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Doctoral School of

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Ph.D. THESIS

-Abstract-

THE SELF-REGULATORY CORRELATES OF UNDERGRADUATE ACADEMIC PERFORMANCE: FACILITATORS, RISK FACTORS AND INTERVENTION POSSIBILITIES

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CONTENTS

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I dedicate this work to my children: Dóra Abigél and Anna Evelin. I hope they will read it someday with joy and understanding and they will find important cues for efficient self-regulation towards achieving their life goals.

Notes:_____

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1 CHAPTER 1. INTRODUCTION

The academic career, the time devoted to education, represents a large amount of the available time of youth who opt for long term formal education. Although it seems there is an ascending interest in getting a college degree following high school in Romania, official statistic data show that the abandonment rate or the extension of maximum period of study is above 35% and can even reach 50% in some accredited universities. [1]

This situation is multiply determined from socio-economic status of undergraduates to wrong choice or lack of abilities, aptitudes or basic characteristics, which are necessary to successfully go through this meaningful period. The lack of performance in academia seems to be a high stake issue, which needs appropriate attention for identification of scientifically grounded methodology which can provide better results for help-seeker undergraduates. Self-regulated behavior is a facilitator in academic performance and coping with high educational demands and since this was not formerly studied in Romania we have chosen this research field to highlight possible paths of academic performance enhancement for struggling undergraduates.

1.1 SELF-REGULATED BEHAVIOR: APPLICATIONS TO EDUCATIONAL SETTING

1.1.1 High-Performing Undergraduates's Self-Regulatory Characteristics

A longitudinal research across the lifespan of gifted adults, highlighted that persistence, intellectual energy, originality and ambition play an important role in achieving success (Cox, 1926).

Self-regulation becomes an important ability since freshman year. Usually, freshmen have the highest difficulty in adapting to the new learning environment, quite different from that of high-school. Although academic success in university requires certain abilities, these are not directly conveyed through results (Zimmerman& Schunk, 2008). Students exhibit self-regulation in learning „to the degree that they are meta-cognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1989, p. 329).

Students' academic achievement in college is measured through grades and GPA (Pascarella & Terenzini, 2005). Good grades during higher education are a significant predictor of finishing studies in time. Literature contains hundreds of research papers addressing predictors for academic success. For example, perceived academic control (Perry, Hladkyi, Pekrum & Pelletier, 2001) and the sense of personal control related to the level of self-efficacy (Bandura, 1991) holds an important role.

Certain studies highlight the importance of academic maturation, experiences and previous performance being the most important predictors of success in higher education (Payne, Davidson & Sloane, 1966; DeBernard et al, 2004; Kinsantas et al, 2008; Harakiewitz et al, 2002). High school GPA or ACT results (equivalent to the Baccalaureate) are the most important correlates of performance in freshman year. Next to previous performance, the size of the vocabulary, and the tendency not to repress incomplete tasks in stress conditions, also known as the Zeigarnik effect (Zeigernik, 1927), are also significant.

Self-regulatory processes are directly connected to proactive behavior in students, who can participate knowingly and strategically in the process of self-formation (Green &

[1] Source: http://cursdeguvernare.ro/abandonul-in-universitati-mai-mult-de-unul-din-trei-studenti-nu-ajunge-la-licenta.html

Azevado, 2007, Pintrich, 1989, 1999). Positive qualities that promote performance, like perseverance, initiative and strategic accommodation, are related to self-concepts and positive self-beliefs (Bandura, 1991) and they are linked to efficient use of metacognitive strategies (Zimmerman, 1986 a, Zimmerman& Schunk, 2008).

Achieving students are capable of being proactive and efficiently applying learning strategies (Yip, 2013). At the same time, they possess learning skills and they are emotionally and behaviorally effectively regulated (Weinstein, 1988, Wainstein et al., 2000). Academic competency, academic enablers and some personality traits (e.g. sociability) were actually proposed for evaluation and diagnosis, being considered important for interventions (DiPerna &Elliot, 2002).

Students' motivation plays an important part in self-determination theory (Deci & Ryan, 1985, 1991). The theory describes the high-achieving student as an individual who is internally motivated and whose performance is energized by the pleasure of learning and acquiring information. Intrinsic motivation encourages exploration and the interest for activities connected to learning. (Piaget, 1971).

Based on hundreds of studies, Goal-Setting Theory (Locke & Latham, 1990) claims that setting goals is essential for achievement. That is why setting goals is also relevant for academic performance, both specific (Pintrich, 1988, 1989) and at large (Morisano, Hirsch, Peterson, Phil & Shore, 2010; Schippers, Scheepers & Peterson, 2015; Travers, Morisano & Locke, 2015), helping students to plan their future and to articulate the necessary steps to be taken. There are two types of goal orientations applied to performance: achievement and mastery. The first mindset predicts grades, the second, the enduring interest for educational tasks (Harackiewicz et al, 2002).

Zimmerman, Bonner & Kovach (1996) described domain specific skills in self-regulated learning:

- Planning and time-management;
- Strategies for comprehension and summarizing texts;
- Improving note-taking;
- Anticipating and preparing efficiently for exams;
- Abilities of efficient writing.

By tackling these five skills in the development of self-regulation, students may become "smart" learners. The importance of learning strategies, like the use of writing, proved extremely important for students with special needs (Deshler & Schumaker, 1986; Sawyer, Graham & Harris, 1992).

The concept of "strategic learning" refers to a vast pallet of behaviors and activities (Pintrich, 1988; Weinstein, 1988; Zimmerman, 1990; Weinstein, Palmer & Schulte, 2002; Weinstein, Husman & Dierking, 2000 Yip, 2013). The relation between learning strategies and academic performance was evinced in several studies (Bennett, Dunne & Carre, 1999; Zimmerman, 2008; Corno, 1986, 1989). Yip (2007, 2013) found that strategy differentiates performance in high school and college, and there is a disparity between high and low achievers when taking this variable into account.

Weinstein, Zimmermann & Palmer (1988), proposed three factors of strategic learning represented by the subtests of the Learning and Study Strategies Inventory: Skill (Information Processing, Selecting Main Ideas, and Test Strategies), Will (Anxiety, Attitude, and Motivation), and Self-Regulation (Concentration, Self-Testing, Study Aids, and Time Management). These factors were scientifically demonstrated (Weinstein, Palmer & Schulte, 2002; Hill, 2012). This view also suggested the complexity of interrelated factors that support academic performance.

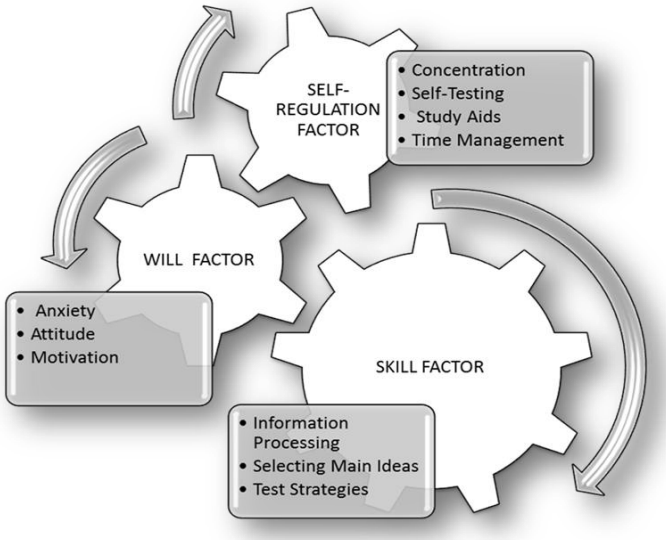

Figure 1. LASSI- System Model of Strategic Self-Regulated Learning (Weinstein, Palmer & Schulte, 2002).

1.2 GOALS IN SELF-REGULATION: THEORIES AND APPLICATIONS

1.2.1 The Theory of Goal Setting

Self-regulatory behavior in a variety of theoretical models presents goals as an element of composition at the time of the beginning of the action. Goals represent reference elements for behavioral adjustment (Sitzmann & Ely, 2011). They have an instrumental role and contribute to the tracking and support of the progress in favor of the abolition of the discrepancy between the current reality and the desired one (Locke & Latham, 1990, 2002, 2013).

1.2.2 Goals – Setting Interventions in Education

In an academic context, if the student experiences the attainment of the proposed goals, self-efficiency increases and thus the level of commitment to those proposed, increases and he or she will be able to mobilize the efficient self-regulation of cognitive and motivational resources for the benefit of the desired results (Pintrich, 2000, Schunk, 1990, Zimmerman, Bandura & Martines-Pons, 1992). The goals related to personal development (growth goals) have gained ground in the past 20 years. The implicit promises present in these goals, with personal relevance, have proved important in the educational context (McAdams et al, 2004). These purposes may, in fact, conceptually unite the learning goals with the performance goals described by Dweck (1986) in terms of ego goals. The common feature joining these categories in the personal field is linked to the desire for self-improvement, which forms the basis of personal perseverance.

Morisano et al. (2010) using a complex online program for personal goal setting, have obtained a weighted GPA 30 % higher for the experimental group compared with those in the placebo group. The results of the study showed the superiority of the operation of goal setting as compared to the placebo program, highlighting the importance of materializing

personal goals in a stage of life in which the identity is not yet formed and the students are in a state of searching. The number of words used in the stage of describing the ideal future influenced significantly the differences between the pre- and post-intervention results, stressing the importance of giving a concrete form to personal goals in motivated behavior. Viewing the ideal future in accordance with the literature leads to better results (Sherman, Skov, Hervitz & Stock, 1981; Campbell & Fairey, 1985) and it is often influenced motivation-wise.

Goals with personal value guide perception, cognition, emotions, and behavior with greater intensity, in particular in adults (Elliott, Chirkov, Kim & Sheldon, 2001). The clarity of these purposes, and respectively the visualization of the future have effect on a personal planning, being at the base of the mobilization of behavior.

1.2.3 Life Goals and Aspirations in Self-Regulation

Deci and Ryan (1985, 1991), the authors of the Self-Determination Theory, conceptualize self-regulation in learning as a process continuum, where personal will and internalized values play an important role. Self-regulation at the highest level involves freely chosen actions, which people embrace, because they find them interesting or important. Low levels of self-regulation involve actions that people must do because they are constrained by external factors. Thus, a high-school student who plans to become a good professional in the future will probably learn diligently, investing more in the learning process of materials related to the field of interest. A student, who does not have a clearly set objective or an internal reason, will probably spend more time on non-scholarly activities.

If we look at motivation as a hierarchical construct, we can outline both the general and the more specific goals and aspirations. Aspirations or life goals are key elements in creating a successful approach even in the academic environment; this represents an important stage in one's life (Kasser & Ryan, 1993, 1996). In a synthetic approach to the concept of self-determination, Vansteenkiste, Niemiec & Soenes (2010) have described five micro-level theories within the paradigm, including the theory of life goals, with particular emphasis on their content. Considering the content, we can differentiate intrinsic goals (growth, social, meaningful relationships, physical) and extrinsic life goals (wealth, image, fame). According to the correlational research (Kasser, 2002, Vansteenkiste et al., 2006) intrinsic aspirations are more likely to satisfy one's basic psychological needs, which play an important role in well-being. These basic psychological needs for competence, autonomy and relatedness are fundamental concepts in the self-determination theory. Intrinsic motivation is based on a simple inward orientation and the commitment to action can be a reward on its own, while the extrinsic motivation is dependent on external validation and performance driven by external rewards (Deci & Ryan, 1985).

Self-determined behavior is based on certain self-awareness and it is accompanied by a sense of free choice. Thus, it may play an important role in any context and in the progress of achieving performance. Also, the sense of belonging is a paramount factor in human behavior (Baumeister & Leary, 1995).

1.3 THEORY OF REGULATORY MODE

Kruglanski, Thomson, Higgins, Atash, Pierro, Shah & Spiegel (2000) address self-regulatory behavior in view of the functional dimensions which are at the basis of human motivation. These two functions are assessment and locomotion, which are defined according to their purpose in human behavior. The Assessment relates to personal value and meaning of the goal. Thanks to this component, the comparison and critical assessment of

the goals and the means for achieving and assessing the results can take place. The definition has been described as follows: *"Assessment Constitutes the comparative aspect of self-regulation concerned with critically evaluating entities or states, such as goals or means in relation to alternatives in order to judge relative quality*." (Kruglanski et al., 2000, p.794). It is based on the principle of "Do it Right".

Mobility (locomotion) is the variable that is related to the phases of movement related to the achievement of the goal. It ensures the activation of the behavior, even if the goal is not well-defined. The authors' definition is the following: *"Locomotion mode is the self-regulatory aspect concerned with movement from one state to state and with committing the psychological resources that will initiate and maintain goal directed progress in a straightforward manner, without undue distractions or delays*" (Kruglanski et al., 2000, p 794). Is guided by the principle of "Just do it".

Performance in the context of the Theory of the Regulatory Mode (Kruglanski, 1996, Kruglanski, et.al., 2000) involves the mobilization of efficient resources, prioritization and situational management in a strategic and well thought manner. Removing obstacles, the need for the initiation, continuous monitoring are essential for success. Thus, only the evaluation and locomotion modes together can lead to superior results from a qualitative and quantitative point of view. In the previous studies the academic performance in the military environment has been associated in a positive way with high scores in both the scale of assessment and locomotion (Taylor & Higgins, 2002, Kruglanski et al., 2000).

2 CHAPTER 2. RESEARCH OBJECTIVES AND GENERAL METHODOLOGY

2.1 GENERAL OBJECTIVE

The main objective of the thesis is the theoretical synthesis of various scientific perspectives on academic self-regulated learning. The aim of the thesis is to argument clearly the possible differences between theories and paradigms and to highlight their specific applications in our culture.

In literature, research on the applications of self-regulation addresses specific implications, related to specific skills belonging to the field of study that hold metacognitive connections (Pintrich, 2000; Zimmerman, 1986 a) with learning strategies and organization of the subject of study, control of personal resources (executive functions, the control of the environment and time management) and they rarely associate performance with life goals, personal identity and finding inspiring social meaning in the life of the students (Morisano et al., 2010; Chase et. al., 2013, Schippers et al., 2015). Considering these radically different perspectives, we propose to highlight the possible roles of specific skills (e.g. specific learning techniques and self-control) and of more general components related to identity and personality (e.g. life goals, self-awareness, perceptions of concepts, regulatory mode) in the psychological profile of students related to academic performance in higher education.

Through exploring the students' psychological characteristcs in relation to academic achievement, we aim at identifying possibilities of intervention, by emphasizing evidence based variables that predict or impact academic success in our culture. The general structure of the studies is presented in the Figure 2.

2.2 THEORETICAL, METHODOLOGICAL AND APPLIED OBJECTIVES OF RESEARCH

Through various theoretical syntheses and correlational and/or experimental research design, we set the following categorical objectives:

1. The theoretical concern is the documented analysis of self-regulated learning as concept and process connected to academic achievement in formal setting, at an undergraduate level, in various theories and paradigms.

2. Methodologically, we translate and adapt four assessment instruments related to self-regulation (LASSI- Learning and Study Strategies Inventory), self-determination (Self-Determination Scale, Aspiration Index) ability perception (Ability Uncertainty Scale) and an online goal-setting intervention of general life goals, that addresses identity and general motivation of students. At the same time, we make a systematic analysis of experimental studies of the last 25 years, related to the possible facilitating effects of goal-setting interventions on performance, in adult population, in formal and informal academic context. Their scientific approach within our culture will evince their specific uses to enhance successful results.

3. The practical application establishes the characteristics of the high-performing full time undergraduate student, considered in general terms (according to general aspirations, self-determination and regulatory mode) and in specific terms (based on specific components of strategic self-regulated learning). We aim at evincing factors and elements that are scientifically significant in predicting academic achievement, but also at showing risk factors. Starting from evidence based data on applied interventions, we will examine the effectiveness of cultural adaptation of a complex program of online goal-setting intervention and elaboration of personal goals, that demonstrated certain benefits when measured in other countries (Canada and the Netherlands), to the Romanian population of underachieving students – to explore the effect on academic performance, in a randomized controlled trial.

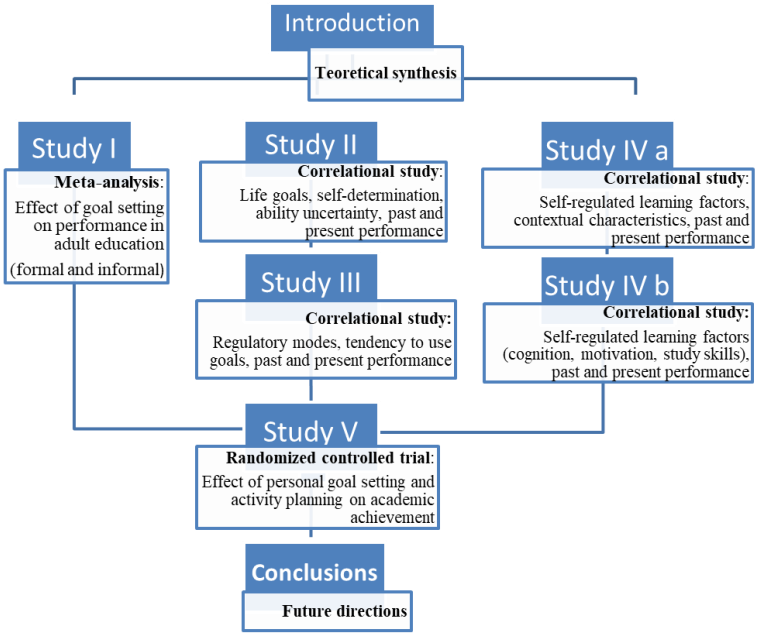

Figure 2. The General Structure of Studies.

2.3 SPECIFIC OBJECTIVES AND METHODOLOGY

The first objective of this thesis is the systematic analysis of available empirical data in literature concerning the possible effect of goal-setting (the main component of self-regulation) on academic performance in experimental setting. To reach this aim, we conducted a quantitative meta-analysis of adult population. The criterion for inclusion was reporting necessary statistical data to compute effect size in experimental and quasi-experimental studies. A series of demographical and methodologically relevant variables were coded and tested as effect moderators in goal-setting interventions.

The second objective tackled the role of life aspirations, the role of self-perceptions of abilities, self-awareness and control of choice. The objective was approached through an exploratory correlational study, to show general patterns in the psychological profile of achieving and underachieving Romanian undergraduate students.

The third objective addresses the role of specific self-regulatory skills in strategic learning, in the context of self-regulated learning (Skill, Will, Self-Regulation). This objective was supported by two different exploratory correlational studies, on minority and majority population, on students enrolled in diverse majors (STEM, non-STEM), through correlational analysis and analysis related to possible predictors of academic performance.

The fourth objective of the thesis focused on identifying the regulatory mode preference (Locomotion vs. Assessment) of the highly achieving Romanian student in the context of academic performance. We designed an exploratory correlational study.

The fifth objective was assessing the effect of an online intervention program, designed to set and elaborate personal goals, in a causal context, on academic performance in underachieving Romanian students. This objective was tackled through the methodology experimental randomized trial and the content was taken from the doctoral dissertation of Morisano (2008), translated and adapted to Romania with the permission of the author.

