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MOTIVATION AND USE OF LEARNING STRATEGIES IN STUDENTS, MEN AND WOMEN, WITH DIFFERENT LEVEL OF SCHOOLING[*]

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Abstract
The study characterizes the motivation and use of learning strategies of students differentiated by gender and level of schooling. Participants (603) answered the Spanish version of the Motivated Strategies for Learning Questionnaire. A two-way ANOVA was performed to examine the main effects of the level of schooling and gender, as well as the interaction of these two factors on each scale of the MSLQ. The results show differences in participants' motivational and strategic profile for the two variables considered, and their interaction. Findings are discussed in relation to previous studies.

Keywords: level of schooling; gender; learning modalities; student ability; motivation

Introduction

During their progression through the different levels of the educational system, students reach qualitatively different learning achievements, not only because of the progressive complexity or specificity of knowledge that they construct at each new level, but because of the fact that each one of these levels demands very different personal conditions. Particularly, it can be asserted that

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the motivational, emotional, and cognitive demands, necessary to reach academic success in a school environment, are clearly different to those required in a university environment.

In general, variations in ways of learning are studied from two angles: 1) from the point of view of the development of these ways of learning throughout a person's life (Papalia, Feldman, & Martorell, 2012). This point of view, rather of an evolutionary nature, recognizes the fact that individuals change as a result of maturity processes and exposure to different social, cultural, and educational contexts (Kuhn & Pease, 2006). And 2) from the point of view of individual differences linked to factors like gender, cultural or social groups, learning approaches or patterns (Biggs & Tang, 2007; Helle, Laakkonen, Tuijula, & Vermunt, 2013), or intellectual styles (Evans et al., 2010).

While the differential view accounts for the diversity present in the learning process, and provides evidence to establish relationships with factors such as personality traits (Chamorro-Premuzic, Furnham, & Lewis, 2007), gender (Parra, López-Vargas, Cerda, & Saiz, 2014), or ways of engaging in classroom activities (Baeten, Kyndt, Struyven, & Dochy, 2010), the evolutionary view allows considering complex variables that unfold through time; variables like the educational level. This variable has the particularity of combining elements of maturation, derived from the learner's age, and contextual elements, like the student's life circumstances and the nature of the classes he/she is taking.

The present article reports on a study that takes into account two variables, one from the evolutionary point of view - the educational level - and another from the differential point of view - gender - to account for differences in ways of learning when different educational contexts are taken into consideration. Knowing about the particularities of learning profiles among high school students, undergraduate students, and professionals is important for educational research. In this area of study, it is relevant to identify motivational and strategic profiles that account for how diverse experiences shape the ways of learning. This type of knowledge is necessary for at least three purposes: 1) as a referent for the construction of general or professional education curricula that take into account both learning potentialities and needs; 2) in the development of pedagogical models applicable to different types of curricula,

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and 3) in decision-making on educational support aides for specific education and training processes (tutoring, counseling, etc.).

Addressing the foregoing, the question that guides this study is: How are the ways of learning of students, men and women, with different levels of schooling characterized?

Ways of learning according to level of schooling

According to Kuhn and Pease (2006), the learning process evolves with time and does not function identically throughout life. The passage from infancy to adolescence, for example, is marked at a neurological level by the development of the prefrontal cortex, which results in an increase in executive control during the performance of cognitive tasks. Factors, such as formal thinking ability or metacognitive function, come into play an important role in adolescent learning (Papalia, Feldman, & Martorell, 2012).

After adolescence, adult cognition has its own characteristics, intrinsic to this stage of life. According to Papalia, Feldman, and Martorell (2012), two streams of thought regarding adult cognition can be distinguished. One of a neo-Piagetian type that emphasizes the arrival of superior levels of reflective thought, or abstract reasoning, and another, of a post-Piagetian type, which mentions the arrival of thinking of a postformal nature. While reflective thought puts all new information into perspective, elaborates inferences based on it, and establishes relationships, thus achieving a complex thought, postformal thought "…combines logic and emotion and practical experience in the solution of ambiguous problems" (p. 434), to reach flexible, relativistic, adaptable, and individualistic forms of knowing (Sinnott, 1998). An important aspect of these adult life cognitive achievements is that, although the potential is always present, it is an undergraduate education that stimulates the progress towards a reflective and postformal thought (Fischer & Pruyne, 2003).

While a great quantity of works exists, that characterize the forms of learning of students in determined educational levels, studies that compare populations that differ in this variable are scarce. A representative study is the one reported by Bakracevic and Licardo (2010), in which motivational, emotional, cognitive, and metacognitive aspects of learning are compared (the authors use the concept of self-regulated learning to abridge all these elements) in students of three age groups: 14-15, 17-18, and 22-23. While the first two groups attended secondary school, the last group attended university. In

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contrast to the hypothesis posited at the beginning of the study, the results yielded decreasing self-reporting indicators for all aspects considered between the first and second age groups, and a modest increase in the self-reporting indicators between the groups of students of 17-18 years and the university students of 22-23 years. To explain the decrease in motivation, confidence, and awareness of their learning process in the students of the second age group, Bakracevic and Licardo propose as possible causes the characteristics intrinsic to adolescence and the effect of schooling at the end of high school. These conditions would disappear with entry to the university and the arrival of adult life.

