Developing academic persistence in the International Baccalaureate Diploma Programme:

Educational strategies and associated personality traits

A research report prepared for the International Baccalaureate by

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Abstract

The objective of the project was to reveal the components of the International Baccalaureate (IB) Diploma Programme (DP) that support academic persistence and its associated personality traits, and to investigate the impact of these educational components and traits on the relevant outcomes, as well as the potential mediating role of academic persistence in this impact. The first two phases of research entailed qualitative investigations of the relevant IB documents and of the IB DP teachers' perspective on these matters. Results indicated ten educational strategies and six personality traits presumed to foster academic persistence. The final research phase was a quantitative investigation on an IB students sample from schools located in 5 Eastern European countries and a non-IB sample from Romanian high schools. It supported the hypothesis that all these strategies and traits significantly sustain IB DP students' academic persistence. Two of the curriculum-related strategies and three personality traits emerged as having the strongest fostering effects. Moreover, results show that IB students' academic performance and dropout intentions are influenced by these traits and educational strategies, and that these effects are mediated by academic persistence. The differences between the two samples indicate that the IB programme ensures a climate that better supports students in completing their education.

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Executive summary

The general objective of the project was to reveal the components of International Baccalaureate (IB) Diploma Programme (DP) that support academic persistence and its associated individual skills or personality traits, and to investigate the impact of these educational components and personal traits on the relevant academic outcomes, as well as the potential mediating role of academic persistence in this relationship. In order to investigate these relationships, we performed both an in-depth analysis of the IB educational components that might support academic persistence and its associated individual competencies, and a comparison between IB students and non-IB students on the relevant psychological and educational dimensions.

The first two phases of research entailed the qualitative investigation of the relevant IB documents and of the IB DP teachers' perspective (through three focus groups), on the following layers of our investigation: (a) the mechanisms, in terms of instructional strategies, pedagogic contents and class management practices, through which the IB programme fosters students' academic persistence; (b) the personality traits that might contribute to IB students' academic persistence which the IB programme aims to develop; (c) the mechanisms that the IB programme uses in order to foster these traits in students.

The third research phase entailed the administration of a questionnaire to a sample of IB students in 5 Eastern and Central European countries, and to a sample of a comparison sample of non-IB students in Romania. The questionnaire was built on the results of the previous research phases. First, we aimed to empirically verify the conclusions of the qualitative studies that precede it, in other words by checking whether the assumptions of the official IB documents and of the IB teachers translate into student outcomes in terms of the relationships between educational strategies and academic persistence. The qualitative results indicated ten strategies presumed to foster academic persistence: a) applicability of knowledge, b) clear framework, c) independent work style, d) teachers' involvement, e) focusing on the student, f) intense collaboration and partnership with the teachers, g) student class size, h) updated curricula, i) comprehensive curricula, j) curricula focused on students' real, practical needs. In the quantitative study, we built short scales evaluating students' perceptions concerning each of these strategies, asking them to estimate the degree to which they are reflected in their daily academic experience. Concerning the traits that foster academic persistence, we selected from the traits revealed by the qualitative results

a set of six traits that, based on the literature, are assumed to be strongly related to academic persistence, namely proactive attitude, self-efficacy, mastery goals, academic resilience, critical thinking, and restraint. Then, we identified in the scientific literature the optimal previously validated instruments that evaluate these traits. We also assessed students' perception of the degree in which their school helps them develop each of these six traits.

The second objective of the quantitative phase of research was to test the relationships between (a) the components of IB programme, as perceived by the IB students (b) students' individual traits, (c) students' academic persistence and (d) potential outcomes of academic persistence (academic performance, absenteeism, intention to drop out, academic aspirations). Focusing on the IB students, we verified the potential mediating role of academic persistence in the relationships between the ten relevant IB educational strategies and the students' individual traits, on one hand, and the hypothesized outcomes of academic persistence, on the other. Finally, the questionnaire data allowed us to explore the differences between IB students and equivalent non-IB students concerning both the set of variables under scrutiny (academic persistence, its associated traits and educational mechanisms, its relevant educational outcomes) and the relationships between these variables.

The hypothesized relationships between the variables in our research are presented in the Figure 1.

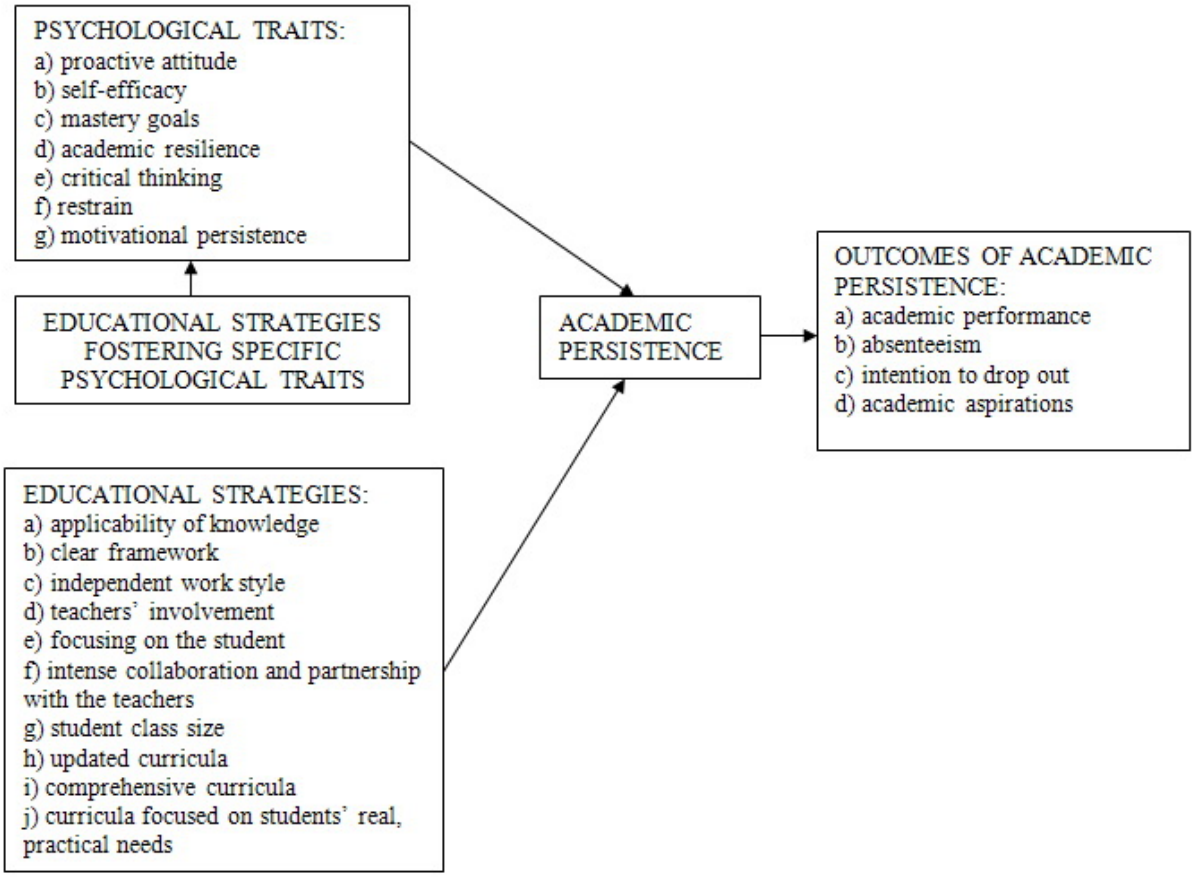

Figure 1. The hypothesized relationships between the variables in our research

The questionnaire was administered to two student samples. The IB sample includes 226 IB DP students in schools located in 5 Eastern European countries, while the non-IB sample includes 328 students in the 11th and 12th grade in top-ranking Romanian high schools.

In the IB sample, the results of the quantitative study support the hypothesis that all ten strategies presumed to sustain academic persistence have a significant fostering effect on this trait. Furthermore, among these strategies, the two strategies that have the greatest impact on academic persistence are the curricula focused on the real, practical needs of students and the comprehensive curricula. Concerning the personality traits presumed to sustain academic persistence, all six traits proved to significantly foster this dimension, in line with the previous studies on their associations in educational settings. Further analysis revealed that three of these traits have the strongest effect on academic persistence, namely mastery goals, restraint and general self-efficacy. Other findings

show that the correlations between the scales assessing IB students' perception on the relevant educational mechanisms and the corresponding personality traits are all significant and positive.

We also examined the influences of the psychological traits, respectively of the educational mechanisms previously highlighted as most important for academic persistence on four outcomes: academic performance (operationalized as the overall mean grade), intention to dropout, absenteeism and academic aspirations. Overall, results show that the first two outcomes are influenced by the set of traits and educational strategies under consideration, and that these effects are fully or partially mediated by academic persistence. Hence, the positive influences of the psychological traits and educational strategies are not restrained at the psychological level of academic persistence, but they extend towards essential practical outcomes. Consequently, fostering academic persistence through the development of its background personality characteristics and through the appropriate educational experiences has a higher stake than just promoting appropriate persistent attitudes and behaviors; it also leads to lower dropout and to higher school performances. We also found an association between academic persistence and IB students' educational aspirations, as well as a significant influence - fully mediated by academic persistence - of mastery goals on these aspirations.

The results of the comparisons between IB students and equivalent non-IB students from Romanian schools show that relative to the traditional Romanian schools, the IB programme promotes a climate that better supports students in completing their education, as non-IB students perceive their educational experiences as less guided by the educational strategies aimed to develop their academic persistence. Non-IB students also score lower than the IB students on academic persistence and on three out of the seven personality traits associated with it. Furthermore, all correlations between non-IB students' perceptions of the school strategies that foster the personality traits associated with academic persistence and the respective traits are smaller than in the IB group.

In sum, we found that the IB DP programme fosters students' academic persistence to a higher degree than does the traditional educational system (at least than the Romanian one). This effect is mostly due to a set of distinct strategies that foster academic persistence both directly, especially through the adapted and comprehensive curricula, and indirectly, through the development of certain psychological skills supporting academic persistence. Moreover, IB

students' academic persistence further stimulates their academic performance, their school commitment and their educational aspirations.

Research on the components of the individual motivation profile and educational system that lead to school completion is highly needed, as school are expected to prepare the youth for the rigors of postsecondary education and for the demands of advancing in a professional career. This goal is crucial in the countries where historically low levels of school graduation and baccalaureate pass rates have been registered in the last decade (Voicu, 2009). School dropout and poor academic preparation of students are two major indicators of the lack of quality of the educational system, which have widespread social and economic effects. In this context, the attention of the researchers and teachers focuses more and more on strategies and practices that could improve the quality of the educational system.

Schools are now, more than ever, expected to prepare students capable of self-regulated learning, not only during their secondary and postsecondary studies, but throughout their whole lives as engaged lifelong learners. In other words, school completion is required for future career success, since post-secondary education has become mandatory for the practice of most professions and the employment in more and more domains of activity (Caspi, Wright, Moffitt & Silva, 1998). Post-secondary educational attainment is also correlated with health problems, regardless of the income level (Pleis, Ward & Lucas, 2010; Rumberger & Lamb, 2003).

In light of these problems, which are related to the internal indicators of educational systems, another set of variables that affects academic motivation and can be targeted by interventions are beliefs and attitudes regarding education, schooling, the credibility of the schools and the teaching profession and its role (Andrei, Teodorescu & Oancea, 2011a&b; Lamb & Markussen, 2011). As one has no control over the non-academic, non-alterable socio-demographic risk factors that can affect student persistence, and education budgets are generally limited, the school can only mediate the influence of the personal factors and skills that play a support role in fostering commitment.

This study aimed to identify the components of International Baccalaureate (IB) programme and instruction that support academic persistence and its associated individual skills or personality traits. Moreover, the study investigated the impact of the educational components and personal traits on the relevant academic outcomes, as well as the potential mediating role of academic persistence in this relationship.

1. Theoretical background

1.1. Academic persistence. Definitions and outcomes

Academic persistence has received wide attention from educational research, mainly as a primary outcome susceptible to multiple sources of influence, in both secondary and postsecondary education (Reason, 2003, 2009; Pascarella & Terrezini, 2005; Tinto, 2006-2007; Wentzel & Wigfield, 1998). For this reason, much of the theoretical discussion has revolved around the factors that shape this psychological phenomenon, with little attention to isolating its manifestations and consequences on learning outcomes, namely retention, dropout intentions and achievement.

Given the complex interconnections between the individual and environment in achievement contexts, we identified the need to better define and explain the features and consequences of academic persistence, first by pinpointing this versatile psychological construct. As noted above, most studies conceptualize academic persistence as an outcome or index of individual motivation, namely the success in academic goal attainment, and a diagnostic tool employed to assess the quality of an educational process, as a reflection of institutional retention, the overlap between the latter and academic persistence being also observed by previous scholars (e.g. Reason, 2009).

Another factor that contributes to the lack of conceptual clarity is the difficulty indistinguishing between the characteristics of academic persistence. Namely, authors fail to establish or agree on whether it should be defined as a trait-like feature (in the set of individual dispositions supporting educational completion, such as conscientiousness or tenacity) or rather as a subjective component of the individual experience resulting from the situational constraints, similar to commitment (Tinto, 1975), class involvement or the energy and time spent in preparing and completing school activities (Astin, 1985; Berger & Milem, 1999), engagement with academic work (Kuh et al, 2005), which are usually treated as mediating variables to retention behaviors or persistence outcomes.

In this section we will focus more on these two aspects, namely the trait-like features and the subjective, more transient experiences that have undoubtedly effects on the intent and decision to continue studies but have to be treated individually and measured adequately and directly. Academic persistence is mainly treated as an outcome and less as a predictor of academic outcomes such as success and performance; also, there have been more sporadic attempts at defining it as a personality trait, captured with specific self-report scales. Such attempts have been made by

various scholars that tried to design adequate measures for the academic context, such as the persistence scale for children (Lufi & Cohen, 1987), the persistence in school scale (Lufi, Parish-Plass, & Cohen, 2003), self-reported persistence/effort (Agbuga, 2010), the effort and perseverance subscale of the Student Approaches to Learning (SAL) Instrument (Marsh, Hau, Artelt, Baumert & Peschar, 2006), the grit scale (Duckworth & Quinn, 2009) or the College Persistence Questionnaire (Davidson, Beck & Milligan, 2009).

We approach academic persistence as the individual ability to direct personal resources towards the achievement of academic tasks and goals, including program completion. In other words, it is a modifiable individual non-cognitive aspect, operationalized as the degree to which students feel compelled to pursue the goals needed to finish their current level of studies, regardless of the difficulties and obstacles they face. Persistence and effort are part of the grit construct, which predicts academic performance, measured as cumulative grade point average (Duckworth, Peterson, Matthews, & Kelly, 2007). Also, it is important to note that persistence and self-directedness are as good of predictors of academic performance as other intellectual and personality dimensions (Moreira et al., 2012).

From all the conceptual models and measurement techniques previously mentioned, we prefer the one proposed by Davidson and colleagues (2009), which aims to identify students at risk of dropping out by measuring their scholastic conscientiousness, degree of involvement and institutional commitment, among other factors that are,–according to the authors,--predictors of retention. This model, although it originally described postsecondary educational settings, comprises the subjective, motivational features of academic persistence, namely commitment to the educational institution and to graduating. This motivational dimension is less salient in the other mentioned models and scales, which focus mainly on effort, tenacity or perseverance. The efforts that students invest in academic preparation in order to respect deadlines, participate in school activities and complete required assignments are also important and are depicted by the school conscientiousness dimension. The persistence score obtained with the instrument created by these authors predicted, in addition to the pre-enrollment performance scores, the correct classification of students at risk. Moreover, its multidimensionality is an argument in favor of its selection, since Davidson and colleagues (2009) indicate that some facets may be better predictors of school completion in some institutions, while other might be more important in other settings.

As we attempt to compare the educational strategies and characteristics of the learners in two distinct educational systems, this quality of the model could provide additional benefits.

1.2. School dropout and intention to persist

The reverse of academic persistence is school dropout, which results, according to some authors, from a process of continuous disengagement (Finn, 1989; Newmann, Wehlage & Lamborn, 1992; Rumberger, 2000). Studies that investigate who drops out and why try to examine the responsible factors on several levels. We will mention some of the responsible factors, and then move to the more subjective factors inside the classroom and pertaining to the learner, with a special focus on those that tend to foster academic motivation and achievement.

1.2.1. Dropout and push-out

Some authors distinguish between two facets of the phenomenon of early school leaving, separating between drop-out and push-out (e.g. Zidărescu, 2009). Drop-out covers the cases in which the individual factors that lead to the decision of leaving school have the major role, such as nationality (Blue & Cook, 2004), learning difficulties and special education needs (Ingrum, 2006), low identification with school and feeling of belonging (Finn, 1989), aggressiveness (Crain-Dorough, 2003), substance abuse (Freudenberg & Ruglis, 2007), and truancy and discipline problems (Rumberger, 2000). Personal investment in school-related activities measured as absenteeism rates and records of grade retention (Lee & Burkam, 1992) and performance measured as teacher-assigned grades (Bowers, 2010) are other identified individual factors of dropout.

In the case of push-out, the school-related factors are seen as mainly responsible for the phenomenon: low level of teacher commitment or attendance (Crain-Dorough, 2003; Sabates, Akyeampong, Westbrook & Hunt, 2010; Surdu, 2011); teaching staff turnover (Voicu, 2010); inadequate curricula and instructional practices, coupled with lack of support in transitional stages from one level to another (Blue & Cook, 2004; Lee & Burkam, 2001); poor school practices and policies (Rumberger, 2000); student perception of the inadequate support received for solving school-related problems (Ajaja, 2012); deficient evaluation systems (Govindaraju & Venkatesan, 2010); and rates of teasing and bullying victimization (Cornell, Gregory, Huang & Fan, 2013). Structural and organizational problems are also potential factors in push-out, namely high student-teacher ratios (Andrei, Profiroiu, Iacob & Ileanu, 2011). Large institutions with over 1500 students (Lee & Bukram, 2001) and bureaucratized institutions that use rigid structures, policies and

practices that alienate students (Angus & Mirel, 1999) seem also to be conducive to push-out. Some of these variables are alterable and can be subject to the influence of teachers; thus, we will mainly approach the ones that affect students' connection to the school environment, the degree of enthusiasm, participation, and ultimately persistence and performance.

Qualitative approaches focusing on student subjective experience reveal that negative classroom experiences with explicit and implicit exclusion lead to feelings of inferiority and resentment that were followed by an increase in wellbeing after the decision to leave school (Lee & Breen, 2007). Bridgeland, DiIulio, and Morison (2006) also found, using mainly qualitative methods on participants that already left their school institutions, that school-related variables such as lack of belongingness or connection, boredom, or a lack of firm policies, coupled with reduced parental support and involvement, are among the most mentioned factors leading to the decision to quit school. For a review of push-out and dropout factors, see Lamb & Markussen (2011), and for a review of existing interventions see Lehr, Hanson, Sinclair & Christenson (2003). However, as Rumberger (2000) pointed out, it is difficult to discern and separate the dropout and push-out factors in understanding how students disengage gradually and, in some cases, reach the conclusion to resume school.

Regarding the design of interventions for dropout prevention, Lehr and colleagues (2003) recommend addressing the following alterable aspects: enhancing interpersonal adjustment with individual and group counseling and creating caring environments, supplementary tutoring and mentoring to sustain academic performance, and addressing attendance behaviors and the attitudes towards school and education. Schargel & Smink (2001) also mentioned family involvement, alternative schooling and afterschool scaffolding programs. Analyzing the perceptions of the variables that are considered by parents and teaching staff as efficient in preventing dropout, Majzub & Rais (2010, p. 1037) listed the following academic, socio-emotional and contextual factors: engagement with parents, developing safe and stimulating learning environments, early diagnosis and detection of warning signs for risk, building enthusiasm and a sense of relevance for academic work, providing challenging curriculum, and setting a class size that allows personalized learning and flexible schedules.