All studies were conducted on students over the age of 18, enrolled in undergraduate full-time programs in different faculties and universities from Cluj-Napoca. Students belong to institutions that are full members of the Bologna Process. The methodology of research was developed considering objective criteria of performance (credit number, number of failed exams, semester grade point average). Concerning ethnic classification, the population of one single study consisted of representatives of an ethnic minority; all all the other studies were conducted on populations that identified as majority in proportion of 90%.

3 CHAPTER 3. ORIGINAL RESEARCH CONTRIBUTIONS

3.1 STUDY I. GOAL-SETTING INTERVENTION: A META-ANALYTIC EXAMINATION OF EXPERIMENTAL STUDIES FROM THE DOMAIN OF FORMAL AND INFORMAL EDUCATION IN ADULT POPULATION [2]

3.1.1 Introduction

Setting goals is a valuable strategy that is frequently used in organizational environment (Locke & Latham, 1990, 2002; Latham & Locke, 2007). Management by objectives has been well-known for decades as an organizational performance enhancer. The technique of goal setting was transferred to education, where most of the research was conducted on children and teenagers, but not on adults. Goals are also considered the central component of self-regulated behavior (Kanfer, 1990, Gollwitzer, 1990) and that is why in educational setting it gains a special importance as a strategy (Zimmerman, 1989, 2003; Sitzmann & Ely, 2011). Concern in applying this technique to college students happened in the last decennium (Morisano, 2008; Morisano et al., 2010).

Various laboratory researches were conducted by Locke and Latham (1990, 2013) on the effect of goal-setting on performance, with an effect size higher than 0.40, ranging up to 0.80, but fewer studies investigate the effects of goal-setting on performance in real-life situations. Despite this, strategies for goal-settings are frequently used in university programs of mentoring and academic orientation, so as to improve retention rates and academic experiences (Bean & Eaton, 2001-2002). At the same time, setting individual commitments and personal action plans is energizing because they can mobilize higher energy levels and greater persistency, compared to goals imposed by others (Wigfield & Eccles, 2000). Personal goals are associated with greater commitment and they can stimulate performance (Morisano et al, 2010; Chase et al, 2013; Schippers et al, 2015; Brown & Latham, 2002; Deci & Ryan, 1985, 1991).

3.1.2 Objectives

This meta-analysis was conducted on this subject because the effect of setting goals in educational setting has not been investigated until now in the approach of causality in ecologically sounder environment. On the account of a meta-analysis examining correlational studies on self-regulated learning, Sitzmann and Ely (2011), identified the regulatory agent, more precisely, goal level and self-efficacy, as the strongest predictor for work related learning and also a randomized controlled trial conducted by Morisano et al. (2010) showed a statistically significant moderate effect size on the impact of an online goal setting intervention on grade point average and emotional outcomes in undergraduate population. Therefore, in our analysis we gathered studies from the context of formal and informal education in order to calculate the strength of the impact on different outcomes-

[2] A summary of this research was published : Marschalkó, E.E. & Szamosközi, S. (2015). Goal-Setting Intervention: A Meta-Analytic Examination of Experimental Studies from the Domain of Formal and Informal Education in Adult Population. *Proceedings of 2nd International Multidisciplinary Scientific Conference on Social Sciences & Arts, SGEM 2015: Psychology & Psychiatry, Albena, Bulgaria (Vol 1, pp 85- 92).* STEF 92 Technology Ltd., Sofia, Bulgaria

and to identify details that could matter in potential interventions for individuals who have difficulties in their studies.

Our qualitative meta-analysis had three objectives:

1. Measuring effect size of goal setting interventions based on self-set goals on educational performance, both formal and informal context. Academic achievement was assessed through objective external criteria in the context of formal education (grade point average, retention rate, obtained credits) or post-training transfer in informal educational environment (maintenance of trained skill, generalization, repetition rate, assimilation of knowledge etc.).
2. The meta-analysis was also concerned with the difference between the effect sizes of goal-setting interventions considering studies that varied in the comparison of methodological factors. We were interested in the differences in the results when groups with interventions for setting goals were compared with control groups, respectively with alternative interventions. This perspective is relevant for the elaboration of an intervention program for struggling college students.
3. The identification of possible moderators of the effect in the goal setting interventions was also the aim of our analysis, because this could be an important factor in the design of future research.

3.1.3 Methods and Coding

Computer-based systematic literature search of articles was conducted in English and PsychInfo, ProQuest, Science Direct and Scopus databases were used to locate studies in formal and informal education literature. To be included in the initial review, the articles had to contain relevant terminology to setting goals in trainings and academic education. The following key words were used for the search: Goal-Setting (OR Goals), Intervention (OR Training), Achievement (OR Performance), Education (Formal OR Informal), and Adults (Employees OR Undergraduates) and all combinations of these terms were used. The time frame filter was set to comprise articles published between January 1990 and June 2015. In order to identify more studies, we have searched the references of identified articles and of the important reviews in the field. Initial searches resulted in 787 possible studies in the database searching. At the end of the selection process, 10 articles were included in the quantitative analysis on account of meeting eligibility criteria. The process of article selection is presented in Figure 3.

Eligibility criteria were:

- Nonclinical, adult population, minimum 18 years old or older;
- Experimental or quasi-experimental methodology was applied to study goal setting interventions;
- The research sample consisted of employed population or undergraduate and postgraduate students;
- Trainings were aimed at educational outcomes or work-related skills;
- The study was reviewed and published in English between 1990 January -2015 June;
- Setting goals was personal, not imposed (self-set);
- The research included a control group (no intervention, waiting list, or “do your best”) or alternative interventions with a similar purpose of enhancing performance;

- Performance was evaluated on specific, measurable criteria both in formal education (grades, grade point averages, behavioral, cognitive or emotional aspects) and informal education (maintenance of trained skill, generalization, repetition rate, assimilation of knowledge etc.).

Studies were excluded if: they were correlational studies or surveys; they were related to sport, physical therapy, special education or clinical intervention; they were laboratory experiments, unrelated to field practice; participants were children, teenagers or adults with deficiencies; the data were unclear or did not provide the necessary data for effect size computing, experimental control was inadequate or they were dissertations that were not published as articles.

Coding of the studies was based on:

- Sample size;
- Work activity (student, employee);
- Year of publication of the article;
- Independent variables;
- Type of dependent variables;
- Type of independent variables;
- Method of evaluation for dependent variable (objective, self-rated, other-rated);
- Moment of evaluation (post, follow-up);
- Type of intervention (face to face, online, combined);
- Length of intervention (in minutes);
- Moment of final evaluation (in weeks).

The dependent variable was concretized in exam grade or GPA (Grade Point Average), considered to be the most important predictor for academic success. In organizational context, performance was the objective criteria. In the category of cognitive criteria the following measured outcomes were included: self-efficacy, maintenance of knowledge, transfer of knowledge, use of strategy, repetition of strategy, solving specific training problems. The emotional category included reduction of negative emotion. The behavioral category encompassed behavioral aspects measured during training intervention.

Data analysis of effect size and variance was conducted via Comprehensive Meta-Analysis version 2.2 (Borenstein, Hedges, Higgins & Rothstein, 2010), with the aid of Cohen's *d* calculation (Cohen, 1988). The random effects model was used to analyze the data, because the studies were conducted on multiple populations and we aimed to assess heterogeneity and possible moderators in order to identify potentially generalizable effects to similar population (Borenstein, Hedges, Higgins & Rothstein, 2010; Hunter & Schmidt, 2005), via a model which applies wider confidence interval. We also have verified the Fail-safe N for our results, for the evaluation of the publication bias (Rosenthal, 1991).

Interpretation of results was based on Cohen's suggestions: an effect size less than .20 was regarded trivial, in the interval of .20-.50 was considered small, .50-.80 is considered medium and above .80 is viewed as a large effect size. Homogeneity testing was also taken in consideration through Q and I^2 statistics was used (Borenstein et al., 2010)

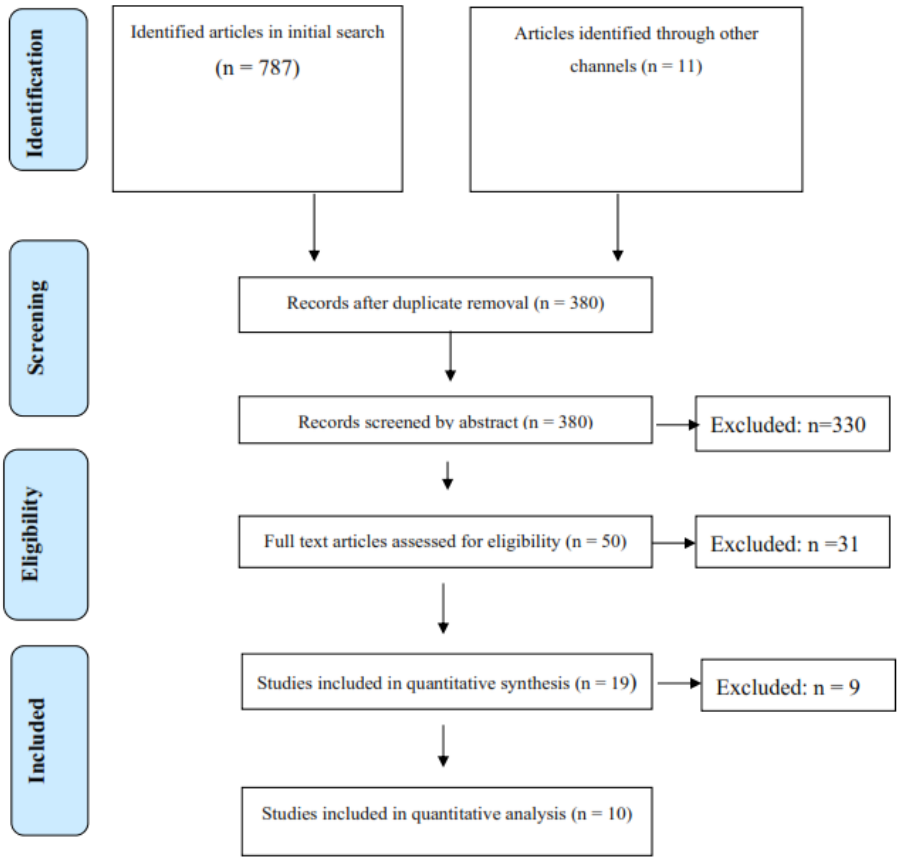

Figure 3. Quorum Flowchart: Illustration of the Article Selection Process in the Quantitative Meta-analysis on Effect of Goal Setting in Formal and Informal Education (Adult Population).

3.1.4 Results

Using quantitative meta-analysis, the summary effects of all interventions were computed in random effects model, resulting in a small and statistically significant overall effect size (*ES*= 0.31, I^2= 50.26, 95% CI = [0.131; 0.494], *p* = 0.001, N= 1935). This result answered our first question by showing us a statistically significant result. Analyzing the data from the perspective of heterogeneity, we checked the Q value and the I^2 coefficient which showed a statistically significant value (Q (9) = 18.097, I^2 = 50.268, p =0.034) and suggested possible moderators of effects. Rosenthal's Fail-safe N=59, which is smaller than $5K+10^2$ (where K is the number of studies), and indicates a considerable possibility of publication bias and there is only 59 missing studies with no significant effects which can nullify the found overall effects size.

Investigating the effects from the perspective of comparison with placebo treatment, control or "Do Your Best", we have found a similar small, but statistically significant effect size. (*ES*= 0.40, I^2= 36.79, 95% CI = [0.208; 0.605], *p* = 0.000, N= 1756). Fail safe N in this case is 46 and homogeneity testing suggested possible moderators: Q (6) =11.25, p = 0.000, which asked for further analysis. One study, which compared a complex goal-setting intervention to placebo control intervention in a randomized controlled trial setting, had the highest effect size, in a moderate category (*ES*= 0.65, 95% CI = [0.243; 1.117], *p* = 0.002, N= 85).

Comparing goal setting with alternative interventions for performance enhancement marks an insignificant effect difference, which suggests that alternative treatments were showing a tendency to have a better effect, but this difference did not prove statistically significant for the data from these studies (*ES*= -0.24, 95% CI = [- 0.688; 0.99], *p* = 280, N= 762) and was provided by only 3 studies, with a tendency towards heterogeneity (Q (2) = 4.75, p = 0.088).

The comparison group type seems to have a significant moderating effect, especially important in case of combined treatments, when goal-setting is combined with other strategies in control group, emphasizing the facilitator effect of goals in an integrated perspective (*ES*= 0.53, I^2= 27.42, 95% CI = [- 0.105; 0.958], *p* = 0.014, Q (3) = 0.24). Differences between goal-setting and alternative interventions did not prove significant and the difficulty to interpret this is caused by the fact that many alternative treatments included goal-setting phase, too. At the same time, in some cases, goal-setting includes more phases that encompassed planning actions or self-management, which makes difficult the assignation of goal setting as definite cause for effect size.

Examining how context (formal or informal educational context) changes the goal-setting intervention impact, we did not find a significant effect size difference and because of the low number of studies aspects like intervention phases, post-intervention assessment timing did not really seem to contour in a significant moderator of effect size.

Examining the effect size according to the type of dependent variable (outcomes), the highest effect seemed to be present considering the behavioral level, but this result must be interpreted with caution because only two out of ten studies focused on this aspect (*ES*= 0.86, I^2= 0.00, 95% CI = [0.295; 1.430], *p* = 0.003, N= 82). Statistically significant small effect was found in the case of objective dependent criteria (*ES*= 0.32, I^2= 60.97, 95% CI = [0.196; 0.462], *p* = 0.000, N= 1587). Cognitive level of outcomes had a trivial effect size (*ES*= 0.20, I^2= 36.19, 95% CI = [-0.080; 0.482], *p* = 0.158) and on emotional level there was a moderate, significant effect size provided by only one study that targeted performance enhancement through goal-setting *(ES*= 0.45, I^2= 0.00, 95% CI = [0.022; 0.896], *p* = 0.039). The only outcome which was related to heterogeneous findings was the objective one (Q (3) = 7.688, p=0.053) and the most relevant impact of goals seemed to be on grade point average (GPA) in college, with the moderate effect size in a highly controlled study (ES= 0.65, p<.01). Despite the differences in results, considering this aspect like a possible moderator, these tendencies do not support significantly the moderation effect linked to the outcome level (Qb=2.186, p=0.535).

Considering statistically significant heterogeneity coefficients of studies (see above), we analyzed possible moderators like comparison type (control, placebo, and alternative treatment), outcome level (behavioral, emotional, cognitive and other), time point of post intervention performance assessment and sample type/socio-economic status (employees, postgraduate, undergraduate). From these alternatives, only one significant moderator of effect size in the socio-economic status (college student, employee, postgraduate-employed student) proved to be statistically significant (Qb=6.226, p= 0.044).

Another interesting finding was related to the minority population and gender, in a quasi-experimental study (Schippers et al., 2015), which was the only one of 10 studies, that addressed the effect size of goals setting in terms of ethnic belonging and gender differences and related significantly better impact on males and minority population in academic achievement, which is at moderate level in case of minority population (ES= 0.38, p<.01) and in case of minority males reaches the highest level (ES= 0.57, p<.01). In the majority population the males are the ones that have the most benefits from goal-setting intervention (ES= 0.38, p<.01).

3.1.5 Discussion and Conclusions

Quantitative analysis was made only from the outcome of ten studies. More interventions and randomized controlled trials are needed to analyze the effect size for interventions on goal setting in formal or informal education.

The first objective of our meta-analysis was measuring the effect size of goal-setting interventions in educational setting. Former studies related effect sizes, above 0.40, ranging up to 0.80 (Locke & Latham, 1990; Travers, Morisano & Locke, 2015) in goal-setting laboratory studies. Sitzmann & Ely (2011) identified the goal level as a very important self-regulation behavior predictor in work related learning, with moderate to strong prediction power. Conversely with the literature, our results show a small, but statistically significant effect size. Considering the methodology of the interventions and that many of them were field studies, we can argue that this effect size is showing up in ecologically more sound environments than laboratory studies, which suggests the presence of real effects in these studies, emphasizing the validity of the goal setting theory (Locke & Latham, 1990, 2002, 2013). Setting goals seems to matter significantly in work–related and in formal-education–related context as well, but there are moderators of effect, like the status of participants, which need to be taken into consideration.

When comparing the goal-setting intervention to "do your best", placebo or no treatment group performance, the effect size gets closer to moderate effect size. Interestingly, the highest effect size is related to a study, with placebo-treatment control intervention, which had a statistically significant moderate effect size in a randomized controlled trial setting in formal education. We have to highlight the fact that this study had a complex goal-setting intervention in formal education, with many phases and insisted on detailed applicative plan development in the intervention (Morisano et al., 2010; Schippers et al, 2015; Chase, Houmanfar, Hayes & Ward, 2013), while other approaches had a more simple view (Gist, Bravetta & Stevens, 1990, 1991; Brown & Latham, 2000). The type of goals also varied from life goals to academic goals, from proximal to distal goals (Chase et al., 2013; Brown, 2005), performance or mastery goals (Senko et al., 2013) and specific difficult goals (Brown & Latham, 1998). There was lot of variation in methodology considering the time of post-intervention (immediate or follow-up of 12 months), but we did not find significant difference in the strength of effect, considering this variable.

The third objective is related to possible other moderators of effect size. The sample type (employees, students), social belonging, age, gender and context of intervention (formal and informal education) were analyzed as possible moderators. More than 60% of the study participants were females, but only one study provided specific results in terms of gender and social belonging in formal education. These results are very important, because they highlight a very important variation of strength in favor of males, and minority population in general, reaching a small to moderate effect size from a trivial level in a field study conducted on college cohorts. The most benefits were declared in case of minority males, who seemingly gained an important positive academic performance modification via a goal-setting intervention addressing life goals and social role-model mindsets (Schippers et al, 2015).

The overall study analysis highlighted the role of moderation in socio-economic status of participants. Undergraduates and employees seem to benefit just alike from goal-setting interventions, only postgraduates, more exactly MBA students, seem to benefit less (Gist et al., 1990, 1991). The tendency is not significant, but it is worth mentioning. The studies that had this population in focus, actually compare goal-setting with self-management techniques and analyze the actual transfer of training aspects which is linked mostly to cognitive components and generalizability to new context. While usually self-management includes

goal-setting as an instrument, there may be a probability that this could have been used spontaneously. This aspect needs further scientific research, because of possible overlapping risk between constructs.

Conceptual overlapping in methodological approach was pretty relevant in our analysis. Some studies include metacognitive steps into goal setting, while others do not. This raises the importance of clarifying the notions and concretizes the following questions: Is it possible to place goal-setting on an in depth continuum? Could it be possible that goal setting comprises actual metacognitive steps automatically in the brain, being the expressions of self-regulation? Is it important to divide clarification from planning or one cannot exist witout the other?