Regarding the development of forms of learning during schooling, it is noteworthy to also mention the work of Paulino, Sá, and Lopes da Silva (2015) in which students between seventh and ninth grade of public schools of Lisboa are compared. According to the authors, the youngest students manifest greater interest in school tasks and have higher expectations of achievement, which stimulates in them the use of motivational regulation strategies; however, throughout schooling, a progressive decrease in the interest in school tasks occurs and the use of learning strategies is less frequent. This finding corroborates that found by Bakracevic and Licardo (2010).

In the same sense, in a study that analyzes the levels of difficulty reported by Polish students in primary, first years of high school, and last years of high school, for activities related to learning English as a foreign language, Studentska (2011) finds a progressive and significant increase in the difficulty reported in planning, organizing, and implementing learning activities. This progressive increase in the perception of difficulty throughout schooling was also observed in other areas such as the selection of objectives, forms and conditions of learning, motivational and emotional control, and reflection and regulation of learning; however, in these areas the differences are not statistically significant.

That found in the three foregoing studies can be complemented with the results of the work of Mazumder and Kilaru (2016) in the University of Michigan, for the passage from high school to university. These authors compare a sample of university engineering students with a group of high school students attending pre-university engineering courses. The study sought explanations of why precisely high school students reached better achievements than university students in the introductory engineering courses offered to both

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populations. Two findings answered the question. On the one hand, in contrast to the study of Bakracevic and Licardo (2010), high school students presented higher levels of self-efficacy and assigned a higher value to the course they were attending versus their university classmates and, on the other hand, these same students dedicated more effort and time to studying the topics. The results reported by Mazumder and Kilaru must, however, be assumed with precaution given the particularities of the study conducted. It is probable that the fact the it deals with high school students that are advanced and observed outside of their "natural" context, is biasing the characterization of the students of this level. Given this consideration, it cannot yet be asserted with certainty that the regressive trend observed in the schooling years is maintained in the passage from school to university.

Many works exist that characterize the particularities of learning of groups of undergraduate students. Most of them seek to understand those factors that ensure an optimal academic performance (i.e., Boza & Toscano, 2012; Rinaudo, Chiecher, & Donolo, 2003; Takashiro, 2016). Martínez-Fernandez (2012), in a study conducted with Spanish psycology students, showed that as they advance in their careers, students exhibit an increase in more complex conceptions of learning (of an interpretive and reconstructive type), but they do not completely abandon all of the initial conceptions of a more reproductive nature, which emphasize memory and recognition resources (Martínez-Fernandez, 2012). In relation to the use of metacognitive strategies, it has been evidenced that students at the end of the career report a greater use of this type of strategies with respect to those at an intermediate or initial level (Martínez-Fernandez, 2012). The study of those emotional or cognitive elements that intrinsically characterize university learning, in contrast to other educational levels, is a field that still requires further in-depth observation.

Differences by gender in ways of learning

In contrast to the studies on differences in students' ways of learning, relatable to their educational level, the differences by gender in the forms of learning between men and women have been widely studied and from very diverse perspectives (Bank, 2007; Hederich, Camargo, López, Páramo, & Sanabria, 2013).

In spite of the foregoing, the results found were inconclusive. While in some works the motivational and strategic differences can be discarded, others

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reveal them to be broad and determinantal. Parra et al. (2014) carry out an interesting review in that respect. Among the studies that yield differences, most underscore women's (girls) disposition towards learning and the fact that they assume their process more proactively, which leads them to use elaborate learning strategies in the search for better performances (Bakracevic & Licardo, 2010; Studenska, 2011). Reports on differences between men and women regarding the learning approach assumed by each gender are also frequent. While males tend to undertake a superficial type of learning, women are the ones that undertake a more committed and deeper perspective regarding their study (Mazumder & Kilary, 2016). In contrast, other studies do not find differences by gender in aspects such as metacognitive strategy management during the study (Akyol, Sungur, & Tekkaya, 2010; Metallidou & Vlachou, 2007; Yukselturk & Bulut, 2007).

Taking into account the presented background information, the objective of the present study consists in establishing the motivational characteristics and those of students' use of learning strategies as a function of their level of schooling (secondary, undergraduate, and postgraduate) and, thus, contribute empirical information that allows proposing pedagogical and/or didactic strategies to favor our students' motivation, use of resources, and learning strategies.

Objectives

To characterized different ways of learning in students of various levels of schooling by means of the MSLQ.

To contrast types of motivation and learning strategies, in students of different gender and educational level.

Method

Participants

Six hundred and three (603) students (322 men and 281 women) participated in the study; among them, 272 (45.1%) attended secondary education, 248 (41.1%) were undergraduate students, and 83 (13.8%) attended postgraduate studies.

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Table 1. Distribution of the sample by educational level and gender

| | | Gender | | Total |
		Men	Women	
Educational Level	Secondary	141	131	272
	Undergraduate	138	110	248
	Postgraduate	43	40	83
Total		322	281	603

      The investigation was carried out in different educational institutions located in the city of Bogotá D.C., Colombia. For the study, ten secondary educational institutions were selected, from which mid-level (11th and 10th grade) high school students participated. On the other hand, the undergraduate students were enrolled in six higher education institutions and the postgraduate students were completing Masters and Doctorate programs in one of the six universities.

      The age of the high school students' oscillated between 15 and 19 years (M=16.30 years, SD=0.93); the undergraduate students between 16 and 30 years (M=20.18 years, SD=3.33), and, finally, the postgraduate students between 22 and 40 years old (M=33.83 years, SD=5.25).