1.3. Personal factors that sustain academic engagement and persistence

Some theoretical models of academic persistence, such as those from the social-cognitive perspective, place high importance on individual beliefs and confidence in one's ability to carry on academic tasks. For instance, Bandura (1977) and Harter (1978) build on the idea that confidence (*self-efficacy* in the case of the first author and *perceived competence* in the writing of the second) is a quality that can be fostered through teaching.

According to the confidence models, while engaged in a process that is mostly characterized by challenge and uncertainty, learners must acquire the conviction that they can execute certain behaviors well. Consequently, they will choose to enact those behaviors and will invest more effort and time (persistence) in them. The focus is on building the skills for self-regulated learning, translated into positively perceived competence and challenging goal-setting, which are crucial for acquiring new skills and dealing with complex information. Domain specific competence beliefs predict the effort invested in academic activities and achievement (Trautwein, Ludtke, Roberts, Schnyder & Niggli, 2009).

1.3.1. Perceived competence and self-efficacy

Efficacy affects academic attainment both directly and indirectly, the latter by affecting goal setting, as Zimmerman, Bandura & Martinez-Pons (1998) point out: the higher the confidence, the higher the goals being set. Researchers have been mainly interested in instructional practices as behavioral and educational interventions that help build and maintain healthy levels of confidence in students, especially in underachiever groups. However, high levels of confidence in the absence of critical thinking and study skills to evaluate the knowledge and areas that need to be further developed can lead to a type of overestimation of performance that is detrimental to poor students. This can be caused, as some authors purported, due to the lack of acceptance of negative feedback (Nease, Mudgett, and Quiñones, 1999).

Related to competence beliefs that usually refer to the self, student motivation is also affected by the presence of growth mindset. Unlike self-efficacy beliefs, which refer to the conviction that one can learn and perform, growth mindset refers to considering abilities as malleable and requiring effort to be gained (Blackwell, Trzesniewski & Dweck, 2007). In contrast, individuals with fixed mindsets consider that academic abilities are unalterable properties that one is born with and either possesses or not. For those who hold fixed mindsets, also referred to as

entity theorists, effort is seen as an indicator of lack of ability; thus they are more likely than those with growth mindsets to disengage when the task is difficult (Dweck, 1996, Dweck, Chiu, & Hong, 1995).

1.3.2. Student engagement

An equally useful concept popular in the area of study on academic motivation that is closely connected in many aspects to the construct of persistence is *student engagement* (Martin, 2007), defined as the learner's affective experience, the cognitive and behavioral investment directed towards learning and cognitive effort invested in academic pursuits. Engagement is often shown to be related to academic performance and often shapes classroom behaviors (Greenwood, Horton & Utley, 2002). Further, institutional characteristics and behaviors that promote engagement lead to persistence (Braxton, Bray, & Berger, 2000). Academic engagement, or the effort invested in acquiring skills and knowledge, is also among the main predictors of school completion (Fredricks, Blumenfeld, & Paris, 2004; Rumberger & Larson, 1998). Not surprisingly, this is one of the most important targeted aspects in intervention designed to prevent dropout (Christenson et al., 2008)--interventions including mentoring, building social-skills and positive self-esteem (Reschly & Christenson, 2006).

1.3.3. Intrinsic motivation and autonomy

Teachers are asked to foster a supportive classroom environment that builds confidence and engagement, but at the same time, they have to look for ways and occasions that allow students to build autonomy and curiosity. A popular concept is intrinsic motivation (Deci & Ryan, 1985), which emphasizes the tendency of learners to seek challenge and enhance their self-determination. Extrinsic motivation is also important, but can, under certain circumstances, undermine intrinsic motivation. In what regards extrinsic motivation, Deci & Ryan (1985) distinguish between task completion-contingent rewards, which require completion of the task, and engagement-contingent rewards, which do not; the latter are more likely than the former to interfere with intrinsic motivation. More recently, they showed that expected tangible rewards (for task completion) are the most detrimental (Deci, Koestner & Ryan, 2001). In conclusion, in-class experiences that foster a tendency for autonomous inquiry, without special emphasis on grades, should be most supportive of engagement and, thus, of persistence. This means rewarding students for their efforts and

involvement, not their accomplishment. The focus is now placed on the process instead of its end goal, and challenge becomes intrinsically motivating and failure an occasion for learning. Beyond its role in motivation, as we mentioned in the previous section, class experience also seems to be an important predictor of intention to drop out of highschool (Vitaro, Laroque, Janosz & Tremblay, 2001).

Other models expand on individual characteristics such as confidence as mediators of the effect of instructional approaches on persistence. Researchers preferring this approach seek the qualities and environmental factors that can be fostered or altered to build persistence. For instance, some models insist on the idea of empowerment of the learner and shared decision making on persistence (Locke, Shaw, Saari & Latham, 1981).

Autonomy is another related and crucial factor, as people are shown to persist more when trying to attain goals towards which they feel they can behave autonomously when they are cognitively involved and motivated at an intrinsic level and identify with the goals and the values that are attached to their endeavors (Deci & Ryan, 1985, 1987; Houser-Marko & Sheldon, 2006; Reeve, Ryan, Deci & Jang, 2007). Project-based activities in which students are empowered to decide on the topics and approach in such a way that matches their skills and interests seem to be a great way to build persistence. Also, adopting a teaching style that fosters applicability, interestingness and relevance of the material leads to autonomy-supportive classroom environments, in which respect for the student is promoted, while criticism and controlling language are avoided (Assor & Kaplan, 2001; Belmont, Skinner, Wellborn & Connell, 1992).

1.3.4. Academic resilience

A fourth crucial factor that functions as a protective personal quality for students is *academic resilience*, as self-doubt, poor performance and dropout – the other side of persistence – are mainly caused by encounters with excessive pressure and stressors. It is defined as the ability to manage setbacks, challenges and other subjective and objective obstacles in school (Fallon, 2010), or a capacity that enables some students to deal with conditions that put them at risk for dropout and allows them to maintain high levels of motivation and achievement despite the adversities (Alva, 1991;Sinay, 2009). For these resilient students who invest and perform despite difficulties, obstacles and setbacks are inevitable parts of the road to success.

Alva (1991) prefers the phrase "academic invulnerability" to express the hedging role of this psychological quality in encountering stressors. Studies show that this quality is not a fixed attribute, and there are ways to foster resilience through interventions (Jimerson, Reschly & Hess, 2008; Rak & Patterson, 1997). In addition to academic self-efficacy, choice of academic goals and confidence are also related to persistence in college students, according to meta-analytical studies (Brown et al, 2008; Robbins et al., 2004).

1.3.5. Tenacity, perseverance and grit

Finally, since these are the factors that are expected to mediate academic persistence to a great extent, we will present the mindsets, traits and skills that describe what keeps people motivated to invest in short- and long-term goals despite obstacles, failure, and repeated setbacks. Effortful self-control, measured as the time spent avoiding temptation, predicts later life test scores, as well as health and professional outcomes (Mischel, 2014). Conscientiousness is another predictor of effort across disciplines and achievement, as evidenced by GPA (De Raad & Schouwenburg, 1996; Noftl e& Robins, 2007; Trautwein et al., 2009). As Duckworth & Seligman (2005) note, failure to exercise self-discipline leads to underachievement more than other factors do, including intellectual quotient.

This last quality in our list represents the result of 40 years of research on factors of academic success, namely grit, defined as "perseverance and passion for long-term goals" that supports students' ability to overcome obstacles (Duckworth et al, 2007, p. 1087). This personality disposition that unites an orientation towards overcoming obstacles and a growth mindset is malleable over time (Hanford, 2012). The dimension has become increasingly popular and research has already shown its multiple benefits on school performance (Dweck, Walton & Cohen, 2011; Farrington et al., 2012) and ignited attempts at designing interventions. Farrington and colleagues (2012) talk about academic perseverance as the ability to complete school tasks in a timely and thorough way by confronting difficulties, obstacles, distractions, and requires self-discipline and delay of gratification. Other authors replace the term of grit or persistence with academic tenacity (Dweck et al., 2011) and refer to it in terms of mindsets and skills.

An Australian Department of Education report (2013) mentions the following aspects of the learning environment that promote perseverance, tenacity and grit: the existence of the opportunity to make worthy long-term, higher order goals, and the existence of supportive

contextual factors to help the pursuit of these goals. The first strategy refers to setting optimal challenges and allowing students to align their learning goals with their interests. Worthy goals reflect personal interests and values, and are set in an optimal challenge zone that doesn't lead to either boredom or extreme anxiety, as research on the concept of flow indicates (Csikszentmihalyi, 1990). Supportive environments seem to be indispensable in mitigating the reactions in the face of adversity and obstacles, whether they involve conceptual complexity, boredom, limited resources or environmental stressors in students' socioeconomic background (Bean & Eaton, 2001/2002).

1.4. Integrative and ecological models of school motivation

A special kind of models are those attempting to integrate the vast array of factors that contribute to student persistence, including individual, academic, institutional and other wider social context risk and protective factors. Noting this interdependency, Viau (1997) defines school motivation as a dynamic state that relies on students' perceptions of their abilities and of the academic environment in which they are integrated. These beliefs and perceptions regulate perseverance during goal attainment. Among this type of model, the most notable and developed are Tinto's (1975, 1982) Student Integration Model(SIM) and Bean's (1980, 1982) Student Attrition Model(SAM), which extensively document factors leading to student dropout or continuation and the decision to continue studies at a postsecondary level.

Ecological models, such as the one proposed by Bronfenbrenner (1979), have the ambition to build exhaustive inventories of contextual influences on dropout, beginning with the microsystem (social identities of the individual), and continuing with the mesosystem (family, peers, school), exosystem, comprising the influences of the extended community, and finishing with the discussion on macrosystem, that include the norms and cultural values that affect the individual). Integrating all the concurring factors has several important consequences, such as the decrease in the focus on individual qualities such as perseverance, will-power, self-control or grit in explaining academic persistence and success. Some authors condemn the persistence narrative as an attempt of diverting the attention away from more structural, organizational problems that lead to school maladjustment (Kohn, 2014; Socol, 2014, Strauss, 2014). Critics of this approach also point to the practical consequences of perpetuating an explanatory view of school persistence based mainly on grit and related concepts, as the practices might have non-productive or even

counterproductive consequences on the student, as they put pressure on already disadvantaged students (Kohn, 2014). The discussion about misuse of non-cognitive factors that facilitate goal-directed efforts for student and teacher evaluation has become more salient recently. The major reason for this salience is the fact that the grit and persistence narratives have been accused of promoting a set of prescriptions that define the Protestant work ethic, namely the duty to strengthen willpower, delay gratification and resist temptation (Strauss, 2014).

SIM (Tinto, 1975, 1982) also states that dropout is mainly the result of poor social integration and poor adaptation to academic demands. It classifies four categories of factors that interact to lead to persistence and that facilitate the transition from some formative contexts to others: first, students' characteristics that exist before formal education, including family background, socio-demographic traits and psychological dispositions, second, the characteristics of the educational institution, third, student's academic integration and fourth, student's social integration. Terenzini & Reason (2005) also condemn the narrow focus of studies in the area and claim that concentrating on the changes on isolated sets of factors does not allow measuring what seems to affect student outcomes, namely the interconnected factor variations. Since organizational factors such as culture and climate are specific to institutions, they recommend inclusion of multiple types of schools.

1.4.1. School factors that promote persistence

Among these organizational factors, the literature on persistence and achievement in secondary and postsecondary studies mention: the school's budgetary allocation to student services and low student-teacher ratio (Chen, 2012); school quality (Bound, Lovenheim & Turner, 2010; Pascarella & Terenzini, 2005); perceived institutional support for all needs of the students, including social and emotional (LanRong & Preissle, 2009); teachers that act like mentors who offer support and encouragement (Hu & Ma, 2010); active teaching pedagogies (Braxton, Bray & Berger, 2000); promoting civic engagement, curiosity, initiative and deep action learning (Allen, 2011); and fostering a culture of collaboration, open dialogue, teamwork and constructive debate (AlKandari, 2012). Teaching study skills and metacognitive abilities explicitly helps students outperform other students taking more traditional approaches of the same scientific subjects (White & Fredericksen, 1998).

Moreover, making students aware of the relationship between their interests and values and what they are learning leads to increased interest and higher grades (Hulleman & Harackiewicz, 2009). Choice of task, involvement and performance are improved when working to acquire knowledge and skills that are viewed as important and relevant (Eccles et al., 1983; McKnight & Kashdan, 2009). Thus, providing relevant knowledge and fostering environments that promote openness and initiative in learning as well as preparedness for the real world seem to be key elements in maintaining engagement.

Analyzing the qualities of effective institutional programs and strategies, Rumberger (2006) cites the following strategies that influence beliefs, values and behaviors that maintain academic motivation and prevent dropout: cultivating a nonthreatening learning environment; attraction and retention of motivated, caring teaching staff that identifies with the mission of helping students achieve; school cultures that promote embracing uncertainty and risk; self-regulated learning and decision making; collegiality and the composition of the student body; and small class sizes.

1.4.2. Particularities of the IB programme

Many of these factors resemble the strategies and practices the IB Diploma Programme uses to impact the learner's conative characteristics, to directly influence their intentions and intensity of engagement in assuming responsibilities and attaining tasks (Bullock, 2011). The IB programme intends to actively promote students' identification with the stated values. This allows an intensive communication between three programme features: theory of knowledge; creativity, action, service; and the extended essay. The cornerstone of this system is based on the realities of the dynamics of the young learners. The students are required to choose personal goals based on the social conditions in which they live, their personal life perspectives (which are shaped through education but also through everyday experiences) and the projected final result.

Fostering high levels of school engagement requires the continual stimulation of all types of student motivation, which is achieved through maintaining an active process of learning that is mainly based on trust, competence and values that promote well-informed decisions regarding their future academic and vocational track.

2. Methods

2.1. Research questions

The specific research questions addressed by the project are:

RQ1. Which components of the IB Diploma Programme support academic persistence?

RQ2. What are the individual skills or personality traits that contribute to academic persistence?

RQ3. How do the components of the IB DP influence these traits contributing to academic persistence?

RQ4. What are the relationships between (a) the components of the IB DP, (b) the individual traits, (c) academic persistence and (d) the outcomes of academic persistence?

RQ5. What are the differences between IB students and equivalent non-IB students in regards to academic persistence and its associated traits, on one hand, and their relationships with the relevant educational outcomes, on the other?

We developed a three-phase empirical study (two qualitative and one quantitative) in order to answer these research questions. The first two phases consisted of qualitative studies (one on the relevant IB documents and one using focus groups with IB DP teachers), their results being used in the process of building the instruments distributed in the final research stage. In what follows, we present the research design of each of these phases of empirical research, as well as the corresponding research questions, methodology, and results.

2.2. Phase 1: Qualitative investigation 1

The first investigation was performed on a set of IB official documents, aiming to find answers to the first three research questions in the official and public guidelines of the IB Diploma Programme. Specifically, each of the first research questions stated above was operationalized through a layer of analysis of the IB documents:

a) the mechanisms, in terms of instructional strategies, pedagogical content and management practices, through which the IB DP purports to foster students' academic persistence – corresponding to RQ1.

b) the personality traits that the IB DP aims to develop in the students , especially those that might contribute to their academic persistence – corresponding to RQ2.

c) the mechanisms (instructional strategies, pedagogic content and management practices) that the IB DP uses in an effort to foster these traits in students – corresponding to RQ3.

2.2.1. Data collection

The IB documents analyzed in the first study were:

- International Baccalaureate Organisation (2004/2010). *Diploma Programme assessment: Principles and practice*. Cardiff: Peterson House.
- International Baccalaureate Organisation (2009). *The Diploma Programme: From principles into practice*. Cardiff: Peterson House.
- International Baccalaureate Organisation(2011). *General regulations: Diploma Programme*. Cardiff: Peterson House.
- International Baccalaureate Organisation (2014). *Handbook of procedures for the Diploma Programme 2014*. Cardiff: Peterson House.
- International Baccalaureate Organisation(2012). *What is an IB education?* Cardiff: Peterson House.
- International Baccalaureate Organisation(2013). *IB learner profile.*

2.2.2. Data analysis

Our approach in data analysis was thematic analysis (Miles & Huberman, 1994; Gibbs, 2002). First, we selected from the IB documents the text sections relevant for our aim. Then, we performed a thematic analysis, by first distributing the material among the six team members. Each elaborated a coding scheme to classify the relevant parts of the IB documents into distinct categories on the three layers mentioned above (corresponding to the first three research questions) and previously decided upon. The set of codes that emerged in the initial phase were then discussed and synthesized into an initial collective coding scheme. Each coder then reanalyzed a part of their initial material through this collective scheme. The final version of the collective coding scheme was decided upon in another session, in which the six coders proposed, discussed and agreed upon its modifications. The final coding scheme was then applied individually by each coder on his/her part of the material, and the resulting classifications (the associations between each code and the corresponding textual segments) were merged. Finally, all coders checked the overall classification, discussed and decided upon its final version.

2.2.3. Results

On the first layer, the educational mechanisms purported to foster academic persistence revealed by our analysis of the IB documents are:

a. *clear framework*, as emphasized by the following excerpts (among others): "Students learn best when values and expectations are explicit" and "they understand how judgments about learning are made, and how to provide evidence of their learning" (IBO, 2009, p. 43-44); "Students need to understand what the assessment expectations, standards and practices are and these should all be introduced early in the course and be the focus of class and homework activities" (IBO, 2009, p. 45).

b. *teachers' involvement and modeling*: "Adults in the school—including the school leadership, staff and even parents--need to model the beliefs, values and behavior indicated in the learner profile" (IBO, 2009, p. 31); "Teachers should use a variety of different approaches at different times, employing a mixture of whole-class, group and individual activities that are representative of the learner profile (IBO, 2009, p. 37); "Adults… are expected to… become involved with school activities beyond the classroom" (IBO, 2009, p. 37).

c. *focusing on the student's psychological needs*, in order to ensure the proper conditions for their development, such as their well-being: "Along with cognitive development, IB programmes address students' social, emotional and physical well-being" (IBO, 2012, p. 3), avoiding burnout; "Appropriate internal assessment timelines are a very useful instrument in helping students and teachers realistically plan their work in manageable loads"; "Well-designed timelines reduce stress on students" (IBO, 2009, p. 27-28), creating a positive climate; "Adults… are expected to care about the atmosphere and climate of learning created in the classrooms and corridors" (IBO, 2009, p. 31).

d. *individualization*: "Students learn best when diverse learning styles are understood and accommodated" (IBO, 2009, p. 44); "Students of all ages come to school with combinations of unique and shared patterns of values, knowledge and experience of the world and their place in it" (IBO, 2012, p. 3); "Teachers plan and prepare their own course of instruction; […] teachers are the best-placed professionals to know their own students and understand the context in which they

are teaching. Instruction also needs to be differentiated, engaging with and challenging each learner's current level of understanding" (IBO, 2009, p. 35).

e. *independent work style*: "Students learn best when … they are encouraged in everything they do in school to become autonomous lifelong learners"; "IB assessments are designed to reward evidence of independent student thinking leading to considered individual responses" (IBO, 2009, p. 37).