3.2 STUDY II. LIFE GOALS, SELF-DETERMINATION AND ABILITY PERCEPTION IN ROMANIAN UNDERGRADUATE STUDENTS: CORRELATES OF ACADEMIC PERFORMANCE[3]

3.2.1 Introduction

In the self-determination approach, aspirations or extrinsic life-goals are described as compensatory goals, that one tends to set when he is not in the position to follow his basic needs due to whatever contextual reason. Different trends injected by the media industry could also have an impact on the employment process regarding extrinsic goals, because fame, image and wealth are presented as continuously ubiquitous values, and thus, ending up having an impact on one's identity (Soenes & Vansteenkiste, 2005). People deprived of a chance meeting basic intrinsic motivations choose external motives as compensatory actions (La Guardia, 2009). Motivational commitment is also determined by one's learning or working field. For example, the field of law may be associated with extrinsic motives like image, wealth, fame (Krieger, 1998). Goals, in means of organismic view (Deci & Ryan, 1985) are differentiated by the reasons of their commitment aimed at achieving them (autonomous vs. controlled) and depend on their content (intrinsic vs. extrinsic). Coherence between action reason and motive content becomes an important part of well-being, and for satisfying basic psychological needs (Scheldon & Kesser, 1995).

Personal abilities or even academic competences, skills and enablers that have been described in the literature (DiPerna & Elliott, 2000) may be at the basis of the predictive raport between academic achievement from high-school and college. High-school years constitute important steps in terms of personality development, when personal concepts about skills and potentials are developing. This may be important in facilitating the afterwards performance in higher education.

Considering other studies on academic success in our culture, we mai argue that there are specific pattern which contoure in the psychological profile of high achieving and struggling students, which hold important cues for the planning of future performance facilitating interventions (Marschalkó, E.E. & Szamosközi I., 2016 a, b).

[3] Partial results from this study were published: Marschalkó E.E., Szamosközi I. (2016 c), Life Goals, Self Determination and Perception of Ability in Romanian Undergraduate Students: Profile and Academic Performance. *Transylvanian Journal of Psychology, 17 (1)*, 71-94

A part of the theoretical introduction was presented and introduced in a Conference Article: Marschalkó, E.E. & Szamosközi, I. (2016). Motivational Aspirations, Self-Determination and Ability Uncertainty in Struggling Undergraduate Students: exploring profiles and patterns. *Proceedings of the 3rd International Multidisciplinary Scientific Conference on Social Sciences & Arts, SGEM 2016: Psychology & Psychiatry, (Vol 1, pp 237-244*). STEF 92 Technology Ltd., Albena, Bulgaria.

3.2.2 Objectives

The motivation of the study was to explore the profile of Romanian undergraduate students enrolled in different faculties and universities from Cluj-Napoca, in order to identify patterns that can guide us in developing interventional programs for underachieving students. The literature suggests a predictive correlation between performances achieved in high school and in college. Confidence in one's skills can trigger the sense of belonging to an academic group, and along with a self-determined behavior of intrinsic aspirations could constitute the basis of a motivated, high-performance profile. In the context described above, we have formulated three hypotheses:

1. H1: High school achievement (High School GPA average and Baccalaureate score) will show a positive association with the many academic performance indicators (weighted GPA, obtained credit points, number of failed exams and scholarship eligibility).
2. H2: High achieving undergraduate students, compared to struggling undergraduates, will have greater confidence in their abilities and their sense of affiliation to the academic group will be stronger, expressed through a sense of "fitting in" intellectually.
3. H3: High achievers, compared to struggling undergraduates, will have stronger self-determined behavior, will feel competent and be self-aware. Motivational aspirations will fall mainly into the category of intrinsic motivations, and their implementation is perceived as a process already in progress, because these undergraduates have a self-determined behavior.

3.2.3 Methods

Participants and descriptive statistics.

Participants of the study were 133 undergraduate volunteers and were recruited by an online media recruitment. In our sample, we had 71.6% females and 28.4% males. The mean age was 21.26 (SD= 2.44). The online recruitment campaign was more effective for female recruitment, but rate of women in higher education is also higher in general. 82.1% of the recruited undergraduate volunteers declared they were Romanians and 17.9% declared their ethnicity as being Hungarian. 85% of the participants had no jobs at the moment of assessment, while 14.7% were employed. 24% of the students were freshman, 42.1% were in the 2nd study year, 24.2 % in 3rd and 9.7% in the 4th year or above (characteristic to engineering and medical fields). By university affiliation, 55% of the volunteers were enrolled in a faculty from "Babeș - Bolyai" University, 15% were studying at the University of Agricultural Sciences and Veterinary Medicine, and 20% were enrolled in a faculty of the Technical University, 10% were attending " Iuliu Hațeganu" University of Medicine and Pharmacy. All high education establishments are in Cluj-Napoca and are credited and organized in Bologna Higher Education System, which standardizes the European Higher Education Area.

Further descriptive analysis showed us, that more than 70% of the recruited undergraduates speak at least one foreign language, and 94.7% of them are enrolled in the first faculty, while 5.3% already obtained one certificate.

Analyzing statistically the means of academic performance indicators both from high school and college, we found that the mean for Baccalaureate score was 8.61 (SD= 0.92), the mean of High School Average GPA was 9.01 (SD= 1.16), the mean of Credit Scores was 24.63 (SD=6.98), the mean of weighted GPA was 7.43 (SD = 1.89) and the mean for number of failed exams was 2.01 (SD= 2.6). About 29 of the participants were eligible for study scholarship (26.31%).

3.2.4 Measures

Students who agreed to participate received an electronic invitation using Lime Survey (version 2.5.), to a set of Questionnaires including: Self-Determination Scale (Sheldon, 1995; Sheldon, Ryan & Reis, 1996), Aspiration Index (Kasser & Ryan, 1993), Ability Uncertainty Scale (Lewis & Hodges, 2015) and a demographic questionnaire that had specific questions about their grades, and socio-economic status (parents' income, having a job, etc.) and the reasons they have chosen to go to college. All the questionnaires were translated into Romanian and for the assessment of reliability we had computed the Cronbach α for each scale after the gathering of answers.

For the academic performance variable we have taken into consideration the last semesters' weighted GPA (February 2016), the number of obtained credits, the number of total failed exams and the scholarship eligibility in that moment. The grades were self-rated in the case of high achievers, and were collected through an officially signed report or through an emailed copy (print screen) of their grades and credit point summarization table they had access to online, in the case of struggling students. High school performance indicators were collected through scanned copies of attesting certificates. We used this methodology for better controlling of the data and for ensuring correctness as far as possible.

The demographic questionnaire had questions about the university, faculty they were attending, number of finalized semesters, the age and birthdate of participants, gender, having a job and number of worked hours if true, income of parents, having a study scholarship, number of failed exams and the reason for college enrollment. We used 12 items about the reason for going to college (Morisano, 2008). These reason describing options were: (1) My parents wanted me to go to college; (2) I had no job. (3) I wanted to leave home. (4) I wanted a better education and critical thinking. (5) For having a better job in the future. (6) I had nothing better to do. (7) To become a more cultured person. (8) For a better future income. (9) For learning more about things I'm interested in. (10) For professional preparation. (11) Because of the encouragement of a role model or mentor. (12) I wanted to find the meaning of my life. The participants had to answer on a 3 point scale, considering how true each option was in their case (0=not true at all, 2= very true). We wanted to see if the reasons would show some significant associations with academic performance indicators.

The methodology used and the chosen instruments were serving a longitudinal reconstruction approach of academic carrier in terms of results and motivation. The academic performance was evaluated and coded, using the objective grades students gained in the past: Baccalaureate Average, High School Average, and in the present: last semestrial Weighted GPA, granted Credit Points, number of Failed Exams and Scholarship Eligibility. The motivation was profiled using a holistically organized view which takes in consideration life goals, reason of enrollment, self-determination and also ability perception which can encourage perseverance and achievement, through relatedness in terms of ability compatibility and certainty.

The Self-Determination Scale (Sheldon, 1995; Sheldon, Ryan & Reis, 1996) was designed to assess individual differences in the extent to which people tend to function in a self-determined way. Acting like this is considered an aspect of one's personality and it is related to awareness of personal feelings and sense of self and to the feeling of free choice and personal freedom in choices. The more self-determined a person is, the more self-awareness and the stronger personal freedom he feels while acting and making decisions. Participants choose from statement pairs the one that seems to be more true to their life at the moment of answering, on a 5 point scale (1= only A feels true, 3= both feel equally true and 5= only B feels true).

The Aspiration Index (Kasser & Ryan, 1993), was developed to assess people's aspirations or life goals, which can be intrinsically defined (meaningful relationships, personal growth, health and community contributions) and extrinsically defined (wealth, fame and image). Participants rate (a) the importance of each aspiration for them, (b) their belief about the likelihood of attaining each, and (c) the degree to which they have already attained each. Participants respond to items on 7-point scale (1= not at all, 4 = moderately and 7= very) at each question.

The Ability Uncertainty Scale (Lewis & Hodges, 1995) was developed in the context of a new perspective on belonging to academic group. In the view of the authors, the feeling of academic belonging or relatedness to the field and to the academic group can be approached trough the self-concept of intellectual abilities. As for this view, an undergraduate student who encounters academic struggle, failed exams, low GPA, etc. will probably have a higher uncertainty regarding his/ her abilities in the context of achieving better results or even finalizing college studies. Participants respond to items on 6-point scale (1= strongly disagree and 6= strongly agree).

3.2.5 Results

Preliminary analyses were conducted to determine if the main variables differed as a function of demographic and socio-economic variables (gender, age, study year, having a job) and our results did not show any significant difference in continuous academic performance indicators we had considered (previous semester's weighted GPA, credit points obtained in the previous semester, number or total cumulated failed exams). *Analyzing the associative relationships between the variables, we have found many significant correlations. In order to avoid the chance of Type I Error, we have chosen to present only the correlational coefficients which have reached at least a statistical significance level of .01*. The associations are presented in Tables 1, 2 and 3.

Table 1. *Correlates of Weighted GPA: Life Goals, Perceived Choice, Reason of Enrollment, and Baccalaureate Average*

Variables	***Weighted GPA***
Baccalaureate Score	0.41***
Parents' will (reason of going to college)	-0.35***
Fame Attainment	0.24**
Growth Attainment	0.28**
Perceived Choice	-0.29**

*Notes: *** p<.001, **p<.01*

In the case of weighted GPA, the Baccalaureate score, the Parents' Will (reason of enrollment), Fame Attainment, Growth Attainment and Percived Choice associated in a statistically significant way. The only negative association was present with the Perceived Choice (Table 1). Interestingly, when we checked the associations between variables considering the number of obtained credit points (Table 2) as the indicator of academic achievement, we found a similar situation like in the case of weighted GPA. An important change was the Importance of Fame and the Fame Likelihood, which contoured better in case of credit points. In both cases (weighted GPA and credit points), the former academic

performance, expressed through the Baccalaureate Score/Average played a significant role, Fame Attainment was the main correlate of academic performance, while the students considered Personal Growth Attainment in progress, but not necessarily important as a life aspiration. In the meantime, Perceived Control, linked to the psychological need of autonomy, which is relevant for general self-determinant behavior was showing up in a negative association with both continuous academic performance indicators. The higher was the obtained credit score and the weighted GPA, the more likely the undergraduates longed for fame, felt the attainment of personal growth, but did not see it important, and felt less control over their decisions in general. Their formerly proven performance was congruent with the actual academic performance and they did not argument their decision of enrolling in higher education with the will of their parents.

Table 2. *Correlates of Obtained Credit Points: Life Goals, Perceived Choice, Reason of Enrollment, and Baccalaureate Average*

Variables	***Credit Points***
Baccalaureate Score	0.31***
Fame Importance	0.30***
Fame Likelihood	0.28**
Fame Attainment	0.38***
Growth Attainment	0.31***
Perceived Choice	- 0.29**

*Notes: *** p<.001, **p<.01*

The costliest part of academic achievement is linked to the number of failed exams, which was also an indicator we considered in our correlational analysis. The analysis of the significant associations was conducted with Spearman's Rank-Order correlation method, in this singular case. We had some surprising results concerning the motivational characteristics, because in the case of these students the Fame extrinsic aspiration showed up in a negative association with the number of failed exams, and the importance of relationships came into the picture with a positive association. These students went to college because of the 'Will of their parents', not necessarily because they wanted a better education (Table 3). The Failed exams outcome variable was coded in binary context and was also analyzed with logistic regression. The results are presented below in Table 6.

The Ability Uncertainty did not show any significant correlation with the weighted GPA ($r(131) = -0.15$, $p = .074$), or obtained credit points ($r(131) = -0.09$, $p = .271$) not even considering the number of failed exams ($\rho(131) = 0.11$, $p = .202$).

Table 3. *Correlates of Failed Exams: Life goals, Perceived Choice, Reason of Enrollment, and Baccalaureate Average*

Variable associations	*Number of failed exams* ***ρ (rho)***
Baccalaureate Score	- 0.41***
Parents' will (reason of going to college)	0.28**
Fame Importance	- 0.47***
Fame Likelihood	- 0.46***
Fame Attainment	- 0.50***
Growth Attainment	- 0.25**
Relationship Importance	0.34***

*Notes: *** p<.001, **p<.01*

A predictive model was built from the following independent variables: Baccalaureate Average/Score, Fame Importance, Fame Likelihood, Fame Attainment, Growth Attainment, 'Will of Parents' (Reason of enrollment), Perceived Choice and a hierarchical multiple regression analysis was conducted to estimate how much variance in the weighted GPA was accounted for, by each of these independent variables. In our analysis, we have controlled gender, age, year of study and the field of study (STEM/ non-STEM).

Our model was statistically significant ($F(7,121= 9.28, p< .001)$). The R^2 Change indicated that 33.5% of the variance in weighted GPA can be explained by the variances in four predictor variables from seven, which play a statistically significant unique role in the prediction of weighted GPA. The analysis suggested that the Baccalaureate Score ($t= 3.29$, $\beta= 0.25$, $p=.001$) was the most influential positive predictor, while the Perceived Choice was the most influential negative predictor ($t= 3.70$, $\beta= -0.28$, $p<.001$). In the meantime, Growth Attainment played a significant positive role ($t= 2.13$, $\beta= 0.18$, $p<.05$) and the 'Will of parents' for enrollment into the higher education system proved to be a statistically significant negative predictor of weighted GPA ($t= -2.52$, $\beta= -0.19$, $p<.05$). Statistical data are presented in Table 4.

We have built a predictive model for Scholarship Eligibility from the following independent variables: Fame Importance, Fame Likelihood, Fame Attainment, Growth Attainment, 'Parents' Will' (reason of enrollment), Baccalaureate Average, Perceived Choice. The result of binary logistic regression analysis was significant $\chi^2=57.167$, $df =7$, $N= 133$, $p < .001$ indicating that the independent variables significantly predicted the outcome variable, respectively Scholarship Eligibility (academic performance indicator). Table 5. shows the logistic regression analysis coefficients, Wald test and Odds Ratios for each of the predictor independent variables. The *Nagelkerke R Square* was 0.550 and suggested that the whole model explained 55% of the variance in results. The model classified correctly 96.2 % of participants without a scholarship and 59.3 % with scholarship and the overall classification success rate of the model was 88.7%. Considering the data presented in Table 5, we can say that only 3 variables from 7 play a statistically significant unique role in the model, respectively the 'Will of parents'/reason of enrollment (negative predictor), the Baccalaureate Average (positive predictor) and the Perceived Choice (negative predictor). The variables linked to life aspirations do not play a significant role in

our model, considering the possibility of Scholarship Eligibility. Considering column number 7 from Table 5, and analyzing the Odds Ratio for each significant predictor, we can say that the strongest predictor of Scholarship Eligibility in our sample was the Baccalaureate score with an Odds ratio of 3.36, indicating that when holding all the other predictors constant, a person who had high Baccalaureate score is 3.36 % times more likely to have scholarship as an undergraduate than colleagues who performed low on this test (SAT equivalent).

Table 4. *The Role of Baccalaureate, 'Will of parents' (Enrollment), and Perceived Choice in the Prediction of Weighted GPA.*

Model Variables	**B**	**SE**	**β**	**t**	**p**	**Adj. R^2**	**R^2 Change**	**F Change**
Baccalaureate	.416	.126	.255	3.291	.001***	-	-	-
Will of parents	-.364	.144	-.197	-2.526	.013*	-	-	-
Fame importance	-.010	.100	-.014	-.095	.925	-	-	-
Fame likelihood	-.013	.135	-.017	-.097	.923	-	-	-
Fame attainment	.205	.148	.195	1.384	.169	-	-	-
Growth attainment	.217	.102	.184	2.131	.035*	-	-	-
Perceived Choice	-.078	.021	-.289	-3.706	.000***	-	-	-
Model						.319***	.335***	9.285

Note: B, unstandardized regression coefficient; SE, standard error; β, standardized regression coefficient; t, obtained t-value; p, probability; R^2, proportion variance explained.
**p<.05, **p<.01, ***p<.001*

Binary logistic regression was performed also in the case of Failed Exams (academic performance indicator). We added to the former model the Relationship Importance, which showed a significant association with this variable (see Table 3). Our predictive model, containing 8 independent variables was statistically significant: $\chi^2 = 94.697$, df =8, N= 133, $p < .001$. The result of *Nagelkerke R Square* was 0.681 and indicated that 68% of the variance in the result can be predicted from our proposed predictive model.

Table 5. *Logistic Regression Predicting Likelihood of Scholarship Eligibility (Life Goals, Perceived Choice, Reason of Enrollment and Baccalaureate Average).*

Variable:	B	SE	Wald	df	p	Odds Ratio	95% C.I.for O.R. Lower	Upper
Fame importance	-.457	.305	2.253	1	.133	.633	.348	1.150
Fame Likelihood	.419	.402	1.089	1	.297	1.521	.692	3.343
Fame Attainment	-.071	.415	.029	1	.865	.932	.413	2.103
Growth Attainment	.267	.310	.743	1	.389	1.306	.712	2.397
Parents Will (reason of enrollment)	-1.002	.411	5.953	1	.015*	.367	.164	.821
Baccalaureate Average	1.212	.492	6.080	1	.014*	3.360	1.282	8.806
Perceived Choice (SDS)	-.276	.070	15.453	1	.000***	.758	.661	.871
Constant	-8.073	4.879	2.737	1	.098	.000		

*Note: *p<.05, **p<.01, ***p<.001*

The model classified correctly 82.2% of the undergraduates without failed exams and 76.7% of those with failed exams. The overall classification success rate was 79.7%. The logistic regression analysis coefficients, Wald test and Odds Ratio for each of the predictor independent variables are presented in Table 6. and suggest that only 3 predictors play a statistically significant role in our model: the Baccalaureate Average (negative), the Perceived Choice (positive) and the Relationship Importance (positive). The variables linked to Fame, Life Goal and the 'Will of parents'/ reason of enrollment do not play a statistically significant role in predicting the possibility of failing the exams. The Odds Ratio column showed us that the strongest predictors from the above described significant ones were the Relationship Importance, which increases the risk of failing exams with 2.75 times, while the Perceived Choice increases the chance of failing exams 1.22 times. The Baccalaureate score has the smallest weight, with an Odd Ratio of 0.29.

Other socio-economic factors we gathered data on, like parents' income, having a job, etc. did not show a significant association with performance in the academic setting in our undergraduate student sample.

