strategies is hypothesized to follow a loop cycle composed of different steps that generally cover at least three phases (Zimmerman, 2000). In the preparatory phase (*forethought*), the students carefully analyze the task at hand, decide what they want to obtain setting one's goals, and plan the activities to reach them. In the *performance* phase, the students carry out the tasks while also monitoring how they perform or whether the adopted strategies are working. In the *self-reflection* phase, the students reflect on how they performed, also making attribution about why things worked or not, influencing the way they will approach future learning tasks (Pintrich, 2004; Schunk & Zimmerman, 2011; Winne & Hadwin, 1998; Zimmerman, 2000, 2008, see Figure 1.2). Appropriate use of the SRL strategies and a metacognitive self-evaluation and comprehension of how the tasks are progressing at different stages of the cycle will eventually favor students' academic achievement (Credé & Phillips, 2011; Richardson et al., 2012). In other words, self-regulated learners: set themselves functional goals and organize their studies; know and use study strategies; assess their learning process, knowledge, and test results; and have a metacognitive awareness of their learning process and abilities (Panadero, 2017). However, the different phases of the SRL cycle are strongly intertwined with students' motivation and emotions (Ben-Eliyahu, 2019; Efklides, 2011; Mega et al., 2014; Panadero, 2017; Pekrun, 2000, 2006; Pekrun et al., 2002). With

emotions and motivation that favor the use of functional SRL strategies –especially in the first two phases– and that, on the other side, are expected to be directly affected by the use of SRL strategies, in particular during the last self-reflection phase in which the students make attributions and strengthen their beliefs (Panadero, 2017).

Figure 1.2 The self-regulated learning cycle (adapted from Zimmerman & Moylan, 2009).



1.1.1.3. Academic motivation

Academic motivation is a broad term that defines the students’ internal drive that energizes, directs, and sustains students toward the attainment of academic goals, and it has a prominent role between the direct predictors of academic achievement (Kriegbaum et al., 2018; Liem, 2021; Robbins et al., 2004; Valentine et al., 2004). Many models of academic motivation have been proposed in the literature (Lavrijsen et al., 2021; Pintrich, 2003; Ryan & Deci, 2020) considering the different components of academic motivation. For this thesis, however, I will focus, among the others, on three

aspects of academic motivation that, in line with Mega and collaborators (Mega et al., 2014), may well represent a general factor for academic motivation:

- *Self-efficacy* represents one's belief about future performance in academic tasks (Bandura et al., 1997) and is measured by asking participants how much they are convinced they will be able to succeed in specific tasks (Bandura, 2006).
- *Learning goals* represent the purpose that a student pursues when engaging in academic achievement tasks (Dweck & Leggett, 1988; Huang, 2012). Here I conceptualize learning goals in a continuum between performance goals (i.e., the student approaches the task to show his/her ability) and mastery goals (i.e., the student approaches tasks to gain knowledge and develop his/her competence).
- *Implicit theories of intelligence* represent the idea that the students have about their intelligence, with incremental theories of intelligence representing the idea that intelligence is malleable, increasable, and controllable and entity theories of intelligence that represent the idea that intelligence is fixed and uncontrollable (Dweck, 1999).

The three factors emerged as significant predictors of academic achievement in different meta-analyses (Costa & Faria, 2018; Kriegbaum et al., 2018; Richardson et al., 2012; Robbins et al., 2004), with self-efficacy generally having the strongest direct relation with academic achievement (Kriegbaum et al., 2018). Self-efficacy, learning goals, and implicit theories of intelligence also correlated with each other and with SRL strategies (Efklides, 2011; Huang, 2012; Mega et al., 2014). Differently, cognitive abilities are mainly orthogonal or have small relation to SRL strategies and motivation (Köller et al., 2019; Kriegbaum et al., 2018; Lavrijsen et al., 2021; Zuffianò et al., 2013) that consequently promote academic achievement over and above the effect of cognitive abilities (Kriegbaum et al., 2018; Lavrijsen et al., 2021).

1.1.1.4. Achievement emotions

Another important affective aspect of academic achievement is achievement emotions (Pekrun, 2006; Pekrun et al., 2002). The term achievement emotions refers to students' emotions about their academic activities (e.g., studying, listening to the teachers) and outcomes (e.g., test success). More specifically, under the control-value theory (Pekrun, 2006), achievement emotions stem from the importance that students give to the actual performance (i.e., value appraisal) and the perceived sense of control that students have about their learning tasks and situations (Pekrun & Stephens, 2010).

Achievement emotions play an essential role in academic achievement because they affect students' motivation and their use of SRL strategies (Mega et al., 2014; Pekrun et al., 2002). In particular, Pekrun and collaborators (Pekrun et al., 2002, 2007) propose that positive achievement emotions should promote metacognitive thoughts, the use of creative learning strategies, and a stronger motivation to study. Conversely, negative achievement emotions are detrimental because they reduce cognitive resources and induce students to adopt rigid, ineffective strategies, lowering their academic motivation. Again, self-efficacy and learning goals should be strictly related to the control and value component of achievement emotions (Pekrun, 2006). Thus, the role of achievement emotions for academic achievement might be twofold: on one side, achievement emotions should directly relate to academic achievement; on the other, their effect might be fully mediated by other aspects, such as SRL strategies and motivation (Daniels et al., 2009; Heffner & Antaramian, 2016; Huang, 2011; Linnenbrink, 2007; Mega et al., 2014; Pekrun et al., 2002, 2011; Putwain et al., 2020).

In line with the above discussion, I will categorize emotions depending on their valence (i.e., positive or negative); I will consider achievement emotions as direct predictors of SRL and motivation and potential direct predictors of academic achievement (e.g., Mega et al., 2014).

1.2.2. Soft skills and academic achievement. Direct and indirect relations

Direct relations. Unlike the literature on the predictive role of soft skills for labor outcomes, literature about the association between soft skills and academic achievement is generally poorly structured, with researchers narrowly focusing on single soft skills from different theoretical standpoints. This makes it difficult to draw conclusions on the role that soft skills might play for students' academic achievement. However, a positive effect of soft skills on students' academic achievement emerges. For example, curiosity has been named the third pillar of academic achievement (von Stumm et al., 2011), and perseverance is considered one of the most important predictors of success over and above the role of cognitive abilities (Credé et al., 2017). In particular, a sizable body of results, including meta-analyses, suggests a positive direct relation between curiosity and academic achievement (Gatzka & Hell, 2018; Hassinger-Das & Hirsh-Pasek, 2018; Richards et al., 2013; von Stumm & Ackerman, 2013), perseverance and academic achievement (Bowman et al., 2015; Credé et al., 2017; Duckworth et al., 2007; Muenks et al., 2017; Wolters & Hussain, 2015), adaptability and academic achievement (Collie & Martin, 2017; Holliman et al., 2019; Tarbetsky et al., 2017), social-emotional competences and academic achievement (Durlak et al., 2011), but also between leadership or initiative and academic achievement (García-Almeida & Cabrera-Nuez, 2020; Lounsbury et al., 2009; Wagner & Ruch, 2015). It often happens, however, that the reason why these factors should be related to academic achievement is not well explained and the association is only exploratory studied without focusing on the processes and the mediating factors that might bring a curious, an adaptable, or a leader student, for example, to reach higher academic achievement. In other words, these studies generally do not integrate soft skills, or the single soft skills, into an intraindividual model of academic achievement and can only suggest that the single soft skills might promote academic achievement when not controlling for other study-related factors. Perseverance, for example, which has been widely associated with success and academic achievement, refers to one's tendency to persist in his/her goals on the long run despite setbacks and

difficulties (Duckworth et al., 2007), however this does not assume that academic achievement is one of the long-term goals that students' posit for themselves. In that case, perseverance should not favour those students' academic achievement, but we may find perseverance in students only when they also show behaviors, thought, and feelings that correspond to a student who is persevering through his or her academic achievement. This request integrating perseverance, and soft skills in general, into a more complete model of learning, such as the intraindividual model that allows considering soft skills together with other positive predictors of academic achievement.

Indirect relations. The general definition of soft skills highlights their role as regulators of thoughts, behaviors, and emotions that consequently enable the individuals to achieve their goals (i.e., at school, soft skills should promote those behaviors, thoughts, and emotions that, when adopted, will promote academic achievement). For this reason, it seems crucial to include these mediating factors into the model when studying soft skills. In the case of academic achievement, we can consequently argue that soft skills should promote behavioral, cognitive, and emotional aspects of learning such as the use of SRL strategies, students' motivation, and the emotions they feel when studying, or at school in general. Previous studies already proved these relations: single soft skills resulted associated with achievement emotions (Dametto & Noronha, 2020; Holliman et al., 2021; Özsaray & Eren, 2018; Robitschek & Keyes, 2009; Weber et al., 2016; Zhang et al., 2021); motivation, in term of self-efficacy, learning goals, and theories of intelligence (Anderson et al., 2020; Martin et al., 2012, 2017; Muenks et al., 2017, 2018; Ruch et al., 2014; Usher et al., 2019; Wolters & Hussain, 2015); and SRL strategies (Burns et al., 2018; Chan et al., 2012; Martin et al., 2013; Pekrun et al., 2017; Richards et al., 2013; Weisskirch, 2018; Wolters & Hussain, 2015). Interestingly, when these factors were controlled or added to the analyses, the relation between the single soft skills considered and academic achievement resulted very small or null (Chan et al., 2012; Muenks et al., 2017, 2018; Powell & Nettelbeck, 2014; Richards et al., 2013; Wolters & Hussain, 2015) suggesting that soft skills might only have a mediated effect on academic achievement. For example, Muenks and collaborators

(Muenks et al., 2017) examined the association between perseverance and academic achievement with a regression model that also included SRL factors. In this case, SRL maintained a stronger relationship with academic achievement, but perseverance's effect resulted very small. In line with the just-mentioned definition of soft skills, the authors argue that perseverance (similarly to the other soft skills) plays its role at a more distal level from academic achievement than SRL, which is strictly connected and specific to academic achievement learning. Wolters and Hussain (2015) also came to the same conclusion when adding SRL facets and self-efficacy into a series of different multiple regressions, perseverance was a positive predictor of SRL strategies, academic motivation, and academic achievement. On the contrary, when they entered SRL strategies and academic motivation into the model as predictors, perseverance did not show any direct associations with academic achievement. Similar examples are also available for other soft skills, such as curiosity (Chan et al., 2012). Chan and colleagues show that in a large sample of Honk Kong high school students, curiosity favors the adoption of deep learning strategies and mastery learning goals that favor academic achievement in a path analysis model, contradicting what pairwise correlations between curiosity and academic achievement show. Indeed, study-related factors appear to serve as a mediating pathway through which the different soft skills influence students' academic achievement.

1.2.3. Summary: soft-skills and study-related factors

In light of the brief review of the literature on soft skills (treated as single separate constructs) and their associations with study-related factors and academic achievement, it seems plausible that soft skills are general personal features that transversally help the individuals in reaching their specific goals by the regulation of behaviors, thoughts, and emotions. This might well apply to the scholastic field; in fact, soft skills resulted positively related to study-related factors (e.g., SRL strategies, academic motivation, achievement emotions) that in turn the attainment of higher grades at school. Soft skills, in other words, will eventually favor academic achievement only when they will promote the adoption of behaviors, thoughts, and emotions that are functional to academic achievement.

Otherwise, for instance, someone might take the initiative without carefully considering the situation and considering which strategies to adopt (SRL at school), thereby lowering their chances of success in the task at hand. In another case, one's curiosity might bring the student to pay attention to things that are not useful for the test, thus improving his/her learning but possibly affecting their performance at school negatively. Curious students should, for example, also be able to self-regulate their learning depending on both their interests and their teachers' requests.

1.3. Soft skills and well-being: relations with life satisfaction and growth

The current paragraph introduces other two factors that will be taken into account from Study 2 onwards: life satisfaction (i.e., one's cognitive evaluation of contentment with life; Diener et al., 1985) and posttraumatic growth (i.e., individuals' positive and enduring changes in self-perception following particularly stressful events; Tedeschi & Calhoun, 1995). This permits capturing a more holistic image of the students without only focusing on performance outcomes, such as academic achievement, but also caring about their wellbeing (Suldo et al., 2006; Weber et al., 2016). In addition, York and collaborators (York et al., 2015) conceptualize academic success as a combination of different academic outcomes, including students' academic achievement and life satisfaction. Considering both should be of primary importance (van der Zanden et al., 2018) given that academic achievement and life satisfaction, or one's cognitive evaluation of contentment with his/her life (Diener et al., 1985; York et al., 2015), are two almost-unrelated constructs (Ng et al., 2015; Suldo et al., 2008). Indeed, considering life satisfaction gives us a more holistic picture, envisaging students as more than just learners (Huebner & Hills, 2011; Terjesen et al., 2004). Considering life satisfaction, in addition, may also help understanding why soft skills may have a prominent role for school-aged students together with all the other study-related factors. Post-traumatic growth is another aspect that emerged as particularly important for students' well-being in difficult and stressful situations. This was considered following the spread of the Covid-19 pandemic and was included in my last study (Study 4) even if not initially planned. Indeed, during the last two years, the Covid-19 pandemic

spread through the world and both adults and adolescents faced difficult times (Magson et al., 2021; Salari et al., 2020; Xie et al., 2020). Some people however positively adapted to the new situations and were able to find positive in these uncertain conditions (Waters, Algoe, et al., 2021; Waters, Allen, et al., 2021). This helped them sustaining their general wellbeing through the pandemic (Casali, Feraco, & Meneghetti, 2021). Importantly, personal characteristics such as soft skills played an important role in this sense (Besser et al., 2020; Casali, Feraco, Ghisi, & Meneghetti, 2021; Feraco, Casali, et al., 2021; Waters, Algoe, et al., 2021; S.-J. Zhou et al., 2020).

In the following paragraphs, I will firstly define the construct of life satisfaction. Then I will present the relations occurring between soft skills, SRL strategies, academic motivation, achievement emotions, and life satisfaction providing valuable insights on what factors educators, school psychologists, and education policymakers should bear in mind. Finally, I will present the concept of post-traumatic growth and the evidence of its relation with soft skills.

1.3.1. Life satisfaction

Life satisfaction is the most stable of the components of one's subjective wellbeing (Diener et al., 1999). In particular, it refers to a person's cognitive evaluation of their contentment with life or about specific domains of life such as school, family, environment, friends, and self. Adolescence is a critical period in which studying life satisfaction (Ng et al., 2015; Suldo et al., 2006; Suldo & Huebner, 2006) because students have to face important biological, cultural, and social changes that challenge their emotional wellbeing and tend to negatively affect their life satisfaction (Goldbeck et al., 2007). Maintaining a high level of life satisfaction is important for students to find resources for their future (Bowman, 2010) and for a host of positive personal, behavioral, psychological, and social outcomes (Diener, 2012; Lyubomirsky et al., 2005). People with high life satisfaction, in fact, generally show lower social problems, are more resistant to difficulties, and report better mental health (Diener & Diener, 2009; N. Park et al., 2004). Understanding which factor may promote and sustain it during adolescence is consequently of primary importance. Finding those personal

characteristics (as soft skills) that may facilitate one's academic achievement and life satisfaction is even more crucial.

1.3.1.1. Life satisfaction, soft skills, study-related factors

Life satisfaction is related to many factors, including personality traits (DeNeve & Cooper, 1998; Proctor et al., 2009; Steel et al., 2008; Weber & Huebner, 2015), emotional intelligence (Sánchez-Álvarez et al., 2015), character strengths (Bruna et al., 2019; Gillham et al., 2011; Shoshani & Slone, 2013; Weber, 2021), self-esteem (Marcionetti & Rossier, 2016; Proctor et al., 2009), and general self-efficacy (Marcionetti & Rossier, 2016), but also by contextual factors and positive peer relationships (Huebner et al., 2006; Oberle et al., 2011; Suldo et al., 2008). Among these factors, some studies also suggest that achievement emotions, SRL strategies, and self-efficacy may be important for students' life satisfaction. Following Fredrickson's broaden-and-build model (Fredrickson, 2001), positive emotions should enlarge the individuals' thought-action repertoire, allowing them to build personal resources that could consequently sustain their well-being, as also shown for positive achievement emotions (Hagenauer et al., 2018; King & dela Rosa, 2019). Similarly, motivation may foster life satisfaction through an individual's self-determination (Peters et al., 2018). One's self-efficacy, or the belief that one can proactively influence the outcomes of a certain task, can promote a positive life appraisal. Self-efficacy, referring to academic or general tasks, has been associated with students' life satisfaction (Cikrikci & Odaci, 2016; Diseth et al., 2012; Moksnes et al., 2019; Telef & Furlong, 2017; Yap & Baharudin, 2016) also longitudinally (Burger & Samuel, 2017; Lightsey et al., 2013; Vecchio et al., 2007). Other motivational factors such as mastery learning goals are positively related to life satisfaction (Antaramian, 2017; Diseth et al., 2012; Tuominen-Soini et al., 2008). This may be because having mastery learning goals, as opposed to performance goals (i.e., extrinsic motivation), support a specific pattern of coping and emotions that avoid risky comparison of one's performance. On the other hand, performance goals request validating one's competence through comparison with others or with grades, making students with

performance goals more vulnerable to self-esteem threats that might affect one's life satisfaction and well-being (Diseth et al., 2012; Tuominen-Soini et al., 2008). Evidence of the link between SRL and life satisfaction is less robust, but theoretical models suggest that the two constructs may be somewhat related (Panadero, 2017). Among the others, the adaptable learning model (Boekaerts, 1992) and the dual processing self-regulation model (Boekaerts, 2011) tried to account for the complex relationship that may link SRL strategies, and students' well-being or life satisfaction. Following Boekaerts' proposals, students may occasionally decide to activate a well-being pathway during their academic tasks. This should happen in cases where students feel uncomfortable with some activities (e.g., they do not match their expectations or needs). Students consequently activate different strategies to preserve their well-being and self-concept instead of activating functional strategies that may help them manage the academic tasks well. Some studies, for example, show that SRL processes, such as metacognitive awareness, self-control, or general self-regulation, are directly related to students' life satisfaction (Balkis & Duru, 2016; Cikrikci & Odaci, 2016; Hofer et al., 2011; Li, 2019; Orkibi & Ronen, 2017).

Finally, positive psychologists suggest that, similar to other positive personal characteristics, soft skills should promote an individual's sense of fulfillment and well-being, including life satisfaction (Bruna et al., 2019; N. Park et al., 2004; Peterson & Seligman, 2004). Soft skills emerged as direct correlates of life satisfaction across the entire lifespan. In particular, all of the six soft skills considered were repeatedly found correlating with adults' and students' life satisfaction (Bruna et al., 2019; Credé et al., 2017; Dametto & Noronha, 2020; Kashdan & Steger, 2007; Martin et al., 2013; Robitschek & Keyes, 2009; Stevic & Ward, 2008). For example, Martin and collaborators (2013), analyzing a large sample of school-aged students (10-19 years old), found that adaptability positively predicts students' life satisfaction over and above other related factors, such as self-regulation and academic buoyancy. Similarly, Ruch and collaborators found that, within 24 character strengths (Peterson & Seligman, 2004), curiosity, leadership, perseverance, and social awareness positively

correlated with life satisfaction in a sample of 2110 German school-aged students. This suggests that soft skills and life satisfaction are associated with each other, but their association has never been studied when considering other study-related factors, including achievement emotions that are important correlates of students' life satisfaction. Soft skills, in addition, may prove crucial for life satisfaction through the mediation of achievement emotions that should be sustained by one's soft skills (Dametto & Noronha, 2020; Robitschek & Keyes, 2009; Weber et al., 2016; Zhang et al., 2021). This should further contribute to the role of soft skills in building a stronger sense of life satisfaction in students (Hagenauer et al., 2018; Heffner & Antaramian, 2016; Karatzias et al., 2002). This makes soft skills worth examining further, taking a holistic approach to students, even though these skills might relate only indirectly to academic achievement.

1.3.2. Post-traumatic growth

When traumatic events, stressful situations, or bad things happen, people, whether adults, adolescents, or children, have to find a way to cope with the difficulties they are encountering. Psychological research generally focuses on the negative consequences that such events have on the individuals (e.g., anxiety, depression, fear, post-traumatic stress), but many of these individuals manage to find positive in such difficult times. Tedeschi and Calhoun (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1995) found out that some of these people show positive and enduring changes in self-perception after particularly stressful events that invalidate the way they used to see the world (e.g., a pandemic, a terrorist attack, a cancer, the death of a close person). The authors call this reframing outcome: post-traumatic growth (Calhoun & Tedeschi, 2006, 2014; Kilmer et al., 2009). Post-traumatic growth is characterized by changed self-perceptions, with people that revise the way they see their abilities, their relationships (e.g., they may reconsider who is a real friend), their availability to engage in new activities, their appreciation of life, the so-called little things, and the meaning of their life or their spirituality. As also shown by the measurement of post-traumatic growth,

it mostly happens in five different domains: openness to new possibilities, interpersonal relationships, personal strengths, appreciation of life, and spirituality (Calhoun & Tedeschi, 2006).

Even if most of the research on post-traumatic growth focused on adults, adolescents and children showed positive post-traumatic growth levels after stressful events (Meyerson et al., 2011). In particular, Meyerson and collaborators (2011), in their review of the literature, suggest that post-traumatic growth in youths is influenced by factors such as environmental characteristics, type of distress response to the stressful event, demographic factors, and social or psychological processes. Among these factors, positive mental health resources, such as self-esteem (Phipps et al., 2007), positive affects (Currier et al., 2009), and competency beliefs (Cryder et al., 2006) have been found to relate to higher levels of post-traumatic growth. Still, less attention has been paid to the positive individual characteristics that may support it, such as soft skills. An opportunity to test such a hypothesis (i.e., soft skills promote higher post-traumatic growth following stressful events) came together with the Covid-19 pandemic that characterized 2020 and 2021.

1.3.2.1. The Covid-19 pandemic. An opportunity for growth

The Covid-19 pandemic started spreading in late 2019 (February 2020 in Italy) and has brought negative consequences for students and the entire population, including fear, stress, anxiety, and depression (Magson et al., 2021; Salari et al., 2020; Singh et al., 2020; Soraci et al., 2020; Xie et al., 2020). People were asked to keep spatial distancing (Abel & McQueen, 2020), and students all over the globe were confined at home with schools that closed for prolonged periods (e.g., 37 weeks in Italy, UNESCO, 2021). Schools were consequently requested to answer to the difficulties caused by the pandemic immediately, and most of the countries decided to abruptly deliver school lessons online (starting from March 2020 in Italy), even if teachers had not been prepared to face this kind of teaching activities (Chiu, 2021). In this situation, many students struggled to keep motivated toward their study materials, often failed to keep engaged, and encountered difficulties in adapting their way of learning to the new learning conditions (Besser et al., 2020; Cai et al., 2020; Chiu, 2021; Perets et

al., 2020). University students, for example, reported that, after moving to online learning, they experienced higher stress, negative moods, and loneliness while also feeling lower motivation, attention, and lower understanding of the study materials or lessons (Besser et al., 2020).

Despite this, recent studies also show that many people (including students) were able to find positive in such an unexpected and challenging situation. For example, some studies provided evidence that people (both adults: Chen et al., 2021; Gander & Wagner, 2020; Stallard et al., 2021; Yu et al., 2021; and school-aged students: C. Wang et al., 2020; Waters, Allen, et al., 2021) are showing post-traumatic growth after the occurrence of the pandemic, since a few months after the first Covid-19 wave. Therefore, understanding which personal characteristics may be particularly useful in promoting positive instead of negative consequences of these situations is fundamental. It may be even more interesting to study which personal characteristics may favor growth in students while also supporting their academic achievement.

1.3.2.2. Soft skills and post-traumatic growth

According to positive psychology (Niemic, 2020; Waters, Algoe, et al., 2021; Waters, Allen, et al., 2021), intrapersonal characteristics – such as soft skills – should play a role in favoring post-traumatic growth. Indeed they should support the individuals in transforming the difficulties into an opportunity to grow as a person through a positive reframing of the difficult or unexpected situations. Similarly, Peterson et al. (2008) suggest that intrapersonal characteristics such as character strengths, which partially overlap with soft skills, favor higher levels of post-traumatic growth, with curiosity that should prompt a higher openness to experience and perseverance that should favor the development of personal strengths, for example (Peterson et al., 2008).

Recent studies already provided evidence in support of post-traumatic growth occurring through the Covid-19 pandemic. For example, positive changes have been reported few months after the first Covid-19 wave in adults and high-school graduates (Chen et al., 2021; Stallard et al., 2021; Yu et al., 2021), but also in middle and high school students (C. Wang et al., 2020; Waters, Allen, et al., 2021).

Extending the literature about the relationship between personal characteristics, such as soft skills, and their relation with post-traumatic growth following the Covid-19 pandemic results of great interest and will be the aim of Study 4. This will allow us to test the hypothesis of a beneficial effect of soft skills during hard times. No studies in literature tested the possible relations occurring between study-related factors and post-traumatic growth at the time of writing.

1.3.3. A summary: life satisfaction and post-traumatic growth

Soft skills are important personal characteristics that may favor one's success and play a relevant role in students' academic achievement. In addition, soft skills may also be critical for other equally important outcomes of students' life, promoting their well-being and nurturing their growth and sense of fulfillment. Even if the relationship between the different soft skills and life satisfaction has been repeatedly studied, it is worth examining such relation in a more general model of learning that includes achievement and wellbeing aspects of school success, while also considering other important predictors of both. This will allow us to conclude on the interactive role of all these factors in promoting school-aged students' academic achievement and life satisfaction. To the aim of the thesis, other than life satisfaction, I will focus on students' post-traumatic growth to better define what soft skills can add to students during difficult times such as those caused by the Covid-19 pandemic.

1.4. Summary of the chapter

In this chapter, I presented the construct that will characterize the four studies of this thesis (see Table 1.1), and I tried to highlight the limits that I found in the literature about soft skills and the role that soft skills might play for school-aged students' academic achievement and wellbeing. In particular, with reference to the intraindividual system of learning proposed by Ben-Eliyahu (Ben-Eliyahu, 2019; Ben-Eliyahu & Bernacki, 2015) – that underline the need of considering all the intraindividual factors that might drive an individual to learning – and the results obtained by previous research on academic achievement and study-related factors (e.g., Mega et al., 2014), I tried to integrate soft skills within this model to obtain a clearer picture of how soft skills work together with

these factor to favor students' academic achievement. Other than achievement, however, it is important to consider more qualitative aspects of students' lives such as their well-being (or life satisfaction) (Huebner & Hills, 2011; York et al., 2015). For this reason, I will also deepen the direct and indirect relations that soft skills might show with students' life satisfaction into the framework of a complete intraindividual system.

Table 1.1 Variables considered, definition, and studies in which they were evaluated

Variable	Definition	Study
Soft skills	Malleable personal characteristics that regulate behaviors, thoughts, and emotions in the individuals, enabling them to consequently reach their personal goals and wellbeing (N. Park et al., 2004; Robles, 2012).	1, 2, 3, 4
- Adaptability	The capacity to constructively regulate psycho-behavioral functioning in response to new, changing or uncertain circumstances situations (Martin et al., 2012).	1, 2, 3, 4
- Curiosity	The desire to learn and discover that drives people to explore and acquire new information (Berlyne, 1960; Kashdan et al., 2018).	1, 2
- Initiative	The tendency to intentionally improve oneself. It describes individuals who tend to be ready for growth, plan it, know how to use and allocate resources for growth, and intentionally decide to engage in activities to grow (Robitschek, 1998; Robitschek et al., 2012).	1, 2
- Leadership	The ability to influence others and help them to contribute to the success of a group (Peterson & Seligman, 2004).	1, 2
- Perseverance	The inclination to work hard even when facing difficulties. It entails working strenuously, keeping interest and effort over time despite failures, setbacks, adversity, and plateaus (Duckworth et al., 2007).	1, 2

- Social awareness	Individual's sense of responsibility for the community and their ability to interact with other people in a socially, culturally and ethically appropriate way (Peterson & Seligman, 2004; World Economic Forum, 2016).	1, 2
Cognitive abilities	Skills involved in thinking, memorizing, and processing information.	1, 2
Academic motivation	Students' internal drive that energizes, directs, and sustains students toward the attainment of a certain academic goal. It has a prominent role between the direct predictors of academic achievement (Kriegbaum et al., 2018; Liem, 2021).	1, 2, 3
- Learning goals	Represent the purpose that a student pursues when engaging in academic achievement tasks (Dweck & Leggett, 1988; Huang, 2012).	1, 2
- Self-efficacy	It represents one's belief about future performance in academic tasks (Bandura et al., 1997).	1, 2, 3
- Theories of intelligence	It represents the students' idea about their intelligence, with incremental theories of intelligence representing the idea that intelligence is malleable, increasable, and controllable and entity theories of intelligence that represent the idea that intelligence is fixed and uncontrollable (Dweck, 1999).	1, 2
Self-regulate learning strategies	The active process in which students carry out, plan, monitor, adapt, and self-evaluate their learning activities (Panadero, 2017).	1, 2, 3, 4
Achievement emotions	Achievement emotions refer to students' emotions about their academic activities and outcomes (Pekrun, 2006).	2, 3
Scholastic engagement	The active and sustained involvement of students in emotional, social, behavioral, and cognitive aspects/tasks of school (Lei et al., 2018)	4
Life satisfaction	It refers to a person's cognitive evaluation of his/her contentment with life or with regard to specific domains of life such as school, family, environment, friends, and self (Diener et al., 1999).	2, 3, 4

Post-traumatic growth	Positive and enduring changes in self-perception following particularly stressful events that invalidate the way one used to see the world (Tedeschi & Calhoun, 1995).	4
Academic achievement	Academic achievement is a widely used indicator of scholastic performance and can be measured with scholastic grades, GPA, or standardized measures of achievement (York et al., 2015).	1, 2, 3, 4

2. *Study 1*: soft skills and academic achievement. Indirect relations through self-regulated learning and motivation

2.1. Rationale of the study

As highlighted in the first chapter, literature on soft skills and academic achievement is not well structured and a better understanding of the role of soft skills for students' academic achievement is needed. Studies to date, in fact, generally refers to different framework for soft skills or study them as single constructs able to predict one's academic achievement at school. In addition, these studies do not include soft skills (or the single soft skills) into more complete models of learning, such as the intraindividual model proposed by Ben-Eliyahu (Ben-Eliyahu, 2019; Ben-Eliyahu & Bernacki, 2015). Under this view, soft skills should be considered together with the other factors that are known to be important for academic achievement, such as cognitive abilities (Roth et al., 2015), SRL strategies (Burnette et al., 2013; Credé & Phillips, 2011; Richardson et al., 2012), and academic motivation (Huang, 2012; Kriegbaum et al., 2018). It is interesting to understand what soft skills might add to such a model of learning that has already been tested in literature (Mega et al., 2014). Indeed, there are no evidence about how all these variables work together to prompt and sustain academic achievement in school-aged students, but when single soft skills and at least one between SRL strategies and academic motivation were studied together, soft skills generally showed only small or null relations with academic achievement (Muenks et al., 2017, 2018; Richards et al., 2013; Wolters & Hussain, 2015). The main aim of this first study was therefore to examine for the first time how soft skills – as a whole – work together with other important aspects of the intraindividual system (Ben-Eliyahu, 2019) to finally promote academic achievement in a sample of school-aged students (10-18 years old).

Study 1 also presents a complementary aim that was initially included to start exploring the possible relations occurring between soft skills and the practice of extracurricular activities, to subsequently deepen such relations in a successive ad-hoc study (initially planned as Study 3). That

study, however, had to be postponed because of the Covid-19 pandemic and the relation between extracurricular activities was only exploratively analyzed in Study 1 and Study 2. Even if these analyses remained exploratory and were not directly tested in a successive study, I believed it would have been interestingly to report them anyway.