On the second layer, the traits supporting academic performance that our analysis of the IB documents revealed as relevant in the IB environment are:

a. *ambition (academic goal setting and pursuit)*: "IB programmes challenge students to excel not only in their studies but also in their personal growth" (IBO, 2012, p. 10); "teachers encourage peak performance, not just average ones, and these are publicly recognized"; "IB programmes aim to increase access to the curriculum and engagement in learning for all students" (IBO, 2012, p. 3).

b. *autonomy and academic purposes related to self-development* : "They acquire the skills necessary to conduct inquiry and research and show independence in learning" (IBO, 2009, p. 4); "The core competencies include… independent study skills" (IBO, 2009, p. 16).

c. *self-confidence*: "In order to become independent learners, students need to develop powers of reflection, self-confidence and self-awareness" (IBO, 2009, p. 37); "Opportunities outside the classroom to help students reinforce their skills and knowledge in specific subjects, or in reading and writing, can help students gain the confidence they need to access the Diploma Programme." (IBO, 2009, p. 23);

d. *the ability to work collaboratively in groups*: "They work effectively and willingly in collaboration with others" (IBO, 2009, p. 4); "Students learn best when they can learn collaboratively" (IBO, 2009, p. 38).

e. *openness towards other cultures*: "The Diploma Programme prepares students for university and encourages them to develop the ability to communicate with and understand people from other countries and cultures" (IBO, 2014, p. 9); "To increase intercultural understanding, IB programmes foster learning how to appreciate critically many beliefs, values, experiences and ways of knowing" (IBO, 2012, p. 6).

f. *commitment to values*: “Our students must develop the necessary skills, habits of mind and the moral and ethical values to be able to understand and manage the interconnectivity and complexity of the modern world” (IBO, 2009, p. 30); “IB World Schools value action that encompasses a concern for integrity and honesty, as well as a strong sense of fairness that respects the dignity of individuals and groups” (IBO, 2012, p. 4).

g. *critical thinking*: “We use critical and creative thinking skills to analyze and take responsible action on complex problems” (IBO, 2012, p. V); “Reflective thinkers must become critically aware of their evidence, methods and conclusions” (IBO, 2012, p. V); “Students are also expected to think for themselves so that they can approach complex problems and apply their knowledge and skills critically” (IBO, 2009, p. 37).

h. *cultural identity*: “IB programmes promote the development of schools that: […] encourage the creation of rich personal and cultural identities” (IBO, 2012, p. 3); “The Diploma Programme prepares students for university and encourages them to […] develop a strong sense of their own identity and culture” (IBO, 2014, p. 9).

i. *interdisciplinary approach*: “Students are expected to make connections between different academic disciplines and not to study subjects in isolation from each other” (IBO, 2009, p. 22); “An IB education provides opportunities to develop both disciplinary and interdisciplinary understanding” (IBO, 2012, p. 8); “Concurrency of learning is expected in the Diploma Programme as it provides one important means of supporting interdisciplinary learning” (IBO, 2009, p. 6).

j. *creativity*: “An IB education fosters creativity and imagination” (IBO, 2012, p. 5); “Three forces shaped the initial development of the Diploma Programme. These were: […] pedagogical - the promotion of critical and creative thinking skills…” (IBO, 2009, p. 35).

k. *metacognitive skills*: “Students learn best when… they become aware of and understand how they learn; […] metacognition, structured inquiry and critical thinking are central to teaching in the school” (IBO, 2009, p. 38); “IB programmes emphasize learning how to learn” (IBO, 2012, p. 3); “This metacognitive approach to learning helps students develop the higher-order thinking strategies needed to become lifelong independent learners” (IBO, 2009, p. 8).

l. *epistemic curiosity*: “Students learn best when…there is a culture of curiosity at the school” (IBO, 2009, p. 38); “We nurture our curiosity, developing skills for inquiry and research”

(IBO, 2012, p. V); “students’ own curiosity provides the most effective provocation for learning that is engaging, relevant, challenging and significant” (IBO, 2012, p. 4).

m. *in-depth understanding*: “Each academic discipline provides its own methodological framework that students learn to understand and use. This understanding is essential in order to provide a deep appreciation of the nature of an academic discipline as well as a solid foundation for future university-level work” (IBO, 2009, p. 6); “The emphasis is on engaging and challenging the learner’s existing mental models in order to develop a greater depth of understanding and to improve performance” (IBO, 2009, p. 37).

2.3. Phase 2: Qualitative investigation 2

2.3.1. Aims and data collection

In the second qualitative research phase, we conducted three focus groups with teachers in the IB DP programme in December 2014. Three samples of 10 teachers each from three IB schools in Romania participated in the focus groups. Similar to the first study, the second aimed to provide answers to the first three research questions, this time from the perspective of the IB DP teachers, who are expected to put into practice the official guidelines of the DP. Consequently, the focus group interview guide (presented in the Appendix) consisted of questions aiming at the same three layers of investigation stated above. Each focus group took approximately one hour.

2.3.2. Data analysis

Analysis of the focus group data was similar to the one described above in analyzing the IB documents, with one major difference: after fully transcribing all focus group discussions, the textual material was not split among the coders. Instead, each team member analyzed the whole transcript and developed his or her own coding scheme organized by the same three layers as in the previous analysis. Then, a collective coding scheme was decided upon and applied on the whole focus group material (Miles & Huberman, 1994; Gibbs, 2002). As before, in the end all coders checked the overall classification, discussed and decided upon its final version.

2.3.3. Results

On the first layer, the educational strategies fostering academic persistence derived from the analysis of the focus groups data are presented as follows. Participants are referred to by the

letter "P" followed by two numbers: the first showing the school affiliation and the second, participant's position within the group.

a. *Applicability of knowledge*: "In the IB evaluation, the children must apply what they learn in a practical setting what they had learnt in theory" (P2-7); "While in the Romanian system you are trained to passively receive certain things, that you take as such and learn, the IB student discovers on his own the respective thing; and in the end in life you have to manage with the things you can use, not with what you read in the books" (P2-8); "Even in math we use a type of problem that is a real life situation, and they come to see that you can do something with math, we don't learn it just because we have to" (P1-7).

b. *Clear framework*: "But I think it is also that IB actually sets a framework for kids, that they know what they need to do to be successful" (P3-5); "If things are harder, but they know how to get to it, they see them on a trajectory, to be able to improve them and to get to it, that is when persistence kicks in" (P3-4); "The standards are explained at the beginning of the year. That is the role of the coordinator, to set the standard at the beginning of the year, so they know what to do" (P3-1).

c. *Independent work style*: "[Non-IB] students feel like--what do you want? Just tell me what you need me to do and I will do it" (P3-6); "In the Romanian system they are used to be fed with information, while here it's more about their own effort and research" (P2-3); "Children [in IB schools] must come up with an idea for an experiment that they have to put to work and test it"… They gather information from the internet, they make connections and then they ask themselves: could I do this?" (P2-5).

d. *Teachers' ' involvement*: "They [IB students] spend a lot of time with us, more than with their parents. I spend 8 hours in the school, their parents see them in the evenings, after 9, maybe" (P3-7); "I think that when the teacher is involved, it changes the whole place" (P2-3); "Another difference is represented by the teachers – not everybody can teach in the IB… I've learned a lot since I came in the school. It was very challenging. A teacher's work in the first years is enormous, day and night" (P3-1).

e. *Focusing on the student*: "At first you play the role of a guide, you have to stand by his side, but in the end he becomes capable of managing on his own. This system [IB] puts in the center the student, not the teacher" (P3-2); "We are here to help them to walk on their own" (P3-6).

f. *Intense collaboration and partnership with the teachers*: "[In the IB system] One of the factors supporting academic persistence, especially in the second year, when they have to do those papers, is teachers' support" (P3-2); "It's a very close relationship; they come, ask for our help, we make up time to assist them" (P2-5); "He [the IB student] trusts you; then, he communicates very easily, you stimulate him at the cognitive level" (P3-2); "If you fail, it's not the end of the world; you have the power to repair the situation. The teacher is not God" (P3-8).

g. *Students class size*: "[In the IB system] Having a lot more time one-on-one… More opportunity for feedback, individually, from teacher" (P3-9); "working with small groups, this allows you to work individually with each student; you have to pay attention to each student… Sometimes you spend an hour with him. You stay just by his side, you feed his universe" (P3-3).

h. *Updated curricula*: "The information is very updated [In the IB system], the content of the curriculum is permanently updated… so you are permanently aware of what happened 20 years ago and what's happening right now" (P1-3); "When I was teaching in the Romanian system, I was teaching the same information that I learned when I was in high school. While in the IB, compared to what I was teaching 5 years ago, the studies in this year's handbook are different, I can't find studies done before 2005, it is updated" (P1-6).

i. *Comprehensive curricula*: "The 6 groups of disciplines cover everything you would want to pursue after high school" (P2-9); "you can make a choice from each group so that you would reach your goal, your ideal" (P2-1); "there are important subjects that are not studied in the Romanian system… Very few of the Romanian students have the chance to study such disciplines" (P2-8).

j. *Curricula focused on the real, practical needs of students*: "I think we all [in the IB system] try to keep materials fairly relevant for the needs of our students, for what students are looking for" (P3-8); "We, as a school, try to improve the set of disciplines that we offer… For instance, there are generations that tend to go towards a specific topic--business or computer science, for instance. Then, you as an institution and as a business have to adapt to these requests" (P2-6); "The IB students, when they choose these disciplines, they don't necessarily think about what they might like, but especially about what will be useful for them in the future" (P2-4).

This set of ten educational mechanisms includes and expands upon the one resulting from the analysis of the IB documents in the first research phase, listed above. In the development of

the questionnaire to be administered in the second research phase (described in the following section), we addressed each of these ten educational mechanisms.

On the second layer, we analyzed the focus group data to identify the traits supporting academic performance. The analysis of the focus group data revealed the following traits relevant to the IB environment:

a. *Ambition (academic goal setting and pursuit)*: "The most persistent students are the ones that have a clear vision about what they are going to do post-secondary--education or even career" (P3-4); "I have conversations with those students that are ambitious, their scores mean something, they want to go to a particular university then they will persist in training themselves to do the exams" (P3-6); "The kids know that there are two years until they are off to college and that is a goal that is within reach and working for something very specific. It is the final part of the race, so it matters to them, they can see the relevance" (P3-2).

b. *academic purposes related to self-development*: "They are very focused right now, there's a strong desire for self-improvement" (P2-8); "In the IB school they are required to be unique, which is very beautiful, but also very hard, so that all is left for them is to continuously develop themselves" (P2-6).

c. *Critical thinking*: "The persistent student is… Inquiring, open minded, capable and enthusiastic about objective critical thinking. Reading more than one book on one subject, comparing multiple sources of information" (P2-1); "The teacher teaches him how to think and, moreover, he asks him to think on his own, offering him certain materials. Thus, you create a feeling that he is on his own, you are his guide that assists him, but in the end he can do this on his own" (P1-7); "They come up with original solutions, think outside the box" (P2-6).

d. *Self-confidence*: "The kids who have a certain level of confidence and an understanding of themselves seem to have that persistence" (P3-2); "Coming from an IB background, me and my wife have both noticed certain character traits specific to the IB programme --one would be confidence, one would be critical thinking, and I do not know if those are product of being told the IB learner profile. When I would walk down the halls of the elementary schools I find that a student is not afraid to talk to me--they say "hello!" to me before I do to them. This is confidence, the power to engage, even with a stranger, an adult. High school [IB] student are definitely not afraid to engage in critiquing a foreign policy or any type of policies that are implemented in the school. And they can argue that in a very articulate and intelligent way" (P3-10).

e. *Self-discipline and restraint*: “You have to be conscientious from the standpoint of doing your tasks, even those that are not very pleasant for you” (P2-2); “[the persistent student] doesn’t look for excuses, does not hide, he just controls himself and does what it needs to be done” (P3-5); “[the IB students] have to study without being controlled by somebody else, they have to become self-disciplined” (P2-7).

f. *Academic resilience*: “Sometimes, managing the academic difficulties of work. I think it’s the intensity that burdens students… In terms of persistence students – the successful are those that can power again, and the next day and next week” (P3-6); “If they don’t know how to manage their intellectual effort and their emotions, it becomes very hard” (P1-5); “Sometimes the pressure is very high… some students panic, get the feeling that they don’t know enough and fail, because they think too much about the grade and not about what they should do, how they should motivate themselves in order to get a high grade” (P2-5).

g. *Openness towards other points of view*: “Many times they have to accept the other’s point of view, even though it differs from his own, even if it contradicts his opinion on the topic” (P2-9); “Persistent students… have to be curious, involved and open in his ideas” (P2-9).

h. *Epistemic curiosity:* “The passion is there because you want to know more about these people, and how they lived and what was going on, something, and that is what persistence and curiosity, curiosity has to have a ground” (P3-2); “A student with high persistence has curiosity, enthusiasm in doing his tasks, he has to like it, to research on his own certain things” (P2-4); “He has to be interested in what he does” (P2-1).

i. *Time management skills*: “Highly persistent students… are very organized, they manage their time very well, they don’t waste their time” (P1-7); “He doesn’t lose time, doesn’t look for excuses to stall” (P1-4); “He is used to respecting deadlines” (P2-3).

j. *In-depth understanding*: “Understanding that there may not be a right answer, there may not be a correct answer. Understanding and not becoming anxious when there is not a correct answer that takes them out of their comfort zone”(P2-10); “And an understanding of themselves seem to have that persistence even if they do not necessarily know what the final goal is” (P3-6).

k. *Intrinsic motivation*: “Persistent students are… those who read without being required to read, who know the latest research in the field. They study even when nobody asks them to study and nobody checks whether they studied” (P1-6); “He is the student that is always ready to engage and even comes up with new ideas for activities” (P2-5).

l. *Interdisciplinary approach*: "Application of skills and the transferrable skills, you see kids when they learn something in my class then they transfer it over to geography" (P3-4); "they apply very well the elements, the information from various fields, they make connections… they are very versatile with what they do with their knowledge" (P1-7).

m. *Vision about their role in the society:* "Persistent students… are involved not only in the activities of the academic community, but in volunteering as well. They understand that society nowadays expects not only informed citizens, but also citizens that assume a role in society and wish to help make things better" (P1-7); "They realize that the world around them needs people with principles, that give without expecting something in return" (P2-2).

n. *Openness towards other cultures:* "It is about being international, more or less, about being aware, receptive of the other cultures, being diverse" (P3-8); "you have to accept those around you just the way they are… and to try to understand different cultures, without being limited by your own culture or your own beliefs" (P2-5).

o. *Integrity*: "They are expected to do certain things for themselves and they cannot pretend. It is an honest thing to do, being asked to do, to provide the evidence they need to back up what their conclusions are on any particular subject. So I think it reinforces themselves in terms of honesty" (P2-1); "Persistence is about… how to develop a human being into a responsible human being" (P3-3).

There is a certain degree of overlap on this layer between the results of the other two phases of research, but there are also traits that are highlighted by only one data source (IB documents or IB teachers). In the final research phase, we selected a set of six traits to be addressed by the questionnaire administered on the students, those that our previous research phases and the existing theoretical accounts in the area describe as having the strongest relationships with academic persistence. Four of these traits were revealed as relevant both in the IB documents and in the IB teachers' perspective: *ambition (academic goal setting and pursuit), academic purposes related to self-development, critical thinking,* and *self-confidence*. The other two are seen less frequently in the IB documents, but they are regarded as highly important for students' academic persistence by the IB teachers, namely *self-discipline* and *academic resilience*.

The results of both research phases also reveal educational strategies used by the IB schools in order to foster each of these six traits. Consequently, we developed the questionnaire items

concerning this third layer of investigation - students' perception of the degree in which their school helps them develop these traits – based on the results of the qualitative analysis of this data.

2.4. Phase 3: Quantitative investigation

2.4.1. Aims and research design

The third research phase entailed the administration of a questionnaire to a sample of IB students, both from Romania and from other Eastern and Central European countries, and to a sample of equivalent non-IB students in Romania. As described in the following section, this research phase was built on the results of the first two phases and aimed to address all our five research questions.

More specifically, it addresses the first three research questions by empirically verifying the conclusions of the qualitative studies that precede it by checking whether the assumptions of the official IB documents, on one hand, and of the IB teachers, on the other, translate into student outcomes. Regarding RQ4, the data collected through the questionnaire allows us to test the relationships between (a) the components of IB programme, as perceived by the IB students (b) students' individual traits, (c) students' academic persistence and (d) potential outcomes of academic persistence. Focusing on the IB students, we verified the potential mediating role of academic persistence in the relationships between the relevant IB educational mechanisms and the students' psychological traits, on one hand, and the hypothesized outcomes of academic persistence (academic performance, absenteeism, intention to drop out, academic aspirations), on the other. In regards to RQ5, the questionnaire data allows us to explore the differences between IB students and comparable non-IB students concerning both the set of variables under scrutiny (academic persistence, its associated traits and educational mechanisms, its relevant educational outcomes) and the relationships between these variables. The data analysis strategy and procedures used in answering each of these research questions are detailed in the Results section.

2.4.2. Instruments

The questionnaire administered to students was built on the results of the previous research phases, and it addresses not only the three layers of investigation described above, but also the hypothesized outcomes of academic persistence, as well as students' socio-demographic characteristics (see the appendix for a copy of the questionnaire). The instruments were pretested

on a sample of 103 non-IB high-school students in the 11th and 12th grade in a large town in Romania. The instruments were pretested in Romanian; in the actual study, the instruments distributed in the non-IB sample were also in Romanian, while those distributed in the IB sample were in English. The following description of the instruments also includes their reliability indices in each case, as emerged from this preliminary test. We computed both the mean inter-item correlation and Cronbach's alpha (which tends to underestimate the true reliability level of short scales) as reliability indices. Mean inter-item correlations (MIIC) higher than .15 indicate acceptable scale reliability (Clark & Watson, 1995).

a. The first layer concerns the **educational strategies through which the IB programme fosters students' academic persistence**. In order to address this topic, given the specificity of these mechanisms and the lack of instruments on these dimensions in the scientific literature, we built short (3-item) scales evaluating each of these 10 strategies that the IB schools employ (or are expected to employ) in order to foster academic persistence, asking them to estimate the degree to which each is reflected in their daily academic experience. The items of these instruments were derived from the qualitative data collected (focus group and IB documents). The response scale for each instrument ranged from 1 = "strongly disagree" to 6 = "strongly agree". The descriptions of each scale, its reliability estimates and sample items are presented in Table 1 in Appendix C.

b. On the second layer, concerning the **traits that foster academic persistence**, we selected from the traits revealed by the analysis of the IB documents and the focus group data the traits that, based on the literature, are hypothesized to be strongly related to academic persistence. Consequently, from the possible factors suggested by the two data sources, we selected six psychological traits (*ambition – or academic goal setting and pursuit -, academic purposes related to self-development, critical thinking, self-confidence, self-discipline* and *academic resilience*) that are hypothesized to support academic persistence. Then, we identified in the scientific literature the optimal previously validated instruments that evaluate these traits. We also included in this set of instruments the *Motivational persistence scale* (Constantin et al., 2011), addressing the general personality predisposition to persist. The descriptions of each of these scales (and of the instrument evaluating *Academic persistence*), their reliability estimates and sample items are presented in Table 2 in Appendix C:

c. On the third layer, concerning the **strategies used by the schools in order to foster these specific traits**, we built our own short (3-item) scales in order to address students' perception of the degree to which their school helps them develop each of these six traits. As before, the items were built with direct reference to the teachers' comments in the focus groups and to the IB documents analyzed. The construct names were chosen based on the traits the strategies were designed to foster, not the strategies themselves. The response scale for each instrument ranged from 1 = "strongly disagree" to 6 = "strongly agree". The descriptions of each scale, its reliability estimates and sample items are presented in Table 3 in Appendix C.

d. **Outcomes of academic persistence**: intention to dropout, absenteeism, academic performance, academic aspirations.

d1. *Intention to dropout scale* (Hardre & Reeve, 2003) is composed of three items focused on the present academic aspirations including future schooling intentions, early indicators of persistence and dropout (the items are "I sometimes consider dropping out of school"; "I intend to drop out of school" and "I sometimes feel unsure about continuing my studies year after year"). The reliability coefficients in the present sample were: Cronbach's alpha = 0.79; MIIC=.50.

d2. *Absenteeism* was evaluated through the following item: "Approximately how many classes have you missed this semester for reasons other than illness or school-sponsored activities?"

d3. *Academic performance* was operationalized through students' overall average grade on the previous semester, which they were required to write in the questionnaire.

d4. *Academic aspirations* were addressed through a question regarding the highest educational degree that participants aspire to complete, wherein they wererequired to choose one of the following response options: high school diploma, university, Masters, or doctorate (PhD).

e. The set of items covering participants' **socio-demographic characteristics**: gender, age, length of experience in the IB programs, grade, country of residence, parents' level of education (high school/university/master studies/PhD), ethnicity (Caucasian (White), Black, Asian, Other, Unknown), nationality, and native language.