Table 6. *Logistic Regression Predicting Likelihood of Failing Exams (Life Goals, Perceived Choice, Reason of Enrollment, and Baccalaureate Average).*

Variable	B	SE	Wald	df	p	Odds Ratio	95% C.I.for O.R. Lower	Upper
Fame Importance	-.358	.230	2.408	1	.121	.699	.445	1.099
Fame Likelyhood	-.252	.327	.592	1	.441	.777	.409	1.476
Fame Attainment	-.486	.436	1.246	1	.264	.615	.262	1.444
Growth Attainment	-.525	.292	3.240	1	.072	.592	.334	1.048
Parents Will (enrollment)	.552	.383	2.083	1	.149	1.737	.821	3.678
Baccalaureate	-1.234	.412	8.973	1	.003**	.291	.130	.653
Perceived Choice (SDS)	.199	.068	8.694	1	.003**	1.220	1.069	1.393
Relationship Importance	1.013	.332	9.321	1	.002**	2.754	1.437	5.278
Constant	6.970	4.407	2.501	1	.114	1063.921		

*Note: *p<.05, **p<.01, ***p<.001*

3.2.6 Discussion and Conclusions

The results we have found showed us important patterns in the behaviors of Romanian undergraduate students. The profiling process was helped very much by the performance indicators we have been using, which offered a sectional view on academic achievement. Academic success cannot be viewed only through the GPA. All the others can represent objective external criteria and can offer a different perspective on the different faces of achievement.

Our first hypothesis, assuming that the high school performance indicators (GPA average and Baccalaureate Score) will have a positive association with academic performance, was proven. We also found statistically significant data for the predictive power of Baccalaureate score. Our finding is consistent with other studies on the topic (DeBerard et al., 2004; Kitsantas et al., 2008; Stumf & Stanley, 2002; Bersonsky & Kuk, 2005), which have found that ACT and SAT scores are relevant for future academic performance in college. These findings highlight the fact that previous academic abilities are the forecasters of achievement in higher education. In the meantime, we can assume the presence of maturation and a gradual development process which might be at the basis of academic competences, which need time and persistence to develop (DiPerna & Elliott, 2002). A struggling student with low Baccalaureate score may be more resistant to intervention and will probably need more time for relevant performance change. The positive correlational relationship with the weighted GPA could be explained by the resilience which needs to be shown both in the Baccalaureate exam session and the exam sessions from the undergraduate education cycle. High-stress level is present in both situations and the volume of the tested material is higher in both cases, which need cognitive abilities and proper self-regulation (metacognitive, cognitive and emotional).

Our second hypothesis was formulated on academic achievement and Ability Uncertainty was based on the assumption that high achievers probably feel more confident about their field related abilities than their struggling mates. The latter can develop a feeling of Ability Uncertainty and the lack of fitting in the group feeling could make them more

susceptible to attrition or lack of perseverance (Lewis & Hodges, 2015; Hausmann et al., 2009) and probably could also cause lower performance. Our second hypothesis not was confirmed. Ability Uncertainty did not show statistically significant associations with the analyzed continuous academic performance indicators and it did not contoure in the case of undergraduates with more failed exams either. This result raises questions mostly linked to the cultural self-efficacy level (Bandura, 1995; 2000), while the Romanian society is rapidly changing and due to flexible contextual influence (which includes globalization effects) may also impact the perception of personal abilities in a positive way, even in the case of struggling students. Also, patterns from the profile of Romanian population (David, 2015) could influence positively the perception of one's abilities.

Our third hypothesis was formulated in the context of self-determinative behavior and life goals and self-determination orientation, and our results did not give scientific support to this assumption, therefore we cannot reject the 0 hypothesis in this case either. We have assumed that there is a positive association between intrinsic aspirations (life goals) and academic performance and the good students are generally self-aware and their perceived choice is high.

Conversely with the literature, our findings showed us a complex situation on academic performance correlates, with some paradoxical elements in it. The most important life aspiration which associated the continuous performance indicators (credit points, weighted GPA) was linked to Fame, which is considered an extrinsic life aspiration. However, the most struggling students, with failed exams, do not consider Fame as being important, they mostly value the Relationships in their life. Considering these statistically significant findings, we can say that intrinsic life goals in the matter of importance were not really well contoured in the successful undergraduates' motivational profile, considering the continuous academic performance indicators (weighted GPA, credit scores). Growth Attainment associated significantly with these, but not in the matter of importance or likelihood.

The presence of Fame Importance, Fame Likeability and Fame Attainment as positive correlates of weighted GPA, could be explained with the possible role of externally mediated rewards, like grades (Deci, 1971; Deci & Ryan, 1985, 2000), in case of top performers. Still, in the regression analysis, Fame Importance did not gain a statistically significant value in the prediction of high achievement. Fame Importance, as an extrinsic life aspiration, could be a higher education related, promotion based feature, because many times professional development and learning in general, and in many domains of activities (law, IT, engineering, medicine), are connected to extrinsically mediated values and linked to fame, image and wealth (Krieger, 1998). The good students, who strive to get their exams and obtain good grades, would actually like to become 'someone' through learning. Although the literature is controversial on rewards (Cameron & Pierce, 1994; Deci, Koestner & Ryan, 2000), our result suggests that good grades probably associate extrinsic life goals in case of successful undergraduates, while the attendance of higher education courses is mainly associated with Fame Importance. According to the literature the extrinsic orientation in motivation on the long term can represent a risk factor for the wellbeing of these undergraduates.

From the perspective of self-determined behavior, the individual differences related to self-awareness and personal freedom of choice, our hypothesis was not confirmed, because the Perceived Choice actually associated negatively with academic performance. The higher the weighted GPA was, the less Perceived Choice the undergraduates declared as having. This variable paradoxically associated positively the number of failed exams, which means that students who declared higher Perceived Choice in their everyday activities actually had a higher chance to fail exams. In both cases, Perceived Choice score predicted significantly

the academic outcome, being more relevant than the life goals. In case of weighted GPA, the Awareness of Self factor of self-determination behavior did not correlate or predict high performance. Seemingly, this concept or individual characteristic does not play a significant role in the students' performance. High achievers do not feel much control over their personal choices, while self-awareness is missing from the students' general orientation. However, the reason for enrollment to college showed us an interesting association in the context of performance.We have found that successful students' decision was not based on the will of their parents, while the undergraduates with worse achievement declared their parents' will as the reason for attending college. This variable turned out to be a significant negative individual predictor for weighted GPA and a significant positive predictor for failed exams. This finding pinpoints the relevance of reason in attaining higher education and also can suggest that comforting of parents does not necessarily result in desired situations. Personal will for personal growth and personal will as the reason for educational enrollment could be a very important variable.

Our research data could be relevant for the development of interventions for struggling as well as underachieving students, based on the following arguments and conclusions. Students with low high school performance probably need help in the development of academic skills and competence. These students could be more resistant to intervention because of the long time these changes need. High Ability Uncertainty did not seem relevant in our sample and this probably could be explained with some cultural aspects, and Ability Uncertainty is probably only rarely important in academic performance in Romania.

The motivational characteristic related analysis showed that the higher the failure (considering the number of failed exams) the more important the Important Others are in the undergraduates' life, which means that they probably allocate more time to socialization and meaningful relations than to the study process. Tomlinson-Keasey & Little (1990) published a longitudinal study about the predictors of educational and professional attainment in gifted persons and highlighted that children's sociability (especially girls'), was a negative predictor of adult life intellectual development or higher educational attainment, even if the cognitive abilities were highly developed.

Considering the above details we can argue that in our socio-economic context the main associative of undergraduate academic performance is Fame, while the Important Relationship accompanies failure possibility. The autonomous behavior need of self-determination encapsulated in the Perceived Choice actually does not facilitate a high weighted GPA, probably due to some educational system characteristics. The former good results, like the Baccalaureate score, which are linked to a stressful exam session, increase the chance of academic performance more than three times, and remain the best predictors of higher education success, while the motivational aspects, Ability Uncertainty, and self-determinant orientation actually hold a secondary role. The importance of context, culture and educational system characteristics probably play a very important role in the moderation of these variables (Kalcza-Janosi, Williams, & Szamoskozi, 2017) and intercultural differences, collective identity aspects surely need to be taken into consideration in the interpretation of our results.

3.3 STUDY III. THE ROLE OF REGULATORY MODE PROFILE IN ACADEMIC ACHIEVEMENT: WHAT FOSTERS SUCCESS IN HIGHER EDUCATION?[4]

3.3.1 Introduction

Higgins & Kruglanski (1995) approach self-regulated behavior from the perspective of functional dimensions that are the basis of human motivation. These two functions are assessment and locomotion, which are defined according to their scope for human behavior.

Assessment refers to the personal value and meaning of the goal. Due to this component, one can compare and critically evaluate goals and modalities to realize and to assess results. At its foundation stands the principle "Do It Right.". *Locomotion* is the aspect that is concerned with action towards a goal. It ensures activation of behavior, even if the goal is not well stated. It ensures activation of behavior, even if the goal is not well stated. It is based on the principle "Just Do it". (Kruglanski et al., 2000)

High Assessment and High Locomotion appears as the most advantageous association in what concerns future goals. Previous studies in university and military setting were associated with high scores on both assessment and locomotion (Taylor & Higgins, 2002; Kruglanski et al., 2000). A higher assessment mode predisposes students towards depression or negative self-evaluations, but at the same time, through rumination, they can learn easily from failure, for a more efficient self-regulation. High locomotion predisposes to optimism and positivity towards future, which sustains the experience of flow (Csikszentmihalyi, 1975). Intrinsic motivation is connected with the locomotion mode, being associated with the start and the continuation of activity. There is a body of research that suggests that in the academic environment, the self-regulatory mode of assessment is positively associated with SAT scores, but not with well-being, which is influenced, together with a healthy lifestyle pertaining to regular exercise, by the locomotion mode, which indirectly influences academic achievement (Garcia et. al., 2015). It also balances the undesirable effects of exaggerated assessment, which is linked to pessimism, counterfactual thinking and negative emotions.

Locomotion can positively impact performance, directly (Kruglanski et al, 2000) and indirectly (Garcia et al, 2015). This equilibrium between the two regulatory modes can determine self-efficacy beliefs about abilities and potential, which stand at the basis of academic success and more (Pintrich, 2003; Schunk, 1991; Locke & Latham, 1990, 2006). Orientations towards optimal goals, a positive mindset make room for commitment to action (Kuhl, 1985; Dweck, 1986). The combined usefulness of Assessment and Locomotion mode, is also suggested by a few interventional studies, where deliberation, evaluation, critical thinking and reflexive behavior applied in the context of setting and elaborating personal goals and an action plan for reaching them, led to better performance in academic setting (Morisano et al., 2010; Schippers et al., 2015; Schippers, 2017; Travers et al., 2015).

[4] This study was published : Marschalkó E.E. & Szamosközi I. (2016). The Role of Regulatory Mode Profile in Academic Achievement: What Fosters Success in Higher Education? *Transylvanian Journal of Psychology, 17 (2),* 227- 245.

3.3.2 Objectives

The regulatory mode, respectively the self-regulated behavior is considered a key element in achievement in many settings, including university. Our motivation for research is the analysis of the correlational relationship between the regulatory mode profile (assessment and locomotion) and different criteria of academic performance - longitudinal (High School GPA, Baccalaureate score, Semester's Weighted GPA) and qualitative (scholarships, failed exams).

In the context of research and theories that were previously described, the hypothesis is the following: The High-Regulator profile (High Assessor/ High Locomotor) will have the best academic results, demonstrating the important role of both regulatory modes to optimally employ personal resources in the service of academic performance. The positive correlation will be present in the case of all performance indices that are analyzed.

3.3.3 Methods

Participants and descriptive statistics

The participants of the study were 146 volunteer undergraduates that were recruited online through a social media campaign designed for undergraduates from different universities located in Cluj-Napoca, Romania. Demographic information was collected regarding the university and faculty affiliation, age, ethnicity and year of study.

In our sample, we had 24% males and 76% females. The mean age was 21.21 (SD= 1.57). 82% of the participants declared they were Romanian and 18% declared their ethnicity to be Hungarian. 31.5 % of the participants were freshmen, 36.3% of them were enrolled in the 2nd year of study, 25.3% in the 3rd year and 6.9% in the 4th year or above (in engineering and medical specialties). 57.5% of the undergraduates were full time students in one of the faculties from "Babeș-Bolyai" University, 12.3% was enrolled in "Iuliu Hațeganu" University of Pharmacy and Medicine, 18.5% were active students at Technical University, and 11.2% of the participants were studying at the University of Agricultural Sciences and Veterinary Medicine and 0.5% in some other institutions. These universities are located in Cluj-Napoca and they are accredited according to the qualifications of the European Higher Education Area, following the Bologna Process, which standardizes the European Higher Education Area.

Analyzing statistically the means of academic performance indicators, both from high school and college we found that the mean for Baccalaureate score was 8.64 (SD= 0.86), the mean of High School Average GPA was 9.06 (SD= 1.01), the mean of Credit points was 26.75 (SD=5.71), the mean of weighted GPA was 7.60 (SD = 1.54) and the mean for number of failed exams was 1.26 (SD= 2.1). About 32 of the participants were eligible for a scholarship (21.9%).

3.3.4 Measures

Students were informed about the purpose of research as being a profiling examination on high achievers. Those who agreed to participate received an electronic invitation in Lime Survey (version 2.5) and they self-reported their High School GPA score, Baccalaureate score and the previous college semester's GPA, granted credit points, undergraduate scholarship eligibility and the number of failed exams. The previous semester's GPA was attested by a screenshot or photo on their official online grade summarization table and official certifying documents for the other indicators of performance. These indicators were collected because we wanted to analyze the relationship between the preferred self-regulatory mode and objective criteria of academic achievement from numerous angles.

The individual regulatory mode profiles were set up using Regulatory Mode Questionnaire (Kruglanski, Thomson, Higgins, Atash, Pierro & Shah, 2000). This instrument was designed to distinguish the preferred regulatory mode for goal-pursuit. Individuals who operate predominantly in Assessment mode prefer strategies of evaluation in the context of decision-making, while Locomotors prefer to apply progressive elimination and accommodation to intermediary situations. The questionnaire was translated into Romanian. Both scales were tested for reliability. Cronbach α for the Assessment scale was 0.70, and, after deleting item 13 and 24 from the Locomotion scale Cronbach α was 0.75.

3.3.5 Results

Analyzing the correlational associations, we found significant results only in case of preference for Locomotion regulatory mode, not in case of Assessment regulatory mode preference. The better the performance, the more likely the preference for Locomotion mode was, in general. The results are shown in Table 7.

Table 7. *Matrix of Correlations among Variables: Regulatory Modes and Academic Performance Indicators*

		1	**2**	**3**	**4**	**5**	**6**	**7**
1	*Assessment R.M.*		.09	.06	.06	-.07	.13	.12
2	*Locomotion R.M.*			.33***	.19*	-.15	.19*	.21*
3	*Last GPA*				.65***	54***	.38***	.28***
4	*Obtained credits*					-66***	.22**	.14
5	*Number of failed exams*						-.25**	-.21*
6	*Baccalaureate Average*							.41***
7	*High School Average*							-

*Note: N=146, * p< .05; **p <.01; ***p <.001*

We have built a predictive model from the Baccalaureate Average and Both Regulatory Modes (both unstandardized and standardized values) in order to test the possible predictive power in academic performance. The z-scores of Locomotion and Assessment Regulatory Modes were computed, along with the product of both, in order to test our hypothesis.

Multiple Hierarchical Regression analysis was conducted to estimate how much variance in semestrial weighted GPA was accounted for by both regulatory modes and important former academic results (Baccalaureate Score /SAT equivalent). Our results are

presented in Tables 8. and 9. and they highlighted, that the proposed model could predict up to 19% from the variance in weighted GPA both in case of unstandardized values ((F (3,137)= 11.99, R^2 Change =0.192, p<.001)) and standardized values ((F (4, 137)= 8.39, R^2 Change = 0.191, p<.001)). The standardized values model included also the product of Locomotion and Assessment Regulatory mode z-scores. The independent variable significancy analysis in both cases (standardized and unstandardized values) showed only two variables which played a significant role in the prediction of weighted GPA. These two were the Baccalaureate score (t= 4.01, β= 0.31, p<.001) and the preference for Locomotion regulatory mode (t= 3.44, β= 0.26, p=.001), both playing a statistically significant positive role in the prediction of academic performance, measured through weighted GPA. The product of the z scores of the two regulatory modes did not turn out to be significant in our multiple hierarchical regression analysis (t= 0.39, β= 0.03, p<.69).

Table 8. *Predictive Power of Baccalaureate Score and Regulatory Modes on Previous Semester's Weighted GPA*

Predictive Models	***R*²**	***R² Change***	***F Change***	***df1***	***df2***	***p***
a	.031	.031	1.500	3	141	.217
b	.223	.192***	11.398	3	137	.000***
c	.222	.191***	8.395	4	137	.000***

*Note: * p< .05; **p <.01; ***p <.001*

a. Controlled predictors: (Constant), Gender, Age, Year of study

b. Predictor Model I: (Constant), Baccalaureate, Locomotion, Assessment

c. Predictor Model II: (Constant), Baccalaureate, Z values for Locomotion, Z values for Assessment, Product of Z values

d. Dependent Variable: Weighted GPA

Scholarship Eligibility and the Failed Exams variables were coded for binary logistic regression analysis. The above predictive model (Baccalaureate score, Assessment and Locomotion regulatory mode scores) was tested for both indicators.

In the case of Scholarship Eligibility our model turned out to be statistically significant, χ^2 = 22.225, df =3, N= 146, p < .001, indicating that the independent variables from the model predicted the outcome variable. The regression logistic coefficients, Wald test, and odds ratios for each variable are presented in Table 10. The *Nagelkerke R Square* estimates were 0.218 indicating that 21.8% of the independent variable was predicted by the variance in the predictors from the model. The model classified correctly 15.6% of the undergraduates with a scholarship and 96.5 % of those without a scholarship. The overall classification success was 78.6%. Considering the Wald test result (Table 10), we can say that only the Baccalaureate score played a statistically significant unique role as a predictor, Wald test result is 11.21, β= 1.223, df=1, p=0.01, and considering the Odd Ratio (3.397), we can say that our results indicate that if an undergraduate had a high Baccalaureate Score he/she is 3.39 times more likely to obtain a performance scholarship in the higher education cycle. The regulatory modes as singular predictors were not statistically significant considering the scholarship eligibility performance indicator.

Table 9. *The Individual Role of Baccalaureate Score and Regulatory Modes in the Prediction of Previous Semester's Weighted GPA*

Variables	***B***	***SE***	**β**	***t***	***p***
Assessment R.M.	.009	.157	.004	.059	.953
Locomotion R.M.	.597	.174	.267	3.440	.001***
Baccalaureate Score	.558	.139	.311	4.016	.000***
R^2 Change= 19.2 % , F Change = 11.39; p< .001* **					

Variables/ Standardized Values	***B***	***SE***	**β**	***t***	***p***
z-score: Assessment R.M.	.031	.119	.020	.259	.796
z-score: Locomotion R.M.	.397	.124	.256	3.210	.002**
Product of z-scores	.050	.126	.031	.398	.691
Baccalaureate Score	.546	.142	.305	3.859	.000***
R^2 Change= 19.1 % , F Change= 8.39; p< .001* **					

*Note: * p< .05; **p <.01; ***p <.001*

The binary logistic regression in case of Failed Exams as an outcome variable, for the same predictive model (Baccalaureate score, Assessment and Locomotion Regulatory Modes) turned out statistically significant as well χ^2 = 21. 798, df =3, N= 146, p < .001. *Nagelkerke R Square* was 0.187, indicating that 18.7% of the variance in this outcome variable was explained by the independent variables included in the model. The model classified correctly 79% of the undergraduates with failed exams and 67% of those without. The overall correctness was 67%. Table 11 comprises the logistic regression coefficients, Wald test results, and Odds Ratios. Considering the Wald test results, we can say that only two variables from the model are statistically significant predictors of exam failure. Both are negative predictors. The first is the Baccalaureate Score: Wald test result was 9.88, β= -0.701, p=.002 and the Odds Ratio was 0.49, indicating that the chance of failing exams is 0.49 times greater if the Baccalaureate score is low. The other significant negative predictor of exam failure possibility is the preference for Locomotion Mode: Wald test result was 4.665, β= -0.579, p=.031.