The instrument

      For the study, the MSLQ was used, developed by P. Pintrich and his colleagues (Pintrich et al., 1991, 1993). It is a self-reporting questionnaire that is answered with a 7-point Likert scale, where 1 means the lowest value (totally disagree) and 7 the highest (totally agree). The questionnaire presents students with a series of questions about their motivation towards studying and on the learning strategies they employ.

      The questionnaire consists of two main components: one directed towards motivation and the other towards the use of learning strategies. The motivation component consists of 31 items, which are distributed in six scales. On the other hand, the questionnaire's second component, related to the use of learning strategies, is comprised of 50 items, distributed in nine scales. Table 2 presents the item distribution in the MSLQ scales.

      There are six scales in the motivation component: those related to belief values, which is to say: (1) *intrinsic motivation*, which indicates the importance that the student places on reasons such as curiosity for the topic or the desire to learn; (2) *extrinsic motivation*, that complements that foregoing and indicates

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the importance placed on reasons like grades, rewards, or competition in learning; (3) the *task value* scale, closely linked to the former, which inquired into how useful or important the student considers the learning task to be; the ones related to expectation, namely, (4) *learning control beliefs* scale, which indicates the degree to which the student believes they have direct control over their own learning process - analogous to the called *locus of internal* (Rotter, 1966) in learning-; (5) *self-efficacy for learning and performance* scale, which represents the judgement that the student makes about their own academic effectiveness (Bandura, 1997; Bandura et al., 2001), and, finally, one related to emotional aspects, (6) the *evaluative anxiety*, which includes the concern for the low performance on tests and the emotional components and the physiological activation linked to states of anxiety in these situations.

On the other hand, there are nine scales regarding the use of strategies, divided in two parts. The first includes the use of cognitive and metacognitive learning strategies and the second groups the resource management strategies.

There are five cognitive and metacognitive learning strategies: (1) review strategies, which involve the use of memorization techniques to acquire and remember new information; (2) elaboration strategies, which involve the development of connections that integrate the new information into the prior knowledge; (3) organization strategies, which synthesize the new knowledge into main ideas; (4) critical thinking strategies, which refer to the degree to which the student applies their prior knowledge to solve problems or critically evaluate the new material; (5) metacognitive self-regulation strategies, which indicate the degree to which the student plans, monitors, and regulates their own learning.

Lastly, we will briefly describe the resource management strategies. There are four of these: (1) time management and study environment, which indicates the extent to which the student schedules, plans, and manages their study time and the provision they make of an appropriate physical space for that task; (2) effort regulation, which indicates the student's ability to control their own attention span and avoid distractions during their learning; (3) learning in pairs, defined in terms of the use of collaboration environments with other peers in learning, and, finally, (4) seeking help, which indicates the extent to which the student resorts to external support, be it from teachers or other students, to obtain assistance and help in problem solving or learning blockages.

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Table 2. Components, areas, scales, and distribution of the items of the Motivated
Strategies Learning Questionnaire (MSLQ) instrument

Component	Area	Scale	No. of items
Motivation	Belief values	Intrinsic goals	4
		Extrinsic goals	4
		Task value	6
	Expectations	Control beliefs	4
		Self-efficacy	8
	Emotional	Evaluative anxiety	5
Learning Strategies	Cognitive	Review	4
		Elaboration	6
		Organization	4
		Critical thinking	5
	Metacognitive	Metacognitive self-regulation	12
	Resource management	Study time and environment	8
		Effort regulation	4
		Learning in pairs	3
		Requesting help	4
Total			81

Procedure

All of the 603 students of the sample answered the MSLQ. Its application was conducted in the participants' places of study. It was applied in group, in normal classrooms. The students that participated in the study were informed of its nature and their collaboration was requested. A template was given to them to sign their informed consent to participating in the study that was to be conducted. In the case of underage students, the consent of the legal representative was requested, who was given the corresponding template for their signature. Once the questionnaires were filled out, the answers were tabulated in a database, input necessary for the statistical analysis conducted.[†]

Design limitations

The limitations of the design of this investigation arise from its transversal nature and in particular, to the fact that the age and educational level

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covariate in parallel. On the other hand, the difficulties of this type of design in equating different educational groups are well known. In particular, it must be taken into account that groups with a higher educational level, postgraduate, for example, are comprised of individuals that were particularly successful in their previous educational levels, reason why we cannot discriminate if their current academic behaviors were previously present when completing inferior levels or are the result of their experience in the current educational level. This ambiguity must be taken into account in the interpretation of the results.

Results

Descriptive statistics

Table 3 shows the descriptive statistics for the 15 scales of the MSLQ. The data show that, in general, the highest means, correspond to the motivation towards studying, while the lowest means, correspond to the cognitive strategies. The scale with the highest mean corresponds to *task value* (*M*=5.61; *DT*=0.88) and the scale with the lowest value corresponds to the use of strategies of *time management and study environment* (*M*=4.58; *DT*=0.85).