Extracurricular activities are central to most students' lives (Feldman & Matjasko, 2005; Shulruf, 2010) and consists in all those non-scholastic activities that students practice in a continuative and structured way (e.g., practicing sports, volunteering, boy scouting, arts, music). Extracurricular activities positively relates with a host of positive outcomes for students comprehending social, psychological, and academic aspects (Lewis, 2005; Shulruf, 2010). For example they favor positive friendships, mental health, and academic achievement in students (Gilman & Huebner, 2006; Guilmette et al., 2019), SRL (Guilmette et al., 2019), self-efficacy (Marsh, 1992), positive and negative emotions at school, and life satisfaction (Gilman & Huebner, 2006; Guilmette et al., 2019; or see Shulruf, 2010 for a meta-analysis). Extracurricular activities give to the students the opportunity to face challenging situation and other people facilitating the development of one's identity, skills, and character aspects or soft skills (Eccles, 1999; Feldman & Matjasko, 2005; Khasanzyanova, 2017). In other terms, extracurricular activities provide an interesting opportunity to modulate students' malleable characteristics such as soft skills, thus responding to the urgent request of soft skills development demanded by many international organization, such as the European Union, the National Research Council in the US, or the Ministry of Instruction, University, and Research in Italy (European Commission, 2016; Ministry of Education, University and Research, MIUR, 2018; Pellegrino & Hilton, 2012). Given the potential contribution of extracurricular activities to nurturing students' soft skills, I also explored how they relate to the other variables (soft skills, SRL strategies, motivation and cognitive abilities).

The complete pattern of relations between the variables considered was stratified on three different levels depending on their specificity to academic achievement which is the final outcome

variable of Study 1 (see Figure 2.1). Variables that are “closer” to academic achievement (i.e., SRL strategies and academic motivation) are context-specific variables that are expected to directly affect one’s learning and academic achievement. On the contrary, more distal variables (i.e., soft skills and cognitive abilities) are conceptualized as more general characteristics of the individuals that regulate or influence more context-specific variables. In other words, soft skills and cognitive abilities were considered as antecedent or regulator of students’ SRL strategies and academic motivation that could in turn and/or directly favor academic achievement (Kriegbaum et al., 2018; Muenks et al., 2018; Zuffianò et al., 2013). Finally, extracurricular activities were placed on the more distal level because they pertain to a non-intraindividual system and might relate to each of the variables considered in less distal positions (Khasanzyanova, 2017; Shulruf, 2010).

The six soft skills belonging to the character qualities branch of the World Economic Forum model (World Economic Forum, 2016) were considered: adaptability, curiosity, initiative, leadership, perseverance, and social awareness (presented in Chapter 1). Soft skills will be considered as a single second-order construct composed by the six soft skills. This is in line with the common definition of soft skills that I proposed throughout the thesis and with similar research fields, such as character strengths, in which personal qualities are grouped into second-order factors that resemble the common variance that these factors share with each other. In other words, the overarching soft skills’ factor should resemble the fact that all the soft skills positively regulate people’s thoughts, emotions, and behaviors that are transversally functional to the attainment of a goal. Among the different SRL strategies, goal operating and goal monitoring (See Figure 1.2, chapter 1) were considered following the results of Burnette et al.’s meta-analysis that show that these are the most effective phases of SRL (Burnette et al., 2013). Following the large studies conducted by Mega and collaborators, learning goals, theories of intelligence, and academic self-efficacy were chosen as representative of academic motivation (Mega et al., 2014). Both processing and fluid abilities were considered among the cognitive abilities included in the study. In particular working memory, spatial reasoning, problem

solving, and general intelligence were considered because they are actively involved in the learning process and predict academic achievement (Greiff et al., 2012; Lubinski, 2010; Roth et al., 2015; Swanson & Alloway, 2012). Finally, academic achievement was evaluated by teachers' assessments of students in different scholastic subjects.

2.2. Hypotheses

Following the evidence presented in the first chapter and in the above rationale, I propose the following hypotheses for the study:

- *Academic motivation and self-regulated learning strategies.* Academic motivation and SRL strategies should be positively related with one another (Mega et al., 2014), and should directly predict academic achievement (Credé & Phillips, 2011; Kriegbaum et al., 2018; Richards et al., 2013).
- *Soft skills, cognitive abilities, and academic achievement.* Literature on the relation between soft skills and cognitive abilities is scarce, but we may expect them to be mainly unrelated (Credé et al., 2017; Fay & Frese, 2001; Poropat, 2009; von Stumm & Ackerman, 2013). For what concerns their relation with academic achievement, I expect a positive and large direct relation between cognitive abilities and academic achievement (Roth et al., 2015). Soft skills, on the contrary, may only show small or nil relations with academic achievement because their effect should be mediated by SRL strategies and academic motivation (e.g., Muenks et al., 2017).
- *Soft skills and academic achievement (indirect relations).* The main hypothesis of Study 1 regards the indirect relation between soft skills and academic achievement. Following the definition of soft skills as personal characteristics that regulate emotions, behaviors, and thoughts that consequently drive to success (Robles, 2012), I expect that soft skills, in the scholastic context should regulated behavioral and cognitive aspects such as SRL strategies

and academic motivation. Both SRL strategies and academic motivation should consequently mediate the relation between soft skills and academic achievement.

- *Extracurricular activities.* On an exploratory level, I expect that participating in extracurricular activities may relate to higher level of personal characteristics such as soft skills. In turn, there could be a positive indirect relation between extracurricular activities and SRL strategies or academic motivation. Extracurricular activities might also directly relate to SRL strategies and academic motivation (Shulruf, 2010). Finally, there could also be a positive relation between extracurricular activities and cognitive abilities, but this may not be true for all extracurricular activities and may be specific of people with very high levels of expertise (Voyer & Jansen, 2017).

2.3. Materials and methods

2.3.1. Participants

640 school students in years 5 to 12 (10 to 18 years old) were enrolled on a voluntary basis. However, 49 students did not complete one or more parts of the tasks and were excluded from the final sample. Another 131 students were excluded because their school principal refused to provide information about their students' academic achievement. The final sample consequently consisted of 460 students (269 males, $M_{age} = 13.68$, $SD_{age} = 2.51$). Table 2.1 provides details of their numerosity and age by school year.

This study was conducted in accordance with the recommendations of the local University's Research Ethics Committee and all participants (their parents when necessary) gave their informed consents prior to participation.

A power analysis confirmed that our sample size sufficed to detect the main relations hypothesized. Starting from a theory-based covariance matrix with a .30 hypothetical correlation between soft skills and both SRL strategies and academic motivation, 100000 random datasets were simulated for different sample sizes. For each simulated dataset, the hypothesized path analysis (see

Results section 2.4, Figure 2.1) model was fitted and the results for the main hypothesis of the study were saved for power calculation, i.e. the indirect effects of soft skills on academic achievement through the mediation of academic motivation and SRL strategies. Assuming a significance level of $\alpha = .05$, it emerged that 436 participants sufficed to obtain a power = .80. 460 participants increase the power to .83.

Table 2.1. Study 1. Participants' descriptive statistics by school year

School year	5	6	7	8	9	10	11	12	Total
Number	66	84	88	15	46	53	53	55	460
Females	31	44	44	7	12	14	18	23	191
Mean age	10.15	11.53	12,45	13.44	14.74	15.58	16.21	17.25	13.68
(sd)	(0.36)	(0.58)	(0.58)	(0.53)	(0.91)	(0.66)	(0.41)	(0.44)	(2.51)

Note. 5 = 5th year of primary school; 6 to 8 = 1st to 3rd year of middle school; 9 to 12 = 1st to 4th year of high school.

2.3.2. Measures

Cronbach alpha coefficients were calculated on our data and are presented in Table 2.2. Cronbach's alpha coefficients calculated on the present sample ranged between .63 (learning goals) and .94 (Primary Mental Abilities – Spatial). The leadership scale, however showed low reliability ($\alpha = .56$).

2.3.2.1. *Soft skills.*

Soft skills were measured using questionnaires adapted and translated for our purposes. Experts in the field and a copywriter read all items to obtain a precise and comprehensible phrasing. These items were then presented to groups of students of different ages to identify and reword those that resulted difficult to understand, especially for younger children. Most of the soft skills questionnaires were adapted due the age of the participants and for research-related purposes. Statistical reliability

was always ascertained (Cronbach alpha, Table 2.2.). Items were answered on a Likert scale con from 1 (not at all) to 6 (very much). Each scale (except for the cultural awareness scale) presented one negative item, and the total score was calculated as the sum of the ratings for each item (after reversing the score for the negative items). The factorial structure of each soft skill scale was confirmed using confirmatory factor analysis (CFA) on the complete sample of 640 students before proceeding with the actual analysis (see Table 2.2 for the results). A total score was calculated to obtain a general measure of soft skills. See the *Preliminary analysis* section for more information about the measurement model.

- *Adaptability* (adapted from Martin et al., 2012). It measures the ability to regulate emotions, behaviors, and thoughts in new and uncertain situations. It is composed of six items (e.g., “I am scared by situations that are new to me”; score range: 6-36).
- *Curiosity* (adapted frm Litman & Mussel, 2013). It measures the desire to acquire new information and knowledge. It is composed of six items (e.g., “Whenever I see something new, I try to understand what it is”; score range: 6-36).
- *Initiative* (adapted from Robitschek et al., 2012). It measures one’s tendency to intentionally improve oneself. It is composed of six items (e.g. “If a decision has to be taken, I take it”; score range: 6-36).
- *Perseverance* (adapted from Miller et al., 1996). This measures the personal tendency to work hard to reach aims despite setbacks and difficulties. It is composed of six items (e.g. “Faced with a difficult situation, I don’t give up”; score range: 6-36).
- *Social awareness* (adapted from Peterson & Seligman, 2004). It measures the individual’s sense of responsibility towards the community. It is composed of six items (e.g. “It is important for all people to be treated equally”; score range: 6-36).

- *Leadership* (adapted from Kouzes & Posner, 2003). It measures the ability of a student to influence others and help them to contribute to the success of a group. It is composed of six items (e.g. “I can be the reference person (a leader) in a work group”; score range: 4-24).

2.3.2.2. *Motivation to learn*

- *Theory of intelligence* (De Beni et al., 2014). It measures the level of incremental as opposed to entity theories of intelligence (e.g. “You can learn new things, but you can’t change your intelligence”). It is composed of four items scored on a 5-point Likert scale from 1 (I agree) to 5 (I completely disagree). Scores for the incremental theories items were inverted to obtain a positive indicator of incremental theories of intelligence (score range: 4-20).
- *Learning goals* (De Beni et al., 2014). It measures mastery learning goals as opposed to performance learning goals (e.g. “It is more important for me to learn things than to get good grades”). It is composed of four items on a 5-point Likert scale from 1 (I agree) to 5 (I completely disagree). Scores for mastery learning goals items were inverted to obtain a positive indicator of a mastery approach to learning (score range: 4-20).
- *Self-efficacy* (built following Bandura [2006] indications). It measures the belief that students have about their own ability to succeed in certain school subjects. It consists of eight items, four for the humanities (i.e. Italian and English language) and four for scientific subjects (i.e. math and science, e.g. “I think I will do well in science”). Answers are provided on a 6-point Likert scale from 1 (not at all) to 6 (very much). Two separate scores were calculated from the sum of the items for scientific subjects, and for the humanities (score range: 4-24).

2.3.2.3. *Self-regulated learning*

- *Self-Regulated Learning Questionnaire* (De Beni et al., 2014). Following the results of Burnette et al.’s meta-analysis (2013) indicating goal operating and goal monitoring as the most important self-regulated learning factors, the corresponding subscales of the self-regulated learning questionnaire measuring “learning strategies”, i.e. the activities, strategies

and behaviours characterizing the process of learning, and “self-evaluation”, i.e. the level of self-awareness about one’s own knowledge of study materials and test performance, were used. It consists of 20 items (10 for each sub-scale, e.g. “I understand when the task that I have to do is easy or difficult for me”, for self-evaluation; “When I study for the exam, I consider what my teacher think it is important”, for learning strategies) on a 5-point Likert scale from 1 (never) to 5 (always). The total score was calculated after reversing the eight negative items (score range: 20-100).

2.3.2.4. *Cognitive abilities*

- *Working memory task* (Carretti et al., 2013). It measures one’s ability to update verbal information in working memory. It is composed of six lists of eight object’s names (e.g. blackboard, pot, oar, copybook, pumpkin, chair, blanket, cake, saddle, closet). Each list is presented orally with a 1-second break between two words, and a 2-second break between the third and fourth words. At the end of each list, participants must write down the four smallest objects on the list in their order of presentation (e.g. cake, pot, copybook, saddle) without any time limit. One point is awarded for each correctly chosen word listed in the right order (score range: 0-24).
- *Culture-Free Intelligence Test* (CFT; Cattell, 1940). This measures non-verbal fluid reasoning ability. It contains four different subtasks with different time limits. The subtasks involve: 1) completing sequences of images (12 items, three minutes); 2) find which of five images differs from the others for some reason (14 items, four minutes); 3) completing a matrix of images that presents a hole in one of the four squares (12 items, three minutes); and 4) finding images that respect the same internal relationships as the target figures (8 items, 2.5 minutes). The total score is the sum of all the items correctly answered (score range: 0-46).
- *Primary Mental Abilities, Spatial* (Thurstone & Thurstone, 1981). It measures the ability to mentally rotate two-dimensional objects. It is composed of 20 items to be completed in five

minutes. Given a target figure and 6 alternatives, participants must identify from one to three images corresponding to the target in a rotated position. One point is awarded for each correctly-identified figure, and one point is subtracted for each figure wrongly-selected. The final score is the sum of the scores for the single items. In case of negative totals, the given score is 0 (score range: 0-54).

- *Problem solving* (inspired by Greiff, et al., 2012). This measures the ability to solve a given situation transforming it into the goal situation. Participants can solve up to five problems in 12 minutes. The ultimate goal is to identify what action needs to be taken to change a set of given baseline values by given amounts. First, participants are asked to look at a series of images representing actions that could be taken to achieve this, and their consequences (e.g., choosing the word “cheese” raises a value “a” and diminishes a value “b” by two points each). Not all of the actions help to achieve the goal, and participants have to understand which ones to use. Actions taken are highlighted in the images, and their consequences are indicated as magnitudes of increase or decrease in specific factors using a graduated line. The task essentially consists in deciding how many times to take each action to reach the necessary amount of change in the factors. Two points are awarded if the goal is reached with the fewest possible actions, 1 if the goal is reached with more actions, and 0 if the goal is not reached (score range: 0-10).

2.3.2.5. *Academic achievement*

- *School subject ratings*. Students’ rates on Math, Science, Italian and a Foreign language (English) on a 6-point Likert scale (1 = very inadequate knowledge, 4 = sufficient knowledge, 6 = very thorough knowledge) were collected. Teachers of each subject reported students evaluations on a grid. We also obtained official grades for a subsample of 142 students. These highly correlated with the teachers’ rating obtained as described above ($r = .81, p < .001$). The sum of the ratings was calculated for each student (score range: 4-24).

2.3.2.6. *Extracurricular activities*

- *Extracurricular activities questionnaire.* Four questions were prepared *ad hoc* to measure students' participation to extracurricular activities. The following activities were considered: after-school study programs, sports, music, and associative activities (e.g. scouting, volunteering) based on previous studies results (Guilmette et al., 2019; Shulruf, 2010). Participants were asked to indicate on a Likert scale – where: 0 = none; 1 = 1-2 hours; 2 = 3-4 hours; 3= 5-6 hours; 4 = 7-8 hours; 5 = 9-10 hours; 6 = 11 or more hours – the amount of time spent on each of these activities in a week. The sum of the four scores indicated the time spent every week on extracurricular activities (score range: 0-24).

2.3.3. *Procedure*

Schools were contacted via e-mail asking to participate in the study. If interested, we organized a meeting to better present the project. Then schools distributed the consent forms and asked students and their parents to sign it. Students attending school in years 5 to 12 were included to represent the three levels of compulsory education in Italy.

Participants attended two collective sessions (lasting one hour each) in class during school time. A trained psychologist administered the tasks in the presence of one of the class's teachers. All the tasks, except for the personal information questionnaire and the extracurricular activities questionnaire, were completed in a balanced order across classes. For every questionnaire, students read the instructions together with the experimenter who also explained that there were no right or wrong answers. For the cognitive tasks, the experimenter carefully read the instructions and the practice items, then let the students work until the given time expired. Teachers' ratings were given to the class coordinators at the beginning of the study. The coordinator gave it back to the experimenter after it had been completed.

2.4. Results

2.4.1. Preliminary analysis

R was used to run all the analysis (R Core Team, 2019). Adopting the person mean substitution method for blank items, .6% of the items were substituted to enable the calculation of the total scores of the corresponding scales. This procedure was only used for questionnaires in which a given participant had left less than 20% of the items, or only one item blank. This type of substitution only slightly affects a scale's reliability providing the percentage of substitutions remains below the 20% threshold (Downey & King, 1998), which is much higher than ours.

As some measures – i.e., leadership, learning goals, and theories of intelligence – showed only fair or poor Cronbach's alpha coefficients (α between .56 and .69; See Table 2.2), I ran all the subsequent analyses excluding them one at a time and all at once. Results always remained very similar (e.g., fit indexes, standardized coefficients), and showed the same significant relations. I consequently present the analyses including all the measures.

Table 2.2 presents the means, standard deviations, Cronbach's alpha coefficients, and correlations between all variables, which were standardized by participants' school year.

Table 2.2 Study 1. Mean standard deviation, Cronbach's alpha and correlation between all study variables.

	M	SD	α	.1	.2	.3	.4	.5	.6	.7	.8	.9	.10	.11	.12	.13	.14	.15	.16	.17
Soft skills																				
1.Adaptability	24.41	4.38	.73	-																
2.Curiosity	26.23	4.50	.80	.37	-															
3.Initiative	25.37	4.49	.72	.44	.57	-														
4.Perseverance	26.91	4.40	.72	.45	.52	.59	-													
5.Social awareness	26.50	4.68	.73	.36	.50	.35	.38	-												
6.Leadership	15.75	3.45	.56	.23	.32	.45	.35	.24	-											
Motivation																				
7.Self-efficacy, sciences	17.33	4.51	.93	.24	.36	.22	.39	.07	.16	-										
8.Self-efficacy, humanities	14.66	3.84	.75	.15	.32	.37	.31	.36	.23	.04	-									
9.Theory of intelligence	13.56	3.51	.69	-.01	.12	.17	.05	-.04	-.01	.13	.04	-								
10.Learning goals	13.27	3.46	.63	.14	.41	.22	.31	.26	.08	.30	.20	.09	-							
11.Self-regulated learning	69.95	8.73	.75	.24	.42	.42	.50	.38	.30	.30	.35	.06	.27	-						
Cognitive abilities																				
12.Problem solving	4.69	3.10	.86	.05	.04	-.04	.07	.04	-.01	.27	.01	-.00	.13	.04	-					
13.Primary Mental Abilities, Spatial	19.30	12.58	.94	.04	.04	.00	-.01	-.05	.04	.24	-.05	.05	.05	-.03	.36	-				
14.Working memory	15.00	3.43	.75	.08	-.00	.03	.04	-.01	.01	.18	.06	.03	.03	.06	.24	.25	-			
15. Culture-free Intelligence Test	33.25	5.46	.84	.07	.05	-.03	.05	.01	-.06	.27	.03	.04	.06	.05	.47	.38	.21	-		
16.Extracurricular activities	3.32	2.18	-	.08	.06	.19	.19	.07	.08	.02	.03	.02	.01	.13	-.07	-.06	.01	.02	-	
17.Subject teachers' ratings	17.44	4.23	.92	.03	.17	.09	.23	.08	.12	.33	.15	.08	.23	.28	.29	.19	.22	.23	-.02	-

Note. Significance for Pearson's coefficient is: for $|r| > .09$, $p < .05$; for $|r| > .12$, $p < .01$; for $|r| > .15$, $p < .001$.

A complete structural equation model that includes all the latent and observed variables collected, would involve estimating more than 60 parameters. To precisely estimate a parameter, scholars suggest the at least 20 participants, or 10 in particular cases, are needed (Jackson, 2003; Kline, 2015). Fitting an over-parametrized model augment the risk of technical problems and lowers the reliability of the results (Kline, 2015), for this reason I decided to use only observed variables after studying that the three latent factors included (i.e., soft skills, academic motivation, and cognitive abilities) do converge into three second-order factors.

To this aim, I ran three confirmatory factor analyses (CFA) to examine the structural reliability of the three second-order factors proposed: soft skills, cognitive abilities, and academic motivation. As stated in the material section, for each of the adapted scales for soft skills, a CFA was run first to examine each factorial structure before grouping them into a single second-order factor.

The CFA for the second-order soft skills factor included the scores for the 6 soft skill questionnaires (on adaptability, curiosity, initiative, perseverance, social awareness, and leadership), which had previously shown good internal fit indexes and acceptable factor loadings (the mean of their factor loading ranged between .52 and .76). The CFA of the cognitive abilities factor included the scores of the 4 cognitive tasks (intelligence, problem solving, spatial ability and working memory). The CFA of the academic motivation factor included the scores for theories of intelligence, learning goals, and the two academic self-efficacy measures. As suggested by Schermelleh-Engel and collaborators, the goodness of the models' fit to the data was assessed using multiple indices: chi-square, the comparative fit index (CFI), the non-normed fit index (NNFI), and the root-mean-square error of approximation (RMSEA) (Schermelleh-engel et al., 2003). Models with CFI and NNFI values of .90 or more and RMSEA values of .08 or less (Bentler & Bonett, 1980; Schermelleh-engel et al., 2003) as adequate. All the fit indexes were acceptable, and all the factor loadings were significant at .05 level (see Table 2.3 for the complete fit indices). These results validate the adoption of these factors as observed variables in subsequent models (Schreiber, 2008).

Table 2.3. Study 1. Results of the second-order factors Confirmatory Factor Analyses. Results of the analyses for the single soft skills are also reported

<i>Factor</i>	χ^2	<i>df</i>	<i>CFI</i>	<i>NNFI</i>	<i>RMSEA</i>	<i>90% CI</i>	<i>M</i>
Adaptability	31.44	9	.99	.98	.07	[.05, .10]	.57
Curiosity	32.77	9	.99	.98	.07	[.05, .11]	.63
Initiative	8.73	9	1.00	1.00	.00	[.00, .05]	.55
Leadership	5.91	2	.99	.96	.07	[.00, .13]	.50
Perseverance	30.23	9	.98	.96	.07	[.05, .10]	.56
Social awareness	37.19	9	.97	.95	.08	[.05, .11]	.56
Soft skills	47.50	9	.95	.92	.09	[.07, .12]	.64
Cognitive abilities	3.90	2	.99	.98	.05	[.00, .11]	.57
Academic motivation	3.46	2	.98	.93	.04	[.00, .11]	.39

Note. χ^2 = chi-square; df = degrees of freedom; CFI = comparative fit index; NNFI = non-normed fit index; RMSEA = root-mean-square error of approximation; CI = confidence interval; M = mean of factor loadings.

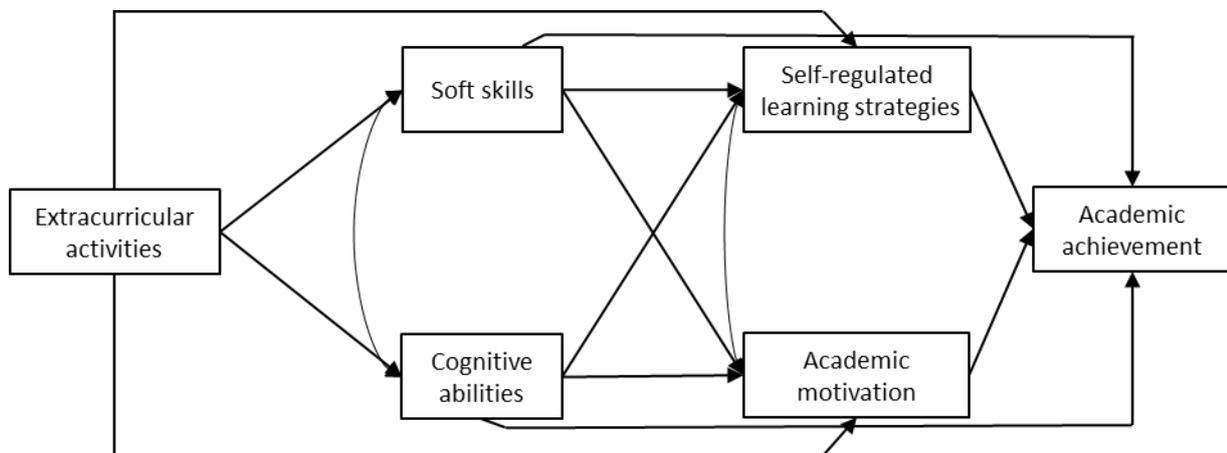
2.4.2. Path analysis

Given that the three latent factors were theoretically well-founded (e.g., Mega et al., 2014), and structurally reliable (see Köller et al., 2019, for a similar procedure), soft skills, academic motivation, and cognitive abilities were considered as three observed variables composed by the sum of the single variables' scores that converged into the three second-order factors.

A full path model (Figure 2.1) was fitted, specifying all the plausible associations between the following observed variables: extracurricular activities, soft skills, SRL strategies, academic motivation, cognitive abilities, and academic achievement). The following relations were estimated: the direct effects of SRL strategies, academic motivation, soft skills, and cognitive abilities on academic achievement; the direct effects of soft skills and cognitive abilities on SRL strategies and academic motivation; and the direct effects of extracurricular activities on soft skills, cognitive abilities, SRL strategies, and academic motivation. All the indirect effects were also calculated

focusing on the main hypothesized indirect relation occurring between soft skills and academic achievement through the mediation of SRL strategies and academic motivation. I also explored the indirect relations between extracurricular activities and academic achievement through the mediation of soft skills, cognitive abilities, SRL strategies and academic motivation.

Figure 2.1. Graphical representation of the complete theoretical model for Study 1



Note. Curves represent correlations.

Model's fit to the data resulted adequate ($\chi^2 (19, N = 459) = 1.73, p = .19, CFI = .99, NNFI = .98, RMSEA = .04, 90\%$ confidence interval for RMSEA $[.00, .13]$). All the standardized β coefficients the resulted significant were significant at the $p < .001$ level (see Table 2.4 for details, and Figure 2.2 for significant results). Results confirmed the hypothesized direct and indirect relations. Specifically, the following significant direct relations emerged: a) academic motivation ($\beta = .21$) and SRL strategies ($\beta = .20$) with academic achievement; b) cognitive abilities ($\beta = .31$) (but not soft skills, $\beta = .04$) with academic achievement; c) soft skills ($\beta = .46$) with academic motivation and SRL strategies ($\beta = .51$); d) cognitive abilities with academic motivation ($\beta = .21$) (but not on SRL strategies, $\beta = .04$); e) extracurricular activities only with soft skills ($\beta = .15$) (not with cognitive abilities, SRL strategies or academic motivation, $\beta = |.04|$). We also found the following indirect

significant relations of: a) soft skills with academic achievement, through the mediation of academic motivation ($\beta = .10$) and SRL strategies ($\beta = .10$); b) cognitive abilities with academic achievement, through the mediation of academic motivation ($\beta = .05$) c) extracurricular activities with SRL strategies through the mediation of soft skills ($\beta = .08$); d) extracurricular activities with academic motivation, through the mediation of soft skills ($\beta = .07$); e) extracurricular activities with academic achievement, through the dual mediation of soft skills and SRL strategies ($\beta = .02$); and f) extracurricular activities on academic achievement, through the dual mediation of soft skills and academic motivation ($\beta = .01$).

Table 2.4. Study 1. Complete results for direct and indirect effects emerging from the path analysis

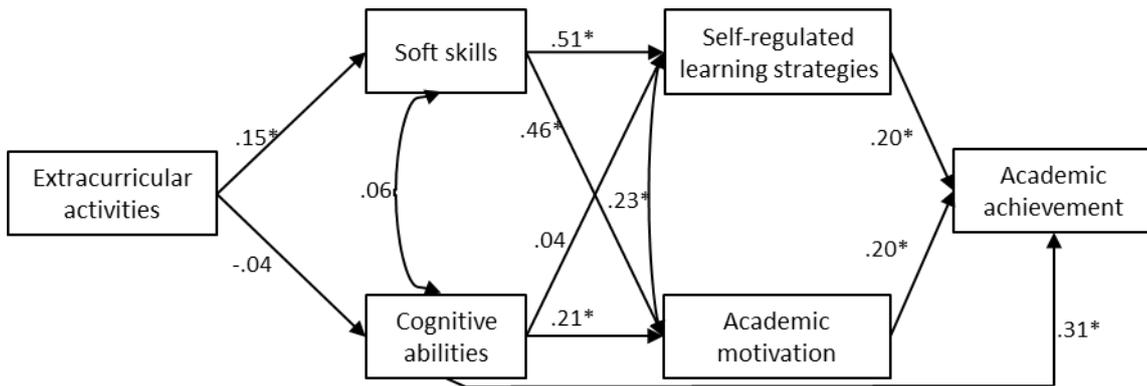
Dependent variable	Predictor	se	z	β
Direct effects				
Academic achievement	Self-regulated learning strategies	.20	4.12	.20***
Academic achievement	Academic motivation	.09	4.32	.21***
Academic achievement	Soft skills	.05	-.84	-.04
Academic achievement	Cognitive abilities	.06	7.32	.31***
Self-regulated learning strategies	Soft skills	.01	12.71	.51***
Self-regulated learning strategies	Cognitive abilities	.01	.96	.04
Self-regulated learning strategies	Extracurricular activities	.02	.88	.04
Academic motivation	Soft skills	.02	11.34	.46***
Academic motivation	Cognitive abilities	.03	5.36	.21***
Academic motivation	Extracurricular activities	.04	-.96	-.04
Soft skills	Extracurricular activities	.09	3.20	.15***
Cognitive abilities	Extracurricular activities	.06	-.92	-.04

Indirect effects				
Academic achievement	Soft skills x Self-regulated learning strategies	.03	3.92	.10***
Academic achievement	Soft skills x academic motivation	.02	4.04	.10***
Academic achievement	Cognitive abilities x Self-regulated learning strategies	.01	.94	.01
Academic achievement	Cognitive abilities x academic motivation	.02	3.36	.05***
Academic achievement	Extracurricular activities x Self-regulated learning strategies	.02	.86	.01
Academic achievement	Extracurricular activities x academic motivation	.02	-.93	< -.01
Academic achievement	Extracurricular activities x soft skills	.02	3.08	< -.01
Academic achievement	Extracurricular activities x cognitive abilities	.01	-.91	-.01
Academic achievement	Extracurricular activities x soft skills x Self-regulated learning strategies	.01	2.48	.02*
Academic achievement	Extracurricular activities x soft skills x academic motivation	.01	2.51	.01*
Academic achievement	Extracurricular activities x cognitive abilities x Self-regulated learning strategies	.00	-.66	< -.01
Academic achievement	Extracurricular activities x cognitive abilities x academic motivation	.00	-.89	< -.01
Self-regulated learning strategies	Extracurricular activities x soft skills	.02	3.08	.08**
Self-regulated learning strategies	Extracurricular activities x cognitive abilities	.01	-.91	< -.01
Academic motivation	Extracurricular activities x soft skills	.02	3.08	.07**
Academic motivation	Extracurricular activities x cognitive abilities	.01	-.91	-.01

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

Note. se = standard error; z = test statistic; β = standardized beta coefficient

Figure 2.2. Results of the path analysis for Study 1. Numbers represent standardized beta coefficients.



Note. Only significant predictors are represented.

Curves represent correlations.