Table 10. *Logistic Regression Predicting Likelihood of Undergraduate Scholarship Eligibility (Regulatory Modes and Baccalaureate)*

Variable	***B***	***S.E.***	***Wald***	***df***	***p***	***Odds Ratio***	***95% C.I.for O.R. Lower***	***Upper***
Baccalaureate	1.223	.365	11.216	1	.001***	3.397	1.661	6.948
Assessment R.M.	.221	.297	.551	1	.458	1.247	.696	2.234
Locomotion R. M.	.545	.340	2.569	1	.109	1.724	.886	3.358
Constant	-15.494	3.750	17.070	1	.000***	.000		

*Note: *p<.05, **p<.01, ***p<.001*

The Assessment Regulatory Mode did not prove to be statistically significant as a predictor variable neither in the case of Scholarship Eligibility nor of Failed Exams. Still, there is an interesting feature which needs to be presented. In the case of top achievers (Scholarship Eligible undergraduates), the β is positive (β=0.221, p=.45), while in the case of more struggling students the β is negative (β= -0.307, p=.21), indicating a different pattern in the use of this regulatory mode, but the results are not significant statistically.

Table 11. *Logistic Regression Predicting Likelihood of Failed Exams (Regulatory Modes and Baccalaureate)*

Variables	B	S.E.	Wald	df	p	Odds Ratio	95% C.I.for O.R. Lower	Upper
Baccalaureate Score	-.701	.223	9.886	1	.002**	.496	.321	.768
Assessment R.M.	-.307	.249	1.515	1	.218	.736	.451	1.199
Locomotion R. M.	-.579	.268	4.665	1	.031*	.560	.331	.948
Constant	9.595	2.329	16.969	1	.000***	14694.447		

*Note: *p<.05, **p<.01, ***p<.001*

3.3.6 Discussion and Conclusions

Previous research on academic success shows the need of High Regulation Profile (High Assessment/ High Locomotion) in order to achieve high in academia or even military (Higgins& Kruglanski, 1995; Taylor & Higgins, 2002; Kruglanski et al, 2000; Garcia, 2011; Garcia & Lindskär, 2016). Conversely with former results and theories, our results showed a different pattern in the successful Romanian undergraduate. We mostly found a positive association between the Locomotor profile and the academic performance indicators under scrutiny. The correlation coefficients are small, but statistically significant. The correlation seems to be stronger in higher education than in high school, showing a stronger need for the activation of Locomotion mode in this context. The years of study from college also seem to associate positively with the Locomotion mode preference showing the importance of activation of personal resources and the necessity of taking action in order to prove successful in the academic achievement. Interestingly, the Assessment mode does not show any statistically significant role in fostering performance, which is a controversial finding in relation to former experimental results (Kruglanski et al; Garcia & Lindskär, 2016; Garcia, 2011; Taylor & Higgins, 2002; Garcia et al., 2015). The explanation could be found in contextual or cultural details (Kruglanski et al, 2007), which at the moment could trigger a general "Let's do it" focus in Romanian undergraduates, while being part of a society where the achievement motive is present on a collective scale (McClelland, 1961) and the hesitation is minimal. There also could be other variables related to personality and identity formation behind this regulatory pattern (Arnett, 2000; Erikson, 1963). The goal formation and evaluation process needs identity formation and values that are still developing at the age of participants of this study, so socialization and goal relevant critical thinking could be deactivated or less frequently used at this age. About 90% of the participants in our study were full-time students, without jobs, which means, that they probably do not have contact with "real life", study loans, materialistic values or having jobs, because they are supported by parents. This might delay the activation of Assessment mode, which shows positive correlation with materialistic values and interests (Giacomantonio et al, 2013), while the Locomotion mode is considered to be related mostly to intrinsic motivation (Kruglanski et

al, 2000) and may trigger the experience of flow more easily (Csikszentmihalyi, 1975), which is beneficial for academic performance, since undergraduates experience it, too while being part of performance enhancement programs (Travers et al, 2015). Critical thinking, pertaining to assessment, is founded on general knowledge which is still developing in this life phase (Halpern, 2014). This also could delay the Assessment regulatory mode activation. Considering former associative results between personality traits and characteristics and Regulatory mode (Kruglanski et al, 2000), we may conclude that the successful Romanian undergraduate probably has good self-esteem, he is positive, optimistic about the future, open and is concentrating on quantitative aspects of learning, serving mostly the "Let's do it" principle. This might also be activated by a demanding learning system, concentrated on knowledge assimilation. In the meantime, the equifinality and multifinality phenomenon found by Garcia & Lindskär (2016) could suggest the dynamic behind regulation of behavior, which is strongly influenced by context and situational characteristics. From this point of view, high demands, complicated schedules, close deadlines might automatically ask for permanent "acting on it" regulatory mode to be activated.

Our a posteriori results show moderate to strong positive correlation between high school leaving exam (Baccalaureate) and higher education performance indicators (Semester's Weighted GPA, Credit points, Scholarship Eligibility), highlighting the importance of former academic skills and the maturation process behind achievement in university. It takes a long time to get ready and the skill of mobilization of resources and locomotion needs to be trained, in accordance with former findings (DiPerna & Elliott, 2002; Stumf & Stanley, 2002; Kitsantas et al, 2008; Kruglanski et al, 2000; Garcia and Lindskär, 2016).

Our findings are surprising, but at the same time could imply a gradual development in the self-regulation behavior and could place Locomotion as basic enhancer of achievement, in the identity formation phase of personality and in the knowledge acquisition phase of education. Assessment might be the next level, with particular connection to the real world, materialistic values and maybe self-supporting. Assessment Regulatory mode surely has lots of positive functions and its lack, is a risk factor for Romanian undergrads, who might operate without goals or without deliberating the course of action. Further research is needed on the relationship between identity formation and regulatory mode activation in academic and in post education context. Will "real life", work environment and self-support activate the Assessment Mode or not? If yes, will it be able to function on an optimistic level or it will be weakened by the late activation? These are research questions needed to be addressed.

3.4 STUDY IV. THE ROLE OF SELF-REGULATION AND SPECIFIC LEARNING SKILLS IN UNDERGRADUATE ACADEMIC PERFORMANCE

3.4.1 Introduction

Weinstein, Zimmermann & Palmer (1988), proposed three factors of strategic learning represented by the subtests of the Learning and Study Strategies Inventory: Skill (Information Processing, Selecting Main Ideas, and Test Strategies), Will (Anxiety, Attitude, and Motivation), and Self-Regulation (Concentration, Self-Testing, Study Aids, and Time Management). These factors were scientifically demonstrated (Weinstein, Palmer & Shulte, 2002; Hill, 2012). This view also suggested the complexity of interrelated factors that support academic performance.

De Zoysa, Chandrakumara & Rudkin (2014) analyzed the differences in high and low achieving management accounting undergraduates and they found significant differences in the learning skills which students made use of. In their study, the Will component had controversial results and Self-regulation component did not differentiate significantly between high and low achievers.

The role of the abilities gained from previous formal educational experiences proved important. In a study, DeBernard et al. (2004) showed high school GPA to be one of the main predictors for academic success. The ACT score (the equivalent of Romanian Baccalaureate) was another important predictor. This suggests that the development of abilities acquired during school is an important foundation for academic performance. Many studies have shown the predictive role of former academic performance indicators, like ACT or SAT, in relation to academic success in college (Wolfe & Johnson, 1995; Camara & Echternacht, 2000; Stumf & Stanley 2002, Kitsantas, Winsler & Huie, 2008;).

The role of stress or traumatic life events challenge college students (Hou & Liu, 2016; Boyraz, Horne, Owens & Amstrong, 2013) and can affect the performance, especially in case of lack in resilience (Winfield, 1991, 1994). While LASSI is measuring only internal attributes of self-regulated learning, external variables, like trauma or stressful events could be important in the assessment and identification of possible risk factors on academic performance (McMahon & Luca, 2001).

3.4.2 Study IVa. The Role of Skills, Will, Self-Regulation and Contextual Characteristics in Academic Performance in Higher Education [5]

3.4.2.1 Objectives

Romania lacks research on academic success in minority students. Aimed at a population at risk, this research may contribute to the design of educational interventions for raising academic performance. The Higher Education phase plays an important role both in terms of future employment and also for self-esteem and well-being.

Literature review suggests that defective self-regulation and improper use of strategic learning impedes academic performance and the development of full academic potential (Weinstein, 1988; 1994). Formerly proved academic competences and abilities, which can be highlighted via SAT and ACT results, or important exams performance are predictive for higher education performance (Payne, Davidson & Sloane, 1966, DeBernard et al, 2004, Kinsantas et al, 2008, Harakiewitz et al, 2002).

Higher Education success is influenced by contextual variables, too. In the case of full-time work, which is more frequent for the older students or for those enrolled in distance learning, we can expect a decrease in their average grades as compared to their younger colleagues who do not have such characteristics (Austin, 1993).

Considering the above we have formulated the following hypotheses:

1. High achiever undergraduates will be more efficient in self-regulation and strategic learning and will score higher on the self-regulation skill-assessment questionnaire (LASSI), on every factor (Skill, Will, Self-Regulation);
2. The Baccalaureate score (SAT equivalent) will be a significant predictor of the academic performance, because former academic abilities are an important predictor of future performance.

[5] Partial results of this study were published: Marschalkó, E.E. & Szamosközi, S. (2015). Successful Undergraduate Student Profile Exploration: The Role of Skill, Will, Self-Regulation and Contextual Characteristics. *Proceedings of the 2nd International Multidisciplinary Scientific Conference on Social Sciences & Arts, SGEM 2015: Psychology and Psychiatry, Albena, Bulgaria (Vol 1, pp 203-210).* STEFF 92 Technology Ltd., Sofia, Bulgaria

3. Contextual variables (age, employment, self-declared stressful events) will influence negatively the obtained GPAs. Older age, employment, stressful life events will have a negative association with academic performance;

3.4.2.2 Methods

The participants were volunteers (N=150) and they were recruited from among undergraduate students from "Babeș-Bolyai" University, Cluj-Napoca, Romania, Faculty of Psychology and Educational Sciences, Department of Applied Psychology, Hungarian Section. After gathering all the details, because of some lacking answers in the questionnaires or missing data on academic performance (GPA) we could analyze only 141 undergraduate students' answers. In our sample we had Hungarian minority students, from which 20.3% were males and 79.7 % were females. Approximately 43.4 % were students in the 3rd year of college, 21% in de 2nd year and 35.7% were freshmen. Of all the participants 76.9% were full-time students and 23.1% were enrolled in distance education. The average age of participants was 24.68 (SD = 8.25). The mean of the Baccalaureate score was M= 8.15 (SD=0.93), and the mean of the GPA was M= 6.87 (SD= 1.67).

3.4.2.3 Measures

In the study we have applied the Learning and Study Strategies Inventory- 2nd Edition (LASSI), since it demonstrated reliability and validity in the measure of strategic learning traits in higher education. According to the declaration of its designers, this instrument was used in more than 2274 educational units. Previous studies showed students with higher grade point averages scored higher on LASSI subtests. Designers of the questionnaire, Weinstein, Palmer & Shulte (2002), proposed three factors of strategic learning represented by the subtests of the LASSI: *Skill* (Information Processing, Selecting Main Ideas, and Test Strategies), *Will* (Anxiety, Attitude, and Motivation), and *Self-Regulation* (Concentration, Self-Testing, Study Aids, and Time Management).[6]. Every scales item had to be noted from 1 to 5, where 1 was "Not at all typical of me" and 5 was "Very typical of me."

The 2nd Edition of the LASSI Questionnaire was translated into Hungarian with the permission of the authors and for the assessment of reliability we have also computed the Cronbach Alpha Coefficient for each scale after gathering the responses. The only scale which proved to be problematic in the reliability analysis was the Study Aids, which needed adaptation, probably due some cultural differences. We deleted 4 items from this scale, and still remained questionable in reliability. All the other scales remained unchanged, just like in the original version, being accepted due to acceptable reliability coefficients.

Demographic and individual data were collected through direct questions, attached to these questionnaires. Data gathering was conducted online or in printed form. GPA and Baccalaureate scores were obtained with student and university consent. Filling out the questionnaire was done in the second half of the second semester. Before filling out, students were informed on the motivation for the research and they received detailed instructions on the task-in-progress. From the yearly GPA scores we have computed a general cumulative GPA for each student.

The academic performance was coded through the Cumulative GPA of all finished semesters the undergraduats finished at the moment of the study. We also have gathered the Baccalaureate Average (SAT equivalent) from the participants and it was used as the most important High Schools academic performance indicator.

[6] Weinstein CE, Palmer DR, Shulte AC. Learning and study strategies inventory. 2nd ed. Clearwater, FL: H & H Publishing Company, Inc.; 2002

3.4.2.4 Results

Preliminary analyses were conducted to determine if any of the main variables differed as a function of demographic and contextual characteristics (gender, age, form of college enrollment, study year, having a job in college, having a stressful event). Our results suggested that the Baccalaureate score differed considering the age of participants (cut-point was at 24 years), t (140) = 2.95, p< 0.01 showing us that the older undergraduate students had higher Baccalaureate scores. This result was characteristically present only for 25. 2% of the participants, who were older than 24. The difference did not show when we were analyzing the GPA scores by this grouping variable. The difference may be explained also with some changes between generations in the calculation of the Baccalaureate score, due to national legal changes.

Searching for differences, we also identified the Baccalaureate score as being responsible for the changes in cumulative GPA, at a cut- point of 6.80. Considering this, we have found a significant difference: t (140) = 2.86, p<0.05, which highlights the fact that the undergraduates whose Baccalaureate score was below 6.80, could be more exposed to academic struggling in higher education than their peers with better results in the high school leaving exam.

Analyzing the correlations between the variables we found significant associations of academic performance (expressed through cumulative GPA), which are presented in Table 12.

Table 12. *Correlates of Cumulated Academic GPA, Baccalaureate score, and LASSI Factorial Scores (Minority Population).*

Variables	***GPA***
Baccalaureate score	0.50***
Anxiety scale	0.27**
Test strategies	0.28**
WILL Total	0.22*
SKILL Total	0.22*

*Note: *** p<.001, **p<.01, *p<.05*

Hierarchical multiple regression analysis was conducted to estimate how much variance in the cumulated GPA was accounted for the main associates of the academic performance we have identified. We have controlled gender, year of study, age and the enrollment form in our multiple hierarchical regression analysis and we built a predictive model consisting of: Baccalaureate score, Traumatic life event and the LASSI measured Skill, Will and Self-Regulation factorial scores. Our model of prediction explained 26% of the variance in the students' considered GPA (R^2 change = .260, F (6,134) = 11.944, p<.001). Analyzing relevant coefficients, we have found that only two independent variables from our model played a significant role in prediction. The most important was the Baccalaureate

score (β= .40, t (139) = 5.06, p< .001) and presence of Traumatic Life event, which impacted negatively the cumulated GPA, (β= -0.22, t (139) =- 2.97, p=.003). The specific study skill or motivational components of self-regulated behavior of our sample did not play an important role in our prediction model, when considering the whole undergraduate sample. Taking them out from our predictive model, the predictive power lost only 2%, which means that the Baccalaureate score and the lack of Traumatic life event, predicted up to 23.9% of the variance in cumulative GPA (R^2 change = .23, F (6,134) = 11.944, p<.001), both having a statistically important role in the model, t (139) = 5.79, p< .001 and t (139) = -3.09, p=.002. The presentation of the multiple hierarchical regression data for this study is in Table 13.

Table 13. *The Individual Role of Baccalaureate Score and the Presence of Traumatic Events on Cumulated GPA (Hungarian sample)*

Variables	**B**	**SE**	**β**	**t**	**p**	**Adj. R^2**	**R^2 Change**	**F Change**
Gender	.395	.314	.095	1.256	.212			
Year of Study	.340	.155	.179	2.193	.030*			
Age	.046	.027	.223	1.727	.087			
Enrollment form	-.992	.504	-.247	-1.969	.051			
Baccalaureate	.721	.142	.403	5.067	.000***			
Traumatic events	-.812	.273	-.223	-2.977	.003**			
Skill	.021	.016	.162	1.357	.177			
Will	.005	.015	.044	.350	.727			
Self-Regulation	-.011	.012	-.102	-.998	.320			
Model I						.313***	.260***	10.28***
Variables	**B**	**SE**	**β**	**t**	**p**	**Adj. R^2**	**R^2 Change**	**F Change**
Gender	.282	.304	.067	.929	.355			
Year of Study	.345	.152	.182	2.264	.025*			
Age	.044	.025	.220	1.775	.078			
Enrollment form	-.801	.483	-.201	-1.658	.100			
Baccalaureate	.779	.135	.437	5.791	.000***			
Traumatic event	-.830	.268	-.227	-3.099	.002**			
Model II						.319***	.239***	24.563***

Note: B, unstandardized regression coefficient; SE, standard error; β, standardized regression coefficient; t, obtained t-value; p, probability; R^2, proportion variance explained.
**p<.05, **p<.01, ***p<.001*

Controlled predictors: (Constant), Gender, Year of study, Age, Enrollment form
Model I. Predictors: (Constant), Baccalaureate, Traumatic Events, Skill, Will, Self-Regulation
Model II. Predictors: (Constant), Baccalaureate, Traumatic Events
Dependent Variable: Cumulated GPA

3.4.2.5 Discussion and Conclusion

Our first hypothesis, which was assuming that the high achiever student would obtain higher scores at Lassi Questionnaire, was only partially proven. The Skill and Will factorial scores were the ones that did show a small, but statistically significant correlational relationship with the cumulated GPA of the undergraduates, but did not seem to matter much or to contour as a pattern in the profile of the first or second year students. The way students learn is probably less strategic and planned in the first year. In contrast, the 3rd year students seem to have a better portfolio of strategic and self-regulating skills, which probably develop with maturation and experience in the learning process. This finding, conversely with the literature (Zimmerman, 1986 a; Weinstein & Mayer, 1986; Garcia & Pintrich, 1994; Weinstein et al., 2000; Gu, 2012) showed us that the strategic learning and self-regulating skills do not generally play an essential role in the students' academic performance. In the meantime, the different profile of last year undergraduates highlight the importance of strategy and self-regulating, while these students are the possessors of the best academic achievements and seem to be more strategic than their younger peers.