2.4.3. Participants and procedure

The questionnaire was distributed to 571 high school students in May 2015. The final IB sample includes 243 students enrolled in the IB DP (150 or 62% females) in schools located in 5 Eastern European countries (Romania, Poland, Czech Republic, Hungary and Serbia), out of which 17 did not fill in the items concerning the outcomes of academic persistence; hence they were eliminated from the final sample. The final non-IB sample includes 328 students (234 or 71.3% females) in the 11^{th} and 12^{th} grade in top-ranking Romanian high schools.

The two samples are comparable given the fact that parental educational level is similar in the two samples; neither the difference between the students in the IB sample and those in the non-IB sample on the mother's educational level (p=.42) nor the difference on the father's educational level (p=.57) are significant as indicated by the Mann-Whitney test.

2.4.4. Results

RQ1. Which components of the IB DP, as perceived by the IB students, are significantly associated with their academic persistence? Our data analysis strategy concerning this question was first to analyze, in the IB sample, the correlations between each of the 10 IB educational mechanisms suggested as relevant by the qualitative analyses and academic persistence. Next we used multiple regression analysis in order to pinpoint those educational mechanisms that have the strongest influence on academic persistence.

RQ1.1. Pearson correlations between IB educational mechanisms and academic persistence

Results indicate that 9 out of the 10 educational mechanisms are significantly and positively correlated to academic persistence, and the tenth was marginally significant. The actual correlations of each mechanism were: applicability of knowledge: r=.34, p<.01, clear framework: r=.29, p<.01, independent work style: r=.29, p<.01, teachers' involvement: r=.23, p<.01, focusing on the student: r=.19, p<.01, intense collaboration and partnership with the teachers: r=.29, p<.01, students class size: r=.13, p=.06 (ns.), updated curricula: r=.30, p<.01, comprehensive curricula: r=.39, p<.01, curricula focused on the real, practical needs of students: r=.46, p<.01.

RQ1.2. Second, we introduced the 9 significant educational mechanisms as predictors in a multiple stepwise regression analyze (with academic persistence as criterion) in order to determine those with the strongest relationship to this variable. The regression model was significant

(F(2,223) = 32.21, $p < .001$), --with two significant predictors: curricula focused on the real, practical needs of students ($\beta = .35$, p<.001), and comprehensive curricula ($\beta = .16$, p<.05).

RQ2. What are the students' individual traits that *significantly* contribute to academic persistence? Similar to the analysis concerning RQ1, first we analyzed the correlations between each of the 6 traits and academic persistence, then we used multiple regression analysis in order to pinpoint the traits with the highest contribution to IB students' academic persistence.

RQ2.1. Pearson correlations between traits and academic persistence

Results indicate that all six traits are significantly and positively correlated to academic persistence: general self-efficacy: r=.39, p<.01; proactive attitude: r=.34, p<.01; academic resilience: r=.33, p<.01; critical thinking: r=.30, p<.01; mastery goals: r=.40, p<.01; restraint: r=.34, p<.01.

We also computed the correlation between IB students' overall scores on the Motivational Persistence instrument (assessing the general and stable personality dimension of motivational persistence) and their academic persistence. This association is also significant and positive: r=.30; p<.01.

RQ2.2. Second, we introduced the 7 traits under scrutiny (the six traits that emerged from the previous research phases, plus motivational persistence) as predictors in a multiple stepwise regression analysis (with academic persistence as criterion) in order to determine those with the strongest influence on this variable. The regression model was significant (F(3,222) = 27.24, $p < .001$)--and included three significant predictors: mastery goals ($\beta = .28$, p<.001), restraint ($\beta = .22$, p<.001) and general self-efficacy ($\beta = .22$, p<.01).

In order to assess the joint influence of the educational mechanisms and the psychological traits on academic persistence, we further tested the model including the significant predictors from the previous analyses. We performed a hierarchical multiple regression analysis, also controlling for age, class, parents' educational level, country, years of IB education and gender. In the regression model that already included the control variables, we introduced at each step each of the five predictors in a fixed order, to check whether they significantly increase the predictive power of the model. The order of introducing the predictors was set on the basis of their standardized regression coefficients (β) that emerged in the previous two regression analysis,

described above, beginning with the predictor with the highest β (curricula focused on the real, practical needs of students) and ending with the predictor with the lowest β (comprehensive curricula).

The addition of four predictors (curricula focused on the real, practical needs of students; mastery goals; restraint; and general self-efficacy) significantly improves the prediction power of the regression model (in all four cases, the *F* statistic change was significant, $p < .05$). In the case of the fifth predictor (comprehensive curricula), its inclusion did not significantly increase the percentage of variability of academic persistence explained by the model (Sig F Change $p = .45$).

To conclude, the joint statistical evaluation of both categories of factors – educational mechanisms and psychological traits – indicates that the strongest predictors of IB students' academic persistence are, in order: curricula focused on the real, practical needs of students; mastery goals; restraint; and general self-efficacy. All the relationships between these predictors and academic persistence are positive, in the sense that the higher the score on these measures, the higher the level of academic persistence.

RQ3. How do the components of the IB DP relate to these individual traits contributing to academic persistence, or, more specifically, which IB educational mechanisms, as perceived by the IB students, foster these traits? In order to answer this question, we computed the correlations between each individual trait and students' perceptions concerning the strategies used by the schools in order to foster it. In all six cases, the correlations between the trait and students' perceptions concerning its fostering in school are significant and positive:

a. General self-efficacy (self-confidence): $r = .38$, $p < .01$.

b. Proactive attitude (academic goal setting and pursuit): $r = .36$, $p < .01$.

c. Academic resilience: $r = .42$, $p < .01$.

d. Restraint: $r = .37$, $p < .01$.

e. Critical thinking: $r = .31$, $p < .01$.

f. Mastery goals: $r = .36$, $p < .01$.

In conclusion, in the IB sample, the educational strategies used in fostering these traits that further support academic persistence have a significant positive effect: the students reporting high levels of these traits tend to also perceive their school as stimulating environment for developing these facets of their personalities.

RQ4. What are the relationships between (a) the components of the IB DP, (b) the individual traits, (c) academic persistence and (d) the outcomes of academic persistence? In order to answer this question, we checked whether academic persistence mediates the influence of the relevant IB educational mechanisms and of students' psychological traits on the outcomes of academic persistence (academic performance, absenteeism, intention to drop out, and academic aspirations). We performed separate sets of mediation analyses concerning each of the four outcomes. In each set we used as predictors the four factors that emerged in the previous analysis as the most important determinants of academic persistence, focusing on the relationship with the four outcomes and whether this relationship is mediated by academic persistence. In accordance with Baron & Kenny (1986), mediation is first indicated by the significant relationships between the three variables (predictor, outcome and mediator). Then, two regression analyses should be performed, with the outcome as dependent variable: one that includes only the respective predictor, and one including both the predictor and the presumed mediator. Mediation is indicated by the reduction of the effect of the predictor on the outcome when the mediator is included in the model. The relationships between the three types of variables (predictor, mediator and outcome) are presented in Figure 2.

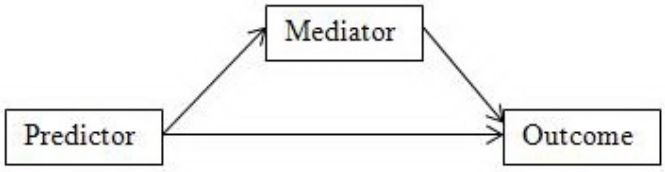

Figure 2.The relationships between the predictor, the mediator and the outcome in a mediation analysis

RQ4.1. Outcome 1: Overall average grade on the previous semester

First, we examined the relationship between the presumed mediator-- academic persistence -- and student's overall average grade, through linear regression. Results show that academic persistence significantly predicted the overall average grade (β = .23, p<.01). Then, we verified

the effect of each of the four factors of academic persistence on the overall average grade and the mediation effect of academic persistence in these relationships.

1.a. Curricula focused on the real, practical needs of students

The previous stage of data analysis already indicated a significant association between this educational mechanism and academic persistence. The relationship between this factor and the overall average grade is also significant, as the latter is significantly predicted by the perception of curricula as focused on the real, practical needs of students (β = .15, p<.05). Finally, we tested the model including as dependent variable the overall average grade and as predictors both the perception of curricula as focused on the real, practical needs of students and academic persistence. Only academic persistence emerged as a significant predictor (β = .21, p<.01), while the perception of curricula as focused on the real, practical needs of students is no longer significant (β = .005, p=.54). According to Baron & Kenny (1986), this pattern of results (the lowering of predictive power--as indicated by β–below significance in the model with the addition of the mediator indicates that the influence of the predictor (the perception of curricula as focused on the real, practical needs of students) on the criterion (overall average grade) is fully mediated by the mediator (academic persistence).

1.b. Mastery goals: this personality trait significantly predicts the overall average grade (β = .25, p<.001). In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting the overall average grade: academic persistence (β = .17, p<.05) and mastery goals (β = .19, p<.01). According to Baron and Kenny (1986), this pattern of results indicates partial mediation, in the sense that besides the effect mediated by academic persistence, the predictor (mastery goals) also exerts other types of influence on the overall average grade (a direct influence and/or influences mediated by other variables).

1.c. Restraint: this personality trait significantly predicts the overall average grade(β = .20, p<.01). In the model including both this predictor and the presumed mediator, only academic persistence significantly predicts the overall average grade (β = .19, p<.01), while restraint is no longer a significant predictor (β = .13, p=.06), indicating that its effect on the overall mean grade is fully mediated by academic persistence.

1.d. General self-efficacy: this personality trait significantly predicts the overall average grade (β = .26, p<.001).In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting the overall average grade: academic persistence (β =

.17, p<.05) and general self-efficacy(β = .20, p<.01), indicating that the effect of students' general self-efficacy on their overall average grade is partially mediated by academic persistence.

RQ4.2. Outcome 2: Dropout intentions

The relationship between the presumed mediator (academic persistence) and students' dropout intentions is significant and negative (β = -.41, p<.001), showing that students with high academic persistence are less likely to drop out of school.

2.a. *Curricula focused on the real, practical needs of students*: this educational mechanism significantly predicts dropout intentions (β = -.33, p<.001). In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting dropout intentions: academic persistence (β = -.33, p<.001) and the perception of curricula as focused on the real, practical needs of students (β = -.17, p<.05), indicating that the effect of this educational mechanism on dropout intentions is partially mediated by academic persistence.

2.b. *Mastery goals*: this personality trait significantly predicts dropout intentions (β = -.16, p<.05).In the model including both this predictor and the presumed mediator, only academic persistence significantly predicts dropout intentions (β = -.41, p<.001), while mastery goals are no longer significant (β = -.001, p=.99), indicating that their effect on dropout intentions is fully mediated by academic persistence.

2.c. *Restraint*: this personality trait significantly predicts dropout intentions (β = -.25, p<.001). In the model including both this predictor and the presumed mediator, only academic persistence significantly predicts dropout intentions (β = -.37, p<.001), while restraint is no longer a significant predictor (β = -.13, p=.052), indicating that its effect on dropout intentions is fully mediated by academic persistence.

2.d. *General self-efficacy*: this personality trait significantly predicts dropout intentions (β = -.27, p<.001). In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting the overall mean mark: academic persistence (β = -.36, p<.001) and general self-efficacy (β = -.13, p<.05), indicating that the effect of students' general self-efficacy on their dropout intentions is partially mediated by academic persistence.

RQ4.3. Outcome 3: Absenteeism

The relationship between the presumed mediator (academic persistence) and students' absenteeism is not significant; academic persistence is not a significant predictor of absenteeism (β = -.11, p=.11). In order to explore the determinants of absenteeism, we examined its relationships with the other four most important factors of academic persistence; we found only a marginal significant effect of restraint on absenteeism (β = -.12, p=.06), a factor that has a direct negative effect on absenteeism, without being mediated by academic persistence.

RQ4.4. Outcome 4: Academic aspirations

The relationship between the presumed mediator (academic persistence) and students' aspirations is significant and positive, showing that the higher the level of academic persistence the higher the level of educational aspirations (β = .16, p<.05).

4.a. *Curricula focused on the real, practical needs of students*: this educational mechanism is not a significant predictor of students' aspirations (β = .09, p=.16).

4.b. *Mastery goals*: this personality trait significantly and positively predicts student's aspirations (β = .14, p<.05). In the model including both this predictor and the presumed mediator, only academic persistence marginally significantly predicts dropout intentions (β = .12, p=.08), while mastery goals are no longer significant (β = .09, p=.21), indicating that their effect on students' aspirations is fully mediated by academic persistence.

4.c. *Restraint*: this personality trait is not a significant predictor of students' aspirations (β = .07, p=.27).

4.d. *General self-efficacy:* this personality trait is not a significant predictor of students' aspirations (β = .09, p=.19).

RQ4.2. Structural Equation Modeling

In order to check the results of the previous analysis concerning RQ4, we also performed structural equation modeling analyses using maximum likelihood estimation in AMOS 16.0 for each of the three outcomes (Academic performance, Dropout intention and Academic aspirations) that the previous results showed that they are influenced by academic persistence, which mediates the effects of other variables. In each case, we built and tested a causal model with latent variables. In each case, Academic Persistence and the four constructs (three personality traits and one

educational components of the IB) that emerged as significantly predicting it in the previous stage of data analysis were introduced as latent variables, each being hypothesized to predict participants' scores on the items measuring the respective variable. The causal relationships among these variables and those between them and each of the three outcomes were also introduced in the model. Hence, the SEM approach is a mix of confirmatory factor analysis and path analysis, allowing the verification of two types of models.

First, it allows the verification of the measurement model, through a first – order confirmatory factor analysis; in our case, this entails the assessment of the psychometric adequacy of the items in the instruments we used in order to measure the latent variables. In this respect, first we expect each item to have a nonzero loading on the variable it was designed to measure, and nonsignificant loadings on other variables, both indicated by the magnitude and the significance of the corresponding regression weights. While the factor loadings in the first category are directly estimated, the *Modification Indices* produced by AMOS offer, among other data, information concerning the second category – concerning item's cross-loadings on other variables in the model. Second, the squared multiple correlation of each item should be at least .20, thus indicating that its latent factor explains a substantial percentage of the variance of the responses it elicits. Second, large (above 2.58 – Jöreskog & Sörbom, 1993) standardized residual covariances pinpoint strong relationships between pairs of observed variables that are not accounted for (included in) the model. The items with a large number of such residual covariances affect the discriminant validity of the instrument.

Also, each item has a measurement error (either random or systematic and specific to the respective item, the latter representing error uniqueness – Byrne, 2013). In the SEM terminology, the items are the directly measured variables, and they are represented in rectangles; the latent constructs they are expected to address (and which are indirectly measured) are represented in ellipses. Errors – either measurement or residual, which occur in the prediction of a variable from other variables – are also represented in ellipses, since they are also unobserved. The construct validity of the instrument also requires the measurement errors of the items to be uncorrelated.

Second, SEM allows the verification of the structural model, composed of the causal and the correlational links between variables. In our case, this mostly entails the statistical examination of the causal paths between the four predictors – indicated as such by the previous stage of data analyses – namely General Self Efficacy, Mastery Goals, Restraint and the perception of curricula

as focused on the real, practical needs of students, Academic Persistence and its outcomes (Academic performance, Dropout intention and Academic aspirations). While each of the multiple regression analyses previously performed focused individually on a unique layer of these relationships – from predictors to Academic Persistence and from the latter to the outcomes –, SEM allows the simultaneous examination of all the links included in the model. Specifically, it tests whether these relationships remain significant when all the links between variables are considered at once. Hence, a primary indicator of the validity of the causal model is the magnitude and the significance of the regression weights between variables, evaluated in relation to those hypothesized. Second, the SEM approach can detect supplementary significant relations between variables that need to be included in the model.

The overall validity of both types of models – measurement and structural – is indicated in SEM by the goodness-of-fit indices, which offer an overall assessment of the model tested. Poor model fit reveals that the theoretical model tested does not offer a correct representation of the empirical data, and that there are important sources of misfit that should be identified and eliminated. In a causal model with latent variables, these sources could belong to the measurement model (poor psychometric adequacy of some instrument items) and / or to the causal model (insignificant causal links in the model and/or significant connections that are currently missing).There are a large number of fit indices currently yielded by most of the SEM software; we chose those most frequently utilized in the social science studies, as follows:

- the chi-square (χ^2) goodness of fit, or the Likelihood Ratio Test statistic (labeled CMIN in the AMOS output) and its probability value. On this criterion, models with higher probability associated to their χ^2 have a better fit (the fit between them and the perfect model is closer - Bollen, 1989). In practice, several problems with this indicator have been noted (Byrne, 2013), such as its dependency on sample size, which undermine its validity in judging model fit. In fact, findings of large χ^2 values (and low associated probability values) are common, even though the model has an adequate fit. Consequently, scholars have developed alternative and more pragmatic goodness-of-fit indices that are to be interpreted besides this primary indicator. When these indices suggest that the model has an acceptable fit, the common practice is to disregard the χ^2 criterion, especially when the sample size exceeds 200 participants.

- The relative chi-square (or the normed chi-square) is one of these alternative indices, computed by dividing the chi-square index by the degrees of freedom and labeled CMIN/DF in the AMOS output. CMIN/DF values lower than 2 indicate acceptable fit (Ullman, 2001).

- The comparative fit index (CFI), also known as the Bentler Comparative Fit Index, compares the fit of the hypothesized model to that of the Independence model (in which all variables are assumed to be uncorrelated). CFI values higher than .95 indicate an acceptable fit of the hypothesized model, and those higher than .97 indicate a good fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

- The Goodness-of-Fit Index (GFI) measures the amount of variance and covariance explained by the model; GFI values higher than .90 indicate an acceptable fit of the hypothesized model, and those higher than .95 indicate a good fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

- The Adjusted Goodness-of-Fit Index (AGFI) adjusts for the number of degrees of freedom in the hypothesized model; AGFI values higher than .85 indicate an acceptable fit of the hypothesized model, and those higher than .90 indicate a good fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

- the root mean square error of approximation (RMSEA) estimates the discrepancy between the model and the population covariance matrix. Low (less than .05) RMSEA values (or errors in approximating the population) indicate good fit (Stieger, 1990), and those less than .08 indicate acceptable fit. AMOS also reports a 90% confidence interval around the RMSEA value; in this respect, models with a good fit are those with an upper RMSEA confidence limit below .08 (Hu & Bentler, 1998). Moreover, AMOS tests for the closeness of fit and reports the PCLOSE value, which indicates the probability that the population from which the sample was drawn has a good (below .05) RMSEA value. PCLOSE values above .50 indicate a good fit of the model from this standpoint (Jöreskog & Sörbom, 1996).

- The Expected Cross-Validation Index (ECVI) estimates the probability that the model cross-validates across samples of similar sizes drawn from the same population (Browne & Cudeck, 1989). AMOS computes the ECVI value of the hypothesized model and that of other two hypothetical reference models: the Independence model and the Saturated model (in which the number of estimated parameters equals the number of data points – Byrne, 2013). The good fit of

the hypothesized model is indicated by a lower ECVI value for the hypothesized model compared to the ECVI values of the other two models (Byrne, 2013).

- the Incremental Index of Fit (IFI) is based on the Normative Index of Fit (NFI), which compares the hypothesized model to the Independence model; the IFI has the advantage of addressing the issues of parsimony and sample size associated with the NFI (Bollen, 1989). IFI values higher than .95 indicate a good fit of the model.

Before running the SEM analyses in AMOS on the IB database, we eliminated the participants with missing data on the variables introduced in the model, due to the requirements of the SEM approach (Byrne, 2013). We also checked the normality of the distribution of the dependent variables and we eliminated the outliers. The final sample analyzed includes 218 IB students.

Results

RQ4.2.1. Academic performance

In order to test the effects emerged from the previous stage of data analysis, we built an SEM model including as dependent variable Academic performance, as predictors General Self Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students, and as mediator Academic Persistence. The model also includes a direct influence of Mastery Goals and Restraint on Academic performance (since the previous results suggested that the effects of these two predictors on Academic performance are only partially mediated by Academic Persistence). The model tested in AMOS is displayed in Figure 1.