Table 3. Descriptive Statistics of the Motivation Strategies for Learning Questionnaire (MSLQ)

	Category	Mean	SD	Cronbach's alpha
Motivation	Intrinsic goals	5.59	0.85	.65
	Extrinsic goals	5.44	1.10	.69
	Task value	5.61	0.88	.81
	Control beliefs	5.34	0.89	.53
	Self-efficacy	5.50	0.77	.81
	anxiety	4.39	1.20	.72
Strategies	Review strategies	4.83	1.00	.62
	Elaboration strategies	4.99	0.93	.73
	Organization strategies	4.74	1.16	.69
	Critical thinking strategies	4.85	0.93	.70
	Metacognition	4.77	0.71	.69
	Study time and environment	4.58	0.85	.59
	Effort for regulation	4.84	0.94	.46
	Learning in pairs	4.71	1.10	.57
	Requesting help	4.96	0.92	.47

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To determine the questionnaire's internal consistency, Cronbach's alpha reliability index was calculated for each one of the 15 subscales. The internal consistency indexes, corresponding to the motivation scale, varied from 0.53, for the control beliefs scales to 0.81 for both self-efficacy and task value. For the subscales of learning strategies, the consistency indexes varied from 0.46 (effort for regulation) to 0.73 (elaboration strategies).

In general, the Cronbach's alpha values in the present research for the different scales contained in the questionnaire are pretty similar to those reported in the original instrument, these calculated on undergraduate students (Pintrich et al., 1991). Insofar as our sample is made up of high school, undergraduate, and postgraduate students, we suppose that in the youngest students, some of the scales have not stabilized enough, and very specifically, the scaled of effort for regulation and learning in pairs. With this caveat, the levels of reliability obtained can be considered acceptable.

Descriptive analysis of the MSLQ by level of schooling and sex

In the first place, the MSLQ's results on motivation towards studying are described and subsequently, the use of strategies is considered. Finally, the relationships between motivation and learning strategies are object of analysis. The educational levels organized to perform the corresponding analysis are secondary, undergraduate, and postgraduate.

Motivation towards studying
The analysis of the six scales of motivation towards studying was conducted through a two-way factorial ANOVA in which the main effects of the educational level and gender are compared, as well as the interaction between these two factors, in the average score obtained in each one of the MSLQ scales. The educational level is defined in three levels (secondary, undergraduate, and postgraduate) and gender in two (male and female). When significant differences are found linked to the educational level, these differences are examined though a post hoc analysis performed with Tukey's HSD test. Figure 1 presents a general overview of the means of each one of the gender groups in each educational level for the different motivation scales.
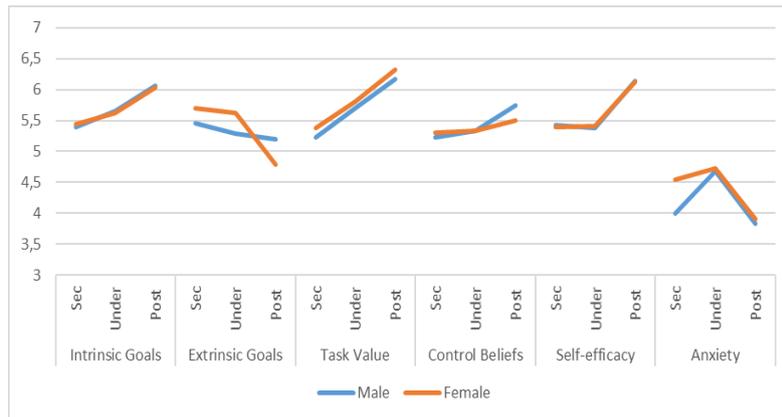
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Figure 1. Scores in different motivational scales by educational level and gender

Beginning with the scale corresponding to *intrinsic goals*, the results indicate significant differences at a .05 level related to educational level $F(2.597)=18.90$, p<.001, $\eta^2=.060$. The post hoc analysis show significant differences (p=0.005) between secondary education (M=5.41, SD=0.92) and undergraduate students (M=5.64, SD=0.73), as well as between the latter (p<.001) and postgraduate students (M=6.05, SD=0.79). As it can be observed, the average scores between educational level exhibit a strictly increasing behavior. There are no significant differences linked to gender $F(1.597)=0.01$, p=.943, $\eta^2<.001$ or to its interaction with educational level $F(2.597)=0.22$, p<.805, $\eta^2=.001$.

On the other hand, the scale corresponding to extrinsic goals shows a behavior very similar to the foregoing, although in the opposite direction. Indeed, the analysis show significant differences related to educational level $F(2.597)=9.21$, p<.001, $\eta^2=.030$ and to the interaction between gender and educational level $F(2.597)=3.91$, p=.021, $\eta^2=.013$. There are no significant differences linked to gender as the main effect $F(1.597)=0.28$, p=.595, $\eta^2<.001$. The post hoc analysis do not show significant differences (p=.323) between secondary education (M=5.57, SD=1.13) and undergraduate students (M=5.43, SD=1.08) although they do show them between these two groups (p<.001 and p=.005, respectively) and postgraduate students (M=5.00, SD=0.97).

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It is interesting to mention the differences in behavior between the scales of intrinsic and extrinsic motivation. In general, as students advance in their educational level, they show a tendency to present motivations of a more intrinsic nature and, at the same time, less extrinsic; in other words, learning is more and more oriented towards knowledge in itself, and less towards competition, social recognition, or awards. This loss of importance of extrinsic motivations is especially acute in the case of female students when reaching the postgraduate level (M=4.78, DE=0.83), moment when they show an even lower average score in extrinsic motivation than their male classmates (M=5.20, SD=1.06).