* = $p < .001$

2.4.3. Model invariance

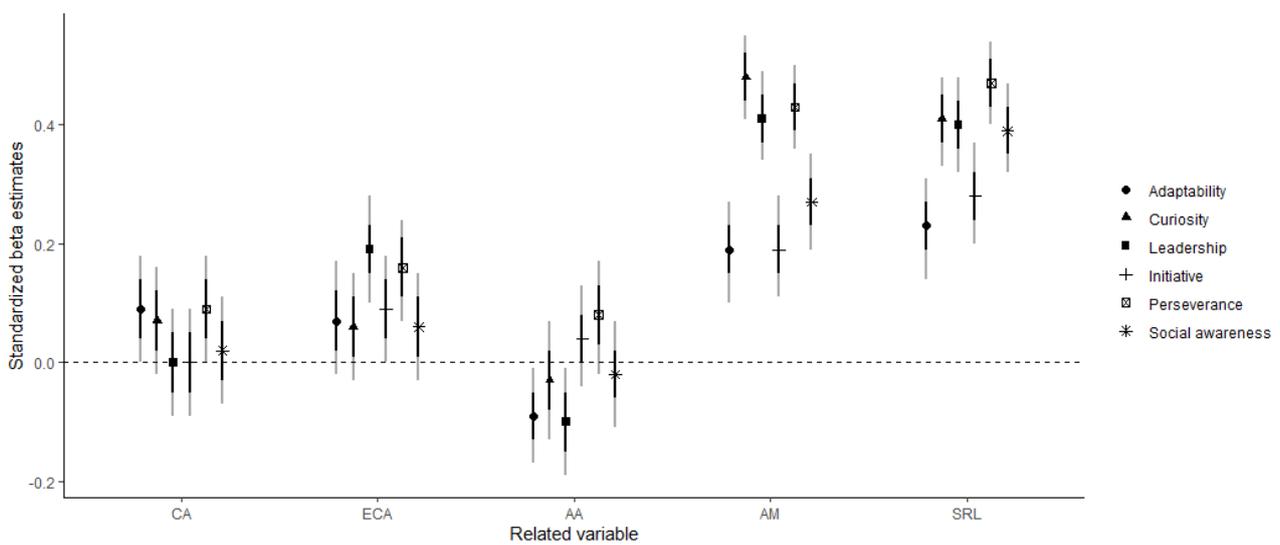
To ensure that the results of the model remain stable along the different school years, I ran a multi-group confirmatory factor analysis using Diagonally Weighted Least Squares (DWLS) to test model's measurement invariance between groups in different school years. The analysis was run distinguishing between participants in years 5-8 ($N = 252$) and those in years 9-12 ($N = 208$) (the two groups attend different type of schools in the Italian secondary-school system). The results confirmed a scalar invariance (equality of factor loadings and intercepts) between the two groups ($\chi^2(19, N = 440) = 30.29, p = .048, CFI = .98, NNFI = .96, RMSEA = .05, 90\%$ confidence interval for RMSEA [.01, .09]). This ensures that the pattern of relations across school years remains the same.

2.4.4. Single skills models

Finally, at an exploratory level, I replicated the above analysis using the scores of the single soft skills to test whether the results are stable across the different soft skills that were considered as a unique second-order factors. This analysis however is prone to both Type 1 and Type 2 errors, and results should be interpreted with caution. Results show comparable relations between the different soft skills and the five variables considered: no soft skills showed significant positive relations with academic achievement and cognitive abilities; all the soft skills (but only three significantly) showed

positive relation with extracurricular activities); all the soft skills showed positive relation with SRL strategies and academic motivation (see Figure 2.3). The six models always showed good fit to the data ($\chi^2(19, N = 459) = [1.10-2.68]$, $p = [.10-.29]$, CFI = [.996-1.00], NNFI = [.937-.996], RMSEA = [.015-.061]).

Figure 2.3. Study 1. Single soft skills standardized beta coefficients and associated standard errors and confidence intervals (in grey).



Note. CA = Cognitive abilities; ECA = Extracurricular activities; AA = Academic achievement; AM = Academic motivation; SRL = Self-regulated learning strategies

2.5. Discussion and conclusions

Study 1 was set up to start deepening the role of soft skills for academic achievement. In particular, this the first study that integrates soft skills into a large intraindividual model of learning to consider how soft skills and other study-related factors such as SRL strategies, academic motivation, and cognitive abilities work together in promoting students' academic achievement. At an exploratory level, I also added extracurricular activities to the model because they are important part of students' lives (Feldman & Matjasko, 2005; Shulruf, 2010) that are known to affect

intraindividual characteristics of the students, also favoring their wellbeing. In line with recent studies that started considering single soft skills together with other study-related factors (Muenks et al., 2017; Richards et al., 2013), I here hypothesized that soft skills do not have any direct relation with students' academic achievement (as previously showed; e.g., Credé et al., 2017; von Stumm et al., 2011), but their relation is mediated by the study-related factors that soft skills should regulate (N. Park et al., 2004; Robles, 2012). I thus examined whether soft skills had a direct effect on academic achievement, or an indirect effect, mediated by SRL strategies and academic motivation. Cognitive abilities were also included into our model as representative of general characteristic of the student that predict their academic achievement. Finally, it should be noted, that soft skills were considered as a single second-order factor that is representative of the six soft skills of the character qualities branch of the World Economic Forum (World Economic Forum, 2016) because they should all relate similarly to the variables of interest (i.e., they all regulate positive behaviors, thoughts, and emotions that predict success), even if the underlying mechanisms may differ between them. To support this statement, I also explored the relation between the single soft skills and the other variables into the same model.

To answer the research questions of Study 1, I fitted a path analysis model (see Figure 2.1). Results of the path analysis (see Figure 2.2) mainly confirmed our hypotheses. In line with previous literature, in fact, we found that both SRL strategies and academic motivation relate to academic achievement (Mega et al., 2014; Richardson et al., 2012). Soft skills, on the other hand, showed to converge into a general second-order soft skills factor, and to be related with SRL strategies and academic motivation, but not with academic achievement or cognitive abilities. Soft skills, however, showed a positive indirect relation with academic achievement through the mediation of both SRL strategies and academic motivation, thus supporting our hypothesis (Muenks et al., 2017). Cognitive abilities showed the strongest direct relation with academic achievement confirming well-established evidence on cognitive factors (Roth et al., 2015). Cognitive abilities also related to academic

achievement through the mediation of academic motivation, but had no indirect effect mediated by SRL strategies. On the last level of the analysis, the direct relation between extracurricular activities and the other factors was only significant for soft skills. Extracurricular activities indirectly related to academic achievement through the dual mediation of soft skills and both SRL strategies and academic motivation.

The main finding of Study 1 relies on the fact that soft skills, considered as a second-order factor or singularly, did not show any direct relation with academic achievement. This appears to negate past results supporting a direct impact of single soft skills on academic achievement (e.g., Credé et al., 2017; Durlak et al., 2011; von Stumm et al., 2011), but those studies usually did not consider the relation of soft skills with SRL strategies and academic motivation. Our findings are in line with the assumption that soft skills are general individual characteristics that regulate feelings, behaviors, and thoughts contributing to an individual's motivation to study at school, and favoring SRL strategies (Robles, 2012). We could therefore argue that academic motivation and SRL strategies might help students succeed in school because they are aided, at least in part, by general personal characteristics, or soft skills. As a result, I hypothesize that, at school, soft skills facilitate the expression of a positive motivation to learn and appropriate SRL strategies, both of which can have a significant impact on students' academic careers and favor their success. Importantly, these results were found when cognitive abilities were also modeled. Soft skills and cognitive abilities in fact were discovered to be mainly orthogonal and all the results of soft skills appear to be unrelated to one's cognitive abilities or intelligence. This emphasizes the importance of soft skills – and SRL strategies and academic motivation – in enhancing academic achievement as a second higher-order factor over and above cognitive abilities.

For what concerns the exploratory analysis of extracurricular activities, interesting relations were found in line with our hypothesis and previous studies (Khasanzyanova, 2017). In particular the positive relationship that appeared between extracurricular activities and soft skills may highlight that

the former could contribute to students' positive attitudes and personal characteristics (Eccles, 1999; Shulruf, 2010), and that non-specific treatments could improve soft skills, providing an effective and easy way to promote soft skills within a scholastic curricula. These results, however, are only exploratory and specific analyses are needed to understand which activities may promote soft skills, and which soft skills are particularly affected by the single extracurricular activities. These changes may subsequently have an impact on other areas, such as increasing academic motivation and SRL strategies, as evidenced by the positive relation that were found between these factors and soft skills.

To sum up, results of Study 1 confirm previous analyses about the importance of cognitive abilities, academic motivation, and SRL strategies for academic achievement and help understanding the role that soft skills may also play for academic achievement. In particular, our results emphasize the importance of considering multiple facets of the intraindividual system to really understand how the different factors that may promote learning and academic achievement work together. Considering soft skills into such a model, brought us to the conclusion that soft skills do not have any direct relation with academic achievement, but this mediation (as also suggested by their definition) is mediated by behavioral and cognitive factors that eventually promote students' academic achievement. Soft skills – differently from the other factors – also resulted related to the practice of extracurricular activities by the students, suggesting that they might be malleable and that more research is needed to really understand how it might be possible to promote such important personal characteristics that could eventually favor students' future work success and wellbeing other than their academic achievement.

2.5.1. Limitations and future directions

Despite the results obtained in Study 1 support our hypotheses, our study has some notable limitations. First of all, the cross-sectional approach does not allow us to infer any causal relation between the variables considered, thus requesting longitudinal analysis and experimental manipulations to really test causality. In addition, Study 1 only focuses on a narrow conceptualization

of academic success, including only a performance outcome (i.e., academic achievement – grades) into the model. This does not provide a holistic picture of the students analyzed and, for example, does not include any measure of students' wellbeing, such as their life satisfaction, or the affective and emotional aspects that characterize students and their relationships with school (these will be better addressed in Study 2). More refined analyses will also be needed to confirm the pattern of relations found at the level of the single soft skills and to really analyze the impact of extracurricular activities on the development of soft skills. One last limitation that should be noted and that will be addressed in Study 2, is the measurement of academic achievement. Indeed teachers evaluation (not official grades) were used as a measure of academic achievement, but it might be important to confirm the results using official grades provide by the schools (see Study 2), even if the two measures resulted strongly correlated in a subsample of students of this first analysis.

3. *Study 2: soft skills, academic achievement, and life satisfaction*

3.1. Rationale of the study

Following the promising results obtained in Study 1, this second study tries to expand the framework to more qualitative outcomes of students' lives (i.e., students' achievement emotions and life satisfaction) also using more refined analysis aimed at directly testing the hypothesis confirmed in Study 1 (i.e., soft skills indirectly favor academic achievement – not directly). In particular this study aims to integrate soft skills and different proven predictors of academic achievement, such as SRL strategies, academic motivation, cognitive abilities, and achievement emotions, to examine how they relate to each other, and to both academic achievement (a performance outcome) and life satisfaction (a qualitative and wellbeing outcome). Considered separately, all these factors have been found to correlate with both academic achievement and life satisfaction, but examining these relations from a multivariate perspective, or including study-related factors and soft skills in a single model, could end in a different result. This, however, might show a clearer picture of their synergic contribution, highlighting plausible direct and indirect effects of study-related factors and soft skills on academic achievement and life satisfaction. Indeed, results obtained in Study 1 indicated that soft skills indirectly relate with academic achievement thorough the full mediation of SRL strategies and academic motivation, suggesting that soft skills only have an indirect role for academic achievement when we consider them into an intraindividual system that includes various study-related factors (Ben-Eliyahu, 2019). The same, however might not be true for other important aspects of students' lives such as their life satisfaction (Diener et al., 1985), which, following positive psychology, should be considered as one of the main desired outcome variables for students and adolescents (Suldo et al., 2006; Weber et al., 2016).

Therefore the aims of Study 2 are::

- 1) replicate the results of Study 1 that indicate that the relation between soft skills and academic achievement is fully mediated by study-related factors. The need to test such

hypothesis comes from the contradictory results that emerge from literature about single soft skills and academic achievement. In fact, even if some direct relations between single soft skills and academic achievement emerge from meta-analyses (Credé et al., 2017; von Stumm & Ackerman, 2013), authors also reported direct positive associations between single soft skills and emotional, behavioral, and cognitive study-related factors such as achievement emotions, SRL strategies, and academic motivation (Chan et al., 2012; Dametto & Noronha, 2020; Martin et al., 2012; Muenks et al., 2017; Weisskirch, 2018). In line with these results, it may be argued that if soft skills regulate these aspects, this should help students to reach their goals, and soft skills should have a mediated rather than any direct effect on academic achievement, contrarily to what previous studies and meta-analyses found without controlling for study-related factors.

- 2) extend the model to more qualitative aspects of students' lives: emotional aspects of learning (i.e., achievement emotions, or the emotions that students feel in relation to school and academic tasks) and life satisfaction (or students' evaluation of their contentment with life). This will allow us to test the relations occurring between soft skills and both achievement emotions and life satisfaction over and above the effect of the other study-related factors and cognitive abilities. Soft skills in fact should promote one's sense of fulfillment with life and well-being (Bruna et al., 2019; Peterson & Seligman, 2004) and they have been repeatedly found as having a positive relation with individuals' life satisfaction (Bruna et al., 2019; Kashdan & Steger, 2007; Martin et al., 2013; Robitschek & Keyes, 2009; Stevic & Ward, 2008) and their level of positive emotions experienced (Dametto & Noronha, 2020; Weber et al., 2016). In other words, their influence with life satisfaction should stem from: i) a direct relation with life satisfaction, because soft skills should sustain individuals in any situation, not just at school as the study-related factors; ii) an indirect relation mediated by achievement emotions (Hagenauer et al., 2018; Heffner & Antaramian, 2016; Karatzias et al., 2002).

- 3) exploratory examine the role of extracurricular activities (at an exploratory level, as in Study 1). Extracurricular activities could have a key part to play because they can promote school students' soft skills and cognitive abilities (Eccles, 1999; Voyer & Jansen, 2017), support their life satisfaction (Gilman & Huebner, 2006), and influence factors such as academic achievement, SRL strategies, academic motivation, and achievement emotions. That said and following the exploratory results from Study 1, I do not expect to find strong evidence for the link between extracurricular activities and study-related factors (i.e., SRL strategies, academic motivation, and achievement emotions) when including soft skills into the model. This is because extracurricular activities do not directly regard school subjects or learning strategies, but they may improve students' more general personal endowments (such as their soft skills and cognitive abilities) (Eccles, 1999; Feldman & Matjasko, 2005), with a consequent impact on variables regarding their school life.

3.2. Hypotheses

Following the evidence that can be drawn from the literature and the results of Study 1, I propose the following hypotheses. These are presented for each step of the path analysis outlined below, starting from the two dependent variables (academic achievement and life satisfaction) to the only exogenous variable (extracurricular activities) (from right to left in Figure 3.1). For each observed variable, I report its expected relationship with the previously-presented factors, and any indirect relation with the more "distal" variables.

All the hypothesized relations are supported by evidence in the literature and by a meta-analytical calculation of plausible effect sizes that subsequently served to specify plausible priors (see the Statistical analyses section for a more detailed presentation of the meta-analytical process, and Table 3.3 for the final value of the priors). In eight cases (e.g., the direct relation between soft skills and academic achievement), however, we hypothesize a different relation respect to the one suggested

by the meta-analytical priors and most of the previous literature. In particular, I hypothesize these eight relations to be null when other variables are contemporary considered in the model, or, in other words, that the relation is mediated by other variables.

The relations hypothesized are as follows:

- *Academic achievement and life satisfaction*: I expect to find a small correlation between the two (Suldo et al., 2006).
- *SRL strategies and academic motivation*: I expect SRL strategies and academic motivation to be positively and directly related to academic achievement (Richardson et al., 2012). Both SRL strategies and academic motivation should also be related to one another (see Mega et al., 2014) and to life satisfaction, though I expect academic motivation to be more strongly related to life satisfaction than SRL strategies (Antaramian, 2017; Peters et al., 2018).
- *Achievement emotions*: I expect positive achievement emotions to be directly related with SRL strategies, academic motivation, and life satisfaction (Diener, 2012; Huang, 2011; Pekrun et al., 2007). Positive achievement emotions should also be indirectly related to academic achievement (Mega et al., 2014) and life satisfaction through the mediation of SRL strategies and academic motivation. On the other hand, I expect negative achievement emotions to show the opposite pattern of relations. Achievement emotions, contrarily to what we found from the meta-analytical procedure are not expected to have a direct relation with academic achievement.
- *Soft skills*: I expect soft skills to be directly related to achievement emotions, academic motivation, SRL strategies, and life satisfaction (Bruna et al., 2019; Feraco, Resnati, et al., 2021; Weber et al., 2016). In line with Study 1, but in contrast with what the meta-analytical procedure suggests, the association between soft skills and academic achievement should be fully mediated by SRL strategies, academic motivation, and achievement emotions (e.g., Chan et al., 2012; Muenks et al., 2017). In addition, soft skills should also be indirectly related with

academic motivation and SRL strategies through the mediation of positive and negative achievement emotions. In line with Study 1, these relations should be consistent for all the soft skills, but - to avoid type 2 errors - I consider them primarily as a single factor, then I will test the stability of the relations for the six soft skills considered at an exploratory level.

- *Cognitive abilities*: I expect cognitive abilities to be the strongest direct predictor of academic achievement (Roth et al., 2015). Cognitive abilities should be mostly unrelated to the other factors considered, except for a small positive association with academic motivation that was also found in Study 1 (Kriegbaum et al., 2018; Lavrijsen et al., 2021).
- *Extracurricular activities*: in line with Study 1, I expect extracurricular activities to be positively related with soft skills (Feraco, Resnati, et al., 2021) but not with the other study-related factors. Soft skills should, in turn, indirectly support SRL strategies and academic motivation. The same should apply to achievement emotions, with extracurricular activities that indirectly relates to achievement emotions through the mediation of soft skills. Finally, I expect extracurricular activities to be positively linked to life satisfaction (Gilman, 2001; Gilman & Huebner, 2006) and cognitive abilities, as seen in studies on practicing sports and music (Schellenberg, 2004; Voyer & Jansen, 2017).

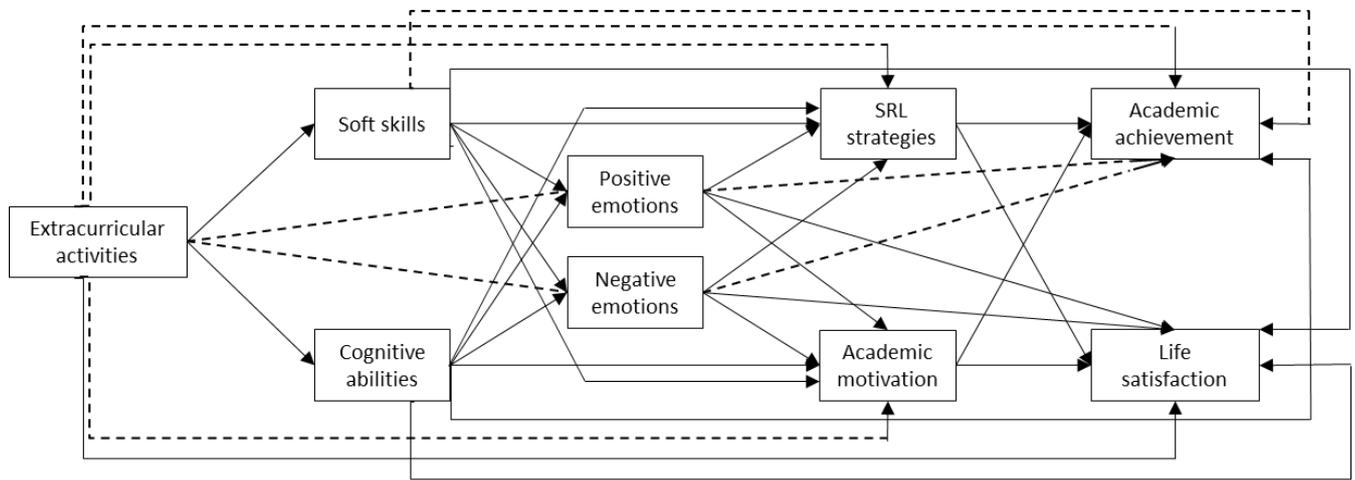
3.3. Materials and methods

3.3.1. Participants

603 students ranging from 11 to 18 years old ($M_{\text{age}} = 13.53$, $SD_{\text{age}} = 1.91$), participated on a voluntary basis after their parents (or the students if 18 years old) had completed and signed a consent form and their school agreed to participate to the project. Another 56 students participated in the study but did not complete all the tasks and were consequently excluded a priori.

This study was conducted in accordance with the recommendations of the local University's Research Ethics Committee and all participants (and/or their parents when necessary) gave their informed consents prior to participation.

Figure 3.1: Graphical representation the theoretical models fitted in the path analysis. The dotted lines represent the paths whose priors were specified differently in the two models, and the continuous lines the paths whose priors were identical in the two models.



A power analysis confirmed that our sample size sufficed to detect the all the direct relations linking soft skills with SRL strategies, academic motivation, positive emotions, negative emotions, and life satisfaction. Starting from a covariance matrix based on the prior calculated (see Table 3.3), 10000 random datasets were simulated for different sample sizes. For each simulated dataset, the hypothesized path analysis (see Figure 3.1) model was fitted and the results for the relations between soft skills and the other factors were saved for power calculation. Assuming a significance level of $\alpha < .001$, it emerged that 600 participants sufficed to obtain a power $> .80$. This sample, however, does not suffice to obtain an acceptable power also for the two indirect effects. Unfortunately, data collection had to be stopped in February because of the school closures caused by the Covid-19 Pandemic.

Table 3.1. Study 2. Participants' descriptive statistics by school year

School year	6	7	8	9	10	11	12	Total
Number	114	117	106	81	87	64	34	603
Females	39	56	59	50	70	59	27	370
Mean age	11.18	12.07	13.08	14.14	15.11	16.33	17.15	13.53
(sd)	(0.43)	(0.29)	(0.30)	(0.38)	(0.56)	(0.62)	(0.50)	(1.91)

Note. 6 to 8 = 1st to 3rd year of middle school; 9 to 12 = 1st to 4th year of high school.

3.3.2. Measures

Cronbach's alpha coefficients were calculated on our sample and are presented in Table 4.1. Cronbach's alpha coefficients calculated on the present sample were always acceptable and ranged between .63 (for perseverance) and .89 (for negative emotions).

3.3.2.1. Extracurricular activities

An ad hoc questionnaire on extracurricular activities was used to assess the amount of structured and regular activities that students attended in their out-of-school time. According to the results obtained in Study 1, three types of activity were selected: sport, music, and associative activities (e.g., scouting, volunteering). Participants were asked to indicate how many years (from "0" to "11 or more") they had been engaging in each type of activity. The sum of the years for all three was considered as the amount of a student's participation to extracurricular activities.

3.3.2.2. Soft skills

Soft skills were measured using the same questionnaires of Study 1. The questionnaire measures students' levels of the six soft skills belonging to the personal qualities branch of the World Economic Forum model (2016). It comprises measures for: i) *Adaptability*, or the ability to adapt positively to new and uncertain situations in everyday life (e.g., "I'm scared by situations that are new to me."). ii) *Curiosity*, or the epistemic desire to acquire new knowledge (e.g., "Whenever I see

something new, I try to understand what it is.”). iii) *Initiative*, or deliberate personal growth referred to general everyday life situations (e.g., “If a decision has to be taken, I take it.”). iv) *Perseverance*, or the general tendency to work hard to reach aims despite difficulties (e.g., “Faced with a difficult situations, I don’t give up.”). v) *Social awareness*, or sense of responsibility for the community and the environment (e.g., “It’s important that all people be treated equally.”). vi) *Leadership*, or the characteristics typical of leadership in students such as being the reference person in a group, or supporting and motivating others (e.g., “I can take the lead in team work.”). Each subscale includes 6 items, except for the leadership scale, which has 4. Answers are given on a Likert scale from 1 (not at all) to 6 (very much). The questionnaire has shown a good factorial validity in Study 1 and the total soft skills score has been found reliable and predictive (see also Measurement model section). I computed the average of each subscale and the mean of the averages for the total score.

3.3.2.3. *Achievement emotions*

The *Positive and Negative Affect Schedule* (D. Watson et al., 1988), in the 20-item version of the Italian adaptation of the inventory (Terraciano et al., 2003), was used to measure achievement emotions at school. It measures positive and negative emotions (10 items each) and participants use a 5-point Likert scale to indicate how much they experienced each of the 20 emotions at school during the previous weeks. Average scores for positive (PA) and negative (NA) emotions are calculated separately.

3.3.2.4. *Academic motivation*

The *Scholastic Motivation questionnaire* (De Beni et al., 2014) includes three subscales measuring specific facets of motivation: i) *Theory of intelligence*, or the level of incremental or entity theories of intelligence (e.g., “You can learn new things, but you can’t change your intelligence.”); ii) *learning goals*, or mastery, or performance approach to learning (e.g., “It’s more important to me to learn things than to get good grades.”); iii) *Self-efficacy*, or how students perceive their own ability to succeed at school (e.g., “How do you rate your study skills?”). The questionnaire includes 13 items

(5 for self-efficacy, and 4 for theory of intelligence and learning goals) that are scored on a 5-point Likert scale. As done previously in Mega et al. (2014), I considered the three subscales as a single indicator of motivation. I computed the average of the means for each subscale after reversing the scores for the items concerning entity theory of intelligence and performance approach to learning.

3.3.2.5. *Self-regulated learning strategies*

The *Self-Regulated Learning Questionnaire* (De Beni et al., 2014) measures SRL strategies in terms of: *elaboration* (e.g., “When I study, I try to literally repeat the textbook.”); *learning strategies* (e.g., “When I study for an exam, I wonder what my teacher considers important.”); *metacognition* (e.g., “If a test goes badly, I try to understand why it happened.”); *organization* (e.g., “I usually know how to organize my studies so that I still have time for my hobbies.”); and *self-evaluation* (e.g., “I understand when the task I have to do is easy or difficult for me.”). The questionnaire is composed of 50 items (10 for each aspect) scored on a 5-point Likert scale. After reversing all the negative items, I calculated the average score.

3.3.2.6. *Cognitive abilities*

The *Culture-Free Intelligence Test* (Cattell, 1940) measures non-verbal fluid reasoning ability. It consists of 4 different subtasks with different time limits. The sub-tasks involve: i) completing a sequence of images (12 items, 3 minutes); ii) finding among five images which is the odd one out (14 items, 4 minutes); iii) completing a matrix of images (12 items, 3 minutes); and iv) finding images that respect the same internal relationships as the target figures (8 items, 2.5 minutes). One point is awarded for each correct answer and the total score is calculated as the sum of all the subtask scores.

3.3.2.7. *Academic achievement*

Academic achievement was measured in terms of school grades. The Italian school system provides for summary grades to be awarded for each subject on a 10-point scale, where 6 is a pass. Students are graded twice a year, in February and June. I collected students’ grades in February for

the four most representative subjects that are common to all academic years and types of school: Italian, foreign language (English), math and science. Each students' average grade was calculated as a measure of their academic achievement.

3.3.2.8. *Life satisfaction*

The *Satisfaction With Life Scale* (Diener et al., 1985) in its Italian adaptation (Di Fabio & Gori, 2016) was used to measure students' overall life satisfaction. It includes 5 items (e.g., "The condition of my life are excellent.") scored on a 7-point Likert scale. The average score was calculated.

3.3.3. *Procedure*

Schools' principals were contacted via e-mail or phone and scheduled a meeting to discuss and explain the project with those interested in taking part. After that, the consent forms were distributed to schools and parents (or students when 18 years old). After they signed the consent, the collective session with the students were organized. Data were collected between January and February 2020.

Two collective sessions lasting one hour each were organized during school hours. A trained psychologist followed this part and administered the questionnaires and tasks in the presence of the class teachers. Participants always started by providing personal information (gender, age, school grade, and extracurricular activities). The other tasks were counterbalanced across classes. For the cognitive tasks, the experimenter read the instructions and completed the practice items together with the students to ensure they understood the task before letting them answer. Students were stopped when the time limits were reached. For the questionnaires, the experimenter asked students to read the instructions carefully and told them that there were no right or wrong answers. In February, after completing the data collection, schools were contacted and asked to provide us with the grades obtained by each participant in math, science, foreign language (English), and Italian.

3.3.4. *Statistical analyses*

All analyses were run using R (R Core Team, 2020) after standardizing the scores by participants' school year. Table 3.2 shows the means, standard deviations, Cronbach's alpha

coefficients, and correlations between all variables. All the Cronbach's alpha coefficients resulted acceptable, with the total score of soft skills having a high coefficient ($\alpha = .89$) indicating that the measures were consistently reliable in this sample such as in the sample collected for Study 1.

Table 3.2. Study 2. Means, standard deviations, Cronbach's alpha, and correlations between all study variables.

	M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.Adaptability	4.04	0.78	.74	1													
2.Curiosity	4.33	0.76	.80	.36*	1												
3.Perseverance	4.50	0.71	.69	.38*	.55*	1											
4.Initiative	4.20	0.79	.65	.47*	.49*	.57*	1										
5.Social awareness	4.77	0.77	.76	.21*	.55*	.38*	.33*	1									
6.Leadership	4.10	0.99	.71	.36*	.33*	.50*	.68*	.22*	1								
7.Soft skills	4.32	0.58	.89	.64*	.74*	.77*	.83*	.60*	.75*	1							
8.SRL strategies	3.37	0.39	.87	.23*	.57*	.53*	.41*	.46*	.29*	.56*	1						
9.Academic motivation	3.54	0.52	.70	.24*	.51*	.44*	.28*	.34*	.23*	.46*	.51*	1					
10.Positive emotions	3.17	0.72	.87	.30*	.51*	.49*	.44*	.28*	.40*	.56*	.52*	.36*	1				
11.Negative emotions	2.25	0.82	.89	-.32*	-.13	-.19*	-.14*	.07	-.14*	-.20*	-.15*	-.19*	-.15*	1			
12.ECA	8.62	3.16	-	.04	.10	.13	.17*	.12	.16*	.17*	.15*	.08	.08	-.01	1		
13.Cognitive abilities	32.10	5.07	.77 ^a	.10	.08	.12	.14*	.06	.21*	.17*	.10	.11	.02	-.11	.17*	1	
14.Life satisfaction	4.62	1.28	.85	.24*	.29*	.38*	.31*	.12	.30*	.38*	.3*	.25*	.43*	-.25*	.11	.05	1
15.Academic achievement	7.10	1.09	.65	.02	.19*	.26*	.15*	.17*	.13	.21*	.32*	.34*	.17*	-.17*	.20*	.35*	.17*

* $p < .001$.

^aThe α for the Culture-Free Intelligence Test refers to split-half reliability

Note. SRL = Self-regulated learning; ECA = Extracurricular activities

3.3.4.1. *Measurement models for soft skills and academic motivation*

In line with Study 1, both soft skills and academic motivation were considered as observed second-order factors. Before proceeding, I ensured that their factorial structure was satisfactory, or in other words whether the six soft skill subscales and the three motivation subscales converge into two second-order factors. A confirmatory factor analysis (CFA) was run to validate the use of the aggregate factors in the subsequent path analysis (Schreiber, 2008). This enabled us to reduce the number of parameters to estimate in the path analysis and avoid running an over-parametrized model (although the consistency of the effect for the six soft skills is explored).

The CFA for the soft skills factor included the 34 items as observed variables, and 6 latent factors (i.e., adaptability, curiosity, initiative, leadership, perseverance, and social awareness). The CFA for the academic motivation factor included the 14 items as observed variables, and three latent factors (i.e., theories of intelligence, self-efficacy, and learning goals). As suggested by Schermelleh-Engel et al. (2003), the goodness of the models' fit to the data was assessed using multiple indexes: chi-square, the comparative fit index (CFI), the non-normed fit index (NNFI), and the root-mean-square error of approximation (RMSEA). The models showed acceptable fit indexes ($\chi^2(521, N = 600) = 2610.39, p < .001, CFI = .93, NNFI = .93, RMSEA = .08, 90\%$ confidence interval for RMSEA [.08, .09], for soft skills; $\chi^2(62, N = 600) = 404.76, p < .001, CFI = .95, NNFI = .93, RMSEA = .10, 90\%$ confidence interval for RMSEA [.09, .11], for scholastic motivation) and significant factor loadings ($p < .001$), with the mean factor loading of the second-order factors amounting to .79 and .48, respectively. Measurement invariance was also tested dividing the sample in upper secondary school ($N = 266$) and lower secondary school students ($N = 334$). To this aim, a multi-group confirmatory factor analysis was run using diagonally weighted least squares (DWLS). The results showed a strong scalar invariance for both the models (equality of factor loadings and intercepts): $\chi^2(461, N = 600) = 3877.89, p < .001, CFI = .92, NNFI = .93, RMSEA = .09, 90\%$ confidence interval

for RMSEA [.08, .09], for soft skills, $\chi^2(171, N = 600) = 594.504, p < .001, CFI = .94, NNFI = .94,$ RMSEA = .09, 90% confidence interval for RMSEA [.08, .19], for scholastic motivation.