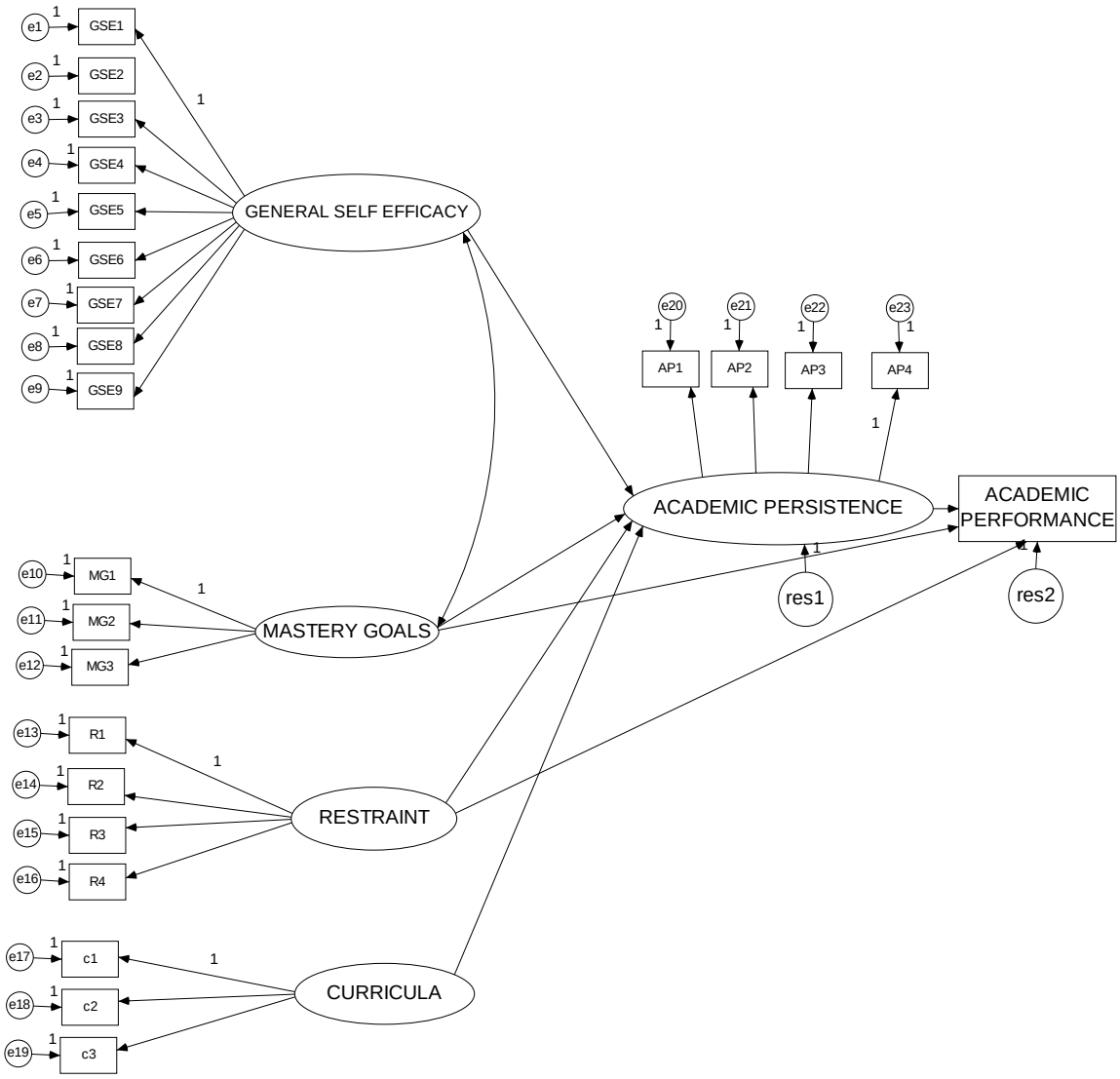

Figure 1. The hypothesized model of the predictors of Academic performance in the IB sample and of the mediating role of Academic Persistence

As explained above, the model has a measurement part (the items of each instrument used in order to measure the latent variables and their measurement errors), and a structural part. The latter includes the causal relationships hypothesized, as well as one correlation (between General Self Efficacy and Mastery Goals) that emerged in the previous stage of data analysis.

Most of the results of the SEM data analysis indicated a poor fit of the hypothesized model: χ^2_{243}=419.17; p <.01; CFI = .854 (< .95), GFI=.857 (< .09); AGFI=.826 (< .85); IFI = .857 (< .95). The only indexes suggesting an acceptable fit were the relative chi-square (CMIN/DF) = 1.704 <

2 and the RMSEA value =.057 (with a 90% confidence interval .048 – .066), but with a PCLOSE value of .11 > .50.

Examining the estimates of the coefficients in the causal part of the overall model, we noticed that all the regression weights between the latent variables are significant, with the exception of the direct influence of Restraint on Academic performance (p = .34 > .05). Consequently, in order to increase the fit of the general model, we first addressed its measurement dimension, by checking the statistical adequacy of the individual items that comprise each of the instruments. In other words, in the first stage of model respecification we searched for the sources of misfit in the measurement model, by verifying each of the relevant parameter estimates of the items.

First, we noticed several problems with one of the items in the instrument measuring Restraint (R4): it had a squared multiple correlation of .14, lower than .20, which indicated that a very high percentage of the variance of the item scores is error variance, unexplained by the latent variable (Restraint) that is presumed to be the source of these scores, and a low (.30) standardized regression weight from its presumed latent variable. It also had 7 standardized residual covariances higher than 2.58 (with GSE6 – 4.92, GSE2 – 5.20; MG1 – 3.29; GSE9 – 2.80; GSE4 – 2.92; MG1 – 2.882; GS9 = 2.590). Moreover, the modification indexes indicated a large number (17) of significant regression weights from other latent constructs and items addressing other constructs in the model to this item, or from it to other variables. Both these sets of results suggest that R4 lacks specificity; hence, we eliminated it from the model in order to increase the construct validity of the Restraint measurement and we performed a new test of the model.

The model fit results of this second step of data analysis were: χ^2_{223}=319.33; p <.01; CFI = .914, GFI=.886; AGFI=.859; IFI = .917; RMSEA=.045 (with a 90% confidence interval .033 – .055 and a PCLOSE value of .788); relative chi-square (CMIN/DF) = 1.43. Three indices still indicate poor model fit (CFI, GFI and IFI); hence, we looked for other sources of misfit in the measurement model, and we noticed that one of the items measuring General Self Efficacy (GSE6) had a squared multiple correlation of .18, lower than .20, and a low (.31) standardized regression weight from its presumed latent variable (General Self Efficacy), as well as two standardized residual covariances higher than 2.58. These parameters suggest that the item is not a valid measure of the latent factor evaluated by the other items in the instrument. Consequently, we eliminated it

from the model in order to increase the construct validity of the General Self Efficacy measurement and we tested the respecified model.

The model fit results of this third step of data analysis were: χ^2_{202}=279.32; p <.01; CFI = .929, GFI=.894; AGFI=.867; IFI = .930; RMSEA=.042 (with a 90% confidence interval .029 – .053 and a PCLOSE value of .869); relative chi-square (CMIN/DF) = 1.383. The same three indices still indicate poor model fit. We identified another source of misfit in the measurement model, namely another item measuring General Self Efficacy (GSE2), which had a squared multiple correlation of .13, lower than .20, and three standardized residual covariances higher than 2.58. Consequently, we eliminated it from the model in order to increase the construct validity of the General Self Efficacy measurement, and we tested the respecified model.

The model fit results of this fourth step of data analysis were: χ^2_{182}=256.73; p <.01; CFI = .929, GFI=.897; AGFI=.869; IFI = .931; RMSEA=.044 (with a 90% confidence interval .030 – .055 and a PCLOSE value of .806); relative chi-square (CMIN/DF) = 1.411. Again, the same three indices still indicate poor model fit; we identified an item measuring Academic Persistence (AP3) as a source of misfit in the measurement model, since it had a low squared multiple correlation (.28) and five standardized residual covariances higher than 2.58. Moreover, the modification indexes indicated a large number (14) of significant regression weights from other latent constructs and items addressing other constructs in the model to this item, or from it to other variables. Both these sets of results suggest that AP3 lacks specificity; hence, we eliminated it from the model in order to increase the construct validity of the Academic Persistence measurement, and we tested the respecified model.

The model fit results of this fifth step of data analysis were: χ^2_{163}=202.95; p <.01; CFI = .958, GFI=.918; AGFI=.894; IFI = .959; RMSEA=.034 (with a 90% confidence interval .015 – .048 and a PCLOSE value of .975); relative chi-square (CMIN/DF) = 1.245. All indices indicate good model fit, but in the examination of the estimates of the coefficients in the causal part of the overall model we noticed that the direct influence of Restraint on Academic performance is still below significance in this overall model (p = .36 > .05). Thus, we excluded this causal link from Restraint to Academic performance and recomputed the model parameters.

The model fit results of this fifth step of data analysis were: χ^2_{164}=203.76; p <.01; CFI = .958, GFI=.917; AGFI=.894; IFI = .959; RMSEA=.033(with a 90% confidence interval .015 – .047 and a PCLOSE value of .976); relative chi-square (CMIN/DF) = 1.242. Also, the ECVI value

of our model (1.36) is lower than that of the saturated model (1.93) and that of the Independence model (5.47), indicating that our model represents the best fit to the data. Taking into account the recommended thresholds of these values, the fact that all estimated parameters were of acceptable magnitude and significant at the .05 level, as well as the absence of any significant modification indexes or large standardized residuals we can conclude that the model has a good fit.

The final model of the influences of the four predictors (General Self-Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students) on academic performance, mediated by academic persistence, is displayed in Figure 2, including the standardized regression weights that quantify the amplitude of the respective causal effect.

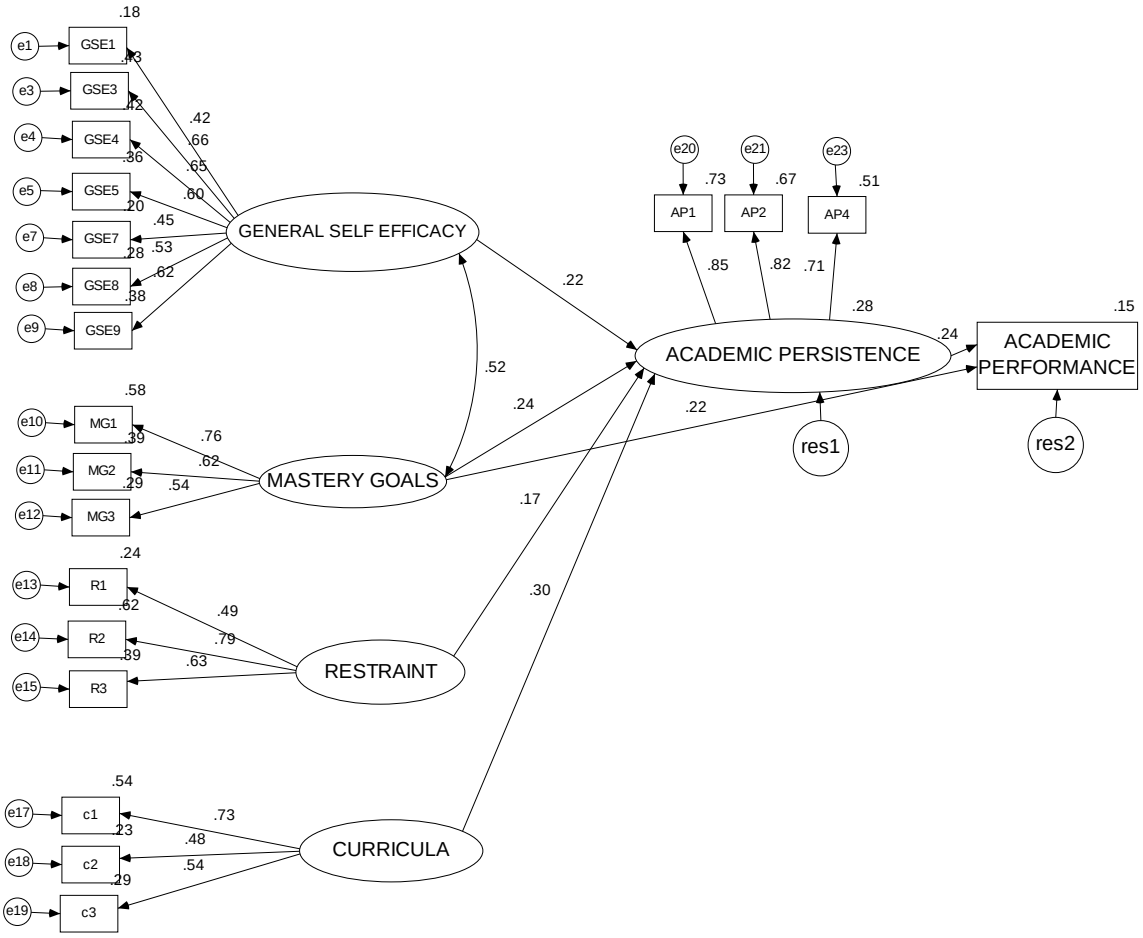

Figure 2. The model of the predictors of Academic performance in the IB sample and of the mediating role of Academic Persistence as emerged from the SEM analysis

All the regression weights between the latent variables in the causal model are significant and in line with the results of the previous stage of data analysis: General Self Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students positively influence academic performance, and their effects are mediated by Academic Persistence. Mastery Goals also have a direct effect on Academic performance (unmediated by Academic Persistence). The only result yielded by the previous stage of data analysis that was not confirmed by the SEM analysis was the equivalent direct effect of Restraint on Academic performance.

RQ4.2.2. Dropout intention

The SEM model built in this respect includes as dependent variable Dropout intention, as predictors General Self Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students, and as mediator Academic Persistence. The model also includes a direct influence of General Self Efficacy and the perception of curricula as focused on the real, practical needs of students on Dropout intention (since the previous results suggested that the effects of these two predictors on Dropout intention are only partially mediated by Academic Persistence). The measurement model used was the one that emerged as psychometrically valid in the previous set on analyses, focused on Academic performance as dependent variable. As Dropout intention was measured indirectly, through the three items in the instrument evaluating this variable, the model also addresses this measurement issue concerning the psychometric validity of these items. The model tested in AMOS is displayed in Figure 3.

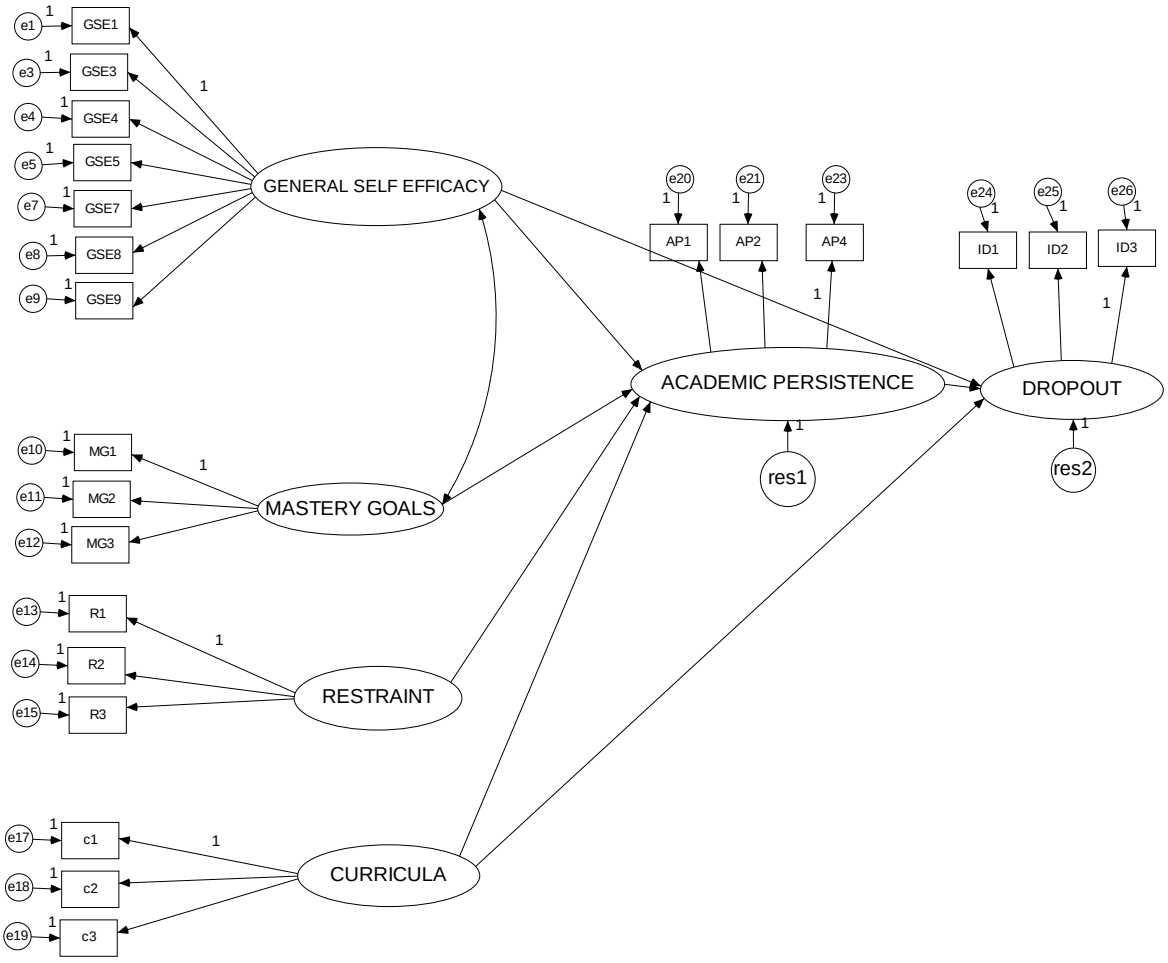

Figure 3. The hypothesized model of the predictors of Dropout intention in the IB sample and of the mediating role of Academic Persistence

The results indicated a good fit of the model: χ^2_{201}=242.99; p = .023<.05; CFI = .962, GFI=.910; AGFI=.887; IFI = .963; RMSEA=.031 (with a 90% confidence interval .012 – .044 and a PCLOSE value of .993); relative chi-square (CMIN/DF) = 1.209. Yet, checking the parameter estimates, we discovered that two regression weights between the latent variables in the causal model are not significant, specifically the direct influence of General Self-Efficacy on Dropout Intentions (p=.42 > .05), and the direct influence of the perception of curricula as focused on the real, practical needs of students on Dropout Intentions (p=.33 > .05). Thus, we excluded these causal links from the model and recomputed its parameters.

The model fit results of this second step of data analysis were: χ^2_{203}=244.73; p = .024 <.05; CFI = .962, GFI=.910; AGFI=.888; IFI = .963; RMSEA=.031 (with a 90% confidence interval

.012 – .044 and a PCLOSE value of .994); relative chi-square (CMIN/DF) = 1.206. Also, the ECVI value of our model (1.59) is lower than that of the saturated model (2.33) and that of the Independence model (6.37), indicating that our model represents the best fit to the data. These indices suggest that the model has a good fit; also, all estimated parameters were of acceptable magnitude and significant at the .05 level, and there are no significant modification indexes or large standardized residuals.

The final model of the influences of the four predictors (General Self-Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students) on Dropout intention, mediated by Academic Persistence, is displayed in Figure 4. Most of the significant regression weights between the latent variables in the causal model are in line with the results of the previous stage of data analysis: General Self Efficacy, Mastery Goals, Restraint and the perception of curricula as focused on the real, practical needs of students positively influence Dropout intention, and their effects are mediated by Academic Persistence. Contrarily to the results of the previous stage of data analysis, the SEM results indicate that the direct effects of General Self Efficacy and the perception of curricula as focused on the real, practical needs of students are not significant; hence, their influences on Dropout intention are fully mediated by Academic Persistence.