The following motivations scale that is examined is *task value*. The behavior of this scale is, as expected, very similar to that of the intrinsic motivation scale. Indeed, the results of the variance analysis show very significant differences linked to education level, as the main effect, $F(2.597)=48.19$, $p<.001$, $\eta^2=.139$ that are also corroborated in the post hoc analysis ($p<.001$ in all of the comparisons) between secondary education (M=5.30, SD=0.89) and undergraduate students (M=5.74, SD=0.71), as well as between the latter and the postgraduate students (M=6.24, SD=0.84). Similarly, just as it occurred in the scale of intrinsic goals, there were no significant differences related to gender $F(1.597)=3.11$, $p=.078$, $\eta^2=.005$ in the scale of task value, nonetheless, in this case the significance values are very close to those conventionally accepted (.05). Neither are there any significant differences linked to the interaction between gender and educational level $F(2.597)=0.67$, $p=.935$, $\eta^2<.001$.

The fourth of the scales of motivation towards learning that we will examines is the one related to *learning control beliefs*. In this case, like in the previous cases, the variance analysis shows significant differences related to educational $F(2.597)=5.23$, $p=.006$, $\eta^2=.017$. In this respect, the post hoc analysis do not show differences ($p=.656$) between secondary education (M=5.27, SD=0.88) and undergraduate students (M=5.33, SD=0.87), but they do corroborate them between these two groups ($p=.003$ and $p=.023$, respectively) and postgraduate students (M=5.62, SD=0.95). The analysis did not find any significant differences related to gender $F(1.597)=0.52$, $p=.469$, $\eta^2=.001$, or to the interaction between gender and educational level $F(2.597)=1.06$, $p=.348$, $\eta^2=.004$.

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The self-efficacy scale shows a behavior similar to the motivational scales aforementioned. First, very significant differences linked to educational level $F(2.597)=35.54$, $p<.001$, $\eta^2=.106$ are corroborated and, second, these differences are not corroborated when examining their association to gender $F(1.597)=0.03$, $p=.868$, $\eta^2<.001$, or their interaction with educational level $F(2.597)=0.16$, $p=.851$, $\eta^2=.001$. The post hoc analysis of the differences show two groups: one with relatively low levels of self-efficacy comprised of secondary education (M=5.41, SD=0.80) and undergraduate students (M=5.39, SD=0.66) without differences between each other (p=.962), and the second, with higher scores in self-efficacy, comprised of postgraduate students (M=6.13, SD=0.77), that show significantly higher scores than the secondary education and undergraduate students (p<.001 in both cases).

The last of the motivation scales that will be examined is the one related to the emotional components of motivation and, specifically, to the presence of *evaluative anxiety*. In the case of this scale, it can be observed that all the factors considered predict significant differences at a .05 level. Beginning with the educational level, the differences are very significant $F(2.597)=19.01$, $p<.001$, $\eta^2=,060$, and show, in the post hoc analysis, that the higher levels of anxiety are exhibited at the undergraduate level (M=4.70, SD=1.07), and these are followed with significant (p<.001) by secondary education (M=4.26, SD=1.17). The anxiety levels exhibited by secondary education are, in turn, significantly higher (p=.018) to those exhibited by postgraduate students (M=3.87, SD=1.40).

Gender seems to predict, significantly, the score in evaluative anxiety $F(1.597)=4.00$, $p=.046$, $\eta^2=.007$. In this case, higher levels of anxiety in women (M=4.52, SD=1.14) can be observed than those exhibited by the men (M=4.27, SD=1.25). It can also be observed for this scale that the interaction between educational level and gender is significant $F(2.597)=3.13$, $p=.044$, $\eta^2=.010$, in the sense that women at the secondary education level seem to report higher anxiety levels (M=4.54, SD=1.06) than the men in their same educational level (M=4.00, SD=1.22), while in the higher education levels these differences disappear.

Use of learning strategies

The description and analysis of the scales related to the use of learning strategies will be performed in two stages. In a first stage, the scales related to

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the use of cognitive and metacognitive strategies during learning will be
presented, and in a second stage, the use of resource management strategies
will be examined.

      The cognitive and metacognitive strategies examined by the MSLQ are
the review strategies, elaboration of information, organization of information,
critical thinking, and metacognition. Figure 2 presents a general overview of
the means of each one of the gender groups at each educational level for the
different scales of use of cognitive and metacognitive learning strategies.
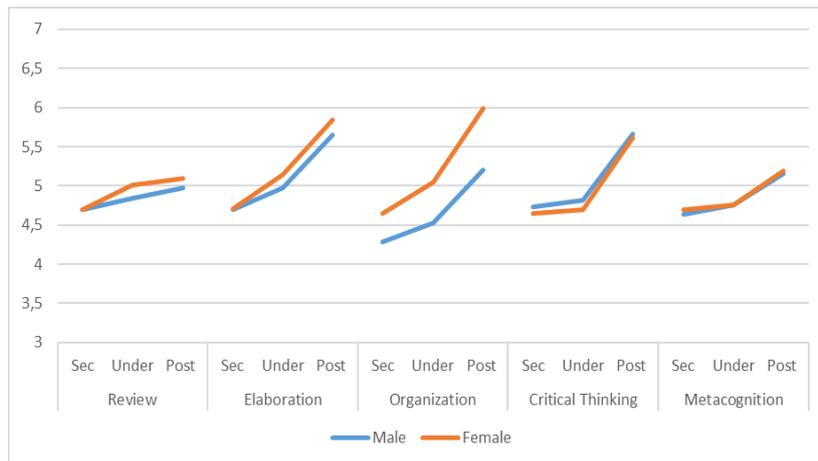

Figure 2. Scores in the scales of use of strategies by educational level and
gender

      Beginning with the review strategies, the results indicate significant
differences at a .05 level related to the educational level $F(2.597)=5.57$, $p=.004$,
$\eta^2=.018$. The post hoc analysis show significant differences ($p=.029$) between
secondary education (M=4.69, SD=1.01) and undergraduate students (M=4.91,
SD=0.91), as well as between the former and postgraduate students ($p=.016$)
(M=5.03, SD=1.15). There are no differences between undergraduate and
postgraduate ($p=.596$). There are no significant differences linked to gender
$F(1.597)=1.10$, $p<.294$, $\eta^2=.002$ or its interaction with educational level
$F(2.597)=0.56$, $p=.574$, $\eta^2=.002$.