3.3.4.2. *Prior specification*

I decided to adopt a Bayesian approach for the path analysis in order to: i) include study 1 results and previous evidence from the literature (prior beliefs) in the model, leading to more precise estimates of the effects; and ii) formulate, estimate, and compare precise alternative hypotheses in terms of probability distributions around a plausible effect, instead of only testing the presence of an effect in terms of significant p values (McElreath, 2016). The second point will be particularly important. Under this view, in fact, Bayesian analysis allows to include different prior knowledge into the model in term of both meta-analytical results or plausible expected results and test which of the two plausible expectations better resemble the data. Before running the path analysis, I thus estimated a prior distribution for the relationship existing between each pair of variables considered. Then two models were fitted under different prior assumptions (hypotheses) and compared using the R package “blavaan” (Merkle & Rosseel, 2018). The comparison enabled us to see which model fitted the data better and choose the best hypothesis. For this reason, we then compared two different models (one assuming the presence of the eight direct effects [m1], the other assuming that these effects are null [m2]) to test whether our hypotheses are confirmed (see Figure 3.1).

To set plausible priors, I adopted a light meta-analytical approach: instead of conducting a full literature review for each relation, I searched for existing meta-analytical results, papers of which I was already aware, other related papers, and papers citing them (total papers considered = 92). Only directly-available correlation results were transformed into Fisher’s Z values (Borenstein et al., 2021), and meta-analyzed using the R package “metafor” (Viechtbauer, 2010). For the variables belonging to second-order factors, I calculated the average of the resulting meta-analytical Z values between each of the variables comprising the second-order factor and the related variable to estimate a plausible second-order prior. Finally, I transformed the Z values back into r coefficients and used the

latter as priors for the standardized path coefficients. Despite our huge literature search effort, I could not find any results for the association between theories of intelligence and life satisfaction, and I found only a few results for others. Three different kinds of prior were ultimately used:

- weak (SD = .40) for the estimates calculated on a small number of effects;
- moderate (SD = .20) for all the other prior estimates in line with the hypotheses;
- strong (SD = .05) for all the prior estimates that contradicted our hypotheses.

For example, a moderately informative prior $N(.20, .20)$ is centered on .20 and has most of its density distribution (95%) ranging between -.17 and .60. A similar, but strongly informative prior $N(.20, .05)$ is still centered on .20, but has most of its density distribution (95%) ranging between .10 and .30, constraining the posterior distribution to a greater degree. All the priors on the path coefficients were specified as following normal distributions. Priors for the correlations between variables were specified using beta distributions. See Table 3.3 for the priors used and Table A1 in the appendix. The number of studies consulted, the number of effects analyzed and the meta-analytical results with associated confidence intervals (CI) are here briefly outlined.

Soft skills and self-regulated learning strategies. The relation between soft skills and SRL strategies has been studied in particular as concerns curiosity and perseverance. I retrieved 16 effect sizes from 7 different studies that showed a positive relation between SRL strategies and adaptability ($z = .43$, CI [.07, .78]), curiosity ($z = .40$, CI [.22, .58]), initiative ($z = .44$, CI [.35, .54]), leadership ($z = .31$, CI [.22, .40]), perseverance ($z = .50$, CI [.43, .60]), and social awareness ($z = .40$, CI [.31, .49]). The mean of the six values obtained was computed (mean $z = .42$) and converted into r ($r = .39$).

Soft skills and academic motivation. The prior on the relation between soft skills and academic motivation includes the relations between each soft skill and the three aspects of academic motivation considered (i.e., academic self-efficacy, learning goals, and incremental theories of intelligence). I retrieved 64 effect sizes (25 for self-efficacy; 21 for learning goals; 18 for incremental theories of

intelligence) from 21 published papers. Academic self-efficacy was found positively related with adaptability ($z = .47$, CI [.29, .67]), curiosity ($z = .38$, CI [.33, .44]), initiative ($z = .24$, CI [.16, .33]), leadership ($z = .30$, CI [.10, .49]), perseverance (from the meta-analysis by Credé et al., 2017, $z = .46$, CI for r [.28, .57]), and social awareness ($z = .32$, CI [-.16, .80]); and the mean of the six values obtained was computed (mean $z = .36$). Learning goals showed a positive relation with adaptability ($z = .39$, CI [.25, .53]), curiosity ($z = .47$, CI [.43, .52]), initiative ($z = .22$, CI [.13, .32]), leadership ($z = .18$, CI [-.03, .40]), perseverance ($z = .38$, CI [.29, .47]), and social awareness ($z = .28$, CI [.20, .36]); and the mean of the six values obtained was computed (mean $z = .32$). Finally, incremental theories of intelligence showed relations with adaptability ($z = .24$, CI [.07, .41]), curiosity ($z = .12$, CI [.03, .21]), initiative ($z = .17$, CI [.08, .26]), leadership ($z = .01$, CI [-.08, .10]), perseverance ($z = .23$, CI [.13, .34]), and social awareness ($z = -.01$, CI [-.10, .08]); and the mean of the six values obtained was computed (mean $z = .13$). Then the three means were averaged (mean $z = .27$) and converted into r ($r = .26$).

Soft skills and positive emotions. I retrieved 27 correlation effects for the single soft skills and positive emotions from 15 published papers. The meta-analytical results showed that positive emotions were positively related to adaptability ($z = .21$, CI [.14, .29]), curiosity ($z = .42$, CI [.38, .47]), initiative ($z = .40$, CI [.31, .49]), leadership ($z = .38$, CI [.31, .45]), perseverance ($z = .50$, CI [.40, .60]), and social awareness ($z = .46$, CI [.30, .62]). The mean of the six values obtained was computed (mean $z = .40$) and converted into r ($r = .38$).

Soft skills and negative emotions. I retrieved 24 correlation effects for the single soft skills and negative emotions from 12 published papers, one of which was a meta-analysis (Weigold et al., 2020). The meta-analytical results showed a negative relation between negative emotions and adaptability ($z = -.16$, CI [-.26, -.06]), curiosity ($z = -.14$, CI [-.21, -.07]), initiative (from a meta-analysis by Weigold et al., 2020, $z = -.25$, CI for r [-.39, -.01]), leadership ($z = -.16$, CI [-.23, -.10]), perseverance ($z = -.18$, CI [-.25, -.11]), and social awareness ($z = -.25$, CI [-.31, -.19]). The mean of

the six values obtained was computed (mean $z = -.19$) and converted into r ($r = -.19$).

Soft skills and extracurricular activities. Only two studies were retrieved, for a total of 7 effect sizes, for the purposes of specifying the prior of the relation between soft skills and extracurricular activities. I found the following correlations between extracurricular activities and adaptability ($z = .08$, CI [-.01, .17]), curiosity ($z = .06$, CI [-.03, .15]), initiative ($z = .19$, CI [.10, .29]), leadership ($z = .19$, CI [.10, .29]), perseverance ($z = .15$, CI [-.02, .33]), and social awareness ($z = .08$, CI [-.01, .17]). The mean of the six values obtained was computed (mean $z = .13$) and converted into r ($r = .12$).

Soft skills and cognitive abilities. Seventeen effect sizes were retrieved from 4 studies and two meta-analysis (Credé et al., 2017; von Stumm et al., 2011). I found the following correlations between cognitive abilities and adaptability ($z = .09$, CI [.04, .14]), curiosity (from a meta-analysis by von Stumm et al., 2011, $z = .22$), initiative ($z = .19$, CI [.01, .36]), leadership ($z = -.06$, CI [-.15, .03]), perseverance (from a meta-analysis by Credé et al., 2017, $z = -.01$, CI for r [-.06, .04]), and social awareness ($z = .01$, CI [-.08, .10]). The mean of the six values obtained was computed (mean $z = .07$) and converted into r ($r = .07$).

Soft skills and life satisfaction. I retrieved 119 effects (112 from a meta-analysis by Bruna et al., 2019) for the relation between the six soft skills and life satisfaction. The following correlations were found life satisfaction and adaptability ($z = .44$, CI [.25, .64]), curiosity (from a meta-analysis by Bruna et al., 2019, $z = .42$, CI for r [.38, .42]), initiative ($z = .53$, CI [.31, .75]), leadership (from the meta-analysis by Bruna et al., 2019, $z = .24$, CI for r [.20, .29]), perseverance (from the meta-analysis by Bruna et al., 2019, $z = .33$, CI for r [.26, .37]), and social awareness (from the meta-analysis by Bruna et al., 2019, $z = .30$, CI for r [.26, .32]). The mean of the six values obtained was computed (mean $z = .38$) and converted into r ($r = .36$).

Soft skills and academic achievement. One of the key aspects of the study was the direct relationship found between soft skills and academic achievement. I retrieved 33 effects (16 of them from meta analyses by Credé et al., 2017, and von Stumm et al., 2011, and 17 from 10 different

studies). All of the soft skills showed a positive association with academic achievement. In particular, academic achievement related to adaptability ($z = .18$, CI [.10, .26]), curiosity (from a meta-analysis by von Stumm et al., 2011, $z = .33$), initiative ($z = .09$, CI [-.02, .18]), leadership ($z = .13$, CI [.06, .19]), perseverance (from a meta-analysis by Credé et al., 2017, $z = .27$, CI for r [.11, .41]), and social awareness ($z = .13$, CI [.08, .17]). The mean of the six values obtained was computed (mean $z = .19$) and converted into r ($r = .19$).

Self-regulated learning strategies and academic motivation. I retrieved 46 effect sizes (35 of them from the meta-analysis by Burnette et al., 2013) for the relations between SRL strategies and the three aspects of motivation considered (i.e., self-efficacy, learning goals, and incremental theories of intelligence). SRL strategies was positively related to self-efficacy ($z = .41$, CI [.35, .47]), learning goals ($z = .25$, CI [.17, .33]) and incremental theories of intelligence (from the meta-analysis by Burnette et al., 2013; $z = .13$, CI for r [.16, .29]). The mean of the three values obtained was computed (mean $z = .30$) and converted into r ($r = .29$).

Self-regulated learning strategies and positive emotions. I retrieved 27 effect sizes from 5 studies for the correlation between SRL strategies and positive emotions. The meta-analytical results showed a z value = .37 (CI [.33, .41]), which was converted into r ($r = .36$).

Self-regulated learning strategies and negative emotions. I retrieved 24 effect sizes from 5 studies for the correlation between SRL strategies and negative emotions. The meta-analytical results showed a z value = -.28 (CI [-.31, -.26]), which was converted into r ($r = -.27$).

Self-regulated learning strategies and extracurricular activities. I retrieved 6 effect sizes from two studies for the correlation between SRL strategies and extracurricular activities. The meta-analytical results showed a z value = .15 (CI [.11, .19]), which was converted into r ($r = .15$).

Self-regulated learning strategies and cognitive abilities. Only one effect size was retrieved from the literature for the correlation between SRL strategies and cognitive abilities (Zuffianò et al., 2013). It showed a z value = .10 (CI [-.05, .25]), which was converted into r ($r = .10$).

Self-regulated learning strategies and life satisfaction. Two effect sizes were retrieved from one study for the correlation between SRL strategies and life satisfaction. They yielded a z value = .17 (CI [.10, .25]), which was converted into r ($r = .17$).

Self-regulated learning strategies and academic achievement. The five meta-analytical effects corresponding to the facets of SRL strategies considered in our study were retrieved from the meta-analysis conducted by Richardson et al. (2012). In particular, organization ($z = .20$, CI for r [.09, .20]), elaboration ($z = .14$, CI for r [.03, .25]), metacognition ($z = .14$, CI for r [.05, .22]), critical thinking ($z = .16$, CI for r [.16, .16]), and study management ($z = .20$, CI for r [.17, .20]) showed positive relations with academic achievement. The average of these effects was .17 ($r = .17$).

Academic motivation and positive emotions. I retrieved 45 effect sizes for the correlations between the three aspects of motivation and PA: 12 for academic self-efficacy (from five studies), 25 for learning goals (from the meta-analysis by Huang, 2011), and 8 for incremental theories of intelligence (from three studies). In particular, positive emotions were positively related with self-efficacy ($z = .41$, CI [.30, .53]), learning goals ($z = .43$, CI for r [.35, .47]), and incremental theories of intelligence ($z = .09$, CI [-.01, .20]). The mean of the three values obtained was computed (mean $z = .33$) and converted into r ($r = .32$).

Academic motivation and negative emotions. I retrieved 50 effect sizes for the correlations between the three aspects of academic motivation and negative emotions: 15 for self-efficacy (from five studies), 25 for learning goals (from the meta-analysis by Huang, 2011), and 10 for incremental theories of intelligence (from three studies). In particular, negative emotions related with self-efficacy ($z = -.38$, CI [-.48, -.29]), learning goals ($z = .13$, CI for r [.07, .19]), and incremental theories of intelligence ($z = -.21$, CI [-.39, -.11]). The mean of the three values obtained was computed (mean $z = -.12$) and converted into r ($r = -.12$).

Academic motivation and extracurricular activities. I retrieved 4 effect sizes for the correlations between the three aspects of academic motivation and extracurricular activities: 2 for

self-efficacy (from two studies), 2 for learning goals, and 2 for incremental theories of intelligence. In particular, extracurricular activities related with self-efficacy ($z = .16$, CI [.01, .32]), learning goals ($z = .02$, CI [-.05, .08]), and incremental theories of intelligence ($z = .02$, CI [-.05, .09]). The mean of the three values obtained was computed (mean $z = .07$) and converted into r ($r = .07$).

Academic motivation and cognitive abilities. The meta-analysis by Kriegbaum et al. (2018) was used for the prior for the relation between cognitive abilities and academic achievement. This value was $r = .17$ (CI [.15, .20]).

Academic motivation and academic achievement. The 221 effect sizes retrieved from three different meta-analyses showed that academic achievement is positively related to self-efficacy ($z = .29$, CI for r [.14, .41]; Richardson et al., 2012), learning goals ($z = .12$, CI for r [.03, .21]; Richardson et al., 2012), and incremental theories of intelligence ($z = .07$, CI [.04, .11]; Costa & Faria, 2018). The mean of the three values obtained was computed (mean $z = .19$) and converted into r ($r = .19$).

Academic motivation and life satisfaction. I retrieved 9 effect sizes for the correlations between the three aspects of academic motivation and life satisfaction: 7 for self-efficacy (from four studies), 2 for learning goals (from one study), and none for incremental theories of intelligence. In particular, cognitive abilities positively related with self-efficacy ($z = .30$, CI [.28, .33]), and learning goals ($z = .38$, CI [.28, .48]). The mean of the values obtained was computed (mean $z = .34$) and converted into r ($r = .33$).

Positive emotions and negative emotions. For the prior on the correlation between positive and negative emotions, I used the results of the validation of the PANAS for Italian youth by Ciucci et al., 2017. This resulted in a value of -.28.

Positive emotions and extracurricular activities Three effect sizes were retrieved from two studies for the correlation between positive emotions and extracurricular activities. The meta-analytical results showed a z value = .20 (CI [.12, .29]) that was converted into r ($r = .20$).

Positive emotions and cognitive abilities. Only one effect size was retrieved (Zaccoletti et al.,

2020) for the correlation between positive emotions and cognitive abilities. In this study, r was .12.

Positive emotions and life satisfaction. Ten effect sizes were retrieved from seven studies for the correlation between positive emotions and life satisfaction. The meta-analytical results showed a z value = .42 (CI [.39, .45]), that was converted into r ($r = .40$).

Positive emotions and academic achievement. Nine effect sizes were retrieved from five studies for the correlation between positive emotions and academic achievement. The meta-analytical results showed a z value = .12 (CI [.09, .16]) that was converted into r ($r = .12$).

Negative emotions and extracurricular activities. Two effect sizes were retrieved from two studies for the correlation between negative emotions and extracurricular activities. The meta-analytical results showed a z value = -.12 (CI [-.17, -.07]), that was converted into r ($r = -.12$).

Negative emotions and cognitive abilities. Two effect sizes were retrieved (from Zaccoletti et al., 2020) for the correlation between negative emotions and cognitive abilities. The meta-analytical results showed a z value = .09 (CI [-.41, .23]), that was converted into r ($r = .09$).

Negative emotions and life satisfaction. Ten effect sizes were retrieved from seven studies for the correlation between NA and life satisfaction. The meta-analytical results showed a z value = -.36 (CI [-.45, -.26]), that was converted into r ($r = -.35$).

Negative emotions and academic achievement. Thirteen effect sizes were retrieved from six studies for the correlation between negative emotions and academic success. The meta-analytical results showed a z value = -.16 (CI [-.22, -.11]), that was converted into r ($r = -.16$).

Extracurricular activities and cognitive abilities. Two effect sizes were retrieved (from Feraco, Resnati et al., 2021) for the correlation between extracurricular activities and cognitive abilities. The meta-analytical results showed a z value = .02 (CI [-.05, .09]), that was converted into r ($r = .02$).

Extracurricular activities and life satisfaction. Two effect sizes were retrieved from two studies for the correlation between extracurricular activities and life satisfaction. The meta-analytical

results showed a z value = .17 (CI [.13, .22]), that was converted into r ($r = .17$).

Extracurricular activities and academic achievement. The value in the meta-analysis by Shulruf (2010) was used as the prior for the relation between extracurricular activities and academic achievement. This value was $r = .13$ (CI [-.15, .31]).

Cognitive abilities and life satisfaction. The literature review by Suldo et al., (2006) was used as an indication of the relation between cognitive abilities and life satisfaction. The authors found no consistency in the literature, so I set this value as $N(.10, .20)$.

Cognitive abilities and academic achievement. The meta-analysis by Roth et al. (2015) was used for the prior for the relation between cognitive abilities and academic achievement. This value was $r = .54$ (CI [.51, .57]).

Life satisfaction and academic achievement. Seven effect sizes were retrieved from six studies for the correlation between academic achievement and life satisfaction. The meta-analytical results showed a z value = .23 (CI [.19, .26]), which was converted into r ($r = .23$).

3.3.4.3. Path analysis

After establishing the priors for each pairwise relation between the variables considered, I estimated and compared two full path analysis models differing only in terms of the priors specified for eight specific effects (Figure 3.1). In both the models, I estimated the following relations: the direct relation of extracurricular activities, soft skills, cognitive abilities, positive emotions, negative emotions, SRL strategies, and academic motivation with academic achievement and life satisfaction; the direct relations of extracurricular activities, soft skills, cognitive abilities, positive emotions, and negative emotions with SRL strategies and motivation; the direct relations of extracurricular activities, soft skills, and cognitive abilities with positive emotions and negative emotions; the direct relations of extracurricular activities with soft skills and cognitive abilities. The four correlations between academic achievement and life satisfaction; SRL strategies and motivation; positive emotions and negative emotions; and soft skills and cognitive abilities were also specified. As stated

before, the two models only differed for the priors specified on the following eight relations (see Figure 3.1, Figure 3.2, and Table 3.3): the direct relations of soft skills, positive emotions, negative emotions, and extracurricular activities with academic achievement; and the direct relations of extracurricular activities with motivation, SRL strategies, positive emotions, and negative emotions. In the first model (m1), for each of these eight relations, I set a strongly informative prior (SD = .05) centered on the estimate calculated in the previous section (e.g., $N[.19, .05]$ on the association between soft skill and academic achievement). In the second model (m2), the priors for the same relations were centered on 0, thereby representing a different hypothesis (e.g., $N[.00, .05]$ on the relation between soft skill and academic achievement). I expected these eight relations to be null and fully mediated by other factors. In other words, I expected m2 to fit the data better than m1. All the other priors were identical (See Table 3.3). Through model comparison, this procedure enabled us to directly compare m2 (which hypothesizes a null effect) with m1 (which hypothesizes the presence of a direct effect, as suggested by the meta-analytical findings from the literature). The model with priors (i.e., hypotheses) that better resemble our data should result preferable. Widely applicable information criterion (WAIC; Watanabe & Opper, 2010) and the Laplace approximation to log-Bayes factors (Raftery, 1993) were used as indices to compare the two models. The results show that m2 was preferable ($\Delta\text{WAIC} = 24.74$; $\log\text{BF} = 33.92$), so the effect for the eight relations is plausibly zero, or practically equivalent to zero. See Figure 3.3 for a graphical representation of the overlap between the different priors of the two models and the data considered. Given that m2 fit the data well (RMSEA = .04, CFI = .99, TLI = 1.04) and showed to better fit the data compared to m1 (i.e., its priors better resemble our data), in the next paragraph I will present its posterior predictions.

3.4. Results

To study the relations occurring between the variables considered, the posterior predictions of m1 will be analysed. Mean β estimates and higher posterior density intervals (HPDI) were extracted from the posterior distributions. Effects were considered as practically equivalent to 0 when the higher

posterior density intervals (HPDI) comprised 0, or the direct β estimate was lower than .10 (Kruschke & Liddell, 2018). The posterior predictions for m2 largely confirmed our hypotheses (see Table 3.3, Figure 3.2, and Figure 3.3 for the detailed results). SRL strategies ($\beta = .19$), academic motivation ($\beta = .21$), and cognitive abilities ($\beta = .31$) showed a positive direct relation with academic achievement, but positive emotions ($\beta = -.00$), negative emotions ($\beta = -.05$), soft skills ($\beta = -.05$), and extracurricular activities ($\beta = .07$) did not. Positive emotions ($\beta = .29$) and soft skills ($\beta = .16$) showed a positive direct relation with life satisfaction, and negative emotions ($\beta = -.17$) showed a negative direct relation with life satisfaction, while SRL strategies ($\beta = .00$), academic motivation ($\beta = .05$), cognitive abilities ($\beta = -.02$), and extracurricular activities ($\beta = .06$) showed only a negligible association with it. Positive emotions ($\beta = .30$; $\beta = .16$) and soft skills ($\beta = .38$; $\beta = .34$) were positively related to both SRL strategies and academic motivation, while negative emotions ($\beta = -.09$) showed a small relation with academic motivation, but not with SRL strategies ($\beta = -.04$). Cognitive abilities ($\beta = .02$; $\beta = .05$), and extracurricular activities ($\beta = .04$; $\beta = -.00$) showed no noteworthy association with either SRL strategies or academic motivation. Soft skills were the only variable relating positively to positive emotions ($\beta = .56$), and negatively to negative emotions ($\beta = -.19$). Finally, extracurricular activities were related to both cognitive abilities ($\beta = .17$) and soft skills ($\beta = .16$). The estimated correlations between academic achievement and life satisfaction, and between positive emotions and negative emotions were very small ($r = .04$; $r = -.05$). On the other hand, there were associations between SRL strategies and academic motivation ($r = .22$), and between soft skills and cognitive abilities, though the latter correlation was small ($r = .14$).

As expected, the analysis of the indirect effects showed that soft skills work as a mediator between extracurricular activities and positive emotions ($\beta = .09$), negative emotions ($\beta = -.03$), academic motivation ($\beta = .06$), and SRL strategies ($\beta = .06$). The effect of soft skills on academic achievement was also mediated by SRL strategies ($\beta = .07$) and academic motivation ($\beta = .07$), and the effect of soft skills on life satisfaction was not only direct, but also mediated by positive emotions

($\beta = .16$) and negative emotions ($\beta = .03$). Finally, positive emotions (but not negative) was indirectly related to academic achievement through the mediation of SRL strategies ($\beta = .06, \beta = -.01$) and academic motivation ($\beta = .03, \beta = -.02$), but showed no indirect relation to life satisfaction.

Figure 3.2 Results of the path analysis for Study 2. Numbers represent standardized beta coefficients. Only patterns with $\beta > .10$ are represented.

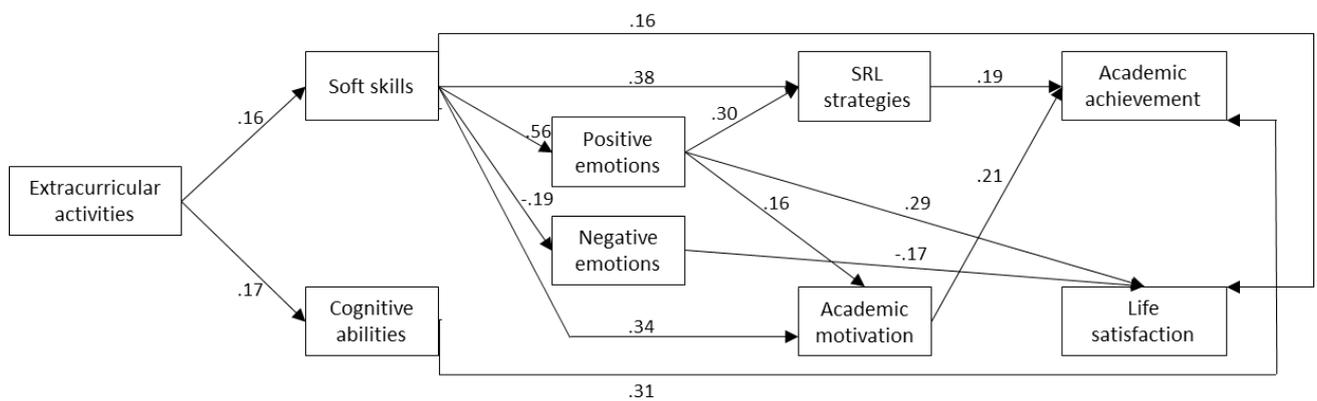
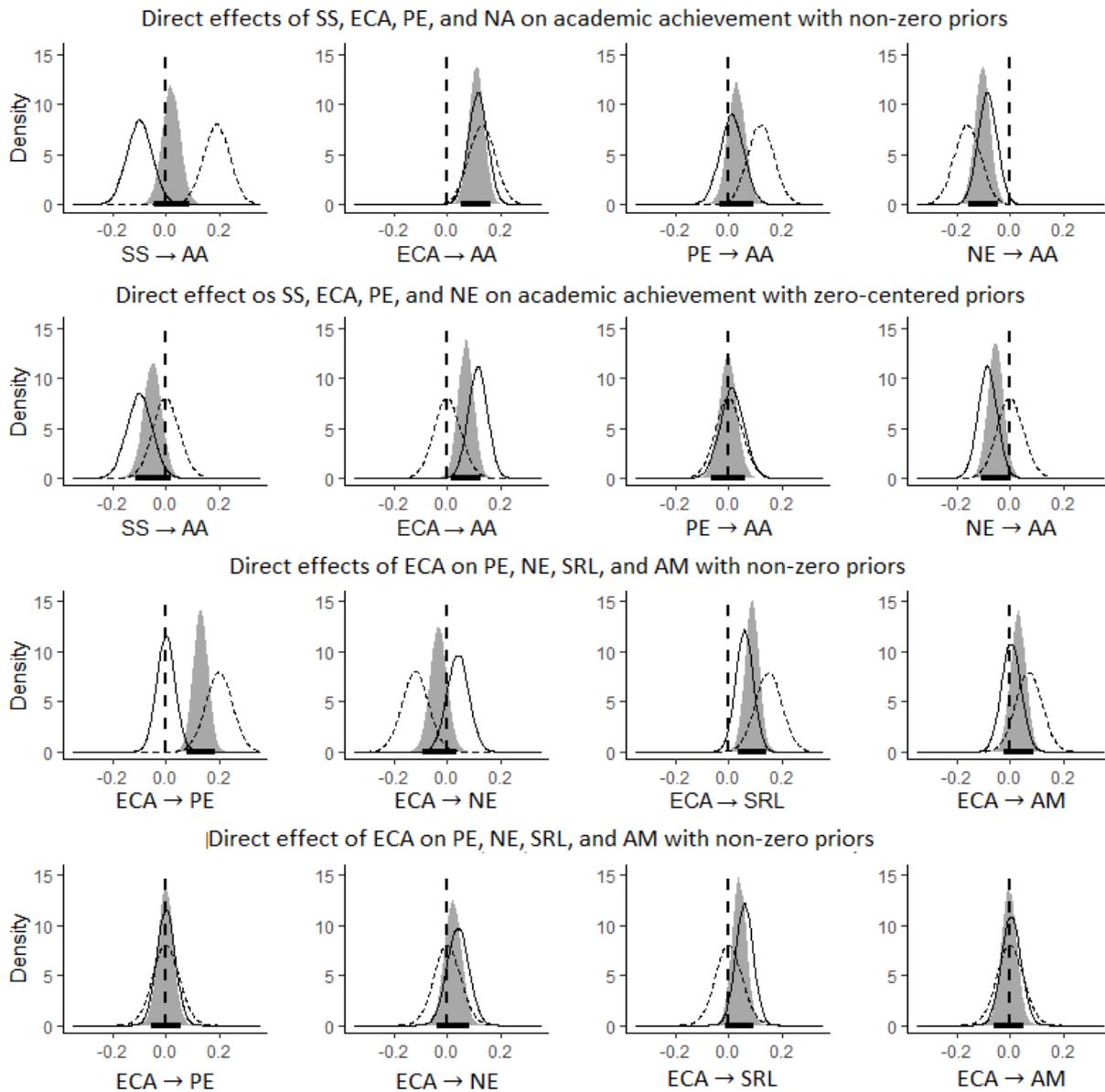


Figure 3.3: Prior (dotted curve), likelihood (continuous line curve) and posterior (grey curve) distributions of the eight effects whose priors differed between m1 and m2. Rows 1 and 3 (m1) show the effects obtained with non-zero priors. Rows 2 and 4 (m2) show the effects obtained with priors centered on zero. The thick horizontal line represents higher posterior density intervals.