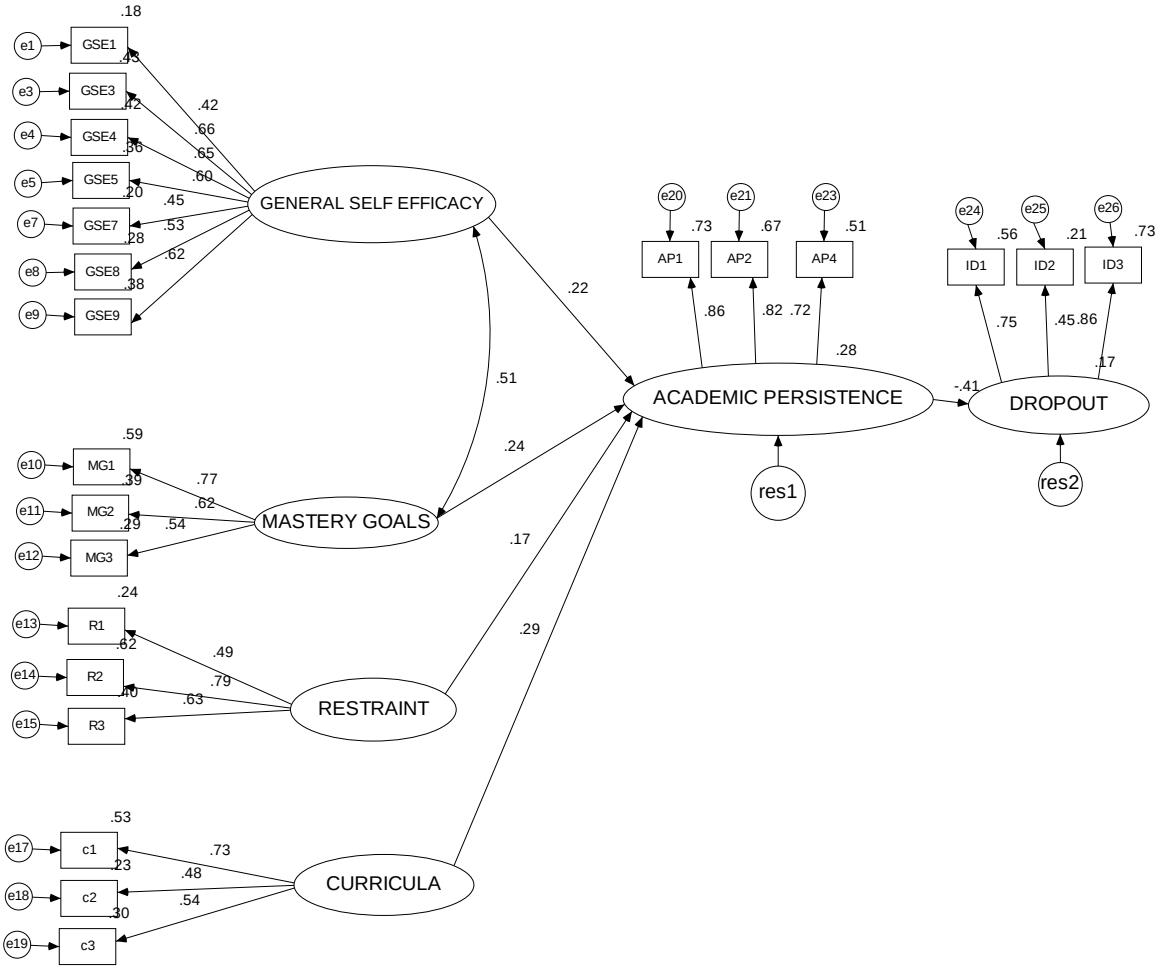

Figure 4. The model of the predictors of Academic performance in the IB sample and of the mediating role of Academic Persistence as emerged from the SEM analysis

RQ4.2.3. Academic aspirations

The SEM model built in this respect includes as dependent variable Academic aspirations, as predictor Mastery Goals, and as mediator Academic Persistence. The model tested in AMOS is displayed in Figure 5.

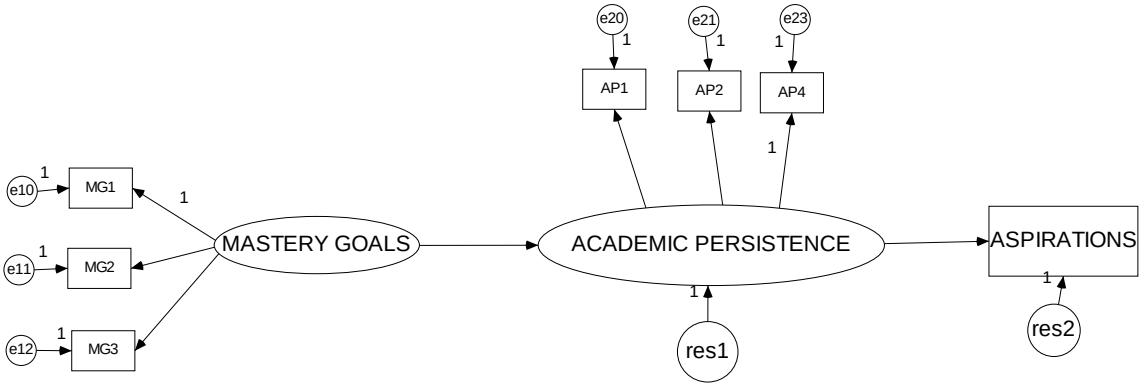

Figure 5. The hypothesized model of the predictor of Academic aspirations in the IB sample and of the mediating role of Academic Persistence

The results indicated a good fit of the model: χ^2_{13}=14.39; p = .035 >.05; CFI = .997, GFI=.982; AGFI=.961; IFI = .997; RMSEA=.022 (with a 90% confidence interval .00 – .073 and a PCLOSE value of .767); relative chi-square (CMIN/DF) = 1.107. Also, the ECVI value of our model (.20) is lower than that of the saturated model (.26) and that of the Independence model (2.00), indicating that our model represents the best fit to the data. Taking into account the recommended thresholds of these values, the fact that all estimated parameters were of acceptable magnitude and significant at the .05 level, as well as the absence of any significant modification indexes or large standardized residuals we can conclude that the model has a good fit. The final model of the influence of Mastery Goals on Academic aspirations, mediated by Academic Persistence, is displayed in Figure 6.

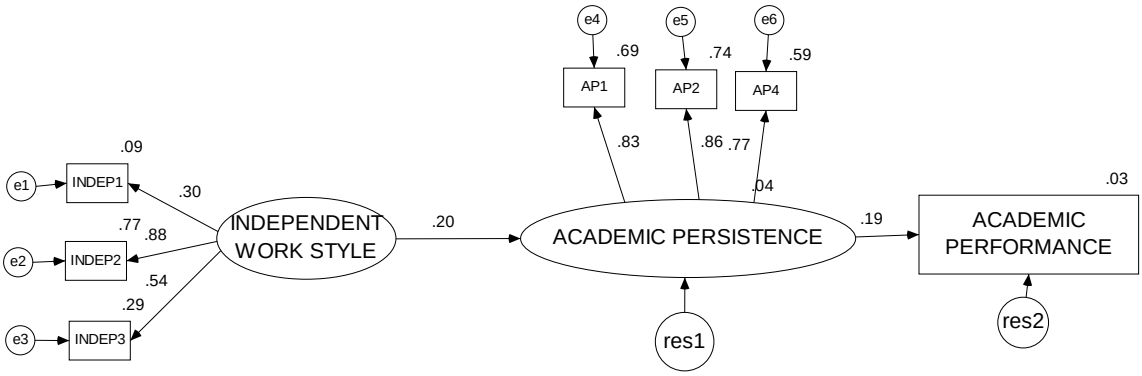

Figure 6. The model of the predictor of Academic aspirations in the IB sample and of the mediating role of Academic Persistence as emerged from the SEM analysis

The regression weights between the latent variables in the causal model are in line with the results of the previous stage of data analysis: Mastery Goals positively influence Academic aspirations, their effect being fully mediated by Academic Persistence.

In conclusion, the SEM analyses support the causal paths identified in the previous stage of data analysis, with the exception of some of the direct effects between the four predictors and two of the outcomes, namely Academic performance and Dropout intention. Overall, they show that these two outcomes are influenced by a set of three personality traits (General Self Efficacy, Mastery Goals and Restraint) and one important educational component (the curricula focused on the real, practical needs of students), and that these influences are mediated by their effect on another essential traits – Academic Persistence. The same mediating role of Academic Persistence was confirmed in the case of the influence of Mastery Goals on the third outcome under scrutiny, namely Academic aspirations.

RQ5. What are the differences between the IB students and non-IB students in regards to academic persistence and its associated traits, on one hand, and their relationships with the relevant educational outcomes, on the other?

In order to answer this question, we performed two sets of analyses. First, we compared the two samples (IB and non-IB) on all the variables included in the hypothesized causal model: students' perceptions of educational mechanisms, psychological traits (including academic persistence) and the relevant educational outcomes. Second, we performed the same analyses described above, this time for the non-IB sample. We did this to examine whether the causal model that links IB students' traits and academic persistence to their academic outcomes is also valid in the case of the non-IB students, or whether the IB educational environment generates a distinctive set of influences on academic persistence (and its supporting traits) on these outcomes.

RQ5.1. Comparisons between the two samples (IB and non-IB)

a. Comparisons on the psychological traits associated to academic persistence

The results of the independent samples *t* test comparing the two student samples revealed significant mean differences on four of the seven traits, presented in the following table.

Trait	**Mean$_{IB}$**	**Mean$_{non-IB}$**	***t*(569)**	***p***
General self-efficacy	3.16	3.09	2.03	<.05
Proactive attitude	3.24	3.14	2.78	<.01
Critical thinking	4.97	4.61	3.34	<.05
Academic resilience	4.79	5.08	2.64	<.01

The IB sample scored significantly higher than the non-IB sample on the first three of these traits, while the non-IB sample scored significantly higher on academic resilience.

The differences on the other traits (mastery goals, restraint and general motivational persistence) were not significant.

b. Comparisons on the perception of the educational mechanisms fostering these traits

The results of the comparisons between the two samples are presented in the following table.

Educational mechanisms	**Mean$_{IB}$**	**Mean$_{non-IB}$**	***t*(569)**	***p***
General self-efficacy	4.21	3.81	4.06	<.001
Proactive attitude	4.21	3.72	5.75	<.001
Restraint	4.19	3.93	2.79	<.01
Critical thinking	4.41	3.81	6.69	<.001
Mastery goals	4.23	3.68	4.45	<.001
Academic resilience	3.85	3.80	.25	.80

The IB students scored significantly higher than the non-IB students on the first five of the six educational mechanisms, while in the case of Academic resilience the difference was not significant.

c. Comparisons on the perception of the educational mechanisms fostering academic persistence

The results of the comparisons between the two samples are presented in the following table.

Educational mechanisms	**Mean$_{IB}$**	**Mean$_{non-IB}$**	***t*(569)**	***p***
applicability of knowledge	4.23	3.36	9.76	<.001
clear framework	3.88	3.70	2.17	<.05
independent work style	4.09	3.82	3.53	<.001
teachers' involvement	4.32	3.73	6.80	<.001
focusing on the student	3.80	3.39	4.92	<.001
intense collaboration and partnership with the teachers	4.25	3.58	7.14	<.001
students class size	4.07	3.43	8.11	<.001
updated curricula	4.31	3.42	12.74	<.001
comprehensive curricula	4.04	3.47	7.24	<.001
curricula focused on the real, practical needs of students	4.06	3.13	8.74	<.001

The IB students scored significantly higher on all the ten educational mechanisms fostering academic persistence.

d. Comparisons on academic persistence

The IB students scored significantly higher on the measure of academic persistence: $Mean_{IB} = 4.52$, $Mean_{non-IB} = 4.39$; $t(569)=2.00$; $p<.05$.

e. *Comparisons on the outcomes of academic persistence*

e1. intention to dropout: the difference between the two student samples is not significant: $t(569)=1.37$; $p=.17$.

e2. absenteeism: the difference between the two student samples in the number of school absences is not significant: $t(569)=0.49$; $p=.56$.

e3. aspirations: the results of the Mann-Whitney test (used due to the ordinal nature of the scale measuring aspirations) reveal that the difference between the two student samples in the number of school absences is not significant: z =0.97; p=.33.

RQ5.2. Relationships between variables in the non-IB sample

a. relationships between IB educational mechanisms and academic persistence

In the non-IB sample, 6 out of the 10 educational strategies are significantly associated with students' academic persistence, with lower correlations than those in the IB sample: applicability of knowledge: r=.15; p<.01, clear framework: r=.16; p<.01, independent work style: r=.26; p<.01, teachers' involvement: r=.20; p<.01, intense collaboration and partnership with the teachers: r=.19; p<.01, comprehensive curricula: r=.18; p<.01. Similar to the analysis performed in the IB sample, we identified the strongest predictors of academic persistence in this group of educational mechanisms through a multiple stepwise regression. The regression model was significant ($F(1,326) = 24.50$, $p < .001$) and included only one significant predictor: independent work style ($\beta = .26$, p<.001).

b. relationships between traits and academic persistence

In the non-IB sample, only 4 out of the 6 traits are significantly correlated to academic persistence: general self-efficacy: r=.30; p<.01; proactive attitude: r=.34; p<.01; academic resilience: r=.21; p<.01; mastery goals: r=.19; p<.01. Motivational persistence is also related to academic persistence: r=.17; p<.01. In the multiple regression analysis performed in order to identify the strongest predictors of academic persistence in this category, a significant regression model emerged ($F(1,326) = 43.56$, $p < .001$) which included only one predictor: proactive attitude ($\beta = .34$, p<.001).

c. correlations between each individual trait and students' perceptions concerning the strategies used by the schools in order to foster it

In the non-IB sample, five out of the six correlations are significant: general self-efficacy (self-confidence): r=.30, p<.01; proactive attitude (academic goal setting and pursuit): r=.30, p<.01; academic resilience: r=.34, p<.01; critical thinking: r=.25, p<.01; mastery goals: r=.19, p<.01. In the case of restraint, the correlation is not significant (r=.07).

d. mediation analyses concerning the relationships between (a) the components of the programme, (b) the individual traits, (c) academic persistence and (d) the outcomes of academic persistence

d1: overall average grade on the previous semester

The relationship between the presumed mediator (academic persistence) and the overall average grade is significant and positive (β = .15, p<.01). Then, we verified the effect of each of the two factors of academic persistence in the non-IB sample (independent work style and proactive attitude) on the overall average grade and the mediation effect of academic persistence in these relationships.

- *independent work style* significantly predicts the overall average grade (β = .15, p<.01). In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting the overall average grade: academic persistence (β = .13, p<.05) and independent work style (β = .12, p<.05), indicating that the effect of this educational mechanism on the overall average grade is partially mediated by academic persistence.

- *proactive attitude* is not a significant predictor of the overall average grade (β = .05, p=.33).

In order to identify the psychological traits significantly influencing the non-IB students' overall average grade, we performed a stepwise multiple regression analysis including all the 7 traits as potential predictors. Only restraint emerged as a significant predictor of the overall average grade (β = .12, p<.05), a trait that is not significantly related to academic persistence in the non-IB sample (r=.08; p=.17) and that students perceive as not significantly fostered by school, as indicated by the correlation between this trait and the perception of its corresponding educational mechanism, reported above.

d2: dropout intentions

The relationship between the presumed mediator (academic persistence) and student's dropout intentions is significant and negative, high academic persistence significantly predicting low levels of dropout intentions (β = -.30, p<.001).

- *independent work style* is not a significant predictor of dropout intentions (β = -.06, p=.28).

- *proactive attitude* is not a significant predictor of dropout intentions (β = .01, p=.07).

In search for the determinant of non-IB students' dropout intentions, we performed separate stepwise regression analyses taking as predictors the set of psychological traits, respectively the set of educational mechanisms fostering academic persistence. No significant predictor emerged in either of the two analyses.

d3. absenteeism

The relationship between the presumed mediator – academic persistence – and student's absenteeism is not significant (β = -.09, p=.11). In order to explore the determinants of absenteeism, we first examined its relationships with the two most important factors of academic persistence in this sample; we found a significant effect of independent work style on absenteeism (β = -.16, p<.05), a factor that has a direct negative effect on this behavior, without being mediated by academic persistence. Similar to the IB sample, we also found a direct effect of restraint on absenteeism (β = -.11, p<.05).

d4. Academic aspirations

The relationship between the presumed mediator – academic persistence – and student's aspirations is significant and positive, high academic persistence significantly predicting high levels of aspirations (β = .16, p<.05).

- *independent work style* significantly predicts students' aspirations(β = .12, p<.05). In the model including both this predictor and the presumed mediator, only academic persistence significantly predicts aspirations (β = .19, p<.01), while independent work style is no longer a significant predictor (β = .07, p=.25), indicating that its effect on student's aspirations is fully mediated by academic persistence.

- *proactive attitude* significantly predicts student's aspirations (β = .2, p<.001). In the model including both this predictor and the presumed mediator, both factors emerged as significantly predicting the overall mean grade: academic persistence (β = .16, p<.01) and proactive attitude (β = .14, p<.05), indicating that the effect of this trait on students' aspirations is partially mediated by academic persistence.

3. Discussion

The general objective of the project was to develop an empirical research aiming to identify the components of the IB programme and instruction that support academic persistence and its associated individual skills or personality traits. We also examined the relationship between the IB instructional approaches and the individual traits that we identified as factors purportedly contribute to academic persistence. Moreover, we investigated the impact of these educational components and these personal traits, respectively, on the relevant academic outcomes, and the potential mediating role of academic persistence in this relationship. In order to examine these relationships, we performed both an in-depth analysis of the IB educational components that might support academic persistence and individual competencies associated with academic persistence, together with a comparison between IB students and non-IB students on relevant psychological and educational dimensions.

In what follows, first we discuss the results of the three research phases in the IB sample, and then we turn to the comparisons between these results and those in the non-IB sample.

One purpose of this study was to identify the most relevant IB DP programme components that enhance and improve students` academic persistence, as well as the outcomes thereof (school performance, absenteeism and students' intention to commit both in the current program as well as in long-term future educational projects). This focus on the educational components of the DP programme extends the usual perspective adopted in most studies on educational outcomes, most of which only take into account students' personality traits and/or socio-demographical variables. Both these aspects are included in our research, either as determinants of academic persistence (in the case of the personality traits) or as controlled variables (in the case of some students' socio-demographical characteristics). Moreover, we were also interested in the role of school strategies in developing engaged, confident, and resilient students, always ready to challenge themselves, and commit responsibly to their academic goals. Effective schooling is a multi-faceted endeavor, which requires the energies of teachers and students to the same extent. The connection between teacher efforts and student outcomes will ultimately reflect the efficiency of the institution in preparing students to thrive academically, first in order to obtain a high school diploma, then in their postsecondary studies. Other studies in this field have also focused on the educational strategies that might support the needs of the three-factor system of school-student-teacher and its

positive effects on students' performance, personal attainment and long-term growth (Harden, Sowden & Dunn, 1984; Pierce & Cameron, 2002; Bordieri, Kellum & Wilson, 2012).

It is not only the joint efforts and engagement of the educator and the student that guide this journey to success, but also the perceived congruence between the motivations, philosophies and actions of the main actors. In this sense, the educational vision and the school mission that guides teachers' approaches to foster academic persistence should be generally recognized by the students. Subsequently, this acknowledgement is expected to influence the specific qualities that enable students to persist in their endeavors. Thus, our study combined two perspectives: the students' and the teachers', in order to gain a more comprehensive, holistic understanding of the investigated set of phenomena. Our main expectation was that the perceptions of the strategies would be reflected in the presence of the traits they are expected to influence positively and directly.