      In relation to the use of *elaboration* strategies, the results are similar,
although much more pronounced. Very significant differences are corroborated

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related to educational level $F(2,597)=46.96$, $p<.001$, $\eta^2=.136$. The post hoc analysis show very significant differences ($p<.001$) between secondary education (M=4.71, SD=0.95) and undergraduate students (M=5.08, SD=0.78), just as significant differences are corroborated ($p<.001$) between the latter and postgraduate students (M=5.75, SD=0.83). As in the foregoing case, there are no significant differences associated to gender $F(1.597)=2.29$, $p=.131$, $\eta^2=.004$, or to its interaction with educational level $F(2.597)=0.73$, $p=.482$, $\eta^2=.002$.

As with the elaboration strategies, the *organization* strategies show large and very significant differences related to educational level $F(2.597)=35.64$, $p<.001$, $\eta^2=.107$, however, they also show significant differences related to gender $F(1.597)=31.10$, $p<.001$, $\eta^2=.050$, which indicate that women (M=5.00, SD=1.12) exhibit a much greater tendency to use this type of strategies than the males (M=4.51, SD=1.14). The post hoc analysis of the educational level groups indicate very significant differences ($p=.004$) between secondary education (M=4.46, SD=1.17) and undergraduate students (M=4.76, SD=1.03), as well as between the latter ($p<.001$) and postgraduate students (M=5.58, SD=1.06). The differences linked to the interaction between gender and educational level were not significant $F(2.597)=1.29$, $p=.275$, $\eta^2=.004$

As in the aforementioned cases, the *use of critical thinking strategies* seem to be significantly associated to educational $F(2.597)=39.51$, $p<.001$, $\eta^2=.117$, however, in this case, the post hoc analysis do not show significant differences ($p=.628$) between secondary education (M=4.69, SD=0.98) and undergraduate students (M=4.76, SD=0.78), although these two groups do exhibit significant differences ($p<.001$ in both cases) with postgraduate students (M=5,64, SD=0,79). For this type of strategies, there are no significant differences linked to gender $F(1.597)=1.12$, $p=.290$, $\eta^2=.002$, or its interaction with educational level $F(2.597)=0.96$, $p=.909$, $\eta^2<.001$.

The use of *metacognitive strategies* shows similar behaviors to the aforementioned. On the one hand, the use of these strategies seems to be strongly associated to educational level $F(2.597)=17.18$, $p<.001$, $\eta^2=.054$; hence, there are no significant differences ($p=.276$) between secondary education (M=4.66, SD=0.74) and undergraduate students (M=4.76, SD=0.74), but these differences are corroborated between the two groups ($p<.001$ in both cases) and the group of postgraduate students (M=5.17, SD=0.70). There are

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no, for this type of strategies, significant differences linked to gender $F_{(1.597)}=0.21$, p=.644, $\eta^2<.001$ or its interaction with educational level $F_{(2.597)}=0.14$, p=.867 $\eta^2<.001$.

Lastly, we will examine the use of *resource management strategies*. This category groups four strategies: time management and study environment, effort management, the use of learning in pairs, and seeking assistance. Figure 2 presents a general overview of the means of each one of the gender groups in each educational level for the different scales of resource management for learning.
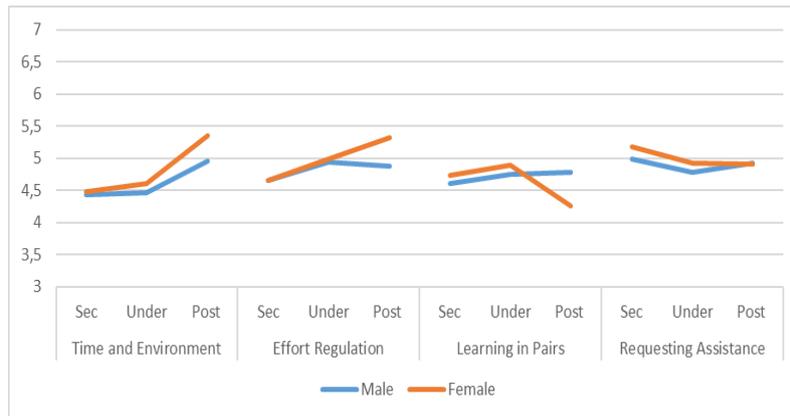

Figure 3. Scores in scales of use of resource management strategies by educational level and gender

Beginning with *time management and study environment*, the results of the factorial variance analysis indicate that the use of this strategy is significantly associated to educational level $F_{(2.597)}=24.28$, p<.001, $\eta^2=.075$ and, to a lesser extent, to gender $F_{(1.597)}=6.46$, p=.011, $\eta^2=.011$, in the sense that women seem to resort to this type of strategies (M=4.65, SD=0.83) more frequently than the men (M=4.52, SD=0.86). Regarding the educational level, the post hoc analysis show two clearly differentiated groups: the first, comprised of secondary education (M=4.46, SD=0.81) and undergraduate students (M=4.53, SD=0.80) without significant differences between each other (p=.600) and the second of postgraduate students (M=5.15, SD=0.85) that exhibit means significantly higher that the first two (p<.001 in both cases).