Note. AA = Academic achievement; LS = Life satisfaction; SRL = Self-regulated learning strategies; SM = Scholastic motivation; PA = Positive emotions; NA = Negative emotions; CA = Cognitive abilities; SS = Soft skills; ECA = Extracurricular activities

Table 3.3. Study 2. Posterior estimates of the direct relations for m1 and m2

Path	Model 1		Model 2		Prior
	β	HPDI 95%	β	HPDI 95%	
SRL→AA	.14	[.05, .22]	.19	[.10, .28]	$N(.17, .20)$
AM→AA	.19	[.10, .26]	.21	[.14, .29]	$N(.19, .20)$
PE→AA	.03	[-.03, .09]	-.00	[-.06, .06]	$N(.12, .05)^a$
NE→AA	-.10	[-.16, -.04]	-.05	[-.11, .01]	$N(-.16, .05)^a$
CA→AA	.29	[.22, .35]	.31	[.24, .37]	$N(.54, .20)$
SS→AA	.02	[-.04, .09]	-.05	[-.11, .02]	$N(.19, .05)^a$
ECA→AA	.11	[.06, .17]	.07	[.02, .13]	$N(.13, .05)^a$
SRL→LS	.00	[-.09, .09]	.00	[-.08, .10]	$N(.17, .40)$
AM→LS	.05	[-.03, .13]	.05	[-.04, .13]	$N(.33, .20)$
PE→LS	.29	[.21, .39]	.29	[.20, .37]	$N(.40, .20)$
NE→LS	-.18	[-.24, -.10]	-.17	[-.24, -.10]	$N(-.35, .20)$
CA→LS	-.02	[-.09, .05]	-.02	[-.09, .05]	$N(.10, .20)$
SS→LS	.16	[.07, .25]	.16	[.06, .25]	$N(.36, .20)$
ECA→LS	.06	[-.01, .13]	.06	[-.01, .13]	$N(.17, .20)$
PE→SRL	.30	[.23, .37]	.30	[.22, .37]	$N(.36, .20)$
NE→SRL	-.04	[-.10, .03]	-.04	[-.10, .03]	$N(-.27, .20)$
CA→SRL	.01	[-.05, .08]	.02	[-.05, .08]	$N(.10, .40)$
SS→SRL	.37	[.29, .44]	.38	[.30, .45]	$N(.39, .20)$
ECA→SRL	.09	[.04, .14]	.04	[-.01, .09]	$N(.15, .05)^a$
PE→AM	.16	[.08, .24]	.16	[.08, .24]	$N(.32, .20)$
NE→AM	-.10	[-.16, -.02]	-.09	[-.17, -.03]	$N(-.12, .20)$
CA→AM	.04	[-.03, .11]	.05	[-.02, .12]	$N(.16, .20)$
SS→AM	.34	[.25, .42]	.34	[.26, .42]	$N(.26, .20)$
ECA→AM	.03	[-.02, .09]	-.00	[-.06, .05]	$N(.07, .05)^a$
CA→PE	-.09	[-.15, -.02]	-.07	[-.14, -.00]	$N(.12, .40)$
SS→PE	.54	[.48, .59]	.56	[.51, .62]	$N(.38, .20)$
ECA→PE	.14	[.08, .19]	.00	[-.06, .06]	$N(.40, .05)^a$
CA→NE	-.07	[-.15, .01]	-.08	[-.16, -.00]	$N(.09, .40)$
SS→NE	-.18	[-.26, -.10]	-.19	[-.26, -.11]	$N(-.19, .20)$

ECA→NE	-.03	[-.09, .03]	.02	[-.04, .09]	$N(-.12, .05)^a$
ECA→CA	.17	[.09, .24]	.17	[.09, .24]	$N(.02, .40)$
ECA→SS	.16	[.09, .24]	.16	[.09, .24]	$N(.12, .20)$

Note. ^a this refers to the prior for model 1. The prior in model 2 was $N(.00, .05)$

HPDI = Higher posterior density interval; AA = Academic achievement; LS = Life satisfaction;

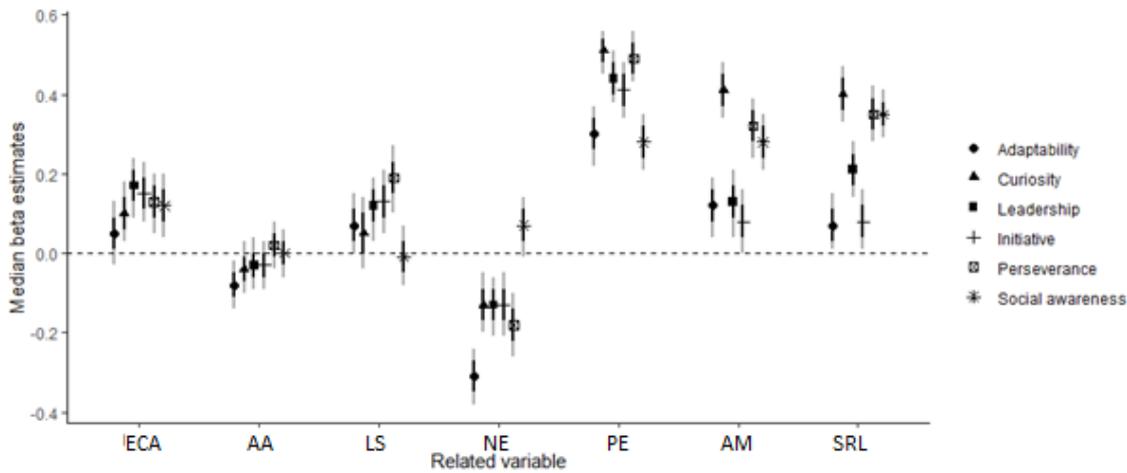
SRL = Self-regulated learning strategies; AM = Academic motivation; PE = Positive emotions; NE

= Negative emotions; CA = Cognitive abilities; SS = soft skills; ECA = Extracurricular activities

3.4.1. Single skills models

The final model (m2) was run again, adding one soft skill at a time instead of the aggregate soft skills factor to explore whether the pattern of relations between soft skills and the other factors remained stable. The pattern of relations (see Figure 3.4) was generally confirmed for the analysis run with single soft skills instead of the aggregate soft skill factors (see Figure S2 in the Supplemental materials). In particular, none of them showed a positive direct relation with academic achievement (β range = -.08; .02), but they did show positive relations with life satisfaction (except for social awareness; β range = .05; .19), PA (β range = .28; .51), scholastic motivation (β range = .08; .41), and SRL strategies (β range = .07; .40), and a negative relation with NA (except for social awareness; β range = -.13; -.31). extracurricular activities were also positively related with each of the six soft skills (β range = .05; .17).

Figure 3.4. Study 2. Single soft skills beta estimates and associated standard errors and HPDI (in grey)



Note. ECA = Extracurricular activities; AA = Academic achievement; LS = Life satisfaction; NE = Negative emotions; PE = Positive emotions; AM = Academic motivation; SRL = Self-regulated learning strategies.

3.5. Discussion and conclusions

I ran this second study to confirm and test the main results previously obtained (i.e., the relation between soft skills and academic achievement is fully mediated) and to expand the research line by integrating wellbeing aspects into the model at the level of study-related factors (i.e., achievement emotions) and at the level of scholastic success (i.e., students' life satisfaction).

The first aim of the study was tested using a Bayesian model comparison approach. Two models were fitted using different priors to quantify the evidence in favor of either a model based on eight zero-centered priors (i.e., these relations were supposed to be practically equivalent to 0: soft skills and academic achievement; extracurricular activities and SRL strategies, academic motivation, achievement emotions and academic achievement; and achievement emotions and academic achievement) and a model entirely based on priors obtained through a meta-analytical procedure. In line with Study 1 and with sparse evidences offered by previous studies (Chan et al., 2012; Muenks et al., 2017; Richardson et al., 2012; Wolters & Hussain, 2015), the hypothesized model showed better indices compared to the one based on the meta-analytical priors supporting the zero-effect

hypothesis. In other words, these results confirm that the hypothesis supporting the absence of a direct relation between soft skills and academic achievement (and between extracurricular activities and study-related factors, and between achievement emotions and academic achievement) is preferable compared to the one supporting that they might directly promote academic achievement (see Figure 3.3 to observe how much the different hypotheses overlap with the results obtained in the two models). How these factors work together with the other study-related factors in promoting academic achievement and students' life satisfaction was then observed inspecting the posterior prediction of the model selected (see Figure 3.2).

Results of the posterior prediction support the basic expected relations between cognitive abilities, study-related factors and academic achievement. In particular (like Study 1), cognitive abilities resulted again the strongest predictor of academic achievement (Roth et al., 2015), and together with both SRL strategies and academic motivation, they were the only variables directly relating with students' academic achievement (Richardson et al., 2012). On the other side, as supposed by the control-value theory (Pekrun et al., 2007), achievement emotions did not show any direct relation with academic achievement, but resulted as important correlates of both SRL strategies and motivations (Mega et al., 2014).

Into this pattern of relations, the role of soft skills emerged clearly and in line with the findings obtained in Study 1 and with our hypotheses. When including soft skills (both as a single overarching factor, or as individual soft skills) into a more complete intraindividual model of learning, they show a positive pattern of relations with the emotional, cognitive, and behavioral aspects that promote learning and academic achievement. In other words, students with higher levels of soft skills, such as curiosity, adaptability, or leadership, generally approach their study material better, using more functional SRL strategies, being more motivated toward the scholastic materials, and feeling more positive and less negative emotions related to their learning activities. This pattern of relations then favors one's academic achievement, supporting again the definition of soft skills as regulators of

psychological aspects that enable the individuals to reach their goals (Robles, 2012). Even if the pattern of relations was studied considering soft skills as a second-order factor, similar results were also exploratory found when running the same model with each single soft skill, confirming (like in Study 1) that these relations are quite stable across the six soft skills.

The major novelty of the study, however, was the addition of more qualitative aspects of scholastic success, in term of life satisfaction, into the model. This permits us to consider a more complete model of students' scholastic success (York et al., 2015) and draw more general conclusions on students' functioning and well-being without only focusing on their performance (Suldo et al., 2006; Weber et al., 2016). Results on the relation between soft skills and study-related factors with life satisfaction are important because they help distinguishing between the contemporary role of the different factors that are usually studied individually with evidence and theories that might suggest that they can all promote one's life satisfaction. Our results, however, only partially support this latter evidence and highlight the primary role of soft skills and achievement emotions for students' life satisfaction, contradicting what we might have expected for academic motivation and SRL strategies. Indeed, no evident relations were found between SRL strategies and academic motivation and life satisfaction, suggesting that these factors may be more specific of school-related outcomes such as academic achievement or eventually narrow facets of life satisfaction like academic satisfaction, while other constructs, such as soft skills and achievement emotions may be more associated with students' general life satisfaction. Emotions are in fact a major component of well-being and their association with life satisfaction has been repeatedly highlighted in previous studies (Diener et al., 1985; Hagenauer et al., 2018; Heffner & Antaramian, 2016; Karatzias et al., 2002). Similarly, soft skills resulted relating to students' life satisfaction over and through the effect of achievement emotions, thus showing a specific direct role over all the other factors considered, and a mediated association through achievement emotions. This is presumably because soft skills refer to individuals' personal qualities that describe the person in any situation, not only at school. These skills induce

them to adopt a more functional behavior, and generally to feel more positive and fewer negative emotions (Park et al., 2004) making the association between soft skills and life satisfaction both direct and mediated by students' achievement emotions. This would further support their contribution to a more flourishing and happy life in general, not only in succeeding in terms of academic achievement. Importantly, this pattern of relation was again confirmed also at the level of the single soft skills with only few exception (e.g., social awareness and adaptability). These results, however, are exploratory and need to be deepened with studies that are specific to the single soft skills (see Study 3 for adaptability).

Finally, it should be noted that the exploratory relation between extracurricular activities and soft skills resulted again positive, suggesting that soft skills might be trainable through structured participation to extracurricular activities. These, as discussed also in Study 1, are highly participated by school-aged students (Feldman & Matjasko, 2005) and may favor a host of positive outcomes, from academic achievement, to SRL strategies, or one's motivation and peer relationships (Guilmette et al., 2019; Lewis, 2005; Shulruf, 2010). Our two studies, however, may suggest that among the primary affected factors are those personal and character qualities that describe an individual in their everyday life, such as soft skills (Eccles, 1999; Feraco, Resnati, et al., 2021; Khasanzyanova, 2017). Extracurricular activities, in fact, give students the opportunity to face challenges, interact with others, and explore their own identity (Eccles et al., 2003). The growing effect that extracurricular may play for soft skills, could consequently induce students to better regulate their emotional, cognitive, and behavioral aspects related to their scholastic activities. These results, however, must be studied with different approaches, as our exploratory cross-sectional analysis does not allow any kind of causal interpretation. Such study was initially planned for this thesis, but due to Covid-19 and the consequent interruption of extracurricular activities, I could not deepen this aspect.

3.5.1. Conclusions

In general, results of this second study, confirm and expand Study 1's results about the importance of soft skills for school-aged students. In particular, we highlight that soft skills favor students' achievement emotions (with soft skills relating to more positive and less negative emotions), life satisfaction (directly and through the mediation of achievement emotions), and academic achievement (through the positive mediation of SRL strategies and academic motivation). The results about life satisfaction are particularly interesting because, differently from what we concluded from the literature review (Boekaerts, 2011; Cikrikci & Odaci, 2016; Diseth et al., 2012; Vecchio et al., 2007; Yap & Baharudin, 2016), only soft skills, but not SRL strategies and academic motivation, directly favor a higher level of life satisfaction in students. This could sustain the direction indicated by international organization that ask for a stronger focus on soft skills in developmental stages such as adolescence (European Commission, 2016; Ministry of Education, University and Research, MIUR, 2018) to favor people wellbeing and, hypothetically, future occupational outcomes.

3.5.2. Limitations and future directions

Despite this study overcomes some of the limitations of Study 1 (e.g., I directly tested the first hypothesis with a Bayesian approach and used official school grades as achievement measure), it still presents some limitations, such as the cross-sectional approach and a sample size that might not be completely appropriate for such a large and complete model. In addition, the analysis of the single soft skills showed some differences (albeit it is expected when testing all these factors) in the magnitude of the relations between the single soft skills and the other factors considered, requesting a focus also at the level of the single soft skills. These limitations will be partially overcome in the next two chapters in which I will focus on the role of one of the six soft skills considered (i.e., adaptability, that showed some of the smallest relations with the variables of interest in Study 1 and Study 2) and I will also study its' predictive role in a longitudinal analysis (Study 4).

4. *Study 3: The role of adaptability in students' academic achievement and life satisfaction*

4.1. Rationale of the study

Study 1 and Study 2 showed that soft skills are important correlates of school-aged students' life satisfaction and academic achievement (and its related predictors), but these relations were only tested at the second-order level (i.e., considering soft skills as a composite factor of six single soft skills) and, when we exploratory looked at the effect of the single soft skills, not all of these showed strong relations with study-related factors and life satisfaction. Among these, it appeared that adaptability, or the ability to regulate one's cognitive, emotional, and behavioral responses to new, uncertain, and unexpected situations (Martin et al., 2012, 2013), was the one with the lowest relations with SRL strategies and academic motivation in Study 1 (see Figure 2.3). In Study 2 (see Figure 4.4) it again showed small relations with academic motivation, SRL strategies, and also life satisfaction, requesting an additional and specific analysis. This specific analysis is also motivated by the fact that adaptability can have a relevant role in academic achievement working together with achievement emotions and SRL strategies but this was almost unexplored in literature at the time of writing. For these reasons I here focus specifically on the role of adaptability in promoting students' life satisfaction and academic achievement into an intraindividual model of learning that considers students' achievement emotions, SRL strategies, and academic motivation (i.e., academic self-efficacy in this case).

4.1.1. Adaptability and its role for school-aged students

Students at school must face changes through the years and within single school days. Indeed, students may face major changes when they are requested to move, for example, from primary to secondary schools, thus needing to change their friends, teachers, and study approach. Students, however, also face changes within the school days when they have to change classes or teachers, among the others, with individual teachers that demands different ways of learning and that also teach

different subjects. In such a mutable environment, being able to find functional ways to cope with uncertainty and novelty sounds fundamental to keep motivation, engagement, or positivity (Collie et al., 2017; Martin et al., 2012, 2013). *Id est*, being able to adapt to such situations may help students finding positive into these continuous changes (Martin, 2017).

For what concerns the variables of our interest (i.e., SRL strategies, academic self-efficacy, and achievement emotions), adaptability, as a narrow self-regulatory construct (Martin et al., 2013), may favor specific self-regulatory processes of learning, such as SRL strategies, motivation, and academic achievement, which are all part of the SRL theory (Efklides, 2011; Panadero, 2017). Specifically, adaptability may sustain students' motivation, emotions, and use of functional SRL strategies in those situations of learning that are new, unexpected, or uncertain and that request adapting one's way of learning. This idea was specifically proposed in the seminal works on adaptability (Martin et al., 2012, 2013) for what concerns SRL strategies and academic motivation, and successively extended to the emotional factors of learning (Collie & Martin, 2017). Such relations however were not successively tested, except for the relations with motivational factors of learning (Burns et al., 2018; Holliman et al., 2018; Martin et al., 2012, 2013, 2017) and one study on the relation between adaptability and achievement emotions, however the latter referred to Chinese university students that had just abruptly adopted online learning modalities following the spread of Covid-19 (Zhang et al., 2021) and cannot be extended to the general students' population. In addition, these relations resulted unstable in our two previous studies and a deeper analysis of the construct was needed.

In Study 3, I thus integrate adaptability into the SRL model of learning (Ben-Eliyahu, 2019), hypothesizing that adaptability is a key personal factor that promotes positive school- and learning-related factors on three different levels: emotional (achievement emotions), and cognitive-behavioral (academic self-efficacy and SRL strategies). Following Study 2, two outcomes were considered as a function of scholastic success: a performance outcome (academic achievement) and a well-being outcome (life satisfaction) to test whether adaptability, as suggested by the results on soft skills,

directly favor students life satisfaction over the three study-related factors that, on the other side, should mediate its relation with academic achievement.

4.2. Hypotheses

Following the theoretical definition of adaptability and the hypothetical relations proposed by Martin and collaborators (Collie & Martin, 2017; Martin et al., 2012, 2013) and the evidence on the relation between adaptability and motivational and emotional factors (Martin et al., 2017; Zhang et al., 2021), I propose the following hypotheses:

- *Adaptability and study-related factors.* I expect that adaptability should positively relate with i) positive achievement emotions (Collie & Martin, 2017); ii) SRL strategies (Martin et al., 2012); iii) academic self-efficacy (Martin et al., 2017).
- *Adaptability and academic achievement.* In line with Study 1 and Study 2 and with evidence in literature (Burns et al., 2018; Collie et al., 2017; Holliman et al., 2018), I expect that the relation between adaptability and academic achievement is fully mediated by SRL strategies and academic motivation. No direct relations between adaptability and academic achievement are expected.
- *Adaptability and life satisfaction.* Adaptability should positively and directly relate with life satisfaction, as suggested by previous evidence that show a direct association between the two over adaptability's cognate factors and other non-academic outcomes such as school engagement (Martin et al., 2012, 2013).

4.3. Materials and methods

4.3.1. Participants

1083 school students (415 males, Mage = 13.37, SDage = 1.97) in years 6 to 12 (11 to 18 years old) participated on a voluntary basis after their parents or the students themselves (if 18 years old) gave their informed consent. See Table 4.1 for more information about the sample. This study was conducted in accordance with the recommendations of the local University's Research Ethics

Committee and all participants (and/or their parents when necessary) gave their informed consents prior to participation.

Table 4.1 Study 3. Participants' descriptive statistics by school grade

School grade	6	7	8	9	10	11	12	Total
Number	229	220	212	123	116	108	75	1083
Females	114	114	113	83	96	94	54	757
Mean age (sd)	11.13 (0.37)	12.02 (0.26)	13.00 (0.34)	14.07 (0.36)	15.09 (0.44)	16.22 (0.59)	17.35 (0.51)	13.37 (1.97)

Note. 6 to 8 = 1st to 3rd year of middle school; 9 to 12 = 1st to 4th year of high school.

A power analysis was performed via simulation to estimate the sufficient sample size able to detect the main effects of interest: the direct relations between adaptability and the three study-related factors and life satisfaction, and the indirect relations between adaptability and academic achievement through self-efficacy and SRL strategies. 10000 datasets were simulated for different sample sizes starting from a theory-based covariance matrix with medium hypothetical correlations between adaptability and SRL strategies, academic self-efficacy, achievement emotions, and life satisfaction and a medium correlation between SRL strategies and academic self-efficacy with academic achievement. For each simulated dataset, the hypothesized path analysis model (see Figure 4.1) was fitted and the results were saved for power calculation. Assuming a significance level of $\alpha = .05$, it emerged that 650 participants sufficed to obtain a power = .80. Power increases to .99 with 1100 participants, similar to our sample size ensuring that, in case the hypothetical relations are really significant and are as big as expected, the relation should be found significant in almost every case.

4.3.2. *Materials*

Cronbach's alpha coefficients were calculated on our sample and are presented in Table 4.2. Cronbach's alpha coefficients calculated on the present sample were always acceptable and ranged between .63 (for perseverance) and .89 (for negative emotions).

4.3.2.1. *Adaptability*

The *Adaptability Scale* (Martin et al., 2012) was translated to Italian following a back-translation procedure carried out by English and Italian native speakers to measure the ability of efficiently regulate psycho-behavioral function in response to new and uncertain conditions. The questionnaire includes 9 items on a 7-point Likert scale equally divided in emotional, behavioral, and cognitive items (e.g., "I am able to adjust my thinking or expectations to assist me in a new situation"). The total average score was calculated following the validation study (Martin et al., 2012) and a confirmatory factor analysis run on our data that confirmed the factorial structure of the original scale ($\chi^2(24, N = 1083) = 76.67, p < .001, CFI = .99, NNFI = .99, RMSEA = .05, 90\%$ confidence interval for RMSEA [.04, .06]). The scale showed good internal consistency (Cronbach's $\alpha = .90$, Martin et al., 2012; Cronbach's $\alpha = .79$ for the actual sample).

4.3.2.2. *Achievement emotions*

The *Positive and Negative Affect Schedule* (PANAS, Watson et al., 1988; Italian adaptation by Terraciano et al., 2003), in the 20-item version of the Italian adaptation of the PANAS inventory, was used to measure emotions at school. It measures positive and negative emotions (10 items each) and participants use a 5-point Likert scale to indicate how much they experienced each of the 20 emotions at school during the previous two weeks. A total average score was calculated after inverting the items referring to negative emotions. The scale showed good internal consistency (Cronbach's $\alpha = .83; .85$; Terraciano et al., 2003; Cronbach's $\alpha = .86$ for the actual sample).

4.3.2.3. *Academic self-efficacy*

The *Academic self-efficacy* subscale of the *Scholastic Motivation questionnaire* (De Beni et al.,

2014) was used to measure how students perceive their own ability to succeed at school. The questionnaire includes 5 items scored on a 5-point Likert scale (e.g., “How do you rate your study skills?”). The average score was calculated. The scale showed good internal consistency (Cronbach’s $\alpha = .85$, De Beni et al., 2014; Cronbach’s $\alpha = .83$ for the actual sample).

4.3.2.4. *Self-regulated learning strategies*

The *Self-Regulated Learning Questionnaire* (De Beni et al., 2014) measures SRL strategies in terms of: *elaboration* (e.g., “When I study, I try to literally repeat the textbook”); *learning strategies* (e.g., “When I study for an exam, I wonder what my teacher considers important”); *metacognition* (e.g., “If a test goes badly, I try to understand why it happened”); *organization* (e.g., “I usually know how to organize my studies so that I still have time for my hobbies”); and *self-evaluation* (e.g., “I understand when the task I have to do is easy or difficult for me”). The questionnaire is composed of 50 items (10 for each aspect) scored on a 5-point Likert scale. After reversing all the negative items, the average score was calculated. The scale showed good internal consistency (Cronbach’s $\alpha = .76$, De Beni et al., 2014; Cronbach’s $\alpha = .89$ for the actual sample).

4.3.2.5. *Academic achievement*

Grades. The Italian school system provides for summary grades to be awarded for each subject on a 10-point scale, where 6 is a pass. Students are graded twice a year, in February and June. We collected students’ grades in February for the two main subjects that are common to all academic years and types of school: Italian and Math. Each students’ average grade was calculated as a measure of their academic achievement. Italian and math scores correlated strongly ($r = .61$).

4.3.2.6. *Life satisfaction*

The *Satisfaction With Life Scale* (SWLS, Diener et al., 1985; Italian adaptation by Di Fabio & Gori, 2016) measures overall life satisfaction with 5 items (e.g., “The conditions of my life are excellent”) scored on a 7-point Likert scale. The average score was calculated. The scale showed

good internal consistency (Cronbach's $\alpha = .85$, Di Fabio & Gori, 2016; Cronbach's $\alpha = .84$ for the actual sample).

4.3.3. Procedure

Schools' responsible was contacted by e-mail or phone to explain the project. When they resulted interested, consent forms were given and the responsible teachers of the available classes distributed them to students (if 18 years old) or their parents. After the signed consent forms were returned, a Qualtrics link was given to the teachers and students filled the questionnaires during school time under the supervision of a trained psychologist. Filling all the questionnaires requested no more than 30 minutes per class. At mid-term, the responsible teachers provided us the official grades in Italian and Math obtained by each student participating to the project. Data were collected during the first semester of the 2019/2020 academic year and the first semester of the 2020/2021 academic year, with consequently a part of the students that were influenced by the Covid-19 pandemic learning situations. Data obtained for adaptability in the second part of the data collection served as baseline for the longitudinal analyses of Study 4.

4.4. Results

All analyses were run using the R (R Core Team, 2020) package "lavaan" (Rosseel, 2012). Table 4.2 shows the means, standard deviations, and correlations between all the variables.

4.4.1. Preliminary analysis

Given that data were collected in two different time periods and under different scholastic circumstances (i.e., part of the data were collected during the first semester of the 2019/2020 academic year [before the Covid-19 pandemic spread in Italy], and a second part of the data were collected in the first semester of the 2020/2021 academic year [when schools were adopting online learning]), I compared the two students' groups in all the variable considered (i.e., age, adaptability, achievement emotions, SRL strategies, academic self-efficacy, academic achievement, and life satisfaction) to ensure that the two groups did not differ in the variables of interest. Results show that the two groups

do not significantly differ in any of the variables considered ($p > .001$), with the largest standardized difference being academic achievement and age, which resulted higher in the students from the 2020/2021 academic year ($\beta = .08, \beta = .09$ respectively).

Table 4.2 Study 3. Means, standard deviations, Cronbach's alphas, and correlations between all study variables

	<i>M</i>	<i>SD</i>	α	1.	2.	3.	4.	5.
1. Adaptability	4.54	0.96	.79	-				
2. Achievement emotions	3.42	0.61	.86	.40*	-			
3. SRL strategies	3.38	0.40	.89	.33*	.42*	-		
4. Academic self-efficacy	3.73	0.66	.83	.27*	.45*	.59*	-	
5. Academic achievement	7.15	1.18	-	.10*	.23*	.34*	.51*	-
6. Life satisfaction	4.68	1.31	.84	.30*	.45*	.32*	.38*	.19*

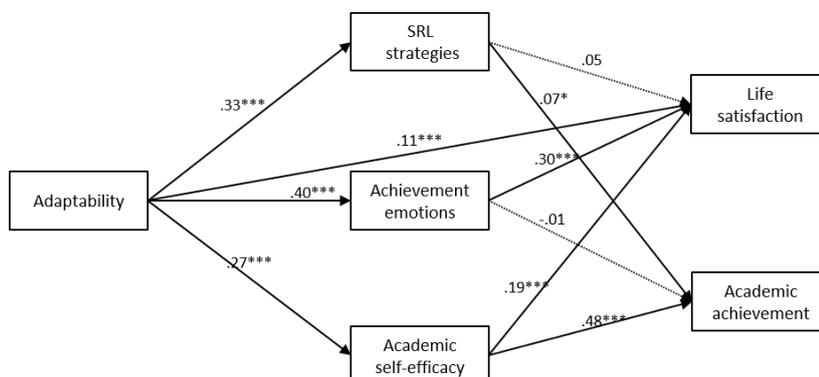
Note. SRL = self-regulated learning.

4.4.2. Path analysis

To study the hypothesized pattern of relations, I fit a path model (Figure 4.1) specifying all the expected relations between the variables considered (i.e., adaptability, achievement emotions, SRL strategies, academic self-efficacy, academic achievement, and life satisfaction). The following direct relations were estimated: the direct effects of adaptability, SRL strategies, academic self-efficacy, achievement emotions on life satisfaction; the direct effects of SRL strategies, academic self-efficacy, and achievement emotions on academic achievement and life satisfaction; the direct effects of adaptability on SRL strategies, academic self-efficacy, and achievement emotions. I also estimated all the indirect effects, focusing on the indirect relations between adaptability and academic achievement through the mediation of achievement emotions, SRL strategies, and academic self-efficacy.

Model fit to the data resulted adequate (Schermelleh-engel et al., 2003): $\chi^2 (19, N = 1083) = 3.23, p = .07, CFI = 1, NNFI = .98, RMSEA = .05, 90\%$ confidence interval for RMSEA [.00, .11]. All the significant standardized β coefficients were significant at the $p < .001$ level, except for the relation between SRL strategies and academic achievement and its mediating role between adaptability and academic achievement (see Table 4.3 and Figure 4.1 for details). The results mostly confirmed the hypothesized direct and indirect relations. Specifically, adaptability directly related to achievement emotions ($\beta = .40$), SRL strategies ($\beta = .33$), and academic self-efficacy ($\beta = .27$). Achievement emotions ($\beta = .30$), academic self-efficacy ($\beta = .19$), and adaptability ($\beta = .11$) related to life satisfaction. Academic self-efficacy ($\beta = .48$) and SRL strategies ($\beta = .07, p = .043$) directly related to academic achievement. We also found the indirect significant relation between adaptability and academic achievement through the mediation of academic self-efficacy ($\beta = .13$) and SRL strategies ($\beta = .02, p = .046$) and the significant indirect relations between adaptability and life satisfaction through the mediation of achievement emotions ($\beta = .12$) and academic self-efficacy ($\beta = .05$). The model explained 26% of the variance of students' life satisfaction; 27% of the variance in academic achievement; 16% of the variance of achievement emotions; 11% of the variance of SRL strategies; and 8% of the variance of academic self-efficacy.

Figure 4.1 Study 3. Path model results



Note. Numbers represent standardized beta coefficients, and dotted lines represent non-significant relations.

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

Table 4.3 Study 3. Complete results for direct and indirect effects emerging from the path analysis

Dependent variable	Predictor	<i>SE</i>	<i>z</i>	β
Direct effects				
Academic achievement	Achievement emotions	.03	-.45	-.01
Academic achievement	SRL strategies	.03	2.02	.07*
Academic achievement	Academic self-efficacy	.03	14.24	.48***
Life satisfaction	Achievement emotions	.03	9.62	.30***
Life satisfaction	SRL strategies	.03	1.39	.05
Life satisfaction	Academic self-efficacy	.03	5.49	.19***
Life satisfaction	Adaptability	.03	3.91	.11***
Achievement emotions	Adaptability	.03	14.34	.40***
SRL strategies	Adaptability	.03	9.23	.33***
Academic self-efficacy	Adaptability	.03	9.23	.27***
Indirect effects				
Academic achievement	Adaptability x Achievement emotions	.01	-.45	.01
Academic achievement	Adaptability x SRL strategies	.01	1.99	.02*
Academic achievement	Adaptability x Academic self-efficacy	.02	7.75	.13***
Life satisfaction	Adaptability x Achievement emotions	.01	7.99	.12***
Life satisfaction	Adaptability x SRL strategies	.02	1.38	.02
Life satisfaction	Adaptability x Academic self-efficacy	.01	4.72	.05***
Correlations				
Academic achievement	Life satisfaction	.02	-.02	< -.01
Achievement emotions	SRL strategies	.03	10.39	.33***
Achievement emotions	Academic self-efficacy	.03	11.73	.38***
SRL strategies	Academic self-efficacy	.03	16.00	.56***

Note. *SE* = standard error; *z* = test statistic; β = standardized beta coefficient; SRL = self-regulated learning.

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

4.4.3. Model invariance

Model invariance was calculated to ensure that the model did not differ across the age span and between the two groups who completed the tasks in two different times. I ran two multi-group confirmatory factor analysis using Diagonally Weighted Least Squares (DWLS) as estimator. The first analysis was run distinguishing between participants in years 6-8 (middle school, $N = 661$) and those in years 9-12 (high school, $N = 422$). The results confirmed a strong scalar invariance (equality of factor loadings and intercepts) between the two groups ($\chi^2(9, N = 1083) = 24.30, p = .042, CFI = .99, NNFI = .99, RMSEA = .04, 90\%$ confidence interval for RMSEA [.01, .06]). This ensures that the pattern of relations across school years remains the same.

The second analysis was run distinguishing between participants answering during the 2019/2020 academic year ($N = 606$) and those answering during the 2020/2021 academic year ($N = 477$). The results confirmed a strong scalar invariance (equality of factor loadings and intercepts) between the two groups ($\chi^2(16, N = 1083) = 27.225, p = .039, CFI = .99, NNFI = .99, RMSEA = .04, 90\%$ confidence interval for RMSEA [.01, .06]). This ensures that the pattern of relations between the variables remained consistent among the two different times and circumstances.

4.5. Discussion and conclusions

Adaptability is a quite recent construct (Martin et al., 2012) and no one studied its relations with study-related factors, academic achievement, and life satisfaction in a comprehensive model of learning. Indeed, only one study analyzing the relation between adaptability and achievement emotions in a pandemic situation (Zhang et al., 2021) and no studies investigating the relation with SRL strategies, except for Martin and collaborators that consider SRL strategies as a covariate of adaptability in predicting other scholastic and non-scholastic outcomes (Martin et al., 2013) are

available in literature. For these reasons we here deepened the specific role of adaptability, studying its contemporary relations with three different factors of the intraindividual system (Ben-Eliyahu, 2019): achievement emotions, SRL strategies, and academic motivation. Differently from Study 1 and Study 2, we used the translated version and not an adapted version of the adaptability scale (Martin et al., 2012). In addition, in Study 1 and 2, adaptability resulted having, among the other soft skills, some of the lowest relations with the study-related variables we considered. This was surprising given that adaptability is one of the most important soft skills for 21st century (World Economic Forum, 2016, 2020) and resulted having positive relations with a host of students' emotional, behavioral, and cognitive outcomes in previous studies. Adaptability, for example, resulted promoting lower distress in university students (Holliman et al., 2021) and higher school enjoyment in high school students (Martin et al., 2012, 2013, 2015, 2017), or higher engagement (Burns et al., 2018; Collie et al., 2017; Holliman et al., 2018; Martin et al., 2017), among others. Literature also showed positive relations between adaptability and students' life satisfaction (Martin et al., 2013) and subjective wellbeing (Holliman et al., 2019).