Our second hypothesis, which said that the Baccalaureate score will predict the academic performance, was confirmed. This score showed positive association and was validated in a multiple hierarchical regression analysis, as the most important predictor of academic performance in this population. The finding is consistent with the literature (Wolfe & Johnson, 1995; Strumf & Stanley, 2002; Camara & Echternacht, 2000) finding, which also confirmed that the SAT score has an important role in predicting the academic achievement. Students' previously proven abilities are relevant for future academic performance, and important exam outcomes like the SAT (Baccalaureate score) usually are relevant predictors of higher education performance.

The third hypothesis was also partially confirmed, because some of the contextual characteristics showed significant association with the cumulative GPA score. We have found that the presence of self-rated traumatic event was playing a significant role in academic achievement. This confirmed the literature findings (Hou & Liu, 20016; Boyraz, Horne, Owens & Amstrong, 2013) The presence of stressful events is important to analyze, because this may be an objective external variable which also leaves a mark on the college results, and as shown in our study, it has a negative association with the results (McMahon & Luca, 2001).The presence of stressful event in one's personal life should also be analyzed in further research, because in this case the approach which aims at performance enhancement should consider different aspects and factors (Winfield, 1991, 1994).

In conclusion, we can say that academic performance is determined by previously proven academic abilities, experience, maturity and lack of stressful personal life events. The high performing undergraduates most likely learn all the material without employing specific strategies, and they usually perform well because they have good cognitive abilities, and if lucky, they do not face traumatic events, and are not forced to strategies because most of them do not have a job while in this cycle of education. The serious lack of strategical approach of the learning process and personal behavior in Romanian Higher Education, probably is due to some cultural differences (ex. parents support the students financially) and there is scarcity in education regarding the trainings about the know-how of learning and facing traumatic events, which could be helpful even for high achieving students who might struggle to develop some knowledge up to the 3rd year of higher education cycle. The struggling students could benefit the most from a more self-aware focus on the learning process and resilience skills linked to traumatic events.

3.4.3 Study IVb. Predictors of Academic Success in College: Actual Learning Skills[7]

3.4.3.1 Objectives

Romania lacks diagnostic instruments in learning strategies and academic self-regulation and intervention programs for students who face academic underachievement. By applying Learning and Study Strategies Inventory - second edition - (LASSI, Weinstein, Palmer & Shulte, 2002) to the undergraduate student sample, we can highlight the chief aspects of strategic learning, considering performance indicators as previous semester's weighted GPA. Taking into consideration the vast data from literature regarding the importance of strategic learning and self-regulation, we formulated the following Hypotheses:

1. The Baccalaureate score (SAT equivalent) will associate positively with weighted GPA, suggesting the importance of former academic skills and competences, and will have a positive association with the LASSI measured skill, will and self-regulation scores.
2. Successful undergraduates will be more efficient in all 3 factor related items: skill, will and self-regulation; the higher the GPA, the higher the score in these factors.

3.4.3.2 Methods

Participants

The participants were volunteers (N= 106) and they were recruited from among undergraduate students from "Babeș – Bolyai" University, from Technical University, from "Iuliu Hațeganu" University of Medicine and Pharmacy and the University of Agronomic Sciences and Veterinary Medicine. All institutions are accredited in the European Bologna System and are located in Cluj-Napoca, Romania. All the recruit undergraduates were full time students. In our sample we had 19.8 % Hungarian minority students and 80.2 % Romanian undergraduates. 35.8% were males and 64.2 % were females. Approximately 25.5 % were students in the 3rd year or above, 21.7% in de 2nd year and 45 % were freshmen. 7.6% of the participants were beyond their 3rd year, which is particular to medical fields. All the participants were full-time students, 52% in the STEM field, and 48% in non-STEM field. The average age of participants was 21.35 (SD = 1.85). The mean of the Baccalaureate score was M= 8.90 (SD=0.77), the mean of previous semester's weighted GPA (February 2016 and February 2017) was M= 7.89 (SD= 1.51). Demographic and individual data were collected through direct questions, attached to LASSI questionnaire. Data gathering was conducted online using Lime Survey between March 2016- March 2017. GPA and Baccalaureate score were obtained with student consent, in a self-rated form, integrated in the online Survey. Before filling out, students were informed about the motivation of research and they received detailed instructions on the task-in-progress.

3.4.3.3 Measures

In the study, we have applied the Learning and Study Strategies Inventory (LASSI), since it demonstrated reliability and validity in the measurement of strategic learning traits in higher education. According to the declaration of its designers, this instrument was used in more than 2274 educational units from the USA. Previous studies showed students with higher grade point averages scored higher on LASSI subtests. Designers of the questionnaire, Weinstein et al. (2002), proposed three factors of strategic learning

[7] This study was published: Marschalkó. E. E., Szamosközi I. (2017). Predictors of Academic Achievement in College: Actual Learning Skills. *Transylvanian Journal of Psychology, 18 (1),* 35-56

represented by the subtests of the LASSI: Skill (Information Processing, Selecting Main Ideas, and Test Strategies), Will (Anxiety, Attitude, and Motivation), and Self-Regulation (Concentration, Self-Testing, Study Aids, and Time Management).[8] The Anxiety scale refers to the interactive effects of one's own thought processes, beliefs and emotions which may facilitate the learning process. The Attitude scale measures the general attitude towards school and the general motivation to succeed. The Concentration scale measures the general control of concentration versus distraction. Information Processing refers to the elaboration and strategically organized learning tactics, which may be applied by students. The Motivation scale, similarly with the Attitude scale, refers to the general attitude and motivation to succeed in the learning tasks. The Selecting of the main ideas measures the ability of the students to select the critical, basic information from the learning material. The Self-testing and Study-aids scales, along with the Test-strategies refer to self-regulating strategies and hints on which the students can rely in order to succeed in learning. The Time-management scale measures the ability of students to make realistic schedules for learning and goal reaching. Every item on the scales scored from 1 to 5, where 1 was "Not at all typical of me" and 5 was "Very typical of me."

The scale of Study Aids was the only one which required adaptation through item deletion. The deleted items were the following: "My underlining is helpful when I review text material", "If there is a website for my textbook, I use information provided there to help me learn the material","When they are available, I attend review sessions for my classes", "I use special study helps, such as italics and headings that are in my textbook." These actions were unlikely to be used by the students in our population, probably due to cultural differences, so we decided to analyze our data after deleting these ones from the total scores. All the other items from the Questionnaire were used identical to the original version.

3.4.3.4 Results

The year of study seems to have an important role, showing us a difference in the weighted GPA, which seems to be higher with the passing of time ($t=4.17$, $p< 0.01$, $r(104)=0.38$, $p< .001$). Analyzing the correlational associations, we found a significant positive relationship between all the LASSI factors (Skill, Will, and Self-Regulation) and the previous semester's weighted GPA. The better the performance, the more likely the students were skilled, and were using self-motivation and regulation tactics. Baccalaureate Average seemed to correlate with the Skill and Will factorial score. The results are shown in Tables 14. and 15.

[8] Weinstein CE, Palmer DR, Shulte AC. Learning and study strategies inventory. 2nd ed. Clearwater, FL: H & H Publishing Company, Inc.; 2002.

Table 14. *Correlates of Weighted GPA: LASSI Factorial and Scale Scores, and Baccalaureate Average*

Variables	***GPA***
Baccalaureate Average	0.25**
SKILL Factor	0.62***
WILL Factor	0.57***
SELF-REGULATION Factor	0.51***
Anxiety Scale	0.44***
Attitude Scale	0.27**
Concentration Scale	0.48***
Information Processing	0.51***
Motivation	0.61***
Self-Testing	0.27**
Selecting Main Ideas	0.48***
Time Management	0.54***
Test Strategies	0.61***

*Notes: *** p<.001, **p<.01, *p<.05*

We have built a predictive model from the Baccalaureate score, and the factorial scores of LASSI Questionaire, respectively Skill, Will, and Self-Regulation. Hierarchical multiple regression analysis was conducted to estimate how much variance in the academic performance (previous semester's weighted GPA) accounted for the variables from our proposed model. We have controlled statistically for age, gender and year of study in the regression analysis. Our result showed that 32.4 % of the variance of previous semester's weighted GPA was predicted by our model (R^2 Change = .324, F (7, 98) =12.883, p< .001), but only one predictor variable played a statistically significant unique role and this was the Skill factor from Lassi (β= .313, t= 2.372, p= .020). In a further step we have also controlled for the study field (STEM/ non-STEM) undergraduates were enrolled to and we have checked the above-presented models' predictive power once again. The total predictive power dropped to 29.3% (R^2 Change = .293, F (8, 97) =12.109, p< .001), and the Skill component of LASSI remained the only significant predictor variable of weighted GPA (β= .309, t= 2.381, p= .019). From the controlled variable the year of study (β= .232, t= 2.781, p= .007) and the Field of study (β= -159, t= -1.990, p= .049) were contributing statistically significantly to the prediction of weighted GPA. The year of study was a positive predictor of academic performance, while the field of study was a negative predictor (STEM field students tended to have lower grades).

Table 15. *Correlates of LASSI Factorial Scores with the Baccalaureate Average (General Undergraduate Population).*

Variables	***Baccalaureate Average***
Will score	0.36***
Skill score	0.28**

*Note: *** p<.001, **p<.01, *p<.05*

We conducted the hierarchical multiple regression analysis for our proposed predictive model separately for STEM and non-STEM field as well. The proposed predictive model comprised the Baccalaureate score, and the LASSI factorial scores separately (Skill, Will, and Self-regulation), while we have statistically controlled Age, Year of study, and Gender. Our results highlighted an interesting difference between the groups. In the case of non-STEM field, the model explained 34. 2 % in the variance of weighted GPA, $R^2 = .342$, $F(7, 38) = 3.50$, $p = .005$, but only one variable seemed to play a statistically significant positive role, and it was the Self-regulation component of LASSI, $\beta = .40$, $t(45) = 2.229$, $p = .032$. In case of STEM undergraduates, the prediction model, explained up to 36.4% of the variation in weighted GPA ($R^2 = .364$, $F(7, 52) = 9.75$, $p < .001$), but only two statistically significant variables seemed to play an important positive role in the prediction of weighted GPA: the Will, $\beta = .387$, $t(52) = 2.388$, $p = .021$ and the Skill, $\beta = .376$, $t(52) = 2.449$, $p = .018$. The Baccalaureate score was a significant predictor in none of the cases. Table 16 is summarizing statistical data of the study field related to hierarchical multiple regression analysis

Table 16. *The Role of Skill, Will, Self-Regulation in the Prediction of Weighted GPA in the Context of STEM and Non-STEM Study Fields.*

Domain of Study	Variables	B	SE	β	t	p	Adj. R^2	R^2 Change	F Change
NON-STEM	*Gender*	-.174	.507	-.051	-.343	.733			
	Age	-.029	.089	-.046	-.329	.744			
	Year of study	.187	.178	.145	1.047	.302			
	Baccalaureate	.535	.276	.282	1.936	.060			
	Skill	.034	.024	.417	1.417	.164			
	Self-regulation	**.029**	**.013**	**.400**	**2.229**	**.032***			
	Will	-.030	.027	-.309	-1.102	.278			
	Model						**.281****	**.342****	**5.347****
STEM	*Gender*	.085	.278	.029	.305	.762			
	Age	-.124	.116	-.109	-1.069	.290			
	Year of study	**.419**	**.153**	**.287**	**2.736**	**.008*****			
	Baccalaureate	-.019	.196	-.011	-.098	.922			
	Skill	**.037**	**.015**	**.376**	**2.449**	**.018***			
	Self-regulation	-.009	.012	-.106	-.789	.434			
	Will	**.039**	**.017**	**.387**	**2.388**	**.021***			
	Model						**.510*****	**.364*****	**10.937*****

Note: B, unstandardized regression coefficient; SE, standard error; β, standardized regression coefficient; t, obtained t-value; p, probability; R^2, proportion variance explained.
**p<.05, **p<.01, ***p<.001*

Controlled predictors: (Constant), Gender, Age, Year of study

Predictor Model Variables: (Constant), Baccalaureate, Skill, Will, Self-Regulation
Dependent Variable: Weighted GPA

3.4.3.5 Discussion and Conclusions

Our first hypothesis assumed that former academic abilities measured and coded through the Baccalaureate Average (SAT equivalent) will be positively associated with the previous semester's weighted GPA. It was confirmed partially, while the academic performance in STEM field seemingly is not predicted by the Baccalaureate score. Considering only the non-STEM undergraduates, the finding is consistent with literature (DeBernard et al. 2004; Stumf & Stanley 2002; Kitsantas, Winsler & Huie, 2008). The successful student comes equipped for college with skills which they can further use for accommodation, in a complex regulative action (Bennett et al, 1999; Corno, 1986, 1989). Optimal use of strategies and metacognition develop in time, due to proactive behavior (Zimmerman, 2008; Pintrich, 1988). The reflective behavior and metacognitive strategies enhance in years, making possible the learning from experience and eventual lack of performance through compensation (Zimmerman, 1990; Zimmerman& Martines-Pons, 1986; Zimmerman & Campillo, 2013). Students get better at monitoring themselves and correcting fallacies (Weinstein, 1988; Weinstein & Mayer, 1986). Previously acquired skills and academic abilities are challenged in exam situations when considerable informational material is tested under pressure, which probably addresses the same abilities and skills demanded by academic exam sessions. This outlines the role of maturation and ongoing

development in academic performance. Past experience is relevant and can be used to categorize struggling students before intervention in different risk categories. The lower the Baccalaureate Average, the higher the risk for learning difficulties in higher education, especially in non-STEM fields.

Our second hypothesis stated that successful undergraduates will obtain higher scores in all the LASSI factor related items: Skill, Will and Self-regulation. Data confirmed our presumption in line with the conclusion of de Zoysa et al. (2014). Skills are in a lead, followed by Will and Self-Regulation considering the role in academic performance, which is somewhat controversial to de Zoysa et al.'s findings (2014). The unfamiliar academic context, the different structure of the academic year, the exam sessions, the quantity of material seem to ask for more Skills, and Self-regulative tactics than in high school. The successful students know how to learn and they can motivate themselves, they can control their attention and have time-management abilities. The only scale which did not show an important association with the weighted GPA was the Study Aids, which, in our sample, probably due to cultural differences, did not earn much importance.

Our results showed that the Skill component seemed to have a statistically significant, unique role in the prediction of high weighted GPA. A posteriori analysis evidenced interesting features in self-regulation emerged considering the fields that students were enrolled in. Specifically, the STEM field students tend to use more skill linked to the WILL and SKILL factors of LASSI, while non-STEM students favor especially the SELF-REGULATION factors specific behavior. Even if learning strategies are vastly defined in literature (see in Gu, 2012) and self-regulation in learning is a complex phenomenon (Boekarts, 1991, Zimmerman & Campillo), the "learner-task-context strategy" (Gu, 2012) is an important paradigm for planning different intervention programs for struggling students. The skills probably can be applied with varying efficiency in different fields (ex. technical, medical or other) and on different educational levels (High School or College).

Knowing how to learn and strategically manage the information should be considered a priority because it is connected to problem solving. The domain of strategic learning skills seems to be dynamic and context specific, and its expert use earns importance in time. Taking into account the possibility of predicting academic success in college, the LASSI factor components seem to be more relevant than previous achievements (Baccalaureate Average), which might be employed for risk categories: the lower the Baccalaureate score, the higher the possibility of academic struggling in higher education.

3.5 STUDY V. PILOT RANDOMIZED CONTROLLED TRIAL OF A COMPLEX ONLINE GOAL-SETTING PROGRAM TO SUPPORT ACADEMIC ACHIEVEMENT ENHANCEMENT

3.5.1.1 Introduction

Morisano, Hirsh, Peterson, Pihl & Shore (2010) using a complex online program for personal goal setting organized in a randomized controlled trial has obtained a weighted GPA average 30% higher for the experimental group compared to placebo group which operated on a face valid, alternative program. The results of the study showed the superiority of goal setting in a stage of life in which the identity is not yet formed and the undergrads are in a state of search and self-definition. The number of words described in the ideal future exercise, which was a self-authorship exercise (Pennebaker & Chung, 2011), influenced significantly the differences between the pre- and post- intervention results, stressing the importance of giving a concrete form to personal goals in motivated behavior. Viewing the

ideal future in accordance with the literature, leads to better results (Sherman, Skov, Hervitz & Stock, 1981, Campbell & Fairey, 1985) and is often influenced motivation-wise.

Schippers, Scheepers & Peterson (2015) found that a goal-setting intervention significantly impacted the academic achievement in undergraduates, considering both the obtained number of credits and the number of failed exams. The greatest impact of the used scalable online goal-setting Program was shown in case of minority male students, which earned 44% more credits after the 1st academic year and their retention rate increased with 54%.

Possible underlying mechanisms of the impact in goal – setting intervention

Goal-setting as a technique and orientation seems to be a divinatory element in human self–regulation behavior. The underlying mechanisms of its effects could be many, linked to cognition, skill development, motivation and even personal identity. Argumentation of possible links is important for the identification of possible underlying mechanisms, which are relevant for performance change.

Goal-setting and Creative Problem Solving

Self-regulation of human behavior neurologically is linked to the Prefrontal Cortex. The neurological area of planning, executive functions, goal-setting, anticipation, emotional regulation is linked to the same area (Saver & Damasio, 1991; Olesen, Westerberg & Klingberg, 2004; Cohen & Liberman, 2010). Neuroimaging techniques have brought scientific support that Prefrontal Cortex is linked to goal directed behavior (Unterreainer & Owen, 2006), goal-oriented active behavior and self-regulation (Wagner & Heatherton, 2010). Problem solving in creative context, the creative integration of information, if it is the outcome of deliberate control, is also linked to the prefrontal cortex of the brain. The effect of goal-setting interventions, especially in self-definig ways (Morisano et al., 2010; Chase et al., 2013; Schippers et al., 2015) linked to deliberate problem solving steps may trigger many executive functions from imagery, to decision-making, creativity and problem solving (Gollwitzer, 1990; Elliott et al., 2001;). Sleep may facilitate creative insight and problem solving (Stickgold & Walker, 2004) and complex goal setting task might be helped in metacognition if applied in a longer timeframe.

Goal-setting and Motivation

Goal-setting is a frequently used performance enhancer (Locke& Latham, 1990), it is at the basis of human action and perseverance (Kanfer, 1990; Frese & Zapf, 1994) and it is a theory validated by hundreds of correlational and experimental laboratory studies (Locke& Latham, 2006). Via concrete representation of desired states (Austin & Vancouver, 1996) it can help human self-regulation in academia (Zimerman, 1986; Weinstein, 1994, Garcia & Pintrich, 1994) and other fields. The essence of the self-determined individual is linked to goals that have internal roots, being in concordance with personal identity (Deci & Ryan, 1985; Deci & Ryan, 2000).

Goal-setting and Identity

Self-relevant knowledge gathering and concretization, with positive emotional associates (Bandura, 1986, 1991) is the main content in the identity crisis phase (Erikson, 1968; Arnett, 2000), when personal relevant meanings represented in goals can be connected with possible selves in general or specifically (Marcus & Nurius, 1986; Dörnyei, 2009) and can guide personal behavior toward continuous learning and adaptation in the context of those concretized (Zimmerman, 1990; Seijts et al., 2004). Interventions linked to personal goals (ex. Morisano et al., 2010; Chase et al., 2013; Schippers et al., 2015) which were

developed on the personal motivational ground linked to self-knowledge and own identity, seemed to have benefits in many domains, showing up a possible inter-domain effect pattern via generalization.