IB instructional strategies were investigated and described through a mixed-method approach through the analysis of IB documents and through focus-groups with IB DP teachers. Results isolated ten strategies presumed to foster academic persistence: a) applicability of knowledge, b) clear framework, c) independent work style, d) teachers' involvement, e) focusing on the student, f) intense collaboration and partnership with the teachers, g) student class size, h) updated curricula, i) comprehensive curricula, and j) curricula focused on students' real, practical needs. The results of the quantitative study confirm that all these strategies have a significant fostering effect on academic persistence: the IB students with high levels of academic persistence also tend to perceive their school as actively employing these educational mechanisms. Their common factor is the sense of being a part of a system that regards abstract academic material as an integrated part of human reality and not as concepts that students use only in order to successfully complete an educational stage. Thus, the main psychological benefit brought by these strategies is the fact that the IB DP programme is not designed only to ensure high quality education, but it also involves students as active agents that can engage with confidence in actions that are significant for their own needs and future. Through such strategies, the IB DP programme promotes a learning experience that facilitates students' holistic intellectual, cognitive, professional and personal development, and, consequently, their long-term educational engagement. Also, the practical use of knowledge, direct connections between information and the chance to interact with those concepts in real life is positively associated with long-term

commitment. Similarly, academic persistence is strengthened when students are working to acquire knowledge and skills that are viewed as important and relevant, in line with the results of previous studies (Eccles et al., 1983; McKnight & Kashdan, 2009). Other empirical results support previous findings that making students aware of the relationship between their interests and values and what they are learning leads to increased interest and higher grades (Hulleman & Harackiewicz, 2009). Moreover, a clear framework in describing personal goals and the means to achieve them is also a positive factor in academic persistence; such dimensions of class management are very important for the success of the educational system (Fenollar, Roman & Cuestas, 2007).

Previous empirical results also suggest a relationship between academic persistence and both teachers` involvement and their intense collaboration and partnership with the students, since quality of student – teacher interaction is one of the primary factors affecting college retention (Habley & McClanahan, 2004).On the other hand, a low-level of teacher commitment or attendance (Crain-Dorough, 2003; Sabates, Akyeampong, Westbrook & Hunt, 2011), teaching staff turnover (Voicu, 2010), deficient evaluation systems (Govindaraju & Venkatesan, 2010), and bureaucratized institutions that use rigid structures and policies and practices that alienate students (Angus & Mirel, 1999) lead to dropout. Teachers that act like mentors who offer support and encouragement (Hu & Ma, 2010), using active teaching pedagogies (Braxton, Bray & Berger, 2000) foster students' connection to the school environment, their enthusiasm, participation and ultimately their persistence and performance.

In the next step of our analysis, we were interested in isolating the strategies that best sustain academic persistence. The results revealed that among the ten strategies under scrutiny, the curricula focused on the real, practical needs of students and the comprehensive curricula have the greatest impact on academic persistence. Promoting civic engagement, curiosity, initiative and deep action learning (Allen, 2011) has been previously shown to have an important impact on commitment in difficult tasks. On the other hand, inadequate curricula and instructional practices, coupled with lack for support in transitional stages from a level to another (Blue & Cook, 2004; Lee & Burkam, 2001), and poor school practices and policies (Rumberger, 2000) predispose students to dropout. A comprehensive curriculum is becoming a world-wide requirement and it is clear that its full and constant update is necessary in order to instill a sense of connection with the outside world, as the lack of such connection is associated with poor school performance

(Bridgeland, DiIulio & Morison, 2006). The IB students that perceive the comprehensiveness of the DP curricula tend to have higher levels of academic persistence perhaps because they acknowledge the potential of the IB education to generate in its students an ability to adapt to any future educational requirements in its students. Together, these two strategies instill in the IB students the sense that the IB education is an educational path worthy of their best efforts to thoroughly pursue.

Our second research question refers to the students' individual traits that significantly contribute to academic persistence. We extracted from the results of the two qualitative research phases and the literature review on the topic a set of six psychological traits that, together with general motivational persistence, were subsequently tested in the quantitative phase in regards to their actual relationship with academic persistence. The six traits are proactive attitude, self-efficacy, mastery goals, academic resilience, critical thinking, and restraint. Mastery goals refer to students' tendency to choose goals and tasks in a way that allows them to focus on growth and development of their skills, not only achieving formal acknowledgment and rewards for their work (Pintrich et al., 1993; Daniels et al., 2009). Restraint reflects the students' capacity to engage in long term tasks by avoiding being sidetracked by momentary distractions and temptations, with minimum adult supervision(Tangney, Baumeister, & Boone, 2004; Maloney, Grawitch, & Barber, 2012).General self-efficacy covers the beliefs and confidence in the ability to face difficult and challenging tasks (Schwarzer & Jerusalem, 1995). Another dimension is proactive attitude, or the predisposition towards initiative (Schmitz & Schwarzer, 1999). Critical thinking refers to the higher order set of skills and strategies employed in applying information and knowledge to new problems or when critically evaluating new concepts and ideas (Pintrich et al., 1993).Academic resilience is also a prominent factor, as surpassing obstacles and being able to cope with stress is essential in order to adapt to the challenges specific to demanding academic environments (Martin & Marsh, 2006).

In the IB sample, all these traits were shown to be significantly associated with academic persistence, in line with the previous studies on their associations in educational settings. Further analysis revealed that three traits that have the strongest effect on academic persistence are mastery goals, restraint and general self-efficacy, personal characteristics with an essential self-regulating role in a person`s life. Concerning the latter, the positive connection with self-confidence and self-efficacy beliefs has been frequently reported in the educational literature (Brown et al, 2008;

Robbins et al., 2004). Such beliefs predict the effort invested in academic activities and, consequently, students' persistence (Trautwein, et al., 2009). Similarly, students oriented towards self-development that is those who approach learning situations as opportunities and, thus, perceive their educational efforts as investments towards mastery goals, have higher levels of academic persistence, in line with the dominant conceptualizations of this type of motivation (Harter, 1978). Finally, the special position of restraint in the set of predictors of the IB students' academic persistence can be explained by taking into account the fact that the learning process frequently requires the capacity to delay immediate gratification. Thus, as other studies also show, exercising effortful self-control in avoiding temptation predicts higher test scores, and other health and professional outcomes (Mischel, 2014). Previous results also show that conscientiousness, a related trait, is a predictor of effort across disciplines and achievement, such as GPA (De Raad & Schouwenburg, 1996; Noftle & Robins, 2007; Trautwein et al., 2009).

The purpose of our third research question was to identify whether there is a relationship between the components of the IB programme and the traits that are considered to contribute to academic persistence, both of which were identified through the qualitative approach in the first phases of the study. To achieve this, we examined the relationship between students' perceptions about the degree to which the main IB educational mechanisms are reflected in their daily academic experience and the specific corresponding competencies designated as important.

In diagnosing the IB educational mechanisms that foster these traits, as they are perceived by the IB students, we analyzed the patterns of the associations between the two sets of variables. The correlations between the scales assessing IB students' perceptions on the relevant educational mechanisms and the corresponding dispositional variables are all significant and positive. In other words, the higher students rated their schools on the relevant educational mechanisms, the higher they rated themselves on the corresponding traits. This result is quite indicative of the congruence between the philosophies promoted by the IB programme and the IB actual practice. Previous studies have repeatedly indicated that student-teacher relations are central for creating academic success in the classroom (Hamre & Pianta, 2001; Harris, 2006; Miller, 2000). Completing this observation, Doll, Zucker, & Brehm (2004) noted that it is not only the provided support and quality of teaching that builds positive qualities, but also its consistency. Thus, part of what makes a teacher's work effective is a foundation in a set of guiding principles that ensure coherence and

converge towards higher level purposes, such as fostering and building upon traits that will serve the students in their subsequent studies and professional career.

The present results offer some insights regarding the importance of teacher efforts in the direction of sustaining student engagement and persistence, through specific practices. Also, the patterns of statistical results shed light on the importance of achieving satisfactory congruence between teaching strategies and student skills, traits and outcomes, indicating that the IB educational efforts are neither arbitrary nor fruitless. Future studies should complement these results through comprehensive accounts of student experiences, especially through qualitative investigations. Also, multi-level designs analyzing the individual, classroom and school-level indicators should complement the observations regarding the teaching strategies and other administrative factors that lead to success.

The fourth research question pertains to the relationships between the components of the IB DP, the individual traits, academic persistence and its outcomes. We examined the association between psychological traits, on one hand, and educational mechanisms previously highlighted as most important for academic persistence, on the other hand, with four outcomes: academic performance (operationalized as the overall average grade), intention to dropout, absenteeism and academic aspirations. Overall, results show that the first two outcomes are related to all the traits and educational strategies under consideration, and that these effects are fully or partially mediated by academic persistence. This complex type of determination is in line with the results of previous studies, that suggest that models of causality involved in generating school outcomes are more diverse nowadays, involving a wide variety of factors, both environmental and personal, with the non-cognitive personality traits representing an important part of the latter category (Farington et al., 2012). Moreover, our results reveal that both the personality traits strongly associated with academic performance (specifically mastery goals, restraint and general self-efficacy) and the educational mechanisms supporting it further relate to school performance and intentions to dropout. Students with intense mastery goals, who also believe in their abilities to successfully overcome academic obstacles and attain their objectives, and who are able to engage in effortful restrained behaviors and delay gratification are those with high academic persistence. Furthermore, their commitment leads to higher academic performance and lower intentions to drop out. A similar influence on the two outcomes is that exerted by the perception of the curricula as focused on the real practical needs of the student, an effect that is also mediated by academic persistence.

Previous studies revealed the importance of some of these dimensions in the educational setting; for instance, general self-efficacy was shown to have a potentially preventive role in academic dropout (Shannon & Bylsma, 2005), while other studies have concluded that personal beliefs about one`s capabilities of succeeding can explain educational outcomes (Zajacova, Lynch, & Espenshade, 2005). Our results add more depth to the understanding of to these relationships by revealing that they are at least partially mediated by academic persistence, thus pinpointing one of the psychological mechanisms of these effects: the aforementioned psychological and educational variables foster students' academic persistence, which in turn are associated with more positive educational outcomes.

Hence, the positive influences of the psychological traits and educational strategies we studied are not restrained to the psychological level of academic persistence, but they extend towards practical outcomes. Consequently, fostering academic persistence through the development of its related personality characteristics and through the appropriate educational experiences has a higher stake than just promoting appropriate persistent attitudes and behaviors; it also leads to lower dropout and to higher school performances, both of which are essential educational outcomes.

Class attendance is usually conceived as linked to academic performance, although recent studies contest this relationship (Moore, Armstrong, & Pearson, 2008). Our results show that in the case of absenteeism, the personality and educational predictors we measured do not exert the same pattern of influences that we observed in the case of the previous two academic outcomes (academic performance and intention to dropout). We only found a marginal direct effect of restraint on absenteeism, but without any significant mediation by academic persistence; moreover, the latter is not significantly related to class attendance. It seems that academic persistence does not guarantee the lack of school absences. It is possible that absenteeism is rather sensitive to students' personal perspective on the consequences of this behavior and on their habits more than to their level of academic persistence. In other words, high commitment and involvement in the educational processes can coexist with a high number of school absences. Further analysis should take into account students' perceptions and attitudes towards this issue in order to gain more insight about its psychological, educational and environmental determinants.

The last educational outcome that we investigated was students' aspirations towards further academic achievements. We found a positive relationship between academic persistence and

students' level of academic aspirations, as well as a significant influence of one of the psychological traits investigated, namely mastery goals, on students' aspirations. This influence is fully mediated by academic persistence. Hence, developing academic persistence appears as an important aim also due to its positive influence on future aspirations, as it appears to instill the desire to pursuit higher academic goals.

Our final research question refers to the comparison between IB students and equivalent non-IB students in Romanian schools in what regards academic persistence and its associated traits, on one hand, and their relationships with the relevant educational outcomes, on the other. Recent studies show that the Romanian public educational system has certain flaws that cause, among other factors, a high frequency of school dropout (Serban, Perju, & Macovei, 2011). In this context, a comparison between the IB schools and the traditional Romanian schools can highlight which personality traits and school strategies can stimulate students to strive to obtain better grades and finish their education.

An overview of our results concerning this question confirms our expectations: compared to the traditional Romanian schools, the IB programme promotes a climate that better supports students in completing their education, as non-IB students perceive their educational experiences as less guided by the educational strategies aimed to develop their academic persistence. Thus, in the non-IB students' dominant perspective, the traditional Romanian schools seem to be lacking such mechanisms. Even when the mechanism are perceived as present, their actual effects on students' academic persistence are weaker than in the IB environment, since only six out of the ten strategies that we have tested were significantly associated with academic persistence, with lower correlations than those in the IB sample. Similarly, all correlations between non-IB students' perceptions of the school strategies that best foster the personality traits associated with academic persistence and the respective traits are smaller than in the IB group; in fact in the case of restraint, this association is non-significant. One possible explanation for this would be a lower ability of the traditional Romanian schools to encourage the development of the personality traits associated with academic persistence. Moreover, non-IB students scored lower than the IB students on academic persistence and on three out of the seven personality traits associated with it.

We also found that the educational strategy with the strongest effect on non-IB students' academic persistence is independent work style. In the Romanian educational system, students seem to be most persistent when they are encouraged to work on their own, when their success or

failure is contingent only on their own work. Several authors state that students need an environment in which they do not feel controlled but are stimulated to work freely (Kohn, 2011). However, the primary use of this strategy, to the detriment of others, may lead, to long term negative effects such as low school engagement, associated with decreased academic persistence (Appleton, Christenson & Furlong, 2008). Moreover, previous studies have shown that students' academic persistence is best stimulated through a synergy of school strategies. For instance, in a meta-analysis of over 800 papers, Hattie (2013) underlines the importance of classroom size and management, teacher-student relationships, teacher's specific teaching strategies and curricula on students' educational achievement.

A similar pattern of results was noticed when we analyzed the students' specific traits that contribute to academic persistence. As opposed to the IB students, where all seven individual traits were associated with academic persistence, in the non-IB students only five such associations were significant. Critical thinking and restraint, which are among the most important individual personality traits associated with increased academic persistence in the IB group, did not correlate with academic persistence in the non-IB group. This finding is also in accordance with previous studies that have found that the Romanian traditional school system lacks the means to encourage student's curiosity and mostly rewards memorization (Nita, 2013). In such a context that discourages students' originality and values the exact reproduction of learnt material, the students' academic persistence seems to be associated with other personality traits. Specifically, as our result show, non-IB students' academic persistence is most associated with their proactive attitude.

Individuals with a proactive attitude believe that they have enough resources to be able to overcome all challenges and pursue all of their goals, taking responsibility for their own growth, for the future and past events in their life (Schwarzer, 1999). Proactive attitude is also associated with a positive perception of the individual's overall self-efficacy and with proactive coping strategies (Albion, Fernie & Burton, 2005). Students with a proactive attitude have a sense of control over their education and believe that they are solely responsible for their success or failure. They prefer to work independently, setting their own goals, and they believe that school has limited influence on their future (Harvey, Blouin & Stout, 2006). It seems that, in the context of a traditional educational system that still overuses coercive measures, and does not support students' creativity and where students' perceive their teachers as being disengaged (Nita, 2013), the most

persistent are those students who are used to work on their own and who believe that they are solely responsible for their education and future.

In our mediation analyses, we found that the only educational strategy associated with non-IB students' academic performance was independent work style and this relationship was mediated by students' academic persistence. This result brings further support to the idea that the students who have the capacity to work on their own and develop various skills independently are the ones most likely to thrive in the Romanian public schools. On the other hand, students' proactive attitudes, although significantly predicting their academic persistence, have no further effect on their academic performance, a result suggesting the traditional educational system does not reward proactive individuals. Somehow paradoxically, the most academically persistent non-IB students also tend to have the most proactive attitudes, but this attitude doesn't translate into higher school grades. This pattern of results suggests that the Romanian traditional school system is not consciously assuming the mission of developing students' proactivity, since this psychological trait only has significant relationships with other subjective dimensions, such as academic persistence and aspirations, but it is not externally reinforced through higher grades. Furthermore, results pinpoint restraint as another significant predictor of non-IB students' academic performance. Interestingly, however, our previous results showed that this personal trait is perceived by the non-IB student as not being fostered by their educational environment and that it has no significant effect on academic persistence. Further studies should try to identify the precise mechanisms that support academic performances in the Romanian schools, and the educational strategies that should be developed to this aim.

Concerning the second educational outcome, dropout intentions, our results show that none of the factors of academic persistence strongly relate to dropout intentions in the non-IB sample. Moreover, enlarging the set of potential predictors by including all the educational and psychological variables that we measured, we still found no significant association with dropout intentions among non-IB students. Hence, these intentions seem to have a very distinct causal mechanism in this sample. Since dropout is a serious problem in the Romanian educational system, further studies are necessary in order to explore its significant factors.

4. Implications and recommendations

Given this important role of academic persistence for the IB students' academic performance and other educational outcomes, we think that teachers working in the IB programme should be made aware of the relevance of developing this trait in their students. Also, the set of educational strategies, both general and specific to each trait that supports academic persistence, should be made explicit to them and they should be encouraged to fully apply the strategies under their control, such as building relationships with their students, promoting an independent work style, thoroughly explaining the IB framework to them, helping them develop the six traits that further support academic persistence (self-confidence, proactive attitude, restraint, critical thinking, mastery goals and academic resilience). On the other hand, the essential role in academic persistence of the two qualities of the IB curricula highlighted as such by our results, namely their comprehensiveness and their focus on the real, practical need of the students, should be acknowledged and reflected in any future review of the IB DP curricula.

Beyond these positive effects, another set of implications and subsequent recommendations for improvement stems from several elements highlighted by the IB teachers and/or by the results of our quantitative research phase. First, looking at the overall means of the IB students' perceptions of the ten educational strategies that foster academic persistence, it can be noticed that two of these strategies, namely clear framework and focusing on the student, have a mean score below 4 (which is the point of "somewhat agreement" of the response scale used in the questionnaire). Consequently, the general perception among IB students is not decisively positive on these two aspects of the IB programme. Concerning focusing on the student, its improvement would primarily entail offering students more guidance and taking into greater account their needs when developing educational activities and tasks. The clear framework dimension, as it is represented in the questionnaire items, is focused on the clarity of the assessment criteria, and on the consistency between requirements and the evaluation of their fulfillment. Its essential status for students' performances is highlighted by studies showing that having a clear goal in mind and knowing the necessary steps to be taken in order to accomplish it can help one effectively plan the endeavors necessary in order to successfully attain it (Belcourt & McBey, 2010).

Another suggestion that emerged from the focus groups with the IB teachers, is to stimulate IB students' long-term future perspectives by emphasizing the benefits of the IB diploma for their

future educational opportunities. For example, schools could provide students with more information about how and where the IB diploma is recognized among universities. This, in turn, would help develop students' academic persistence and educational commitment, in line with the empirical studies revealing that students' learning motivation is sustained by their awareness of the manners in which education can help their future career plans(Barrett, 2000). On this topic, there were IB teachers in our sample who stated that "the most persistent students are the ones that have a clear vision about what they are going to do post-secondary" and that students' academic persistence is stimulated by "the options they feel are available for them at the end of the high schools studies". Besides the evident advantages in the "educational market" of having an IB education, students could be made more aware of the practical skills that the experiences in the IB system have helped them develop. On this issue, some teachers remarked that the IB learner profile, which synthesizes the skills fostered in the IB students, is not very efficient in this purpose, as students do not acknowledge it as truly reflective of their true personalities. For instance, one opinion among those expressed by the IB teachers was that "a lot of the students do not respond well to the IB learner profile because they feel it's artificial". A solution might be to further explain the relevance of the learner profile attributes to their lives and experiences and the practical skills derived from them that students develop, as well as the ways in which these skills could help further their careers and education.