The results of Study 3 perfectly fit our hypotheses about the relations occurring between adaptability and study-related factors. Adaptability was then indirectly related to academic achievement through the full mediation of SRL strategies and academic achievement, but not achievement emotions that, as hypothesized (Pekrun et al., 2007) –and also found in Study 2–, only work as predictors of SRL strategies and academic motivation for what concerns achievement. Unfortunately, this time the relation of SRL strategies with academic achievement was very small, ending in a very small (albeit significant at the .05 level) indirect effect of adaptability on academic achievement through the mediation of SRL strategies. This might be possibly explained by the extremely large correlation between SRL strategies and academic motivation (academic self-efficacy) that we found in this data ($r = .59$) that may have caused collinearity problems, probably masking the

effect of SRL on academic achievement that, at the correlation level (see Table 4.2), resulted medium, as expected ($r = .34$).

Importantly, adaptability, as soft skills in general, resulted relating directly with students' life satisfaction, thus being an important factor for their wellbeing. This effect, other than direct, was also mediated by the effect of achievement emotions and academic self-efficacy (contrarily to the academic motivation results found in Study 2). Even if adaptability showed a lower relation with life satisfaction compared with achievement emotions, it should be noted that the total effect (or the sum of the direct and indirect effect) almost equated the relation occurring between achievement emotions and life satisfaction.

The results we found for adaptability ensure that, at least for this skill, the hypothesized pattern of relations that we studied in Study 1 and Study 2 is confirmed also at the level of the single soft skills that, in line with their definition result again as regulator of feelings, behaviors, and thoughts that consequently enable people to reach their personal goals. In particular, adaptability plays its role when the individual has to face new, unexpected, and uncertain situations. These situations, that are common to students, seem to be better faced by those who show higher levels of adaptability. In fact, our results suggest that students who can regulate their cognition, behaviour, and emotions in new situations may also efficiently adjust their cognitive, emotional, and behavioural repertoire in response to a novel or uncertain academic task, for instance, employing flexible study strategies and staying motivated (Martin et al., 2012, 2013). The use of such responses will then consequently favour the attainment of higher grades through the school years (Kriegbaum et al., 2018; Richardson et al., 2012). Moreover, according to other researchers (Holliman et al., 2021; Martin et al., 2013; M. Zhou & Lin, 2016), the ability to handle novelty can be regarded as a personal resource that protects the individual from current and future unpleasant events; in this way, it can directly influence students' subjective well-being. Our findings also suggest that adaptability may have an indirect impact on life satisfaction by broadening students' cognitive capacities and emotional resources (Fredrickson,

2001). This would make them more confident in their ability to succeed in school and more open to experiencing positive emotions, leading to more positive assessments of their own life circumstances.

4.5.1. Limitations and future directions

Study 3 aimed at ensuring that adaptability maintains the same pattern of relations with academic achievement and life satisfaction when it gets integrated into an intraindividual system comprehending study-related factors such as achievement emotions, SRL strategies, and academic motivation. The findings support once again the hypothesis of a fully-mediated effect of soft skills on academic achievement, accompanied by a direct role of the soft skill for what concerns students' life satisfaction.

Future studies might be needed to include different study-related aspects into the model or considering different scholastic and non-scholastic outcomes in a longitudinal perspective or through experimental manipulation, that remain probably the biggest limitation of this study. Study 4 will try, at least in part, to overcome this issue by studying the longitudinal effect of adaptability with students' engagement, SRL strategies, and post-traumatic growth during the 2020/2021 academic year that was characterized by the Covid-19 pandemic and by the adoption of new and unexpected learning modalities.

5. *Study 4: soft skills during the Covid-19 pandemic. The role of adaptability for academic achievement and post-traumatic growth*

The Covid-19 pandemic spread unpredictably affected most of our lives and the project of my PhD was not excluded. The original plan included two additional studies (Study 4 and 5) about the malleability of soft skills, one focusing on developing soft skills through a structured training and one focusing on the relationship between extracurricular activities and soft skills aiming at testing the possible causal link between the two. Unfortunately, extracurricular activities were stopped during this period and it was not possible to organize meeting with numerous children to administer training sessions in person. The project was consequently updated and adapted to positively respond to this situation and possibly catch the opportunity to test the predictive role of soft skills into such a particular situation.

5.1. Rationale of the study

During the Covid-19 pandemic, students had to adapt to an abrupt and unexpected adoption of online learning accompanied by a general disruption in their curricular and extracurricular activities, as well as socializing opportunities (Singh et al., 2020) that challenged their academic motivation, engagement, and SRL, also causing high levels of stress and anxiety and threatening their mental health (Xie et al., 2020). Some students, however, were able to adapt to this situation and found a way to grow (Waters, Allen, et al., 2021), but research on the intrapersonal predictors able to favour students' adaptation to the new situation and consequent growth are scarce. In Study 4 I postulate that adaptability may have played an important part in students' adaptation and growth during the Covid-19 pandemic.

In fact, the Covid-19 pandemic requested high levels of adaptability as it was characterized by high levels of uncertainty and novelty. Students, for example had to adapt to new daily routines (e.g., they were confined at home), new learning modalities (e.g., lessons were moved online for the first time), and uncertainty about their future, including scholastic situations that was continuously

changing, at least in Italy. In other words, adaptability, may have helped students reaching a building effect that is characterized by and individual's ability to manage and transform a crisis into an opportunity for growth through the regulation of emotional, cognitive, and behavioural aspects (Waters, Algoe, et al., 2021; Waters, Allen, et al., 2021).

In addition, adaptability may have sustained students' daily school life, helping them sustaining their engagement (i.e., the students' active and sustained involvement in behavioural, emotional, cognitive, and social scholastic aspects) and finding new ways of organizing, planning, and evaluating their learning, consequently favouring their academic achievement.

Finding a way to sustain SRL strategies in the pandemic situation is of primary importance. Indeed, SRL strategies are one of the stronger non-cognitive predictors of academic achievement (Richardson et al., 2012; Sitzmann & Ely, 2011) but students, especially during online or distance learning (Wong et al., 2019), need high levels of autonomy to regulate their learning efficiently. Adaptability, in general (see Study 3), should favor SRL strategies because it is a narrow self-regulatory ability that comes into play in every uncertain or new situation (i.e., it sustains students continuously adapting their learning process on the basis of the new, changing, or uncertain learning situations Collie & Martin, 2017; Martin et al., 2013). Given that the Covid-19 pandemic prompted a learning situation that was new to everyone, adaptability probably played a central role for students who needed to find new ways to self-regulate their learning. For example students in this situation had to find a way to efficiently evaluate their performance at the new school tests, they had to organize and plan their study also considering a completely new routines, or they had to find new ways to cooperate with their peers to boost their understanding of the materials. For this reason, for this study, we conceptualize SRL strategies in terms of efficient adaptation of SRL strategies to the new learning modalities that were adopted after the Covid-19 spread. In other words, for example, we will not consider whether a student has always organized his/her study, but whether he/she was able to find an efficient way to organize the study during this period.

Sustaining students' engagement is also of great importance, particularly in this period in which students fatigued maintaining their engagement at high levels (Farooq et al., 2020; Nickerson & Shea, 2020; Zhang et al., 2021). Engagement is defined as the active and sustained involvement of students in emotional, social, behavioural, and cognitive aspects/tasks of school and it is a positive direct predictor of students' academic achievement (Lei et al., 2018; M.-T. Wang, Degol, et al., 2019; M.-T. Wang, Fredricks, et al., 2019). Engaged students, for example, actively participate to the activities proposed in class (behavioural engagement), care about the scholastic materials (cognitive engagement), feel close to their school (emotional engagement), and have positive relationships with their peers (social engagement). Adaptability resulted a positive correlate of students' engagement in non-pandemic situations (Burns et al., 2018; Collie et al., 2017; Holliman et al., 2018; Martin et al., 2017), but it may be even more crucial for students who completely changed their learning modalities after the abrupt adoption of online learning (Zhang et al., 2021).

To sum up, in Study 4 I propose adaptability (Martin et al., 2012, 2013) as one of the intrapersonal factors that are able to sustain one's growth and adaptation to new, uncertain, and unexpected situations such as those brought by the Covid-19 pandemic. In particular, I aim at studying the longitudinal associations of adaptability (measured at the beginning of the school year, Study 3) with students' engagement, SRL strategies – in terms of efficient adaptation of SRL strategies to the new learning modalities –, and PTG during the Covid-19-caused transition to online learning and confinement. The effect of adaptability on engagement and SRL strategies, should also prove important in indirectly favouring students' academic achievement.

5.2. Hypotheses

In particular, I hypothesize that:

- *Adaptability and engagement.* I expect that adaptability positively relates to scholastic engagement during the entire 2020/2021 scholastic year that was delivered in blended or

alternate modalities (online and in presence) because of the Covid-19 pandemic. More adaptable students should be more engaged because they consider “more ambitious and positive future selves in the academic context” (Martin et al., 2012, p. 732) and because being adaptable is fundamental to maintain one’s engagement. Indeed students must continuously adapt to new demands, professors, tasks, and request that change through the scholastic year and within the single school days (Martin et al., 2012). In addition, adaptability positively related to engagement during the switch to online learning in a sample of Chinese university students (Zhang et al., 2021).

- *Adaptability and self-regulated learning strategies.* In line with Study 3, I expect adaptability to positively relate to SRL strategies. In particular, in this case, I expect that students with higher adaptability also report that they were able to successfully adjust their SRL strategies to the demands of the new and unexpected learning conditions. In other words, adaptability should have sustained students successfully grasp how to organize, plan, monitor, and evaluate their learning process under these uncertain circumstances.
- *Adaptability and academic achievement.* I expect adaptability to be indirectly related to academic achievement through the mediation of engagement and SRL strategies. As expressed in the previous hypotheses, adaptability should have favored engagement and SRL strategies, which in turn are expected to promote academic achievement (Lei et al., 2018; Richardson et al., 2012).
- *Adaptability and posttraumatic growth.* I expect adaptability to be positively associated with students’ post-traumatic growth related to the Covid-19 pandemic. Adaptable individuals should in fact find ways to face new and uncertain situations that could represent a threat for mental health and well-being, bringing out “positive things and opportunities for growth and new beginnings” from such situations (Martin, 2017, p. 697).

5.3. Materials and methods

5.3.1. Participants

574 students aged between 11 and 18 years old (6-12 school grades) completed the first part of the data collection (T1) answering to the adaptability scale and 467 students completed the second part of the data collection answering to the Covid-19-related questionnaires (T2). Students who completed both the first data collection and the second data collection were included in the final sample. This consisted of 435 students (157 males, $M_{age} = 13.27$, $SD_{age} = 2.13$, see Table 5.1 for descriptive statistics by school grade) because some students were not present in one of the two data collection for personal reasons. Students were enrolled on a voluntary basis after their parents or the students themselves (if 18 years old) gave their informed consent. This study was conducted in accordance with the recommendations of the local University's Research Ethics Committee.

Table 5.1 Study 4. Participants' descriptive statistics by school grade

School grade	6	7	8	9	10	11	12	Total
Number	101	95	74	39	23	43	39	435
Females	56	63	38	31	22	34	26	278
Mean age (sd)	11.04 (0.24)	11.95 (0.22)	12.95 (0.28)	13.92 (0.27)	15.04 (0.20)	16.09 (0.53)	17.54 (0.51)	13.27 (2.13)

Note. 6 to 8 = 1st to 3rd year of middle school; 9 to 12 = 1st to 4th year of high school.

A power analysis was performed via simulation before data collection to evaluate the minimum sample size necessary for our analysis. 10,000 data sets were simulated for different sample sizes starting from a theory-based covariance matrix with small-to-medium hypothetical correlations (i.e., $r = .30$) between adaptability and engagement, SR-A, and post-traumatic growth. At each simulation, we fitted the hypothesized multivariate regression model (see Results section) and saved the results for power calculation. Assuming a significance level of $\alpha = .001$, it emerged that 400 participants sufficed to obtain a power ~ 1 . Power remained high (.93) when considering in the

computation also the two hypothesized indirect relations with academic achievement through the mediation of engagement and SRL strategies.

5.3.2. *Materials*

Cronbach's alpha coefficients were calculated on our sample and are presented in Table 5.2. Cronbach's alpha coefficients calculated on the present sample were always acceptable and ranged between .70 (for SRL strategies) and .90 (for engagement). I also checked the factorial structure of each scale because we adapted or translated them from other scales (see Statistical analyses section).

5.3.2.1. *Adaptability*

Adaptability Scale (Martin et al., 2012). The Adaptability Scale measures a person's ability to efficiently regulate psycho-behavioral functions in response to new and uncertain conditions. It includes nine items on a 7-point Likert scale (from 1 = "strongly disagree" to 7 = "strongly agree") equally divided between emotional, behavioural, and cognitive items (e.g., "I am able to adjust my thinking or expectations to assist me in a new situation"). The total average score was calculated following the validation study (Martin et al., 2012), and a confirmatory factor analysis run on our data supported the factorial structure of the original scale: $\chi^2(24, N = 435) = 44.02, p < .01, CFI = 1, NNFI = .99, RMSEA = .04, 90\% \text{ confidence interval for RMSEA } [.02, .06]$. The scale showed good internal consistency (Cronbach's $\alpha = .90$, Martin et al., 2012; Cronbach's $\alpha = .82$ for the current sample).

5.3.2.2. *Engagement*

Multidimensional School Engagement Scale (Wang et al., 2019a, 2019b). The Multidimensional School Engagement Scale was translated in Italian following a back translation procedure and instructions were adapted to fit the Covid-19 situation by asking students to selectively think about the current scholastic year. It is composed by 30 items that measure four facets of students' engagement: behavioural (e.g., "I find reasons to get out of class", eight items), cognitive (e.g., "When school work is too hard, I just don't do it", six items), emotional (e.g., "I am proud of

my school”, eight items), and social (e.g., “I enjoy spending time with peers at school”, eight items) scored on a 5-point Likert scale (from 1 = “not at all like me” to 5 = “very much like me”). Each subscale includes positive (engagement) and negative (disengagement) items. The total average score was calculated following the validation study (Wang et al., 2019a, 2019b), and a confirmatory factor analysis run on our data supported the factorial structure of the original scale: $\chi^2(397, N = 435) = 1893.43, p < .001, CFI = .94, NNFI = .93, RMSEA = .09, 90\%$ confidence interval for RMSEA [.09, .10]. After reversing all the negative items, the average score was calculated. The scale showed good internal consistency (McDonald $\omega = .81$, Wang et al., 2019a; Cronbach’s $\alpha = .90$ for the current sample).

5.3.2.3. *Self-regulated learning*

Self-Regulated Learning Strategies (SRL strategies, adapted from De Beni et al., 2014). The Self-Regulated Learning Adaptation questionnaire measures how much the students feel they were able to adapt their SRL strategies to the new learning conditions caused by Covid-19 (i.e., blended and online learning). The questionnaire was adapted from the Self-Regulated Learning questionnaire (De Beni et al., 2014) and includes five different SRL facets: *elaboration* (e.g., “During this period, I found it difficult to adapt to the new learning conditions and I preferred learning by heart than elaborating the materials”), *learning strategies* (e.g., “During this period I found it difficult to use good strategies”), *metacognition* (e.g., “During this period, I reasoned about my study approach, and searched for a better way to face the new online modalities”), *organization* (e.g., “During this period I found it difficult to organize my study”), and *self-evaluation* (e.g., “During this period, I found it difficult to understand whether I was performing well or not in school tests”). The questionnaire is composed of ten items (two for each aspect) scored on a 5-point Likert scale (from 1 = “never” to 5 = “always”). After reversing all the negative items, the average score was calculated. A confirmatory factor analysis run on our data partially supported the factorial structure of the scale: $\chi^2(30, N = 435)$

= 189.60, $p < .001$, CFI = .91, NNFI = .87, RMSEA = .11, 90% confidence interval for RMSEA [.09, .13]. The scale showed good internal consistency (Cronbach's $\alpha = .70$ for the current sample).

5.3.2.4. *Post-traumatic growth*

The Revised Post-traumatic Growth Inventory for Children (PTGI-C-R; Kilmer et al., 2009). The PTGI-C-R was translated in Italian following a back-translation procedure and instructions were adapted to refer to the Covid-19 pandemic, so to measure students' positive changes perceived after this traumatic experience. It is composed of ten items on a 4-point Likert scale (from 0 = "I did not experience any change" to 3 = "I experienced change to a very great degree"). The questionnaire includes five subscales measured by two items each: others, new possibilities, personal strength, spirituality, and appreciation of life. A total score was calculated following the validation study. A confirmatory factor analysis run on our data supported the factorial structure of the original scale: $\chi^2(30, N = 435) = 36.22, p < .01$, CFI = 1, NNFI = 1, RMSEA = .02, 90% confidence interval for RMSEA [.00, .04]. The scale showed good internal consistency (Cronbach's $\alpha = .85$, Kilmer et al., 2009; Cronbach's $\alpha = .76$ for the current sample).

5.3.2.5. *Academic achievement*

Grades. The Italian school system provides for summary grades to be awarded for each subject on a 10-point scale, where 6 is a pass. Students are graded twice a year, in February and June. Students were asked to report their average grade in Italian and math (i.e., the two main subjects that are common in every school year in Italy). Each student's average grade was calculated as a measure of their academic achievement. The Italian and math scores correlated strongly ($r = .66$).

5.3.3. *Procedure*

At the beginning of the school year (September 2020), we contacted schools by email or phone and exposed the project aims. Schools interest in participating received the consent forms, and the teachers of the participating classes sent them via online systems to students (if 18 years old) or their parents. After the signed consent forms were received, a Qualtrics link was provided to the teachers,

and the students completed the questionnaires at two time points. Questionnaires' completion was carried out during school time and was supervised by a trained psychologist. During the first data collection (between October and the beginning of January 2020), students provided personal information (e.g., gender, class age) and filled the items related to the Adaptability Scale. During the second data collection, which occurred at the end of the scholastic year (between the last two weeks of May and the first two weeks of June 2021), students filled the items for the three questionnaires about engagement, SRL strategies, and post-traumatic growth and reported their grades in Italian and math. Completion of all the questionnaires required no more than 30 minutes per class. During this period students alternatively followed school in person and online for prolonged periods.

5.3.4. Statistical analyses

All analyses were run using the R (R Core Team, 2020) package lavaan (Rosseel, 2012). Table 5.2 shows the means, standard deviations, and correlations between all the variables. In line with the power analysis, only the effects with an associated p value lower than .001 will be considered as significant because with more than 400 participants also negligible relations would result significant with $p < .05$.

5.3.4.1. Measurement models

To ensure that the factorial structure of the questionnaires translated/adapted for this study was acceptable, I ran a series of CFA using diagonally weighted least squares as estimator, treating items as ordinal (Flora & Curran, 2004; Pastore & Lombardi, 2014), and specifying the items belonging to the different questionnaires' subscales as correlated. Models' fit to the data was checked using multiple fit indices (Schermelleh-engel et al., 2003): chi-square, the comparative fit index (CFI), the non-normed fit index (NNFI), and the root-mean-square error of approximation (RMSEA).

Table 5.2 Study 4. Means, standard deviations, Cronbach's alpha coefficients and correlations between all variables considered and age.

	M	SD	α	1.	2.	3.	4.	5.
1.Age	13.27	2.13	-					
2.Adaptability	40.65	8.76	.82	-.04				
3.Posttraumatic growth	13.32	5.37	.76	-.12	.23*			
4.SRL strategies	32.61	6.02	.70	-.15	.29*	.31*		
5.Engagement	110.42	16.58	.90	-.30*	.29*	.33*	.59*	
6.Academic achievement	7.41	1.11	.66 ^a	-.34*	.10	.01	.37*	.39*

* $p < .001$.

^arefers to the Pearson correlation coefficient between grades in math and Italian

The CFA for the adaptability factor included the scores for the 9 items with the items for the emotion regulation being correlated between each other. Fit indices resulted acceptable ($\chi^2 (24, N = 435) = 44.02, p < .01, CFI = 1, NNFI = .99, RMSEA = .04, 90\%$ confidence interval for RMSEA [.02, .06]) and the mean of the factor loadings was .58. (factor loadings ranged between .35 and .70).

The CFA for the engagement factor included the scores for the 30 items loadings on the correspondent subscales, which then loaded on the second-order engagement factor. Fit indices resulted acceptable ($\chi^2 (397, N = 435) = 1893.43, p < .001, CFI = .94, NNFI = .93, RMSEA = .09, 90\%$ confidence interval for RMSEA [.09, .10]) and the mean of the second-order factor loadings was .68. (factor loadings ranged between .48 and .81).

The CFA for the SRL strategies factor included the scores for the 10 items with the pairs of items of the single subscales being correlated between each other. Fit indices resulted acceptable ($\chi^2 (30, N = 435) = 189.60, p < .001, CFI = .91, NNFI = .87, RMSEA = .11, 90\%$ confidence interval for RMSEA [.09, .13]) and the mean of the factor loadings was .46. (factor loadings ranged between .32 and .71 with the exception of one item that showed a factor loading equal to .20).

The CFA for the posttraumatic growth factor included the scores for the 10 items with the pairs of items of the single subscales being correlated between each other. Fit indices resulted acceptable ($\chi^2(30, N = 435) = 36.22, p < .01, CFI = 1, NNFI = 1, RMSEA = .02$, 90% confidence interval for RMSEA [.00, .04]) and the mean of the factor loadings was .52. (factor loadings ranged between .37 and .65).

5.3.5. Post-traumatic growth

Based on the values proposed by Kilmer and collaborators (Kilmer et al., 2009) most of the students reported at least medium post-traumatic growth (296 cases: 68% of the values were higher than 10), with 41 (i.e., 12%) reporting very high levels of post-traumatic growth, or values higher than 20. 138 students (32%) reported small or null post-traumatic growth (i.e., values lower or equal to 10).

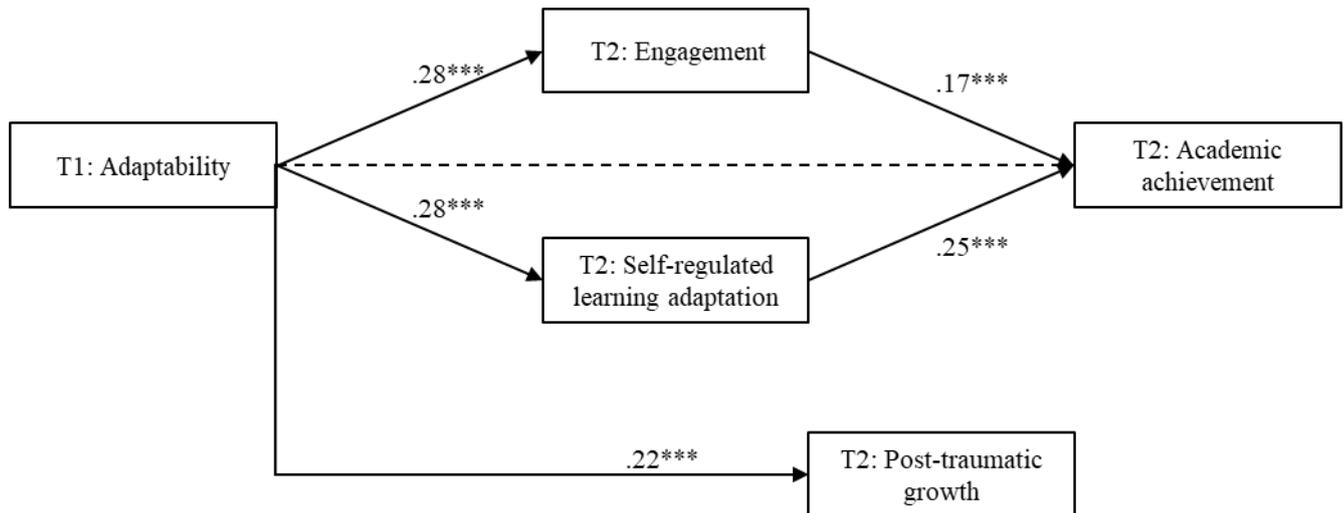
5.4. Results

5.4.1. Association between adaptability and engagement, self-regulated learning-adaptation, and post-traumatic growth

To study the hypothesized multivariate pattern of relations, a saturated path analysis model was fitted (see Figure 5.1). Specifically, the following relations were estimated: i) the direct relations between adaptability (T1) and engagement (T2), self-regulated learning-adaptation (T2), and post-traumatic growth (T2) ii) the direct associations between adaptability (T1), engagement (T2), and self-regulated learning-adaptation (T2) and academic achievement (T2). The indirect effects between adaptability and academic achievement through the mediation of engagement and self-regulated learning adaptation were also calculated. Additionally, age and gender were added as covariates of all the variables considered because they previously resulted influencing them (Bussey, 2011; Collie et al., 2017; Holliman et al., 2018; Martin et al., 2012; Vishnevsky et al., 2010; Voyer & Voyer, 2014). The relation between post-traumatic growth and academic achievement has never been studied before, but this goes beyond the scope of this study whose focus remains on the role of adaptability.

Results of the preliminary correlational analysis, however, only show a negligible ($r = .10$) and nonsignificant association between post-traumatic growth and academic achievement.

Figure 5.1 Study 4. Graphical representation of the results. Age and gender were added as covariates in every relation



Note. Numbers represent standardized beta coefficients, and dotted lines represent non-significant relations.

$***p < .001$.

The results confirm our hypotheses (see Table 5.3). First of all, adaptability significantly related to engagement ($\beta = .28$), SRL strategies ($\beta = .28$), and post-traumatic growth ($\beta = .22$). Second, engagement ($\beta = .17$) and SRL strategies ($\beta = .25$) significantly related to academic achievement, while adaptability ($\beta = -.03$) did not. Descriptively, age resulted significantly negatively related with engagement ($\beta = -.30$) and academic achievement ($\beta = -.27$) while gender did not show any significant relation with the variables ($p > .001$).

The analysis of the indirect effects showed that the relation between adaptability and academic achievement was significantly mediated by both engagement ($\beta = .05, p < .01$) and SRL strategies ($\beta = .07$).

Table 5.3 Study 4. Complete results for direct and indirect effects emerging from the analysis

Dependent variable	Predictor	<i>SE</i>	<i>z</i>	β
Direct effects				
Engagement	Adaptability	.08	6.36	.28***
Engagement	Gender	1.52	1.36	.06
Engagement	Age	.34	-6.66	-.29***
Self-regulated learning	Adaptability	.03	6.21	.28***
Self-regulated learning	Gender	.57	-1.79	-.08
Self-regulated learning	Age	.13	-2.88	-.13*
Post-traumatic growth	Adaptability	.03	4.76	.22***
Post-traumatic growth	Gender	.52	-2.14	-.10*
Post-traumatic growth	Age	.12	-2.20	-.10*
Academic achievement	Engagement	.00	3.22	.17***
Academic achievement	Self-regulated learning	.01	4.69	.24***
Academic achievement	Adaptability	.01	-.64	-.03
Academic achievement	Gender	.10	2.98	.13**
Academic achievement	Age	.02	-6.15	-.27***
Indirect effects				
Academic achievement	Adaptability x Engagement	.00	2.87	.05**
Academic achievement	Adaptability x Self-regulated learning	.00	3.74	.07***

Note. *SE* = standard error; *z* = test statistic; β = standardized beta coefficient.

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

Given that the model was saturated, fit indices were not meaningful. However, removing the non-hypothesized and non-significant direct relation between adaptability and academic achievement allowed us to estimate fit indices. In this case, the model resulted perfectly fitting the data: $\chi^2(1, N =$

435) = 0.40, $p > .05$, CFI = 1, NNFI = 1.02, RMSEA = 0, 90% confidence interval for RMSEA [0, .11].

5.5. Discussion and conclusions

The last study of this dissertation responds to the unexpected spread of Covid-19 that disrupted the original plan of the thesis but gave us the opportunity to shed some light on the importance of soft skills (i.e., adaptability in this case) during a difficult, uncertain, and peculiar situation such as the one that students had to face during the 2020/2021 academic year that was characterized by online learning at school and many negative psychological consequences for students and the general population (Salari et al., 2020; Singh et al., 2020; C. Wang et al., 2020). In particular, this study allowed us to longitudinally test the role of adaptability in sustaining students' engagement and SRL strategies (thus indirectly favouring academic achievement) and promoting post-traumatic growth. Adaptability, among the soft skills, seemed particularly adequate for this study as it concerns how people handle new, uncertain, and unexpected situations such as those that, unfortunately, the Covid-19 generated (Besser et al., 2020; Martin, 2017; Martin et al., 2012, 2013; Zhang et al., 2021). In particular, Martin (2017) also states that students with higher adaptability should be more prone to consider these conditions as opportunities for growth or new beginnings and should be more able to find new ways to manage them.

Our results support the hypothesis that adaptability might have played a central role for students on both scholastic and nonscholastic outcomes. In fact, the path model confirmed the direct and indirect relations that I hypothesized. Adaptability measured at the beginning of the scholastic year (i.e., between October and January) was found to be positively related with students' engagement referred to this particular scholastic year and to students' belief about their successful adaptation of their SRL strategies despite the continuous learning modalities changes. In line with two previous studies on the effect of adaptability for university students during the Covid-19 pandemic (Besser et al., 2020; Zhang et al., 2021), this indicates that when individuals are able to regulate and adjust their

emotions, thoughts, and behaviours under new and uncertain situations –such as those caused by the pandemic–, they are able to find new functional strategies or modalities to approach their learning. Indeed, in line with Study 3, more adaptable students reported they were able to smoothly adjust to the new learning conditions imposed by Covid-19, by tuning their elaboration, organization, and study strategies to the novel requests, while meta-cognitively monitoring and evaluating their learning process. This, as stated in the rationale section, may have been of primary importance given that online learning (especially if unexpected) generally requests very high levels of autonomy and refined SRL strategies to be accomplished (Wong et al., 2019). Adaptability thus positively modulated the adoption of new functional SRL strategies, consequently promoting students' academic achievement even under the difficult learning condition characterizing the Covid-19 pandemic. This, remaining in the scholastic setting, may also have helped students maintaining higher levels of scholastic engagement despite the engagement difficulties that students generally encountered during this year (Farooq et al., 2020; Zhang et al., 2021). Indeed martin and collaborators (Martin et al., 2012, 2013, 2017) suggest that more adaptable students are generally more engaged with school because maintaining high engagement requires the ability to frequently adapt to new tasks, teachers, requests, task formats, as well as adjust their believes, emotions, and behaviours to follow the different courses' contents along the years. This was even more peculiar this year when the entire scholastic settings and learning modalities were revolutionized to face the Covid-19 pandemic.

Other than favouring the adoption of new SRL strategies and maintain a high level of engagement, we also found that adaptability, during the Covid-19 pandemic, influenced students' life out of their schools by also promoting their growth. Being able to adapt to new, unexpected, and uncertain situation entails being open to them and being able to find opportunities for growth or new beginnings into them (Martin, 2017). Indeed, personal characteristics such as adaptability might favour a building or reappraisal effect (Niemic, 2020; Waters, Algoe, et al., 2021) that should sustain the individuals in positively reinterpreting the new and difficult situations (Casali, Feraco, Ghisi, &

Meneghetti, 2021; Casali, Feraco, & Meneghetti, 2021), which is a fundamental aspect of post-traumatic growth (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1995). To the best of our knowledge, these findings are the first to support the idea that adaptability fosters a more positive perception of new, unexpected, and/or unpredictable situations for the person, leading to positive personal improvements and helping individuals to thrive even in the hardest of times (Martin, 2017). As a consequence, we may hypothesized that adaptability, as other personal characteristics (Casali, Feraco, & Meneghetti, 2021), may have safeguarded students from experiencing unpleasant mental health symptoms (e.g., anxiety or depression) during this time by reframing stressful situations as chances for personal growth. Indeed, adaptability may have played a part for students' wellbeing also in these stressful situations, as already showed for what concerns life satisfaction (Study 3).