Goal-setting and Mindsets

The core element of the social-cognitive theory (Bandura 1986, 1991) linked to self-efficacy, highlights the unique role of goals in self-regulation and human agency. Furthermore, the study of Schippers et al. (2015) evidences that minority participants had the most benefits from the goal-setting intervention in an undergraduate cohort. Changing their mindsets and focusing on possibilities, seem to be the most beneficial for minority male students, which is concordant with the literature (Dweck, 1986).

Goal-setting and Skill development

Field studies and controlled trials usually had many goals in work plan, so it was probable that participants could also develop a skill, which was transferable to other fields in their everyday life (Morisano et al., 2010; Travers et al., 2015). The transfer between domains can be allocated to implicit learning too, as described in a qualitative analysis of a one-semester long diary research on goal-setting made by Travers et al. (2015). The learnability of the goals-setting skills is highlighted in the goal-system theory as well, which connects the goals with means, in neurological systems (Kruglanski, 1996; Kruglanski et al., 2003).

3.5.1.2 Objectives

We had the following objectives with this study:

1. To assess effect on academic performance of the online goal-setting program created by Morisano (2008) in our sociocultural context, on STEM and non-STEM undergraduates in a randomized controlled trial. The study assumed that the goal-setting intervention was superior to placebo intervention in effect regardless of the profile of the faculty students were enrolled in, and would positively impact the midterm grade point average (GPA) of students.
2. To test whether the program is effective rapidly, as help seeking undergraduates usually are looking for rapid effects in interventions. The field studies published until now, usually measured change after one year. We targeted to measure the performance change between the 2 semesters.
3. To identify possible general and specific (field-relevant) moderators of the effect via qualitative and quantitative approach. Our intention was to highlight the most relevant features or differences of the intervention for two categories of undergraduates enrolled either in stem or non-STEM field. Furthermore, we considered the count of the used words and time spent on different phases of the intervention (Inspiration, Visualization and Planning), to see probable differences which could be connected to possible underlying mechanisms concerning the effects of personal goals on academic performance.

3.5.1.3 Methods

Participants

We conducted a pilot randomized controlled trial with two groups: Goal-Setting Group and Control (face-valid Placebo Treatment) Group. The undergraduates were recruited via a structured recruitment campaign, through posters in campuses and online social media adverts targeting both student groups and individuals, over a four month time-frame (November 2015 - March 2016). Procedures targeted struggling students from Babeş-Bolyai

University, Technical University, "Iuliu Haţeganu" University of Medicine and Pharmacy and University of Agricultural Sciences and Veterinary Medicine. All higher education institutions are located in Cluj-Napoca, Romania. Initially, we had 85 Undergraduates completing all the steps of the intervention, but because of bureaucratic issues, we could get the second semester's weighted GPA (July/September) only for 57 undergraduates (27 in experimental group and 30 in control group). Approximately 85% were females and 15 % were males. More than half (60%) were enrolled in non-STEM field and 40 % in Stem fields. The average age was 21.19 (SD = 1.68).

Eligibility and inclusion criteria

Participants were eligible if they met all of the following criteria:

1) Weighted GPA under 7.50, or, if above, students felt pressured by college demands and by learning tasks;
2) Full-time student status;
3) Formal, official statement signed by the Dean, that specifies identifying information, grades, and number of failed exams and weighted GPA for the 1st semester (of the subsequent year).

The initial intention to participate was signaled online. Following this step, all students were telephoned to be informed about the purpose of the study and the selection criteria for applicants. They were informed that there were two online interventions, that we did not guarantee their efficiency and that they would be randomly assigned into one of the groups by a computer. Financial compensation or credits were not offered in return for their participation, students being only self-motivated. For blinding, the research coordinator was not met in person and all communication was maintained via phone or e-mail. We had 330 undergraduates who signed up to our virtual list, but only a total of 101 students confirmed their interest, met the eligibility criteria and presented the official statement signed by the Dean for official admission, which also stated the criteria for evaluating the 1st semester's academic performance (number of failed exams, obtained credit points and weighted GPA).

The intervention was conducted in Lime Survey, a free survey software, sent via the participant's e-mail.

Randomization and treatment allocation

Randomization was made using an online research randomization website (www.randomizer.org). The allocation lists were sent to the Lime Survey technicians and they were introduced into the system, so as to implement the intervention.

Materials

Academic achievement

The academic achievement was coded via both semesters' weighted GPA (winter and summer exam session, 2016). We also collected the number of failed exams and obtained credit points in both cases. The intervention was conducted in April 2016.

Intervention content

Group 1

The content of our experimental intervention[9] was the Romanian translation and adaptation of the method published by Morisano (2008), which was originally based on the program developed by Peterson & Mar (2004). The translation and adaptation was made with the support of linguists and psychologists. The only difference was that we have

[9] The source of the experimental content of Study V. is in: Morisano, D. (2008). Personal goal setting in university students: Effects on academic achievement, executive functioning, personality, and mood (Doctoral thesis). McGill University, Montreal, Canada.

exposed the participants gradually, dividing the program in 3 distinct phases, in order to avoid personal resource depletion, by giving time for extended creative activity and meta-cognitive involvement. The participants were asked to spend at least 1 hour on each phase and they had 1 week allocated for every phase, with the possibility to take breaks during performance. In the meantime the content of the program was divided into three for better tracking of possible underlying mechanisms: Inspiration, Visualization and Planning. The content of these phases are presented in Figure 4.

The first phase was inspirational. The participants pondered possible futures and possible selves, which, by the end, were encapsulated in 8 or 9 personally relevant goals (Step 1 and 2 of the Morisano Program).

The second phase consisted in actualization of previous goals, participants having the chance to modify them, if they wanted. Afterwards, they visualized the possible effects of reaching them in their own lives. They ranked them according to importance, detailing the impact of reaching them (Step 3 and 4 of the Morisano Program). This phase consisted in visualization of the effects, of impact and positive possible outcomes of achieving these personal goals.

The third phase consisted of a meta-cognitive approach to goal realization via planning. The students made plans to achieve them and they attempted to operationalize all steps, from challenges to benchmarks (Step 4 to 8 of the Morisano Program).

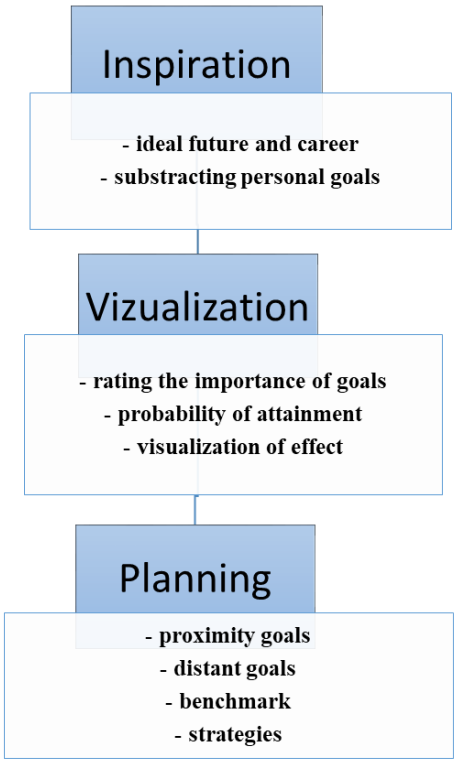

Figure 4. Illustration of the Content in the Experimental Intervention (Inspiration, Visualization, Planning).

Group 2

Group 2 (Control/Placebo) - had a 3 phase intervention as well. In the first the phase, the participants answered the following positive psychology questionnaires:

1) Personal Growth Initiative Scale (Robitschek, 1998);
2) Mindful Attention Awareness Scale (Brown & Ryan, 2003);
3) Meaning of Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006);
4) The Gratitude Questionnaire (McCullogh, Emmons, & Tsang, 2002);
5) The Inspirational Scale (Thrash & Elliot, 2003) and Exploration Inventory (Kashdan, Rose, & Finhman, 2004).

In the second phase, they had a free writing exercise on different school topics. This was linked to timing and it was an open task.

In the third phase, they went through an online careers orientation exercise without a consultant, by taking a complex profiling test validated in Romania: VIA - Professional Orientation Survey[10] - which assessed reasoning (verbal and numerical), personality traits and professional interest (Dima, Smeureanu & Petrescu, 2011). After completing it, the undergrads were sent a complex computer-generated report of results and recommendations of career paths that could match their psychological profile. They were sent 3 different reports with more than 100 pages in total.

3.5.1.4 Measures

The goals that undergraduates set and elaborated were coded by two different people into three categories: Academic vs. Non-academic Goals, Intrinsic and Extrinsic Aspirations and Emotional vs Factual Goals. Every goal related to academia or career was coded as Academic. Goals, with emotional content, without concrete content, like "I want to be happy" were coded as emotional, versus concrete content, coded as factual, like 'I would like to lose 5 kilograms." In what concerns life goals, the coding categories were based on Aspiration Index developed in the framework of self-determination theory (Kasser & Ryan, 1993), which describes intrinsic aspirations (meaningful social relationships, personal growth and community contributions), extrinsic aspirations (wealth, image, fame) and health, which is not defined clearly, neither as extrinsic, nor intrinsic.

The time spent online was coded in the software that we used and the number of words the undergraduates used in the different phases of the intervention (Inspiration, Visualization, and Planning) were counted using a special software algorithm.

Approximately 10 weeks after the end of the intervention, the participants completed the Concluding Questionnaire online. The feedback questions were related to how committed their participation was and if the results estimated objectively and emotionally relevant outcomes. They were asked if they would recommend the intervention, how serious their approach was, if they obtained higher grades or could focus or learn any better and if they observed negative emotion reduction (anxiety, sadness, depression). Approximately 60% of the participants answered these questions. The first personal meeting with the research coordinator was optional and happened approximately 20 weeks after the beginning of the intervention. Approximately 40% of the participants attended the meeting.

3.5.1.5 Results

The criterion for the possible impact of the intervention was the possible positive shift of weighted GPA (Grade Point Average) between semesters. No baseline differences were identified in GPA for the experimental group (M = 7.17, SD = 0.98) and the control group

[10] http://www.via-consiliere.ro/despre_proiect/index/ce_inseamna_via.html

(M=7.18, SD= 0.88), F (1, 55) = 0.02, p = .96, t (55) = 0.04, p = .96 at the beginning of the intervention.

For the possible effect analysis in the *intra-group/ within group* context, we used the Paired Sample t- test and found a statistically significant positive main effect of Goal Setting Intervention, t (26) = 3.42, p < .005, d = 0.79. This was not the case for the control group t (29) = 0.70, p = .47, d = - 0.19. Independent Sample t-test also revealed significant results, considering the intergroup differences in GPA change (GPA2-GPA1), between experimental and control group: t (55) =2.29, p< .005, d = 0.61.

The intergroup assessment of weighted GPA difference (pre- and post- intervention) was conducted via a repeated measure analysis of variance (ANOVA) and Independent Samples t-test. We have found a statistically significant effect in favor of the experimental group, F (1, 55) = 8.66, p < .05, partial η^2=.13; t (55) = 2.94, p<.05, d= 0.78. The experimental and control group differences are presented in Figure 5.

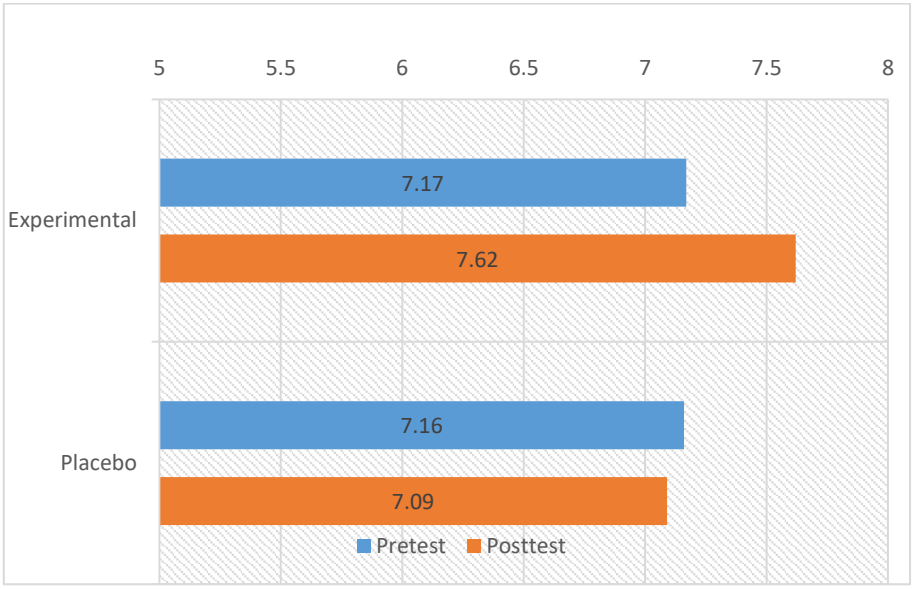

Figure 5. Group differences in semestrial point average (GPA). Post intervention general change regardless of the study field.

A posteriori analysis considered the faculty profile. The undergraduates enrolled to non-STEM field (social sciences, economic sciences, management, public relations, law, etc.) seem to have the most benefits from the Goal-setting Intervention (t (30) = 3.82, p< .001, d = 0.94) versus those enrolled to STEM fields (t (23) = 0.53, p= 0.59, d = - 0.16).

The time spent online did not show any significant association with academic performance change. Interestingly, this variable did not seem to matter. The participants spent more than 2 hours in general elaborating their personal goals. Data analysis suggests that not the time, but the quantity of content mattered more.

The qualitative and quantitative analysis of the data revealed a statistically significant positive association between the general word count outcomes in the Goal-Setting Program and the academic performance from the 2nd semester. The higher the number of written words in general, the higher was the positive post-intervention difference in weighted GPA between the 2 semesters, (r= 0.47, p<.05). Considering separately the three different phases, only the second and the third showed significant positive association with the weighted GPA correction, even if the most words belonged to the first phase, the inspirational part of the intervention. Considering the three different phases (Inspiration, Visualization, Planning),

there seems to be a positive correlation between modified weighted GPA and the number of words used in the visualization of personal goals ($r = 0.51$, $p<.01$, $N=27$) and in the metacognitive task ($r=0.44$, $p<.05$, $N=27$). The number used in the inspiration phase did not show any association with the GPA change between the semesters.

Considering different academic achievement criteria in the experimental group, like the number of obtained credits (failed exams vs all exams taken) we have found that the undergraduates, who passed all exams generally use more words in every phase than their colleagues who struggled more ($M= 1652$, $SD=795$, $N= 11$ versus $M= 1418$, $SD=677$, $N= 10$). This difference was more prominent in case of non-STEM students with all exams passed ($F (1, 15) = 5.90$, $p < .05$, partial $\eta^2=.14$) and in the 3rd Phase (the metacognitive part) this also showed up ($F (1, 15) = 7.81$, $p < .01$, partial $\eta^2=.34$) more preeminently. The undergraduates enrolled to a non-STEM faculty had the tendency to write 20-35% more in every phase. The word count in the metacognitive phase (Planning) showed statistically significant difference in favor of non-STEM students ($t (25) = 2.03$, $p<.05$, $d = 0.69$). In the meantime, considering the year of study, freshman category and second year students had the tendency to write more, employing more words than their third year peers. These differences were obvious, especially in the case of the second phase (visualization) and the metacognitive phase (planning).

Qualitative analysis of the type of goals which were set also did show a difference between STEM and non-STEM students in case of emotional versus factual goals. The emotional outcome related goals, like 'I want to be happy 'were more likely used by STEM undergraduates ($t (25) = 2.24$, $p<.05$, $d= 0.79$; $M= 1.13$, $SD=0.61$ versus $M= 0.45$, $SD=0.93$), while non-STEM undergraduates preferred factual goals, with some concrete content ($t (25) = 1.88$, $p= 0.07$; $M= 7.18$, $d = 0.75$, $SD=0.98$ versus $M= 6.56$, $SD=0.72$).

Aiming at identifying potential predictors of performance change, considering positive shift of the weighted GPA between semesters, hierarchical multiple regression analysis revealed that the word count of second phase from the intervention (Visualization), linked to possible impact of the realization of personal goals, significantly predicted positive change in weighted GPA ($\beta =.51$, $t (27) = 2.71$, $p<.05$), even if we statistically controlled for gender, university profile and year of study. The visualization phase, concerned with the possible impact of personal goals in one's life explained a significant 18% proportion of variance in positive change of weighted GPA, $R^2=.45$, R^2 Change $=.18$, $F (4, 22) = 4.66$, $p<.001$.

The type of goals the undergraduates set for themselves did not show any significant association with the change in their academic performance. Those who set more academic goals did not necessarily gain a better weighted GPA in the second semester. All the other subtypes of coded goals, like intrinsic and extrinsic goals and emotional and factual goals were also taken into consideration as possible effect moderators, but no statistically significant relationship was identified, even if there seemed to be differences in certain aspects between students. For example, STEM undergraduates seemed to favor extrinsic life goals ($M= 1.19$, $SD=04$) more than their peers ($M=0.55$, $SD= 0.68$). These differences were not significant statistically, but considering the small sample size, they might indicate a possible difference, $t (25) = 1.78$, $p = 0.08$. Furthermore, STEM field students set more emotional goals ($M=1.13$; $SD=0.61$) than students enrolled to non-STEM field ($M= 0.45$; $SD=0.93$) which favor factual goals. This difference statistically was validated as being significant, $t (25) = 2, 24$, $p <.05$, between STEM and non-STEM field students.

In the post-intervention Concluding Questionnaire, there were some differences in the evaluations made by participants. There was a difference in the recommendation of the goal-setting intervention in case of the non-STEM undergraduates ($M=1.00$; $SD=0.00$) versus STEM field students ($M=0.75$; $SD=0.44$) and the difference was statistically significant, $t (29) = 2, 16$, $p <.05$. In both cases the intervention was low scored on general

recommendation. Students seemingly did not really understand why is relevant for them to work on their personal goals in order to have better academic achievement. Interestingly, considering the seriousness of the participation, non-STEM field students seemed to self-evaluate worse their personal attitude than STEM students (M=3.73; SD=0.79 vs. M=4.56; SD=0.61) but the difference was not significant statistically, t (29) = 0.79, p = 0.43, d= -0.21. Non-STEM undergraduates seemed to take less seriously the personal goal elaboration than their STEM field peers.

No differences in emotional (anxiety, sadness) and well-being outcomes were detected in the short term.

3.5.1.6 Discussion and Conclusions

In our randomized controlled trial we tested the effect of a multi-session, three- phased (Inspiration, Visualization, Planning), intensive online goal-setting intervention effect on struggling Romanian undergraduates. Our results show that, compared with the control group, which received placebo treatment, the experimental group generally benefitted from the intervention, expressed via the weighted GPA in the semester following the intervention, showing a statistically significant 13% increase in weighted GPA, between semesters in our sample, regardless of age, year of study or the faculty profile (STEM or non-STEM) students were enrolled to. This positive performance change in GPA showed rapidly up in the short term (in four months). Our result was concordant with other findings from the literature (Morisano, 2008; Morisano et al., 2010; Schippers et al., 2015).