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There does not seem to be a significant effect from the interaction between educational level and gender for this strategy $F(2.597)=1.55$, $p=.213$, $\eta^2=.005$.

The *effort regulation strategy* is the second of the strategies included in resource management. With respect to this strategy, the results show a very significant association to educational level $F(2.597)=10.66$, $p<.001$, $\eta^2=.034$ and an association to gender that, even though it is not high enough to be significant with the conventionally accepted levels (.05), it is pretty close to them $F(1.597)=3.45$, $p=.064$, $\eta^2=.006$ and favors the women (M=4.88, SD=0.96) over the men (M=4.81, SD=0.93). In this case, the means obtained by the secondary education students (M=4.66, SD=0.92) are significantly lower (p=.001 for the two comparisons) than those obtained by the undergraduate (M=4.96, SD=0.88) and postgraduate students (M=5.09, SD=1.08). There are no significant differences between the university students (p=.540). There is not, for this strategy, a significant association to the interaction between educational level and gender $F(2.597)=1.92$, $p=.147$, $\eta^2=.006$.

Learning in pairs is another of the most popular strategies of resource management for learning. The results of the variance analysis for this strategy show a noteworthy difference in behavior versus the strategies seen so far, insofar as the use of learning in pairs does not seem to be significantly associated to the educational level $F(2.597)=2.88$, $p=.057$, $\eta^2=.010$, at least at the conventionally accepted levels, and neither to gender $F(1.597)=0.70$, $p=.402$, $\eta^2=.001$; however, there is a slightly significant association to the interaction between educational level and gender $F(2.597)=3.13$, $p=.044$, $\eta^2=.010$, indicated by an important change in the use of this strategy in university women at a postgraduate level. While in secondary education they exhibited a greater tendency to use this strategy (M=4.73, SD=1.07), greater even than that of the men (M=4.61, SD=1.13), this tendency increased and was repeated at the undergraduate level (M=4.90, SD=095 in women and M=4.75, SD=1.01 in men), but at the postgraduate level a sharp fall is evidenced in the use of this strategy in women (M=4.25, SD=1.32), while the tendency in men continues to have levels comparable to those of the inferior educational levels (M=4.77, SD=1.07).

Seeking assistance is the last of the strategies that will be examined in resource management for learning. The behavior of the use of this type of strategies is similar to most of the ones we have examined so far, insofar as it

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finds a slightly significant association to the educational level $F(2.597)=4.10$, $p=.017$, $\eta^2=.014$, but does not find one to gender $F(1.597)=1.45$, $p=.229$, $\eta^2=.002$ or to the interaction between these two variables $F(2.597)=0.34$, $p=.709$, $\eta^2=.001$. Regarding the educational level, the post hoc analysis barely show a slightly significant difference between secondary and undergraduate students ($p=.012$), but does not show one with postgraduate students ($p=.327$) or between the last two ($p=.834$).

Conclusions

In general, the results indicated strong and close relationships between motivational and strategic aspects of learning and the student's educational level. Regarding the differences linked to gender, these, although present in some scales, turn out to be, in general, much less noticeable.

In relation to the educational level, it is worth mentioning three big clear tendencies in the results linked to the increase in educational level. First, very important transformations are observed in the motivation towards learning. Second, is it very interesting to highlight the increase in the importance of the deeper strategies of learning, and especially of some that, by being more developed at the higher education levels, seem to be indicators of more advanced cognitive levels. Third, it is noteworthy to mention the loss in importance of the social learning strategies.

With respect to the first of the tendencies, related to the motivational, valuation, and emotional aspects, an important gain is noticeable in intrinsic motivation, the value assigned to the learning task, the learning control beliefs, and self-efficacy. These four aspects are consistent with a progressive loss in importance of extrinsic motivation that, in turn, seems to be coupled to an important decrease in the levels of evaluative anxiety. These results concur with those reported by the study of Bakracevic and Licardo (2010), in the comparison between secondary education and university students. Taking into account the results of that previous study and our results, it is possible to hypothesize an initial decrease in the levels of intrinsic motivation throughout secondary education (Martinelli & Sisto, 2010), which reverts with the arrival to a university environment, and whose environment is novel and challenging. The subsequent step towards the postgraduate level would greatly reinforce this

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gain towards an ever increasing intrinsic motivation, and less extrinsic, towards learning.

Another of the clear results in the motivational dimension is gaining a locus of control more and more internal and of greater self-efficacy, that seem to occur particularly with the arrival of the postgraduate level. This confidence in their own abilities at the end of secondary education does not exhibit very high indicators, neither in our study nor in previous studies (Bakracevic & Licardo, 2010; Paulino et al. 2015; Studenska, 2011). Apparently, students require going through undergraduate studies to understand and undertake the responsibility of their own learning. Once the enormous degree of control that a person has to that respect is understood, an immediate gain ensues in the levels of self-efficacy, with all the favorable conditions it involves. This process, however, seems to unfold clearly only in those students that surpass their undergraduate studies. This result is coherent with that posited by Fischer and Pruyne (2003) on the conditions for the development towards an adult cognition.