5.5.1. Conclusion

This last study, even if narrowly focusing on one of the six soft skills, extend the importance of these personal characteristics that may prove transversally important in the different situation of an individual's life, being them everyday or completely unexpected situations. In this specific case, students who showed higher levels of adaptability at the beginning of their school year reported that they better adjusted their SRL strategies to the new learning condition while also being more engaged at school. This consequently prompted their academic achievement. At the same time, these students also showed higher posttraumatic growth at the end of the year, suggesting that they reframed the difficult and unexpected situation in a more positive way than students with lower levels of adaptability did.

5.5.2. Limitations and future directions

Despite the longitudinal approach that was used in Study 4, the work still presents some limitation that is worth highlighting. First of all, adaptability was measured in between the pandemic and not before the Covid-19 spread. It is plausible that students changed their level of adaptability following this event and our results cannot control for this eventuality. In addition, I did not collect

additional information about how and how much the Covid-19 pandemic affected each student's life (e.g., they or their parents were infected), possibly losing important information. These limitations might have affected our results that may be invalidated in different contexts or under different circumstances. To overcome these problems, it might be interesting to run an experimental study in which we can precisely define the experimental condition (e.g., create an unexpected situation) and control all the variables of interest.

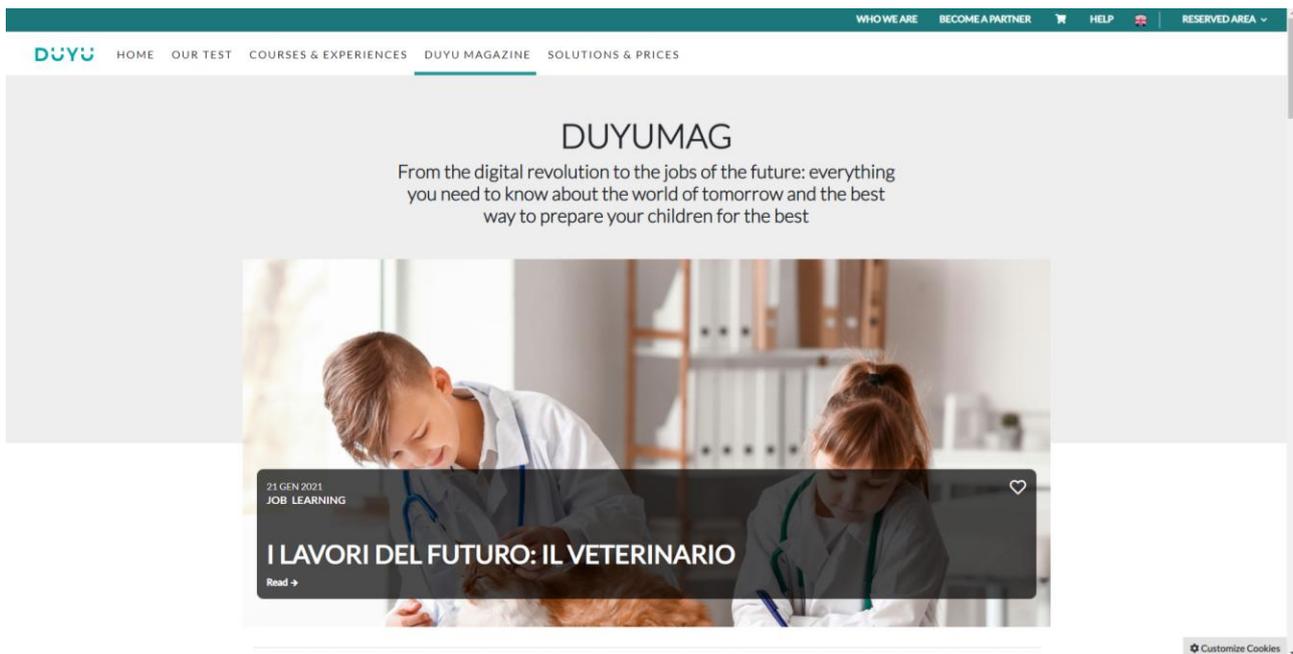
6. Applications of the project

As specified in the introduction, the main aim of this doctoral project was twofold. On one hand we aimed at deeply analyzing soft skills in school-aged students to shed new lights on the role that they might play in favoring students' academic and nonacademic outcomes comprehending study-related factors, academic achievement, engagement, life satisfaction, and posttraumatic growth, but also exploring the relation between the practice of extracurricular activities and the level of soft skills. On the other hand, the project was financed by a private company that recently created an online platform (<https://duyu.it/>) aimed at promoting knowledge about soft skills, also allowing students and parents to measure their soft skills and to receive indications and opportunities for nurturing their soft skills. For this reason, the research project was accompanied by direct practical applications that consisted in the following accomplishments: a) Writing informative articles directed to parents, students, educators, and school personnel that were based on the results of our research and on psychological literature. b) Building and validating a set of reliable measures (questionnaires and tasks inspired and adapted from published measures) able to profile one's soft skills (i.e., the soft skills proposed by the World Economic Forum, 2016). c) Preparing and structuring a series of courses (video/animated lessons, quizzes, and materials) aimed at explaining soft skills to school-aged students (6-18 years old).

6.1. Informative articles

For what concerns the informative articles I personally prepared a series of papers about the single soft skills considered in the platform. In particular, I generally covered the following topics: the definition of each soft skill, their practical importance at different ages, including occupational and academic outcomes, and simple suggestions about how they could be nurtured through simple exercises and everyday life activities. These papers, together with the other papers written by other professional, formed the section of the platform called "DUYU MAGAZINE" or "DUYUMAG" (see Figure 7.1).

Figure 7.1 The DUYU MAGAZINE



6.2. Measuring soft skills

For what concerns the measurement part, a deep literature review permitted us to retrieve and adapt psychological measures for each of the soft skills considered. In particular, we built the following measures adapting them for students aged between 10 and 18 years old. Part of these measures were also used in Study 1 and 2:

- *Academic self-efficacy* for the six “foundation literacies” included in the world economic forum model (World Economic Forum, 2016). These questionnaires were built following the suggestion provided by Bandura (Bandura, 2006) and consisted of 30 items (five per subject) answered on a 6-point Likert scale.
- *Critical thinking*. This was built starting from the Watson-Glaser critical thinking appraisal (G. Watson, 1980) and consisted in a series of four described scenarios to which students respond to four question each about the contents in the scenarios.
- *Problem solving*. This was adapted from the MicroDYN (Greiff et al., 2013). Our version, differently from the original one was adapted to be completed as a paper-and-pencil task and

consisted of five different problems. In addition, we only measured the number of items that were correctly solved. The measure is deeply described in the Materials section of Study 1.

- *Creativity*. This was inspired from the Torrance Tests of Creative Thinking (Torrance, 1972) and consisted of eight different tasks in which the students are requested to find as much creative solution as possible in a given time.
- *Communication*. This was inspired from different questionnaires that measure assertive communication (Arrindell & van der Ende, 1985; Gambrill & Richey, 1975) and consisted of 20 items answered on a 6-point Likert scale.
- *Negotiation*. This was build *ad hoc* for the project and consisted of five items on a 6-point Likert scale measuring how much an individual is able to obtain the best he/she can from a conflictual situation.
- *Adaptability*. This was adapted from the Adaptability Scale (Martin et al., 2012) to measure the ability to regulate emotions, behaviors, and thoughts in new and uncertain situations and consisted of six items on a 6-point Liker scale.
- *Curiosity*. This was adapted from the curiosity scale proposed by Litman and Mussel (2013) to measures the desire to acquire new information and knowledge and consisted of six items on a 6-point Liker scale.
- *Initiative*. This was adapted from the Personal Growth Initiative Scale–II (Robitschek et al., 2012) to measures one’s tendency to intentionally improve oneself and consisted of six items on a 6-point Liker scale.
- *Perseverance*. This was adapted from the persistence subscale used by Miller and colleagues (Miller et al., 1996) to measure one’s personal tendency to work hard to reach aims despite setbacks and difficulties and consisted of six items on a 6-point Liker scale.

- *Social awareness*. This was adapted from the social awareness subscale of the VIA-IS-120 (Peterson & Seligman, 2004) to measure an individual’s sense of responsibility towards the community and consisted of six items on a 6-point Liker scale.
- *Leadership*. This was adapted from the leadership practices inventory (Kouzes & Posner, 2003) to measure one’s ability to influence others and help them to contribute to the success of a group and consisted of six items on a 6-point Liker scale.

All the measures were finally organized in a specific area of the platform: the “DUYU-SKILL TEST” (see Figure 7.2). In this area, the users can fill all the questionnaires and complete the tasks. Their results are then compared with the scores obtained by their peers and an automatic report is provided reporting all the results with specific comments and explanations about the meaning of the scores and of the single soft skills. The results are also reported in the user’s dashboard where he/she can also find suggestions for growth and comparisons with parents’ opinions on their soft skills (see Figure 7.3).

Figure 7.2 The DUYU-SKILL TEST

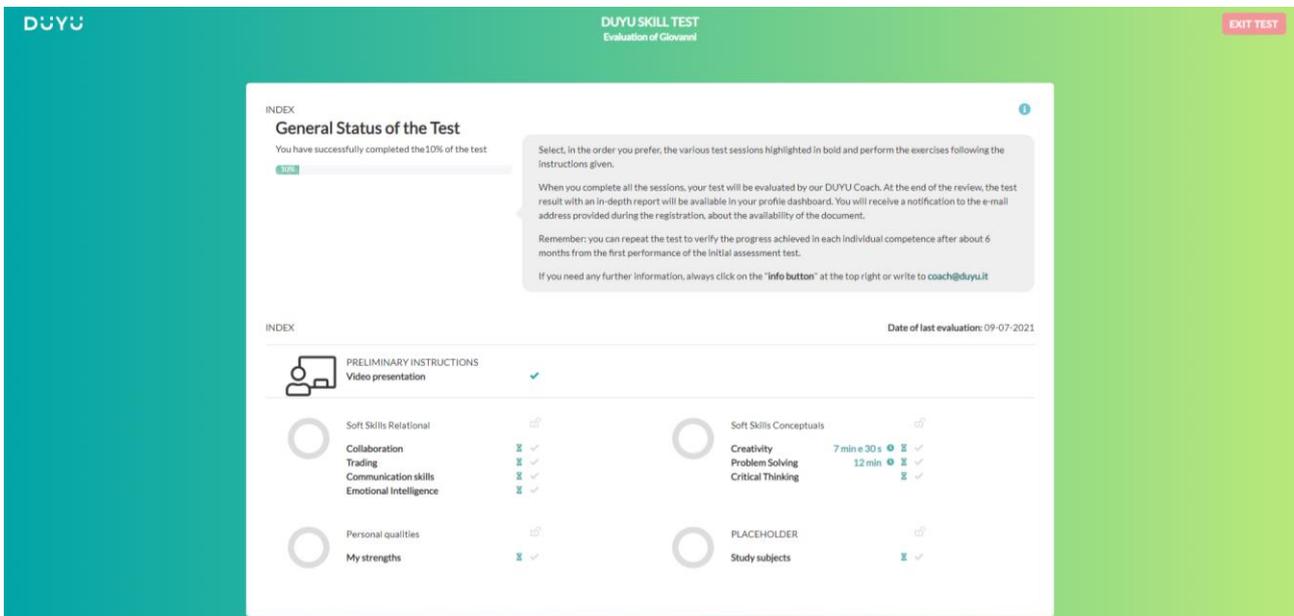
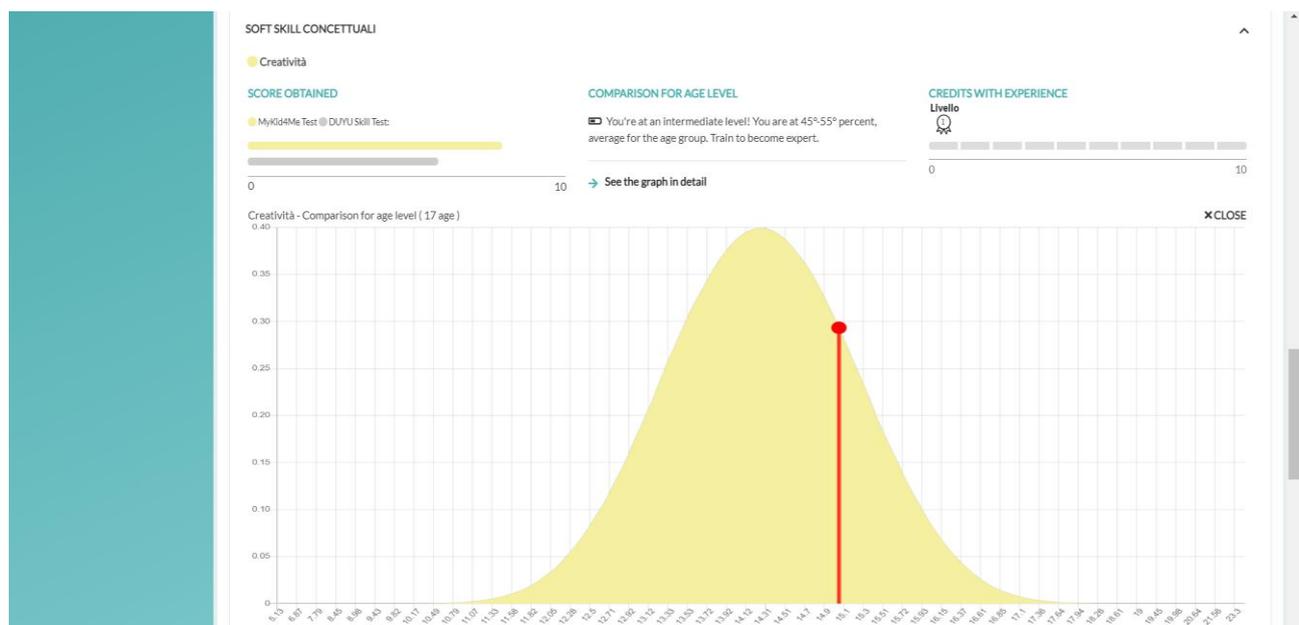


Figure 7.3 Screenshot of part of the user dashboard with results



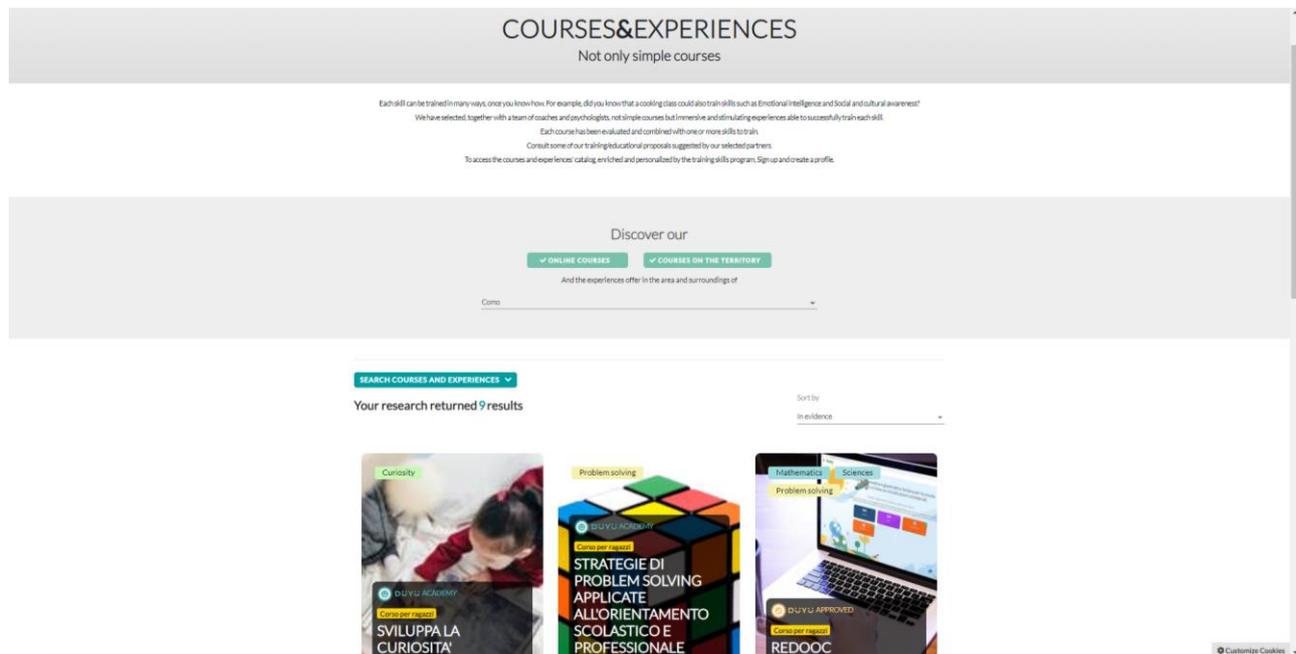
Questionnaires and tasks were initially administered to a large sample of students from the North of Italy and their factorial structure was studied using CFA and reliability indices (Cronbach's alpha and McDonald omega). Personality traits, cognitive tasks, and study-related factors were also collected to analyse the convergence validity of the measures. Finally, the factorial structure of the measures was confirmed through the studies we conducted later on and through the data collected by the online platform of Pentathlon S.r.l.

6.3. Courses for soft skills

For what concerns courses and experiences aiming at developing soft skills, different activities are proposed in the "COURSES & EXPERIENCES" section of the platform (see Figure 7.4). Here extracurricular activities are proposed, together with specific courses for soft skills, coaching sessions, and gaming sessions with trained psychologists. All of these proposals were evaluated and assigned to specific soft skills that might be nurtured by participating in them, with assignments that was done based on literature suggestions and/or discussions between educators and psychologists. For example, we deeply discussed with a team of sport psychologists about the effect that sport practice may have for soft skills development to catalogue the different sports depending on what

they might nurture (other than sport expertise) to encourage adolescents and parents in engaging in sport activities to also grow as a person.

Figure 7.4 COURSES&EXPERIENCES page



I specifically worked on the creation of two courses for soft skills: curiosity and emotional intelligence (see Figure 7.5). The courses have a psychoeducational aim and try to explain important psychological constructs to an adolescent population. This are not to be intended as scientific trainings but should hopefully stimulate students' metacognitive awareness and self-reflection. For this reason I will not go in deep in the theoretical framework that is at the basis of the two courses. These are similarly structured (see Table 6.1) and are composed by animated video-lesson created with PowToon (<https://www.powtoon.com/>). Each lesson covered a different component of the related construct (Kashdan et al., 2018; Salovey & Mayer, 1990) and was generally composed by two theoretical videos and exercises to be completed during the lessons (e.g., quizzes, brief online tasks) or during free time. Free time exercises included, for example, a daily diary for emotional intelligence, or activities such as learning a new word per day or daily talking with one's family about what each

component of the family learned in that day to reflect and engage in free learning activities that characterize curiosity.

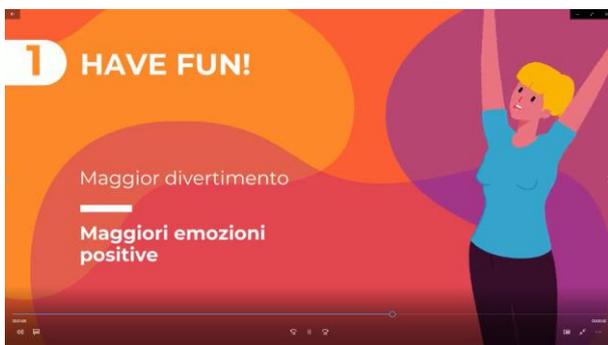
We are actually collecting data about the curiosity course to receive feedback and suggestions from the students who are asked to judge, on a Likert scale, the clarity of the contents, the usefulness of the contents, whether the contents are interesting, the usability of the course interface and their experience with the site. Students are also being asked to report their general opinion about the course and whether they would like to see some changes in both the contents and the structure of the course. These data will be internally used to improve the quality of the course adapting it to the user’s opinion. After a first data collection about students’ opinion, the courses will be modified following their suggestions and a structured data collection will be carried out to test whether the two courses are also able to develop, respectively, curiosity and emotional intelligence measuring students’ levels of the two constructs before and after course completion.

Table 6.1 Structure of the two courses

<i>Episode</i>	<i>Curiosity</i>		<i>Emotional Intelligence</i>	
	<i>Translated title</i>	<i>Content</i>	<i>Translated title</i>	<i>Content</i>
Episode 1	May curiosity be with you	Course presentation and introduction	Introduction to emotional intelligence	Course presentation and introduction
Episode 2	Thinking is fun, learning is fun, finding things out is fun!	Joyous exploration 1	The emotions	Emotions
Episode 3	The joy of learning	Joyous exploration 2	Perceiving emotions (part one)	Perception of emotions 1
Episode 4	I know that I know nothing	Deprivation sensitivity 1	Perceiving emotions (part two)	Perception of emotions 2
Episode 5	A child, a teacher, a book and a pen can change the world	Deprivation sensitivity 2	Facilitate thinking with emotions	Facilitating thought using emotions

Episode 6	Fake it 'til you make it!	Social curiosity 1	Understanding emotions (part one)	Comprehension of emotions 1
Episode 7	Fighting the unknown	Social curiosity 2	Understanding emotions (part two)	Comprehension of emotions 2
Episode 8	Elementary, my dear Nellie	Stress tolerance 1	Regulating emotions (part one)	Regulating emotions 1
Episode 9	Spy game	Stress tolerance 2	Regulation techniques (second part)	Regulating emotions 2
Episode 10	Those who do not risk do not win	Sensation seeking 1	Final episode	Global revision and feedback
Episode 11	Fatti non foste a viver come bruti, ma per seguir virtute e canoscenza	Sensation seeking 2		
Episode 12	Conclusion	Global revision and feedback		

Figure 7.5 Screenshots of two videos from the curiosity course (left) and the emotional intelligence test (right).



6.4. Conclusions

In this chapter, I presented the application that we managed to find, together with Pentathlon S.r.l., in the research work that was carried out through the three years of my PhD project. Such application permitted us to reach a larger audience and to communicate psychological knowledge and our research results directly to students, parents, and schoolteachers through a strict collaboration with professional copy-writers and an online magazine aiming at communicating general knowledge about soft skills. The collaboration also gave us the opportunity to structure and create a series of courses aiming at enlarging students' knowledge about single soft skills and developing their metacognitive awareness about their soft skills. In particular, I directly worked at two courses about curiosity and emotional intelligence, respectively. However, in collaboration with other psychologists, we were able to prepare other courses on emotion recognition, problem solving, perseverance, and creativity. Another opportunity for students and their parents/schoolteachers to reflect about their soft skills was given by the creation of reliable measures that evaluate students' soft skills through questionnaires and objective tasks and that return a detailed report about one's soft skills' level.

All this work resulted very interesting to me, as it gave us the opportunity to find a practical and hopefully useful application to the research work that we conducted. This also give us the opportunity to plan future collaboration with Pentathlon such as developing new courses and test their efficiency (i.e., testing whether they statistically favour the development of the specific soft skills), refining the measurement of soft skills after large online data collection through the platform, refining the algorithm of the automatic report that might continuously update the reference standardized values, creating services for schools and teachers that might, for example, use our video lessons to communicate psychological knowledge to their students or receive a personalized report of the results obtained at the DUYU-SKILL TEST by their classes. The refinement of the assessment will be particularly important to ensure the quality of the services offered in the platform. To this aim I am

actually collecting data to study the test-retest reliability of each measure and to improve the convergent validity of the scales by also testing their correlations with already-validated scales. In addition, the collaboration with the company could reveal precious. In fact, a large number of people will be assessed multiple times on the same set of variables allowing us to study both the reliability of the instrument, but also the development of soft skills through adolescence.

7. General discussion and conclusions

Soft skills are crucial characteristics for success and wellbeing and are highly requested in adulthood, especially in the labor market. For this reason, many organizations are trying to develop such skills in young people and integrate them into scholastic curricula (e.g., in Italy; MIUR, 2018). Despite this early focus, literature about the role that soft skills might play during adolescence is still scarce, and scholars rarely tried to integrate soft skills into more complete models of learning, such as the one proposed by Ben-Eliyahu (Ben-Eliyahu & Bernacki, 2015). In their model, the authors suggest considering multiple study-related factors simultaneously to capture how all these factors work together to favor students' academic achievement. Following the general definition of soft skills as malleable personal qualities that regulate behaviors, emotions, and thought, consequently favoring one's success (Robles, 2012), we proposed that soft skills, in the school context, should favor students' SRL strategies, motivation, and achievement emotions. At the same time, however, we also expected soft skills to not directly favour academic achievement. This relation, on the contrary, should be mediated by the other study-related factors. Additionally, other important soft skills' implications were considered, such as their association with students' life satisfaction and personal growth during unpredictable difficult situations such as the spread of a pandemic. A second research question that guided the PhD project regarded the study of the malleability of soft skills. We intended to analyse in term of soft skills' relations with the practice of extracurricular activities and effectiveness of training for soft skills. However, even if the relation occurring between soft skills and extracurricular activities was explored in Study 1 and 2, the Covid-19 pandemic did not allow us to deepen these research questions that remain open for the future. Four studies were conducted to the aims of the project.

In the first cross-sectional study (Study 1), soft skills were integrated into a learning model comprehensive of cognitive abilities, SRL strategies, and academic motivation to evaluate their contemporary relations with students' academic achievement. Following the definition of soft skills

mentioned above and inspiring evidence from the literature (e.g., Muenks et al., 2017; Richards et al., 2012), we correctly hypothesized that, when also considering study-related factors, soft skills appear to work as regulators of SRL strategies and academic motivation, instead of being directly associated with academic achievement. These results, replicated in Study 2 with a Bayesian approach, contradict previous findings on the relation between soft skills and academic achievement that suggested a direct relation between the two. In fact, especially for curiosity and perseverance, many researchers report positive correlations and meta-analytical findings support these associations (e.g., Credé et al., 2017), but authors often miss including variables directly linked to students' academic achievement as SRL strategies or their academic motivation. Our results, in other words, highlight the fact that soft skills may prove crucial for academic achievement when they work as regulators of positive SRL strategies use and positive motivational beliefs that consequently favor students' attainment. Soft skills by themselves, on the contrary, may prove useless (for academic achievement) when favoring behaviors or thoughts that are not associated with a higher achievement (e.g., being so curious about a topic that you forget to check other homework).

In Study 2, other than replicating the results obtained in Study 1, the focus also moved to other important aspects of students' life: achievement emotions and life satisfaction. Achievement emotions, which are the emotions characterizing one's academic life and tasks, resulted favoring SRL strategies and academic motivation (Pekrun et al., 2007) but also students' life satisfaction (Hagenauer et al., 2018). At the same time, this study shows that soft skills, other than SRL strategies and academic motivation, also positively relate to students' achievement emotions, thus supporting the hypothesis that they should also regulate one's emotions and life satisfaction. The latter relation was particularly important because it highlights a direct role of soft skills for students' life satisfaction, contrary to what we found for all the other study-related factors and academic achievement.

Study 1 and Study 2 also exploratory analyzed the relation occurring between extracurricular activities and an individual's level of soft skills. This result was supposed to be the starting point of a more profound analysis of the effect that practicing extracurricular activities might have on soft skills. Unfortunately the studies that were planned for this aim could not be conducted for pandemic reasons. In both Studies 1 and 2, the relation between extracurricular activities and soft skills, albeit small, resulted positive and requested further investigation. Proving that the simple practice of extracurricular activities can promote the development of soft skills might have great practical implications. Indeed, most students participate in extracurricular activities, which are hypothesized to be good occasions for personal growth in terms of social relationships, character, and personal beliefs (Eccles, 1999). Further research should better deepen which soft skills might be more affected by the specific activities and test the directionality of the effect.

Even if the results from Studies 1 and 2 were consistent and confirmed our hypotheses, this was only true when considering soft skills as a second-order factor composed of the six soft skills selected. In fact, when replicating the analyses using the single soft skills as predictors, some inconsistency emerged, especially for what concerns adaptability. Even if this might be explained with expected statistical power problems, I decided to analyze the construct of adaptability further to ensure that its role for academic achievement was similar to that obtained for soft skills in general. To this aim, Study 3 was planned and conducted collecting data from a large sample of school-aged students and measuring students' adaptability, SRL strategies, academic motivation (i.e., academic self-efficacy), achievement emotions, academic achievement, and life satisfaction. Adaptability, or the ability to efficiently regulate one's behaviors, thoughts, and emotions in unexpected and difficult situations (Martin et al., 2012, 2013), resulted positively associated with the three study-related factors considered and with students' life satisfaction, confirming that adaptability plays a similar role to the one played by the other soft skills for students' academic achievement and life satisfaction. In particular, adaptability should sustain the adoption of positive SRL strategies, or the presence of

positive motivational beliefs in those uncertain situations that characterize students' life, such as adapting to new teachers or different learning requests when moving from one school to another (Martin et al., 2013).

In Study 4, adaptability was considered again. This time I evaluated its role in response to the Covid-19 pandemic that affected students' life worldwide. In particular, I longitudinally tested whether adaptability favoured students' engagement and SRL strategies during the 2020/2021 academic year characterized by online or blended learning. In this case, SRL strategies were considered in terms of efficient adaptation of one's SRL strategies to the new learning conditions. In addition, given the difficult times that students had to face during this period, I also hypothesized that adaptability might have favored the occurrence of post-traumatic growth. In other words, that, during the pandemic crisis, adaptability favored a positive reframing of the situation (Martin, 2017). Results supported our hypothesis and students who showed higher levels of adaptability at the beginning of the 2020/2021 academic year showed higher engagement, higher SRL strategies (indirectly favoring academic achievement), and higher post-traumatic growth at the end of the year. These results suggest that adaptability, like other soft skills (Waters, Algoe, et al., 2021; Waters, Allen, et al., 2021), might be a protective personal characteristic in different situation, from everyday life occasions, such as school life, to exceptionally difficult and unexpected situations, such as a lockdown caused by a pandemic.

In general, our results support the importance of soft skills in favoring students' life satisfaction (both directly and indirectly), their achievement emotions, and academic achievement (through the mediation of SRL strategies and motivation). On the other hand, classical predictors of academic achievement - such as SRL strategies, motivation, and cognitive abilities - only influenced students' academic achievement, but not their life satisfaction. These results are in line with the recommendations of several international organizations and institutions (EU, 2016; MIUR, 2018; Pellegrino & Hilton, 2012) that underscore the importance of focusing more on students' soft skills

(among other things) to promote school students' wellbeing and more functional approach to learning. Nurturing their soft skills will also improve their opportunities when they enter the job market (Heckman & Kautz, 2012), and their life satisfaction in adulthood (Bruna et al., 2019). Such an approach is even more justified by the fact that soft skills appear to be malleable. Even just engaging in extracurricular activities seems to relate to their development in boys and girls. While targeted interventions for soft skills could be implemented during school hours by training teachers and educators to adapt their teaching methods or by working directly with the students, schools may also consider extracurricular activities as a plausible way to shape students' soft skills. The Covid-19 pandemic finally allowed us to test the hypothesis of soft skills as important characteristics that might promote one's growth following a difficult situation. In this case, we found that adaptability played a significant role during this period, suggesting that soft skills have important implications for people and students' wellbeing other than success.

For convenience, a schematic summary of the results is now presented.

- Study 1, considering 460 students (10-18 years old), showed that soft skills favor academic achievement through the mediation of SRL strategies and academic achievement. A small but positive correlation also emerged between the practice of extracurricular activities and soft skills.
- Study 2, considering 603 students (11-18 years old), confirms the results obtained in the first but using a Bayesian approach to the analyses. Study 2 also newly shows that soft skills directly relate to achievement emotions and student's life satisfaction over and above the other study-related factors, which did not directly relate to it. Again, a small but positive correlation between soft skills and extracurricular activities emerged.
- Study 3, considering 1083 students (11-18 years old), replicates the findings of Study 2 at the level of an individual soft skill: adaptability. Interestingly this was the first time adaptability

was studied in relation with emotional, behavioral, and cognitive study-related factors. It was confirmed that adaptability directly relates to SRL strategies, academic self-efficacy, achievement emotions, and life satisfaction, while also indirectly favoring academic achievement.