One of the most important findings of our study was related to a possible moderator of the effect, connected to the field of study students are enrolled to (STEM and non-STEM). The most benefits were gained in non-STEM fields, where students' weighted GPA changed with more than 30% in the semester following the intervention. This finding was concordant with the literature, and very similar with the findings of Morisano et al. (2010) on social science students. In the case of STEM field undergraduates, this change was not observed. All these findings raise questions regarding underlying mechanisms in personal goal-setting in academia, which might be responsible for the difference in impact, considering the field of education. If goal setting can have such controversial effects considering context (STEM vs. non-STEM), it means that probably the fields are yielding for different kinds of approach. Recent field study (Dobronyi, Oreopoulus & Petronijevici, 2017) has evidence that goal-setting does not have effect in case of undergraduates enrolled to economic studies. This field is not necessarily integrated in STEM category, but it does have more mathematics than many other fields. There might be a higher need in STEM field for additional study technique and strategy teaching for possible performance changes (Weinstein, 1994) or simply a task-based application of personal goals is necessary (Clark, Gill, Prowse & Rush, 2017).

Freshmen and the students with the most failed exams seemed to benefit the most from the intervention, which means that there probably are some mechanisms linked to problem solving (Yip, 2013) and clarification of current and future states relevant enough to influence performance, possibly linked to identity as well (Arnett, 2000).

Possible moderator analysis revealed that the number of words used in the elaboration of personal goals (Inspiration, Visualization, and Planning) had influence on the academic performance change of the students. The 2nd (Visualization) and the 3rd phase (Planning) seemed to have the most relevance, showing a positive association with the change in academic performance. Based on our findings, we conclude that a low-cost, online goal-setting intervention connected to life goals and personal goals could be an important complementary intervention, especially in the case of non-STEM field undergraduates. Both struggling students and freshman category can benefit from it, while clarifying better their

future goals, and simplifying the ambiguous and sometimes poorly structured context in which they operate.

4 CHAPTER 4. GENERAL CONCLUSIONS AND FUTURE DIRECTIONS

This thesis could contribute to the answering of important questions from the literature, regarding the impact of self-regulation on academic performance, both from general (life goals, self-determination, ability perception, etc.) and specific (study process related) approaches. The general objective of the thesis was the identification of self-regulatory correlates and predictors of academic performance, with the intent of identifying possible variables, which can be used in specific interventions designed for struggling undergraduates.

4.1.1 Theoretical Advances

From a theoretical point of view, the thesis aimed at integrating different explicative theories and models from the literature of self-regulation, which could be relevant in our exploratory approach on possible correlates and predictive variables in academic performance. From cognitive and neurocognitive to development and personality psychology concepts, models, possible procedures were described and integrated, historically and from a developmental point of view. The argumentation, while followed a deductive logic, aimed at pinpointing general to specific aspects of self-regulation in Academia. The field-specific (Zimmerman, 1986 a; Weinstein, 1994; Zimmerman, 1986) and intra-individual variables linked to identity (Arnett, 2000), self-determined behavior (Ryan & Deci, 1993), self-efficacy and academic belonging (Bandura, 1982; Lewis & Hodges, 2015) and former academic indicator from high school (DeBernard et al., 2004; Stumf & Stanley, 2002; Kitsantas, Winsler & Huie, 2008) were used in the conceptual planning of the profiling studies on the Romanian high-performing undergraduate. Correlates and possible predictors of academic achievement were identified, for possible interventions targeting struggling students.

4.1.2 Methodological Advances and Practical Implications

One important finding which repeatedly emerged in four different studies (Study II, III, IVa) is related to the Baccalaureate score (Romanian high school leaving exam), which was a very important predictor of academic performance in Higher Education. The lower the Baccalaureate score, the greater the chance for struggling in college. This is a risk factor to be evaluated when a struggling student is asking for help, especially in the non-STEM field. One possible explanation could be linked to study skills, while academic success is yielding for a slow maturation process, which needs years of development. Other possible arguments behind this result could be the similar context between the exam sessions and the high school leaving exam context, when students have to cope with a high-level stress, have to concentrate on a relatively large volume and diverse study material and the self-regulative mechanisms linked to proper management of internal (like concentration) and external resources (like time) need to be activated in order to succeed. Study IVb evidenced that the former academic results (Baccalaureate/SAT equivalent) lose their weight in the prediction of weighted GPA only when compared to specific academic self-regulation strategies and skills. A good self-regulation under pressure actually can bring a lot of benefits for these students, which is consistent with our findings from Study IVb and is suggesting that probably the most important intervention domain in case of struggling students could be the field of strategic learning skills and proper self-regulation techniques. Further research is

needed for the identification of possible underlying mechanisms in case of Baccalaureate Average predictor role on academic performance (eg. Zeigernick effect).

In Study II, the motivation for the enrollment into higher education was identified as a predictor of academic success. If the undergraduate declared that his or her parents insisted on higher education enrollment, there is a great chance for lack of success. This aspect could be connected to possible selves and ideal self-theories, which already gained application in education (Dörnyei, 2009). The "parents' will" could also be integrated into the 'ought to' self' theory and might hold the chance of remorse in one's life, if associated with failure (Higgins, 1983, 1989, 1997). Considering the Important Relationship life aspiration together with the will of parents as statistically significant positive predictors of failed exams, through the ought to self and the real self-discrepancy, can hold distress risk for these students. In the phase of emerging adulthood (Arnett, 2000), when role diffusion needs to get to a closure, this perturbing possibility can be the source of identity developmental issues, however, this assumption needs future testing.

The perception of abilities and the evaluation of possible fitting in the team of colleagues did not gain scientific support in our studies. Struggling, or failing exams in higher education do not associate significantly with this variable, probably due to cultural characteristics linked to collective self-efficacy or even to the chances offered by globalization (Bandura, 1995, 2000), as Romanian people, in general, trust their abilities and are optimistic (David, 2015). This result, provided by Study II, is raising many questions linked to cultural identity and collective self-efficacy which can be mirrored in this finding (Bandura, 1995, 2000).

Considering the results from Study II, self-determined behavior orientation and intrinsic life goals were associated with performance in a negative way. Self-awareness did not play any role in performance issues. The perceived choice is low in top achievers, and conversely, with the assumption of internally motivated high achievers from self-determination theory, academic success in Romania associates an extrinsic aspiration: Fame. Meanwhile, the Important Relationship life aspiration associates and predicts the possibility of failing exams. Perceived choice actually is higher in students with failed exams than in performance scholarship eligible undergraduates, who feel less control over choices, and declare a lower perceived choice level than struggling students. These are paradoxical results in the context of self-determination theory and might be also attributed to a possible cultural moderation effect (Kalcza-Janosi, Williams, & Szamoskozi, 2017). Wanting to be "someone", i.e. the mental representation of fame, is connected to long-term education while having meaningful others in one's life and the sense of stronger autonomy is negatively predicting academic performance. This finding also could be explained with the need of higher self-control (Metcalfe & Mischel, 1999) in the undergraduate higher education cycle, since the system is demanding, mediating a large volume of knowledge, students need to be less critical in this period, focusing mostly on the growth of their knowledge base. This education cycle is an identity development stage (Arnett, 2000) and maybe the finding of one's personal professional self needs time and implies a lot of studying in the first stage. The personal growth attainment, which associated the weighted GPA, was present as a significant positive predictor, but was not considered important by the undergraduates, probably because of the fact that for the students this matter is natural at this stage of life, when most of them dedicate their full time to learning and are supported financially by parents. The converse results on self-determination, intrinsic aspirations and ability uncertainty should be tested in a longitudinal design, while it would be important to see how aspiration preference or self-determination orientation change after graduating. Is there a switch or does it remain the same? However, if nothing changes, the lack of autonomy and extrinsic, individualistic aspirations like longing for fame can represent a risk factor of the

well-being of these students on the long term (Ryan, Sheldon, Kasser & Deci, 1996). Also, in case of struggling students the important relationship aspiration might be a clue for interventions, especially if formerly struggling students could be involved to relate about how they handled the situation. Group interventions or involvement of an 'important other' in the intervention could be a facilitator variable in planned enhancement interventions.

Study III evidenced surprising findings about the importance of Locomotion in academic performance, while Assessment Mode did not show any influence in undergraduate academic performance. This could imply a gradual development in the self-regulation behavior and could place Locomotion as a basic enhancer of achievement, in the identity formation phase of personality and in the knowledge acquisition phase of education. Assessment might be the next level, with a particular connection to the real world, materialistic values and maybe, self-supporting. Specific behavior mobilization capacity of locomotion regulatory modes seems to have an impact on academic achievement in our culture, even if goals are intermediary or unclear. Assessment Regulatory mode surely has lots of positive functions and its lack is a risk factor for Romanian undergraduates who might operate without goals or without deliberating the course of action. It could represent an important area of intervention in enhancing academic performance. It is possible either for the assessment mode to be activated when students will be employed, or they will operate continuously after the "Just do it" principle, which can be caused by a dominant cultural pattern. Further research is needed on the relationship between identity formation and regulatory mode activation in academic and in post-education context. Will the work environment, and the self-support activate the Assessment Mode or not? If yes, will it be able to function on an optimistic level or it will be weakened by the late activation. These are research questions needed to be addressed.

Studies IVa and IVb were designed to test the presence of a complex self-regulation model with application in education. Our specific, field related self-regulation studies evidenced some important predictive variables in academic performance in the Romanian undergraduate population. Skills (procedural knowledge in learning) were proven as being the most important predictor of performance, in general. It had a predictive power of 32% even if we controlled the age, study year and field of study undergraduates were enrolled in. This means that the most important field of intervention for study enhancement could be the strategic learning skills field.

The presence of contextual variables, like the presence of traumatic events, was important in the performance and seemed to be influential on grades. According to the results of Study IVa, the lack of stressful events was significant in the negative prediction of weighted GPA. In these situations, certain help centers for students may be relevant because these can be considered as possible risk factors.

Interestingly, the field related approach (STEM vs. non-STEM) highlighted important differences which need to be taken into consideration in possible interventions. In case of STEM field students, the Weinstein (1994) models application (LASSI) evidenced a higher frequency in the use of skill and will components of self-regulated learning than in case of non-STEM students, who prioritized the self-regulation components of learning more. This important finding could suggest that, in case of interventions, the two fields could require different intervention plans. This contextual difference could also explain the difference in the effect of the Goal-Setting Intervention, from Study V, and lays emphasis on strategic learning skill training possibilities which may be necessary in both cases, but those in STEM fields especially need more help from this perspective. In future studies, a goal-setting intervention might be applied along with specific study strategies linked to the procedural knowledge of learning (information processing, selecting main ideas, test strategies) and to emotional regulation (anxiety reduction, motivation, attitude) in case of STEM students,

while self–regulation of personal resources (concentration, time management, self-testing, study aids) might be more relevant in the non-STEM fields. The different type of exam sessions and the structure of the subject of study in case of non-STEM students, yield for self-regulation techniques which could represent the number one priority in an intervention, STEM students being tested all semester long and having many topics related to exact sciences in which the challenge is linked to understanding very abstract concepts from mathematics, chemistry, physics, etc. Details of the self-concepts related to professional goals probably have to be clearer even at the moment of being accepted to the faculty. Also, Anxiety reduction, the semester-long persistence Attitude, and Goals need to be present, while the logic of certain practical applications in laboratories needs the identification of essential information all the time and continuously. The authors of the model consider all the factors (motivation, study skills, and resource regulation) very important, regardless of the study field, but in case of rapid interventions, our result showed field related priorities.

Methodologically, and from an applicative point of view, we managed to test the effect of a Complex Goal-Setting Intervention Program (Morisano, 2008; Morisano et al., 2010) in our culture, using a randomized controlled trial. Our results indicated important effectual differences considering the context or the field undergraduates were enrolled in (STEM and non-STEM). While non-STEM undergraduates managed to obtain up to 30% more in post-intervention weighted GPA, in the second semester, the STEM field students did not. Additionally, there seemed to be important differences between students in life-goal categories they opted for and a number of words used in different phases - which might be linked to certain underlying mechanisms in the overall effect - yet, it needs further testing. Interestingly, the second phase of the intervention (Visualization) turned out to be an important predictor of a positive GPA swift, regardless of the study field, age or year of study; it is responsible for an 18% change in performance. The imagery on effects of personal goal achievement seemed to be more relevant in our sample than the metacognitive phase (Planning). Considering all these results, we might say, that non-STEM field undergraduates may benefit rapidly and a lot more from a life-goal and identity-related goal-setting program than their STEM field peers, but the visualization on impacts of goals can probably be used with some benefits even in case of STEM students. This difference in effects could be linked to the presence of ambiguity in many non-STEM fields when the professional self-knowledge or even the future plans are more open than in STEM fields when the concepts of application are more relevant and practicability possibilities are more exact and predictable. The difference could be caused by the procedural difference in word handling as well as metacognition between the two categories. Non-STEM undergraduates wrote 30% more and the metacognitive part was developed with a much higher volume in their case, showing more fluency. Having a higher expertise in word handling and metacognition (used more factual goals), maybe non-STEM students implicitly learned the goal-setting complex skill, operating on 8 goals more rapidly than their STEM colleagues, and could transfer it afterwards to their everyday life, or study sessions. Also, the difference in GPA could have been impacted by the difference in the studied subject in both cases. If STEM students lack knowledge in mathematics, they might make a change in a longer time than their non-STEM peers, in order to change actual performance. The impact of Visualization and the weaker handling of words could suggest also the possibility of application of the program with visual material or even the possible utility of Virtual Reality. The different processing mode utility (image vs. concept) in goal setting is an important future development direction of this study. Based on our findings, we conclude that a low-cost, online goal-setting intervention connected to life goals and personal goals could be an important complementary intervention, especially in the case of non-STEM field undergraduates, but context and intra-individual moderating variables need further examination.

4.1.3 Limitations and Future Directions

The thesis aimed at identifying specific self-regulative variables, which play a role in higher education performance and at testing the effect of a specific identity and life-goals centered online program in our culture. The theoretical and practical reason of our research was linked to the development of possible intervention programs designed for struggling undergraduates, by the identification of psychological correlates and predictors involved in academic performance.

Considering the limitations of our studies, there are a few common ones like:

- Small sample of participants and rather low percent of males. Our conclusions can only be considered with care, and they hold a risk, considering the option of generalizability to the Romanian undergraduate population (Type I Error).
- Exploratory approach was present in most of the studies and the majority targeted the identification of the correlates and predictor variables of academic performance. Further investigation linked to causality needs to take confirmatory perspective.
- Academic performance was represented statistically by semestrial indicators (weighted GPA, obtained credits, number of failed exams), and had mostly a cross-sectional approach. Only one study of the five (Study IVa) took into consideration the general cumulated weighted GPA of the undergraduates and all the rest considered only semestrial indicators of performance. Further investigation could be built upon longitudinal research design.
- All questionnaires used in the study (except VIA - Carrier Orientation Survey) lacked statistical validation on Romanian population. Even though we have checked the reliability of each scale and deleted problematic items, our conclusions have to be taken into consideration with care. Future studies should be done for the purpose of validation, especially important in case of LASSI (Weinstein et al., 2002), which has a highly applicative value in interventions which target academic performance enhancement.
- Assessments were taken in self-rated form, while external evaluations would have been more exact (e.g. peer-rating).
- The struggling undergraduate category applications could raise some concerns, because of the subjective value of the self-rating. There are students with low grades who do not consider themselves struggling, while others with all their exams taken, do consider struggle as being part of their academic life.
- The presence of traumatic or stressfull events in the life of the undergraduates was not coded in every study, and can be an important variable which needs to be controlled in studies.

In the following section we will present the specific limitation of each study:

Our first study was a systematic qualitative meta-analysis on experimental and quasi - experimental field studies from formal and non-formal education on goal-setting. We had a special interest in the studies which were conducted starting from 1990 until 2015, as a lot of changes took place in the Romanian educational system during these years. Considering our strict criteria, we could identify only 10 studies, which were included in the analysis. The methodological variations and the content of the studies were very diverse, and we could not identify all effect moderators. The goal-setting technique seemed to have a small, but statistically important effect size, both in formal and informal context, while MBA students were the only ones with negative results. This suggested some contextual or intra-individual variables, relevant for future research. For example, if linked to other meta-cognitive techniques (e.g. Planning, Self-instruction), Goal-Setting seemed to be more effective,

gaining straight in effect size. Unfortunately, the small number of studies and the great diversity in the study methodology did not favor the identification of all possible moderators, but certainly brought up some important questions regarding the possible underlying mechanisms of goal setting. The identified beneficial association between goal-setting and planning and the possible contextual and intra-individual differences (e.g. MBA students) were taken into consideration in the applicative changes which were made on the Complex Online Goal Setting Intervention, which was used in the 5th study, with struggling undergraduates, from STEM and non-STEM fields.

The second and the third study aimed at the identification of possible intra-individual differences and variables that may have a role in academic performance. Our results, most of the time, were weak to moderate associations. In these studies, we did not differentiate between STEM and non-STEM students, although the field type could be a moderator. This could be a particular limitation. Interesting results evidenced that performance at its highest level in our undergraduate population could be associated with some unfavorable variables for self-determination or even well-being. Many questions emerged which could become subject of testing in future studies.

The two sub-studies from the fourth study (IVa, IVb) highlighted very important profile differences between STEM and non-STEM students. Skills related to strategic learning seemed to be the most predictive, in general, regardless of study field or year of study. The procedural knowledge of learning seems to develop in time, and our culture seems not to be conscious enough of what self-regulated learning is. STEM field undergraduates tend to use more from the LASSI measured specific self-regulation skills, but there is an imminent need for optimizing strategic learning in general. All these conclusions were based on results provided by a questionnaire which was validated in the USA, while undergraduates actually self-rated themselves. The interpretation must be used with care and definitely needs further scientific clarification. Future validation of LASSI and its periodic formative application could probably bring many benefits to undergraduates and teachers, in order to develop more meaningful knowledge which can be used consciously in self-regulation and can be transferred afterwards to the work domain students are heading to, or even to the achievement of personal goals they set for their life.

In the fifth study we conducted a randomized controlled trial which showed us a possible field-relevant moderation of the effect in identity and life-goal relevant personal goal-setting program. The attrition was high, while 25% of the undergraduates who started the intervention did not finish it, and the collected indicators of the second semester's academic performance (weighted GPA, failed exams, number of credits obtained and scholarship eligibility) were a disturbing factor, because we did not manage to obtain all details. This caused a 45% loss of the initial participants. Almost all participants (who gave us all performance data) in the end, were girls. This aspect means that our results may be applicable only to female population. In the meantime, we obtained a lot of qualitative data, that differentiated the STEM field from the non-STEM, but their interpretation is to be made with the help of future studies. Another limitation of the study was related to the categorization of struggling undergraduates, which is highly subjective. Most of the participants had all their exams taken, and were more preoccupied about grades. We did not have the chance to test this intervention on students who really struggle with passing their exams or are on probation, which may be more relevant. Still, considering our results, we argue that this online intervention can be a rapid enhancement aplication, especially for non-STEM struggling undergraduates.

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