The decrease in evaluative anxiety, that seems to be particularly strongest during the postgraduate, can be explained by the same loss in importance of the extrinsic motivation. Indeed, when the interest to learn is no longer related to the search for rewards linked to performance, or with avoiding punishments, evaluative anxiety loses the concern cognitive component that characterizes it, hence it disappears. This result is consistent with different previous studies (Fernandes & Silveira, 2012; Gottfried, 1985).

It is interesting to note that his phenomenon of loss in importance of extrinsic motivation or of the presence of evaluative anxiety markedly takes place in women when they reach the postgraduate level. For years, many studies have been developed that indicate greater levels of evaluative anxiety in women than in men (Silverman, La Greca, & Wassertein, 1995; Singh, Moraes, & Ambrosano, 2000; Batista & Oliveira, 2005). What is interesting about this case is that, apparently, these differences disappear in higher education levels.

In relation to the second tendency, related to the use of learning strategies, students seem to uninterruptedly advance towards higher levels of elaboration and organization of learning content. In contrast, the review and memorization strategy, that supposes a more superficial approach to studying, does not show very marked differences by educational level. This progression is found to concur with the fact that as a person advances through the

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educational system, less superficial and deeper approaches are required more and more (Biggs & Tang, 2007; Martínez-Fernandez, 2007). Additionally, this study found that the critical thinking and metacognitive self-regulation strategies seem to develop only during the last of the levels of learning examined, reason why they can be considered as strategies of a greater level of complexity. The finding is coherent with the particular characteristics of adult cognition, that directly relate them together, both with metacognition (Martínez-Fernandez, 2007; Papalia, Feldman, & Martorell, 2012), and critical reflection (Fischer & Pruyne, 2003).

The tendency observed for the critical thinking and metacognitive self-regulation strategies is confirmed with that found for the use of resource management strategies, such as time management, study environment, and effort regulation. Apparently, the gain in the ability to manage time and study environment is clearly visible at the postgraduate level.

Finally, in regards to the third tendency found, it is interesting to observe that the use of social strategies for learning (working with others or asking for help) shows a pretty different behavior than the other scales of use of resources, insofar as it shows a rather decreasing tendency in the passage towards higher educational levels. In that sense, it is possible to suppose that the use of this type of strategies is linked more to lower educational (and development) levels and is gradually abandoned in higher levels.

Regarding the differences by gender, a general overview of our results allows to corroborate the tendency of women to report higher values than the men in some motivational and strategic management of learning scales. Also, there is a clear tendency of women to show a better regulation effort, they dedicate more time to content organization tasks, and, in general, they have a more proactive approach to learning, characterized by dedicating more time to it. With respect to these points, our results are consistent to those obtained by Parra et al. (2014). What can explain these differences? It is unclear. On the one hand, the presence of differences between genders in aspects like memory function that make women use strategies like paraphrasing or information recodification more frequently could be considered. On the other hand, we could consider differences induced by childrearing guidelines that underscore, to a greater extent, behaviors, such as dedication, as more "feminine" characteristics. At this time, it is impossible to know.

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In general terms, the findings presented herein allow establishing very clear correlations between ways of approaching learning and novices' educational levels, correlations that interact when gender differences are considered. We think that the progressions or regressions observed, both in the motivational and strategic profiles of the participants, can be understood in two ways.

On the one hand, it is possible that the specificity intrinsic to each educational context (level) shapes the student towards the development of certain characteristics that are necessary to succeed at that level. It is possible, for example, that a secondary education student is satisfied with the frequent use of review strategies in order to succeed at that level and that it is in the higher levels of the system that they are required to construct deeper and more complex forms of learning. In this case, the question that arises is: must the educational system require deeper learning from earlier levels? The fact that it does not could be the basis of the problems related to the quality of the educational service in the Colombian context.

On the other hand, it is possible that the system should not be thought of as a shaper of learning profiles, but rather that it be the profile itself that determines the progression towards higher levels in the educational system. The idea would be then that only that student with high levels of extrinsic motivation, self-efficacy, critical thinking, metacognitive self-regulation, ability to manage time, etc., would have the possibility of successfully advancing in the educational system until they reach its highest levels and the student that does not possess them will be unable to do so. Thus, the following question arises: must the educational system privilege learning profiles to the detriment of others? The fact that it does could be indicating problems relating to the equality of our country's educational service.

The foregoing discussion could also be valid to explain the differences observed by gender. Both for the educational level variable and for gender, the explanation of the differences observed must expect interdisciplinary studies that take into account the great complexity of the education phenomenon.

Academic counselors should consider that high school students tend to exhibit extremely high levels of external motivation. It would be desirable for this external motivation to move gradually towards more intrinsic forms of motivation. The value given to the task is critical to this purpose. Even at university level, many students are unable to build a positive academic self-

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efficacy. It is important for teachers and counselors to provide successful learning experiences, so that positive self-efficacy can be achieved. This would contribute to lower evaluation anxiety levels.

In general, a student's academic history seems to be defined in terms of a progressively conscious quest to attain meaning and sense from what is learned. This quest, which is undoubtedly part of a bigger journey to achieve learning autonomy, is long, deliberate and hard. In this context, we believe that achieving learning autonomy, should be considered an educational goal that should be explicitly stated.

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