Another implication is related to the assessment process that seems, in the opinion of the teachers interviewed, "antithetical to a lot of the teaching strategies" that they are employing. The primary reason is that while the teaching aims to develop "curiosity" and "inquiry" in students, the final examinations are "really stressful" and do not actually reward students' creativity. Consequently, the students are "very stressed in preparing themselves for this [examination] process which becomes quite tedious and exhausting". The results of our quantitative research phase also show that academic resilience, a psychological trait that could help students better overcome these difficulties, is the only personality dimension among the seven that we investigated on which IB students scored lower than the non-IB ones. This difference is in line with the fact that the educational mechanism of fostering academic resilience is perceived by the IB students as being somewhat under-implemented, as it is the only one among the six strategies aimed at the traits supporting academic persistence with an overall mean below 4. Hence, IB students perceive that the teaching periods in their academic year do not prepare them enough for

the requirements and the pressures of the examination period, so that they could be more able to adapt to its difficulties.

In conclusion, our results show that the IB DP programme fosters students' academic persistence to a higher degree than the traditional educational system (at least the Romanian one) does. The generalizability of the findings concerning this comparison is limited by the fact that we only used Romanian students as a control group; further studies could test the cultural variability of these effects by comparing IB students to non-IB students enrolled in traditional school systems in other countries. This effect is mostly due to a set of distinct strategies that stimulate this trait both directly and indirectly, especially through the adapted and comprehensive curricula, and through the development of certain psychological skills supporting academic persistence. Moreover, IB students' academic persistence is associated with their academic performances, their school commitment and their educational aspirations. The importance of academic persistence among the educational effects of the IB programme has also been highlighted by previous studies, although only at an implicit level. For instance, Wright(2014), in a synthetic overview of the long term outcomes of the IB programmes, shows that their mission and instruction focus on enhancing people with an integrated personal system of social values and dispositional orientations that ensure long-lasting effects in their life by becoming lifelong learners. Our study reveals some of the actual mechanisms of those effects, as well as the role of academic persistence and the educational strategies that can enhance it.

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APPENDICES

Appendix A. Teacher focus group protocol

"1. Please tell me a bit about your professional background. How long have you been teaching? How long have you been here, at this school? Have you worked at other schools before? Do you work exclusively with IB students?

2. From your experience, how would you describe a student characterized by high levels of academic persistence? If this helps, please think of a student who stood out to you as very persistent academically?

3. Further, please think specifically of IB students in your schools. How would you describe the IB student with a high level of academic persistence? In your opinion, what are the skills and personality traits specific to the students high in academic persistence?

4. From your perspective, do you think there are differences between the IB students in your school and their non-IB peers in regards to their level of academic persistence? If there are such differences, what do these differences look like?

5. Next, I would like to discuss the components of the IB programme that support the IB students' academic persistence. My suggestion is to focus on four such components, separately:

a) The principles and values promoted by IB (including the IB Learner profile) – which of these support the IB students' academic persistence? Can you think of specific examples?

b) The IB Diploma Programme curriculum – how does it support the IB students' academic persistence? Can you think of specific examples?

c) The work practices encouraged by and applied in the IB Diploma Programme - which of these support the IB students' academic persistence?

d) The evaluation practices specific to the IB Diploma Programme - which of these support the IB students' academic persistence?

6. Finally, I would like you to think of your daily experience in the IB programme. In your opinion, how does the IB programme contribute to the development of the skills and traits associated to a high level of academic persistence?"

Appendix B. Student questionnaire administered in the third research phase

The following questionnaire is part of a scientific research on the perceptions and experiences of high school students. Your responses are anonymous, and the results of the study will only be used in scientific purposes. Please read attentively the following assertions, choose the response that best reflects your opinion and mark the appropriate box with an "X". Where you are asked about your school, please respond by referring to your experiences **in the IB program**.

I		***Not at all true***	***Hardly true***	***Moderately true***	***Exactly true***
1.	I can always manage to solve difficult problems if I try hard enough				
2.	I spend time identifying long-range goals for myself				
3.	If someone opposes me, I can find means and ways to get what I want				
4.	I feel in charge of making things happen				
5.	It is easy for me to stick to my aims and accomplish my goals				
6.	I feel responsible for my own life				
7.	I am confident that I could deal efficiently with unexpected events				
8.	I feel driven by my personal values				
9.	Thanks to my resourcefulness, I know how to handle unforeseen situations				
10.	I can solve most problems if I invest the necessary effort				
11.	I am driven by a sense of purpose				
12.	I can remain calm when facing difficulties because I can rely on my coping abilities				
13.	I am able to choose my own actions				
14.	When I am confronted with a problem, I can usually find several solutions				
15.	I focus my efforts on things that I can control				
16.	If I am in trouble, I can usually think of something to do				
17.	There are abundant opportunities that await me				
18.	No matter what comes my way, I am usually able to handle it				

II		***Not at all true of me***						***Very true of me***
		1	**2**	**3**	**4**	**5**	**6**	**7**
1.	I believe I'm mentally tough when it comes to exams							
2.	I treat the course material as a starting point and try to develop my own ideas about it.							
3.	I prefer course material that really challenges me so I can learn new things							
4.	I don't let study stress get on top of me.							
5.	I often find myself questioning things I hear or read in this course to decide if I find them convincing							
6.	I'm good at bouncing back from a poor mark in my schoolwork							
7.	When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence							
8.	I prefer course material that arouses my curiosity, even if it is difficult to learn							
9.	I think I'm good at dealing with schoolwork pressures							
10.	Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives							
11.	I don't let a bad mark affect my confidence							
12.	When I have the opportunity in my courses, I choose assignments that I can learn from, even if they don't guarantee a good grade							
13.	I try to play around with ideas of my own related to what I am learning in school							
14.	I'm good at dealing with difficulties at school							

III		***Not at all like me***	***A little like me***	***Somewhat like me***	***Mostly Like Me***	***Very much like me***
1.	I maintain motivation even in activities that last months and months					
2.	I have a good capability to focus on daily tasks					

3.	I still think of different ways for using the opportunities that we gave up					
4.	I am good at resisting temptation					
5.	Long-term goals motivate me to overcome the daily hardships					
6.	When I plan to do something on a day, I do not give up until I do what I intended					
7.	I keep up a difficult task even when others have already given it up					
8.	I have a hard time breaking bad habits					
9.	Even if it does not matter anymore, I keep thinking of personal goals that I had to abandon					
10.	I realize easily when I have to stop from pursuing certain important personal goals					
11.	I abandon daily activities, if they are unpleasant or not too interesting					
12.	I wish I had more self-discipline					
13.	Often, new ideas come to me about a former problem or project					
14.	I insistently pursue fulfilling the projects I believe in					
15.	I find myself thinking of old, abandoned initiatives					
16.	People would say that I have iron self-discipline					
17.	I continue to invest time and effort into ideas and projects that require years of patience and work					
18.	When I start working, I forget everything all of a sudden, and I focus on what I'm doing at the moment					
19.	It is difficult to forget an important project that I had to give up, in favor of other projects					

IV		***Strongly disagree***	***Disagree***	***Somewhat disagree***	***Somewhat agree***	***Agree***	***Strongly agree***
1.	The school that I am in helps me to develop towards a successful career						
2.	The subjects that I study contribute to my personal growth						
3.	The way our work tasks are organized helps me to successfully overcome my difficulties in learning						

4.	High school has taught me to be disciplined						
5.	We are often encouraged by the teachers to express our own viewpoints concerning the matters discussed during classes						
6.	My classroom experiences increased my confidence in my ability to solve the problems I am facing						
7.	We are often required to apply the theoretical knowledge to various practical situations						
8.	We always know why we received a certain mark						
9.	We are often assessed based on the projects we carry out independently						
10.	I believe that teachers are not involved enough in our education.						
11.	I would like to receive more guidance from my teachers						
12.	Teachers are a real support for me						
13.	During the courses, teachers always have enough time to offer me further explanations or support when I need it						
14.	The topics we studies often seem obsolete to me						
15.	The disciplines I study at school cover my knowledge needs						
16.	The topics I study at school will be useful for me in the future						
17.	Teachers in my school help me to evaluate my progresses						
18.	The teachers / the school urge me to look for new information						
19.	The constant work rhythm that the school requires helps me to deal with my school tasks and exams						
20.	I learned in high school how to organize myself in order to respect the deadlines for my papers and projects						
21.	The teachers encourage us to filter the things they teach us through our own mind						
22.	My classroom experiences have raised my trust in my ability to engage in conversations with anyone, even on difficult issues						
23.	We often talk with teachers about the how we can practically apply the information they teach us						

24.	It is often unclear what to do to get a high mark						
25.	Teachers encourage us to come up with proposals for new activities						
26.	Teachers pay a lot of efforts to deliver us a high quality education						
27.	Sometimes I feel that teachers do not care about me						
28.	I feel I can talk openly with my teachers about the challenges I am confronted with						
29.	The school groups are too large in number and this does not allow teachers to know each one of us						
30.	The information we learn in school are up-to-date						
31.	I feel I couldn't choose the study subjects according to my interests						
32.	There are many study subjects that I feel will never bring me any real benefit						
33.	I talk to my teachers about my future plans						
34.	All the subjects that I study are very important						
35.	I think the way that the courses and exams are organized helps me deal with any task related to school						
36.	The high school program encourages me to set myself a working rhythm without being carefully monitored by my teachers						
37.	Most of our teachers ask us to form our own conclusions about the topic discussed, based on the information they provide						
38.	The school supports me in developing my self-confidence						
39.	Many of the things we learn are connected to real life, to practical issues						
40.	The evaluation criteria for each discipline are clear from the outset						
41.	I am granted plenty of freedom in completing school tasks and projects						
42.	Teachers are committed in all their work with us						
43.	The teachers adapt the contents of the lessons taking our needs into account						
44.	Teachers are available and helpful whenever I need them						

45.	Sometimes I wish our teachers had more time to work individually with me in classes						
46.	In classes we discuss modern topics, important for our future						
47.	From my point of view, the subjects that I study are sufficiently diverse						
48.	The disciplines we study really cover the demands of the labor market						

V		***Not at all like me***	***A little like me***	***Somewhat like me***	***Mostly Like Me***	***Very much like me***
1.	I will do my best to make sure I finish my high school / IB studies in time					
2.	I am very committed to earn a degree from this high school / / IB program					
3.	I am very confident that this high school / IB program fits my needs and capabilities					
4.	I am very interested in doing the right things in order to graduate from this high school / IB program					

VI		***Not at all***						***Very true so***
		1	**2**	**3**	**4**	**5**	**6**	**7**
1.	I sometimes consider dropping out of school							
2.	I intend to drop out of school							
3.	I sometimes feel unsure about continuing my studies year after year							

Approximately how many **classes have you missed** this semester for reasons other than illness or school-sponsored activities? _____

What was your **overall mean mark** on the previous semester? If you don't remember exactly, please approximate. _____

Gender: male □ female □

Age: _____ years

Grade □ XI □ XII

* Since how many years have you been **enrolled in the IB programs** (PYP, MYP, DP)? _____

*** Country of residence _____**

Parents' level of education:
Mother: high school □ university □ Master studies □ PhD □
Father: high school □ university □ Master studies □ PhD □

Ethnicity: Caucasian (White) □ Black □ Asian □ Other □ Unknown □

Nationality _____

Native language _____

What is the **highest educational degree** that you aspire to complete?
high school diploma □ university □ Masters □ doctorate (PhD) □

* Questions included only in the questionnaire administered to the IB sample

Appendix C. The descriptions, reliability estimates and sample items of the instruments evaluating the dimensions on the first three layers of investigation

Table 1. The scales evaluating students' perceptions concerning the educational strategies through which the IB programme fosters students' academic persistence

Name	**Reliability estimates**	**Descriptions**	**Sample item**
Applicability of knowledge	Cronbach's alpha = 0.78; MIIC=.50	The degree to which the theoretical knowledge transmitted in school is applied to practical issues.	We are often required to apply the theoretical knowledge to various practical situations
Clear framework	Cronbach's alpha = 0.57, MIIC=.30	The perceived transparency and clarity of obligations and responsibilities, tasks and assignments of the evaluation system.	We always know why we received a certain mark
Independent work style	Cronbach's alpha = 0.59, MIIC=.23	The presence of opportunities and encouragements offered by the school to develop and maintain independent work habits in their students.	We are often assessed based on the projects we carry out independently
Teachers' involvement	Cronbach's alpha = 0.72, MIIC=.47	The degree of teacher engagement in the instructional process.	I believe that teachers are not involved enough in our education
Focusing on the student	Cronbach's alpha = 0.51, MIIC=.50	The degree to which teachers take into consideration students' needs and preferences.	I would like to receive more guidance from my teachers
Intense collaboration and partnership with the teachers	Cronbach's alpha = 0.79, MIIC=.50	The general evaluation of the quality of the teacher-student relationship.	Teachers are a real support for me

Student class size	Cronbach's alpha = 0.44, MIIC=.20	The adequacy of class sizes for the achievement of educational goals, or whether they should be adjusted in order to serve every student's needs appropriately.	During the courses, teachers always have enough time to offer me further explanations or support when I need it
Updated curricula	Cronbach's alpha = 0.52, MIIC=.27	The novelty and appropriateness of the educational contents and technologies to students needs and demands.	The topics we study often seem obsolete to me
Comprehensive curricula	Cronbach's alpha = 0.51, MIIC=.27	The broadness of the subjects and the degree to which they satisfy all the knowledge demands of students.	The disciplines I study at school cover my knowledge needs
Curricula focused on the real, practical needs of students	Cronbach's alpha = 0.63, MIIC=.37	The perceived applicability and utility of the knowledge that the students usually attach to their academic work.	The topics I study at school will be useful for me in the future

Table 2. The scales evaluating psychological traits (academic persistence and the traits hypothesized to support it)

Name	**Reliability estimates**	**Descriptions**	**Sample item**
Proactive attitude scale (Schmitz &Schwarzer, 1999), addressing the dimension of *ambition (academic goal setting and pursuit)*	Cronbach's alpha = 0.69; MIIC=.22	8-item scale evaluating the belief that one can bring changes to oneself and the environment. These changes mobilized by a vision regarding life and important, ambitious goals, taking responsibility for one's success and development, resourcefulness (believing one has sufficient external and internal resources to access in order to reach goals) and values. Response scale from 1 = "Not at all true" to 4 = "Exactly true".	I spend time identifying long-range goals for myself.

General Self-Efficacy Scale (Schwarzer& Jerusalem, 1995), addressing the dimension of *self-confidence*	Cronbach's alpha = 0.81, MIIC=.30	10-item scale evaluating broad positive beliefs in one's ability to manage difficulties and cope with challenges and stressful situations. The dimension correlates negatively with depression and anxiety, and positively with self-efficacy, self-esteem and optimism (Schmitz &Schwarzer, 1999; Schwarzer, Baessler, Kwiatek, Schroeder &Zhang, 1997; Schwarzer& Born, 1997) and helps people persevere despite obstacles via their beliefs in the capacity to alter environments and their own behaviors (Schieman& Campbell, 2001). Response scale from 1 = "Not at all true" to 4 = "Exactly true".	I am certain that I can accomplish my goals.
Mastery Goals Scale from the *Motivated Strategies for Learning Questionnaire (MSLQ)* (Pintrich et al., 1993, validated also by Daniels et al., 2009), addressing the dimension of *academic purposes related to self-development*	Cronbach's alpha = 0.60, MIIC=.34	3-item scale evaluating students' tendency to choose goals and tasks in a way that allows them to focus on growth and development of their skills, not only achieving formal acknowledgment and rewards for their work. The original MSLQ self-report instrument comprised 81 items measuring motivational orientation and learning strategies, based on a model of self-regulated learning that views motivation as directly related to the students' ability to organize and self-regulate. High scorers on the *Mastery Goals* scale seek new learning situations, and perceive them as opportunities to increase their knowledge and skills. Response scale from 1 =	The way our work tasks are organized helps me to successfully overcome my difficulties in learning.

		"Not at all true of me" to 7 = "Very true of me".	
Academic resilience scale (Martin & Marsh, 2006)	Cronbach's alpha = 0.81, MIIC=.42	6-item scale evaluating students' ability to cope with stressors and school pressure, enabling them to persist in achieving their academic goals. The scale correlates with indicators of academic success, including enjoyment, general self-esteem and participation in classroom activities (Martin & Marsh, 2006). Response scale from 1 = "Not at all true of me" to 7 = "Very true of me".	I think I'm good at dealing with schoolwork pressures.
Critical Thinking scale from the *Motivated Strategies for Learning Questionnaire* (Pintrich et al., 1993)	Cronbach's alpha = 0.76, MIIC=.39	5-item scale from the MSLQ evaluating the higher order set of skills and strategies employed in applying information and knowledge to new problems or when critically evaluating new concepts and ideas. Response scale from 1 = "Not at all true of me" to 7 = "Very true of me".	I treat the course material as a starting point and try to develop my own ideas about it
Restraint subscale from the *Brief Self-Control Scale* (Tangney, Baumeister, & Boone, 2004, validated also by Maloney, Grawitch, & Barber., 2012), addressing the dimension of *Self-discipline*	Cronbach's alpha = 0.50, MIIC=.20	4-item scale evaluating the individual ability to resist temptations and not succumb to momentary desires and impulses; in other words, to delay gratification; general measure of the tendency to engage in effortful restrained behaviors. This ability is crucial in a person's self-imposed regulation of behavior, predicting long-term outcomes, including academic success (Duckworth et al., 2012). Response scale from 1 = "Not at all like me" to 5 = "Very much like me".	I am good at resisting temptation

Motivationalpersistencescale – MPS (Constantin et al., 2011)	Cronbach's alpha = 0.84, MIIC=.27	19-item scale (extended version of the initial 13-item scale) evaluating an individual's predisposition to persist motivationally in the effort directed towards achieving an assumed goal. Cumulated scores of the three factors of the MPS Questionnaire (LTPP - long term goal pursuit; CPP - current goal pursuit; and RUP - recurrence of unattained purposes), allow the assessment of a person's tendency to persevere behaviorally and motivationally in the effort to achieve ambitious targets; to persist, and not abandon. Response scale from 1 = "very small extent" to 5 = "very high extent".	Long-term goals motivate me to overcome the daily hardships
Academic Persistence scale is adapted from the subscales *Degree Commitment, Institutional Commitment* and *Academic Consciousness* in the *College Persistence Questionnaire* (Davidson et al., 2009)	Cronbach's alpha = 0.82, MIIC=.50	4-item scale; institutional commitment measures the loyalty and trust the student invests in the academic institution he or she is enrolled in, deriving from the satisfaction with the choice to pursue that specific educational program. Degree commitment refers to the importance or the strength of intentions to earn a degree. Academic Consciousness refers to the efforts the student invests in academic work in respecting deadlines, participating in school activities and completing required assignments. Response scale from 1 = "Not at all true of me" to 7 = "Very true of me".	I am very confident that this high school / IB program fits my needs and capabilities. I will do my best to make sure I finish my high school / IB studies in time

Table 3. The scales evaluating students' perceptions concerning the strategies used by the schools in order to foster the 6 psychological traits hypothesized to support academic persistence

Name	Reliability estimates	Descriptions	Sample item
Ambition (academic goal setting and pursuit)	Cronbach's alpha = 0.66; MIIC=.40	The degree to which students consider school-related goals as part of their development process.	The subjects that I study contribute to my personal growth.
Self-confidence	Cronbach's alpha = 0.79, MIIC=.52	The way in which schools develops students' confidence in their skills.	My classroom experiences increased my confidence in my ability to solve the problems I am facing.
Academic purposes related to self-development	Cronbach's alpha = 0.60, MIIC=.34	The degree to which students consider school-related goals as part of their development process.	The subjects that I study contribute to my personal growth.
Academic resilience	Cronbach's alpha = 0.74, MIIC=.49	The implicit and explicit support received for dealing with challenges and the difficulties inherent in any learning process.	The way our work tasks are organized helps me to successfully overcome my difficulties in learning.
Critical Thinking	Cronbach's alpha = 0.66, MIIC=.50	The degree to which the program is perceived as supportive of independent inquiry and critical thinking skill.	We are often encouraged by the teachers to express our own viewpoints concerning the matters discussed during classes.
Self-discipline	Cronbach's alpha = 0.73, MIIC=.47	The degree to which their school equips them with the self-regulatory strategies needed in order to organize and manage their school work and any task in general.	High school has taught me to be disciplined.