- Study 4, considering 574 students (11-18 years old), newly shows the longitudinal relations linking adaptability to students' engagement, SRL strategies, and post-traumatic growth in difficult and unexpected conditions such as the one caused by the Covid-19 pandemic. More adaptable students reported keeping higher engagement through the academic year, better adaptation of their SRL strategies to the new condition, and a higher level of growth following the pandemic.

7.1. Implications

Other than providing a theoretical contribution to the literature on soft skills, the present thesis also sustained the development of different sections of the Pentathlon S.r.l.'s platform (<https://duyu.it/>) (see Chapter 6 for the applications) and offered insights for educational practices.

First of all, as already evident from the literature, the predominant role of SRL strategies and academic motivation for academic achievement was again highlighted in the four studies conducted. This suggests that educators, teachers, and policymakers interested in promoting students' learning and success might work on students' knowledge, use, and metacognitive control of their study strategies and their motivational beliefs. This might be done through specific intervention or by disseminating SRL and motivational expertise to teachers and educators.

This thesis, however, suggests that similar results might partially be reached by working on students' soft skills. Succeeding in their soft skills development might indirectly affect their adoption of positive SRL strategies, nurture their academic motivation, favour positive achievement emotions, and lessen the negative ones. The importance of focusing on soft skills and developing them is also justified by their implication with more general aspects of students' lives, such as life satisfaction or

future occupational success, which do not seem to be affected by SRL strategies and achievement motivation. To the aim of developing them, specific initiatives might be taken, as already done by the MIUR in Italy (MIUR, 2018), to nurture students' soft skills. Other kinds of activities, such as the practice of extracurricular activities, might also be incentivized to this aim (Eccles, 1999; Khasanzyanova, 2017), as also suggested by the first two studies we ran. Other interventions, such as the SEL programs (Durlak et al., 2011) or soft skills' interventions, might be efficiently adopted (Niemic, 2017). However, further studies are needed to clarify these interventions' effectiveness with adolescents and find the best ways to carry them out within the school context.

7.2. Limitations and future directions

Even though the current work adds to the existing literature, in this paragraph, I will try to highlight some limits and some issues that are worth considering, and that might be addressed in future studies. While some of these concerns were discussed in the individual studies and some were addressed in the subsequent studies, the focus here is more general. First of all, three studies (except for Study 4) conducted are cross-sectional and do not allow to conclude on the causality of the hypothesized relations. This issue might be addressed in the future by adopting a longitudinal approach or adding specific experimental manipulations. The cross-sectional nature of the studies might also be worsened by the adoption of questionnaires as measurement method for the main variables considered. The use of questionnaires allowed us to collect a large number of participants in each study. Still, it might be interesting to collect data from different sources (e.g., teachers and parents) to obtain more refined indicators of students' soft skills.

A third limitation regards the analysis of soft skills as a second-order observed factor. This was statistically and theoretically acceptable, but it does not allow us to compare the different soft skills or to conclude about their specific effects. Even if their single contribution was controlled with additional analyses, it might be interesting to replicate the findings we obtained at the level of the single skills, as done in Study 3 with adaptability. The use of a second-order factor, however, might

be theoretically justifiable as it resembles the fact that all the soft skills positively regulate people's thoughts, emotions, and behaviors that are transversally functional to the attainment of a goal.

A fourth limitation regards the measurement of soft skills, which relied on questionnaires and tasks that were adapted or created for the aim of the thesis. This was justified because there were not Italian measures for all the soft skills and because of the company's requests of building a new reliable assessment. All the tasks, however, were built following a scientific approach (see Study 1) and their psychometric properties were checked through every study ensuring, at least in part, that the results were reliable, as also confirmed when using the original adaptability scale in Study 3 and 4.

A final limitation that we initially planned to address regards the study of the malleability of soft skills. Even if the results obtained in Study 1 and Study 2 are promising, a specific study should be planned to test the relations occurring between extracurricular activities and the single soft skills. This appears to be one of the most interesting points that I would like to address in future studies to conclude the initially planned work.

7.3. Concluding remark

The present dissertation aimed to understand the role of soft skills for school-aged students better and integrate soft skills into a model of learning comprehensive of different study-related factors. The results we obtained highlight the importance of studying these factors together to shed a clearer light on the underlying processes connecting soft skills to one's achievement. Importantly soft skills showed to be fundamental in regulating students' SRL strategies, achievement motivation, and academic achievement, but also in favoring their well-being and their ability to face difficult and unexpected situations. Further studies will be needed to find the best ways to integrate soft skills and their development into scholastic curricula and overcome this dissertation's limitations.

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Appendix

Table A1. List of the correlational effects considered for the purpose of specifying the priors, and related studies.

Study	N ^a	Relation	r	z	CI	Second-order relation	r
1. Martin et al., 2013	969	AD → SRL	.54	.44	[.35, .54]	SS → SRL	.39
2. Feraco et al., 2021	448	AD → SRL	.24				
3. Chan et al., 2012	1381	CU → SRL	.48				
4. Chan et al., 2012	1381	CU → SRL	.01				
5. Richards et al., 2013	90	CU → SRL	.54	.40	[.22, .58]		
6. Richards et al., 2013	90	CU → SRL	.52				
7. Pekrun et al., 2016	438	CU → SRL	.30				
8. Feraco et al., 2021	448	CU → SRL	.42				
9. Feraco et al., 2021	448	IN → SRL	.42	.44	[.35, .54]		
10. Feraco et al., 2021	448	PE → SRL	.30				
11. Weisskirch, 2018	3023	PE → SRL	.51				
12. Weisskirch, 2018	302	PE → SRL	.38	.31	[.22, .40]		
13. Weisskirch, 2018	302	PE → SRL	.38				
14. Wolters & Hussain, 2015	213	PE → SRL	.50				
15. Feraco et al., 2021	448	PE → SRL	.50				
16. Feraco et al., 2021	448	SA → SRL	.38	.50	[.43, .60]		
17. Feraco et al., 2021	448	AD → IT	.01				
18. Martin et al., 2013	969	AD → IT	.25	.24	[.07, .41]		
19. Martin et al., 2012	2731	AD → IT	.25				
20. Martin et al., 2012	2731	AD → IT	.41				
21. Feraco et al., 2021	448	CU → IT	.12	.12	[.03, .21]		
22. Feraco et al., 2021	448	IN → IT	.17				
23. Feraco et al., 2021	448	LE → IT	.01	.01	[-.08, .10]		
24. Burgoyne et al., 2018	488	PE → IT	.15				
25. Dixson et al., 2017	105	PE → IT	.39	.23	[.13, .34]		
26. Feraco et al., 2021	448	PE → IT	.05				
27. Myers et al., 2016	9	PE → IT	.34				

28. Karlen et al., 2019	1215	PE → IT	.13		
29. Park et al., 2020	1667	PE → IT	.20		
30. Sigmundsson et al., 2020	146	PE → IT	.27		
31. Tang et al., 2019	2018	PE → IT	.15		
32. West et al., 2016	1368	PE → IT	.18		
33. Zhao et al., 2018	1842	PE → IT	.51		
34. Feraco et al., 2021	448	SA → IT	-.01	-.01	[-.10, .08]
35. Burns et al., 2018	1481	AD → SE	.70		
36. Burns et al., 2018	1481	AD → SE	.29		
37. Feraco et al., 2021	448	AD → SE	.24		
38. Feraco et al., 2021	448	AD → SE	.15	.47	[.29, .67]
39. Martin et al., 2016	3617	AD → SE	.56		
40. Martin et al., 2016	989	AD → SE	.51		
41. Martin et al., 2016	1182	AD → SE	.52		
42. Anderson et al., 2019	447	CU → SE	.33		
43. Feraco et al., 2021	448	CU → SE	.36		
44. Feraco et al., 2021	448	CU → SE	.32	.38	[.33, .44]
45. Ruch et al., 2014	2110	CU → SE	.41		
46. Fay & Frese, 2001	152	IN → SE	.24		
47. Fay & Frese, 2001	152	IN → SE	.25		
48. Fay & Frese, 2001	152	IN → SE	.08		
49. Fay & Frese, 2001	152	IN → SE	.21	.24	[.16, .33]
50. Feraco et al., 2021	448	IN → SE	.22		
51. Feraco et al., 2021	448	IN → SE	.37		
52. Feraco et al., 2021	448	LE → SE	.16		
53. Feraco et al., 2021	448	LE → SE	.23	.30	[.10, .49]
54. Ruch et al., 2014	2110	LE → SE	.45		
55. Credé et al., 2017	M	PE → SE		.46	[.28, .57]
56. Feraco et al., 2021	448	SA → SE	.07		
57. Ruch et al., 2014	2110	SA → SE	.51	.32	[-.16, .80]
58. Feraco et al., 2021	448	AD → LG	.14		
59. Holliman et al., 2018	90	AD → LG	.32	.39	[.25, .53]
60. Martin et al., 2016	3617	AD → LG	.49		

61. Martin et al., 2016	989	AD → LG	.44			
62. Martin et al., 2016	1182	AD → LG	.40			
63. Chan et al., 2012	1381	CU → LG	.45			
64. Feraco et al., 2021	448	CU → LG	.41	.47	[.43, .52]	
65. Richards et al, 2013	90	CU → LG	.47			
66. Feraco et al., 2021	448	IN → LG	.22	.22	[.13, .22]	
67. Feraco et al., 2021	448	LE → LG	.08	.18	[-.03, .40]	
68. Weber et al., 2016	196	LE → LG	.29			
69. Feraco et al., 2021	448	PE → LG	.31			
70. Karlen et al., 2019	1215	PE → LG	.25			
71. Karlen et al., 2019	1215	PE → LG	.40	.38	[.29, .47]	
72. Muenks et al., 2018	190	PE → LG	.38			
73. Muenks et al., 2018	190	PE → LG	.22			
74. Zhao et al, 2018	1842	PE → LG	.50			
75. Feraco et al., 2021	448	SA → LG	.26	.28	[.20, .36]	
76. Weber et al., 2016	196	SA → LG	.31			
77. Austin et al., 2010	475	AD → PA	.19	.21	[.14, .29]	
78. Saklofske et al., 2012	238	AD → PA	.25			
79. Anderson et al., 2020	447	CU → PA	.36			
80. Anderson et al., 2020	447	CU → PA	.40			
81. Dametto & Noronha, 2019	826	CU → PA	.40			
82. Gallagher & Lopez, 2007	293	CU → PA	.50			
83. Güsewell & Ruch, 2012	574	CU → PA	.36			
84. Kashdan et al., 2009	150	CU → PA	.28	.42	[.38, .47]	
85. Kashdan et al., 2004	514	CU → PA	.44			SS → PA .38
86. Macaskill & Denovan, 2014	214	CU → PA	.50			
87. Neff et al., 2006	177	CU → PA	.37			
88. Ros-Morente et al., 2018	419	CU → PA	.33			
89. Weber et al., 2016	196	CU → PA	.46			
90. Robitschek & Keyes, 2009	467	IN → PA	.38	.40	[.31, .49]	
91. Dametto & Noronha, 2019	826	LE → PA	.35	.38	[.31, .45]	
92. Ros-Morente et al., 2018	419	LE → PA	.32			

93.	Weber et al., 2016	196	LE → PA	.46			
94.	Dametto & Noronha, 2019	826	PE → PA	.42			
95.	Datu et al., 2019	606	PE → PA	.43			
96.	Datu et al., 2019	220	PE → PA	.49			
97.	Datu & Fong, 2018	1051	PE → PA	.56	.50	[.40, .60]	
98.	Datu & Fong, 2018	1051	PE → PA	.35			
99.	Ros-Morente et al., 2018	419	PE → PA	.35			
100.	Weber et al., 2016	196	PE → PA	.63			
101.	Dametto & Noronha, 2019	826	SA → PA	.41			
102.	Ros-Morente et al., 2018	419	SA → PA	.32	.46	[.30, .62]	
103.	Weber et al., 2016	196	SA → PA	.56			
104.	Austin et al., 2010	475	AD → NA	-.12			
105.	Saklofske et al., 2012	238	AD → NA	-.22	-.16	[-.26, -.06]	
106.	Dametto & Noronha, 2019	826	CU → NA	-.11			
107.	Gallagher & Lopez, 2007	293	CU → NA	-.28			
108.	Kashdan et al., 2009	150	CU → NA	-.05			
109.	Kashdan et al., 2004	514	CU → NA	-.22	-.14	[-.21, -.07]	
110.	Macaskill & Denovan, 2014	214	CU → NA	-.17			
111.	Neff et al., 2007	177	CU → NA	-.08			SS → NA -.19
112.	Weber et al., 2016	196	CU → NA	-.02			
113.	Weigold et al., 2020	M	IN → NA		-.25	[-.39, -.01]	
114.	Dametto & Noronha, 2019	826	LE → NA	-.15	-.16	[-.23, -.10]	
115.	Weber et al., 2016	196	LE → NA	-.22			
116.	Dametto & Noronha, 2019	826	PE → NA	-.27			
117.	Datu et al., 2016	606	PE → NA	-.13	-.18	[-.25, -.11]	
118.	Datu et al., 2016	220	PE → NA	-.26			

119.	Datu et al., 2018	447	PE → NA	-.21				
120.	Datu & Fong, 2018	1051	PE → NA	-.06				
121.	Datu & Fong, 2018	1051	PE → NA	-.09				
122.	Weber et al., 2016	196	PE → NA	-.28				
123.	Dametto & Noronha, 2019	826	SA → NA	-.23	-.25	[-.31, -.19]		
124.	Weber et al., 2016	196	SA → NA	-.30				
125.	Feraco et al., 2021	448	AD → ECA	.08	.08	[-.01, .17]		
126.	Feraco et al., 2021	448	CU → ECA	.06	.06	[-.03, .15]		
127.	Feraco et al., 2021	448	IN → ECA	.19	.19	[.10, .29]		
128.	Feraco et al., 2021	448	LE → ECA	.19	.19	[.10, .29]	SS → ECA	.12
129.	Feraco et al., 2021	448	PE → ECA	.07				
130.	Lufi & Tenenbaum, 1991	149	PE → ECA	.25	.15	[-.02, .33]		
131.	Feraco et al., 2021	448	SA → ECA	.08	.08	[-.01, .17]		
132.	Derksen et al., 2002	873	AD → CA	.10				
133.	Feraco et al., 2021	448	AD → CA	.07	.09	[.04, .14]		
134.	Newsome et al., 2000	137	AD → CA	.09				
135.	Von Stumm et al., 2011	M	CU → CA		.22			
136.	Fay & Frese, 2001	152	IN → CA	.28			SS → CA	.07
137.	Fay & Frese, 2001	152	IN → CA	.27	.19	[.01, .36]		
138.	Feraco et al., 2021	448	IN → CA	.03				
139.	Feraco et al., 2021	448	LE → CA	-.06	-.06	[-.15, .03]		
140.	Credé et al., 2001	M	PE → CA		-.01	[-.06, .04]		
141.	Feraco et al., 2021	448	SA → CA	.01	.01	[-.08, .10]		
142.	Austin et al., 2010	475	AD → LS	.10				
143.	Holliman et al., 2018	90	AD → LS	.44				
144.	Martin et al., 2013	969	AD → LS	.58	.44	[.25, .64]	SS → LS	.36
145.	Martin et al., 2012	2731	AD → LS	.62				
146.	Saklofske et al., 2012	238	AD → LS	.23				
147.	Zhou & Lin, 2016	99	AD → LS	.39				
148.	Bruna et al., 2019	M	CU → LS		.42	[.38, .42]		

149.	Chang et al, 2019	152	IN → LS	.40				
150.	Robitschek & Keyes, 2009	467	IN → LS	.40	.53	[.31, .75]		
151.	Stevic & Ward, 2008	204	IN → LS	.64				
152.	Bruna et al., 2019	M	LE → LS		.23	[.20, .29]		
153.	Bruna et al., 2019	M	PE → LS		.33	[.26, .37]		
154.	Bruna et al., 2019	M	SA → LS		.30	[.26, .32]		
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155.	Austin et al., 2010	475	AD → AA	.24				
156.	Burns et al., 2018	1481	AD → AA	.19				
157.	Collie et al., 2016	186	AD → AA	.05				
158.	Martin et al., 2012	2731	AD → AA	.30	.18	[.10, .26]		
159.	Martin et al., 2015	969	AD → AA	.16				
160.	Holliman et al., 2018	90	AD → AA	.35				
161.	Newsome et al., 2000	137	AD → AA	.08				
162.	Von Stumm et al., 2011	M	CU → AA		.33			
163.	Feraco et al., 2021	448	IN → AA	.09	.09	[-.02, .18]	SS → AA	.19
164.	Feraco et al., 2021	448	LE → AA	.12				
165.	Lounsbury et al., 2009	237	LE → AA	.14	.13	[.06, .19]		
166.	Wagner & Ruch, 2015	378	LE → AA	.12				
167.	Credé et al., 2017	M	PE → AA		.27	[.11, .41]		
168.	Feraco et al., 2021	448	SA → AA	.08				
169.	Lounsbury et al., 2009	237	SA → AA	.10				
170.	Wagner & Ruch, 2015	378	SA → AA	.17	.11	[.08, .17]		
171.	Wagner & Ruch, 2015	378	SA → AA	.12				
172.	Wagner & Ruch, 2015	378	SA → AA	.17				
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173.	Mega et al., 2014	5805	SRL → SE	.49				
174.	Mega et al., 2014	5805	SRL → SE	.36				
175.	Mega et al., 2014	5805	SRL → SE	.35				
176.	Mega et al., 2014	5805	SRL → SE	.39	.41	[.35, .47]	SRL → SM	.29
177.	Mega et al., 2014	5805	SRL → SE	.40				
178.	Wolter & Hussain 2014	213	SRL → SE	.30				

179.	Mega et al., 2014	5805	SRL → LG	.28				
180.	Mega et al., 2014	5805	SRL → LG	.36				
181.	Mega et al., 2014	5805	SRL → LG	.16	.25	[.17, .33]		
182.	Mega et al., 2014	5805	SRL → LG	.17				
183.	Mega et al., 2014	5805	SRL → LG	.26				
184.	Burnette et al., 2012	M	SRL → IT		.13	[.16, .29]		
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185.	Artino & Jones, 2012	302	SRL → PA	.53				
186.	Artino & Jones, 2012	302	SRL → PA	.51				
187.	Mega et al., 2014	5805	SRL → PA	.37				
188.	Mega et al., 2014	5805	SRL → PA	.47				
189.	Mega et al., 2014	5805	SRL → PA	.42				
190.	Mega et al., 2014	5805	SRL → PA	.31				
191.	Mega et al., 2014	5805	SRL → PA	.32				
192.	Mega et al., 2014	5805	SRL → PA	.37				
193.	Mega et al., 2014	5805	SRL → PA	.24				
194.	Mega et al., 2014	5805	SRL → PA	.27				
195.	Mega et al., 2014	5805	SRL → PA	.23				
196.	Mega et al., 2014	5805	SRL → PA	.33	.37	[.33, .41]	SRL → PA	.36
197.	Mega et al., 2014	5805	SRL → PA	.39				
198.	Mega et al., 2014	5805	SRL → PA	.34				
199.	Mega et al., 2014	5805	SRL → PA	.33				
200.	Mega et al., 2014	5805	SRL → PA	.36				
201.	Mega et al., 2014	5805	SRL → PA	.36				
202.	Pekrun et al., 2002	230	SRL → PA	.44				
203.	Pekrun et al., 2002	230	SRL → PA	.33				
204.	Pekrun et al., 2011	389	SRL → PA	.26				
205.	Pekrun et al., 2011	389	SRL → PA	.45				
206.	Pekrun et al., 2011	389	SRL → PA	.43				
207.	Pekrun et al., 2011	389	SRL → PA	.14				
208.	Shih, 2011	481	SRL → PA	.56				
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209.	Artino & Jones, 2012	302	SRL → NA	-.37				
210.	Artino & Jones, 2012	302	SRL → NA	-.28	-.28	[-.31, -.26]	SRL → NA	-.27
211.	Artino & Jones, 2012	302	SRL → NA	-.40				

212.	Artino & Jones, 2012	302	SRL → NA	-.28				
213.	Mega et al 2014	5805	SRL → NA	-.31				
214.	Mega et al 2014	5805	SRL → NA	-.41				
215.	Mega et al 2014	5805	SRL → NA	-.38				
216.	Mega et al 2014	5805	SRL → NA	-.20				
217.	Mega et al 2014	5805	SRL → NA	-.25				
218.	Mega et al 2014	5805	SRL → NA	-.26				
219.	Mega et al 2014	5805	SRL → NA	-.24				
220.	Mega et al 2014	5805	SRL → NA	-.30				
221.	Mega et al 2014	5805	SRL → NA	-.28				
222.	Mega et al 2014	5805	SRL → NA	-.23				
223.	Mega et al 2014	5805	SRL → NA	-.3				
224.	Mega et al 2014	5805	SRL → NA	-.26				
225.	Mega et al 2014	5805	SRL → NA	-.22				
226.	Mega et al 2014	5805	SRL → NA	-.28				
227.	Mega et al 2014	5805	SRL → NA	-.27				
228.	Pekrun et al.,2002	230	SRL → NA	-.21				
229.	Pekrun et al.,2002	230	SRL → NA	-.22				
230.	Pekrun et al.,2002	230	SRL → NA	-.26				
231.	Pekrun et al.,2011	389	SRL → NA	-.25				
232.	Pekrun et al.,2011	389	SRL → NA	-.29				
233.	Pekrun et al.,2011	389	SRL → NA	-.26				
234.	Pekrun et al.,2011	389	SRL → NA	-.34				
235.	Pekrun et al.,2011	389	SRL → NA	-.04				
236.	Shih, 2011	481	SRL → NA	-.20				
237.	Feraco et al., 2021	448	SRL → ECA	.13				
238.	Guilmette 2019	401	SRL → ECA	.21	.15	[.11, .19]	SRL → ECA	.15
239.	Guilmette 2019	401	SRL → ECA	.11				
240.	Zuffianò et al., 2013	170	SRL → CA	.10	.10	[-.05, .25]	SRL → CA	.10
241.	Antaramian, 2017	357	SRL → LS	.17	.17	[.10, .25]	SRL → LS	.17
242.	Antaramian, 2017	357	SRL → LS	.17				
243.	Richardson et al., 2013	M	SRL → AA		.20	[.09, .20]	SRL → AA	.17
244.	Richardson et al., 2013	M	SRL → AA		.14	[.03, .25]		

245.	Richardson et al., 2013	M	SRL → AA	.14	[.05, .22]		
246.	Richardson et al., 2013	M	SRL → AA	.16	[.16, .16]		
247.	Richardson et al., 2013	M	SRL → AA	.20	[.17, .20]		
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248.	Artino and Jones, 2012	302	SE → PA	.22			
249.	Mega et al 2014	5805	SE → PA	.51			
250.	Mega et al 2014	5805	SE → PA	.62			
251.	Mega et al 2014	5805	SE → PA	.54			
252.	Artino et al.,2010	136	SE → PA	.27			
253.	Pekrun et al.,2011	389	SE → PA	.37	.41	[.30, .53]	
254.	Pekrun et al.,2011	389	SE → PA	.53			
255.	Pekrun et al.,2011	389	SE → PA	.51			
256.	Pekrun et al.,2011	389	SE → PA	.07			
257.	Putwain et al 2012	206	SE → PA	.26			
258.	Putwain et al 2012	206	SE → PA	.27			SM → PA .32
259.	Putwain et al 2012	206	SE → PA	.32			
260.	Huang et al., 2011	M	LG → PA		.43	[.35, .47]	
261.	King et al.,2012	1147	IT → PA	-.06			
262.	King et al.,2012	1147	IT → PA	-.06			
263.	King et al.,2012	1147	IT → PA	-.04			
264.	King, 2012	676	IT → PA	.11	.09	[-.01, .20]	
265.	Mega et al 2014	5805	IT → PA	.22			
266.	Mega et al 2014	5805	IT → PA	.19			
267.	Mega et al 2014	5805	IT → PA	.25			
268.	Shih, 2011	481	IT → PA	.39			
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269.	Artino et al.,2010	136	SE → NA	-.36			
270.	Artino et al.,2010	136	SE → NA	-.24			
271.	Artino & Jones, 2012	302	SE → NA	-.21			
272.	Artino & Jones, 2012	302	SE → NA	-.10			
273.	Mega et al 2014	5805	SE → NA	-.39	-.38	[-.48, -.29]	SM → NA -.12
274.	Mega et al 2014	5805	SE → NA	-.54			
275.	Mega et al 2014	5805	SE → NA	-.48			
276.	Pekrun et al.,2011	389	SE → NA	-.35			
277.	Pekrun et al.,2011	389	SE → NA	-.39			

278.	Pekrun et al.,2011	389	SE → NA	-.48				
279.	Pekrun et al.,2011	389	SE → NA	-.67				
280.	Pekrun et al.,2011	389	SE → NA	-.29				
281.	Putwain et al 2012	206	SE → NA	-.14				
282.	Putwain et al 2012	206	SE → NA	-.30				
283.	Putwain et al 2012	206	SE → NA	-.31				
284.	Huang et al., 2011	M	LG → NA		.13	[.07, .19]		
285.	King, 2012	676	IT → NA	-.06				
286.	King et al.,2012	1147	IT → NA	-.27				
287.	King et al.,2012	1147	IT → NA	-.26				
288.	King et al.,2012	1147	IT → NA	-.31				
289.	King et al.,2012	1147	IT → NA	-.34				
290.	King et al.,2012	1147	IT → NA	-.40	-.21	[-.39, -.11]		
291.	Mega et al 2014	5805	IT → NA	-.05				
292.	Mega et al 2014	5805	IT → NA	-.04				
293.	Mega et al 2014	5805	IT → NA	-.08				
294.	Shih, 2011	481	IT → NA	-.19				
295.	Feraco et al., 2021	448	SE → ECA	.02				
296.	Marsh, 1992	10613	SE → ECA	.29	.16	[.01, .32]		
297.	Feraco et al., 2021	448	LG → ECA	.02	.02	[-.05, .08]	SM → ECA	.07
298.	Feraco et al., 2021	448	IT → ECA	.02	.02	[-.05, .09]		
299.	Kriegbaum et al., 2018	M	SM → CA		.17	[.15, .20]	SM → CA	.17
300.	Antaramian 2017	357	SE → LS	.25				
301.	Danielsen et al., 2009	3358	SE → LS	.30				
302.	Diseth et al., 2012	240	SE → LS	.30	.30	[.28, .33]		
303.	Huebner & McCollough, 2000	92	SE → LS	.28			SM → LS	.33
304.	Diseth et al., 2012	240	LG → LS	.44				
305.	Diseth et al., 2012	240	LG → LS	.28	.38	[.28, .48]		
306.	Richardson et al., 2012	M	SE → AA		.29	[.14, .41]		
307.	Richardson et al., 2012	M	LG → AA		.12	[.03, .21]	SM → AA	.19
308.	Costa & Faria, 2018	M	IT → AA		.07	[.04, .11]		

309.	Gilman & Huebner, 2006	485	PA → ECA	.22				
310.	Gilman & Huebner, 2006	485	PA → ECA	.08	.20	[.12, .29]	PA → ECA	.20
311.	Guilmette et al., 2019	401	PA → ECA	.30				
312.	Zaccoletti et al.,2020	152	PA → CA	.12	.12	[-.04, .28]	PA → CA	.12
313.	Austin et al., 2010	475	PA → LS	.40				
314.	Cohn et al.,2009	86	PA → LS	.32				
315.	Effner & Antaramian, 2016	814	PA → LS	.40	.42	[.39, .45]	PA → LS	.40
316.	Hagenauer et al., 2017	792	PA → LS	.36				
317.	Lewis et al.,2009	239	PA → LS	.46				
318.	Karaztias et al., 2002	425	PA → LS	.49				
319.	Saklofske et al 2012	238	PA → LS	.40				
320.	Austin et al., 2010	475	PA → AA	.12				
321.	Daniels et al.,2009	669	PA → AA	.09				
322.	Daniels et al.,2009	669	PA → AA	.22				
323.	Daniels et al.,2009	669	PA → AA	.07				
324.	Guilmette et al., 2019	401	PA → AA	.07	.12	[.09, .16]	PA → AA	.12
325.	Lewis et al.,2009	239	PA → AA	.13				
326.	Mega et al 2014	5805	PA → AA	.10				
327.	Mega et al 2014	5805	PA → AA	.19				
328.	Mega et al 2014	5805	PA → AA	.10				
329.	Gilman & Huebner 2006	485	NA → ECA	-.12	-.12	[-.17, -.07]	NA → ECA	-.12
330.	Guilmette et al., 2019	401	NA → ECA	-.12				
331.	Zaccoletti et al.,2020	152	NA → CA	-.25	.09	[-.41, .23]	NA → CA	.09
332.	Zaccoletti et al.,2020	152	NA → CA	.07				
333.	Austin et al., 2010	475	NA → LS	-.40				
334.	Cohn et al., 2009	86	NA → LS	-.16				
335.	Hagenauer, et al., 2017	792	NA → LS	-.38	-.36	[-.45, -.26]	NA → LS	-.35
336.	Effner & Antaramian, 2016	814	NA → LS	-.45				

337.	Karatzias et al., 2002	425	NA → LS	-.32				
338.	Lewis et al.,2009	239	NA → LS	-.05				
339.	Saklofske et al., 2012	238	NA → LS	-.49				
340.	Austin et al., 2010	475	NA → AA	-.12				
341.	Daniels et al.,2009	669	NA → AA	-.18				
342.	Daniels et al.,2009	669	NA → AA	-.18				
343.	Daniels et al.,2009	669	NA → AA	-.38				
344.	Daniels et al.,2009	669	NA → AA	-.17				
345.	Daniels et al.,2009	669	NA → AA	-.22				
346.	Daniels et al.,2009	669	NA → AA	-.15	-.16	[-.22, -.11]	NA → AA	.16
347.	Effner & Antaramian, 2016	814	NA → AA	-.15				
348.	Guilmette et al., 2019	401	NA → AA	.09				
349.	Lewis et al.,2009	239	NA → AA	-.18				
350.	Mega et al 2014	5805	NA → AA	-.11				
351.	Mega et al 2014	5805	NA → AA	-.22				
352.	Mega et al 2014	5805	NA → AA	-.14				
353.	Feraco et al., 2021	448	ECA → CA	.02	.02	[-.05, .09]	ECA → CA	.02
354.	Gilman & Huebner, 2006	485	ECA → LS	.17	.17	[.13, .22]	ECA → LS	.17
355.	Gilman, 2001	321	ECA → LS	.18				
356.	Shulruf, 2010	M	ECA → AA		.13	[-.15, .31]	ECA → AA	.13
357.	Roth et al., 2015	M	CA → AA		.54	[.51, .57]	CA → AA	.54
358.	Antaramian, 2017	357	LS → CA	.11				
359.	Diseth et al., 2012	240	LS → CA	.26				
360.	Effner & Antaramian, 2016	814	LS → CA	.21				
361.	Gilman & Huebner 2006	485	LS → CA	.32	.23	[.19, .26]	LS → AA	.23
362.	Marques et al., 2015	682	LS → CA	.24				
363.	Suldo & Shaffer, 2008	321	LS → CA	.19				
364.	Suldo & Shaffer, 2008	321	LS → CA	.21				

^a in case a meta-analysis was considered, I referred to it with M

Note. AD = Adaptability; CU = Curiosity; IN = Initiative; LE = Leadership; PE = Perseverance; SA = Social awareness; AA = Academic achievement; LS = Life satisfaction; SRL = Self-regulated learning; SM = Scholastic motivation; PA = Positive emotions; NA = Negative emotions; CA = Cognitive abilities; SS = soft skills; ECA = Extracurricular activities; IT = Intelligence theories; LG = Learning goals; SE = Self-efficacy