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Metacognition: Components and Relation to Academic Achievement in College

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Abstract
We report an investigation into the relationships of metacognition with academic achievement in college and with confidence in academic achievement. Based on a three-component model of the Metacognitive Awareness Inventory (MAI by Schraw & Dennison, 1994), findings indicated that both metacognitive monitoring and control are good predictors of academic performance in college, while metacognitive knowledge is not. Moreover, consistent with the idea that relatively poor monitoring skills contribute to lower academic achievement, ratings of confidence revealed that low achievers tend to over-estimate their performance.
***Keywords*:** academic achievement in higher education, metacognition, metacognitive regulation

Metacognition: Components and Relation to Performance in College

Metacognition can be defined as the ability to think about and control one's own learning and mental processes. It is widely argued that metacognition plays an important role in learning because it enables learners to reflect on and guide their learning (Schraw, 1994; Sperling, Howard, & Staley, 2004; Young & Fry, 2008). Although most research that has investigated the relationship between metacognition and achievement has been done with school-aged students (Artzt & Armour-Thomas, 1992; Meyers, Lytle, Palladino, Devenpeck, & Green, 1990; Olshavsky, 1976–1977), there is evidence that college students with higher metacognitive knowledge and skills are more likely to perform better on a number of measures of learning and performance than peers with low metacognition (Steinberg, Bohning, & Chowning, 1991; Maki, 1998a; Commander & Stanwyck, 1997). However, research relating metacognition and long-term academic achievement, such as measured by grade-point average (GPA) have produced inconsistent findings (Sperling et al., 2004). The present study set out to investigate this issue, by specifically focusing on the roles of the distinctive components of metacognition in academic achievement.

Metacognition: Definition and Components

According to Flavell (1976, 1979), metacognition refers to thinking about one's own cognitive processes and comprises two aspects: (1) knowledge or awareness of cognitive processes, and (2) control of cognitive processes. This definition set the foundation for a later and widely adopted theory of metacognition suggested by Brown (1987), which conceptualized metacognition as a combination of knowledge and regulation of cognition. In fact, most modern research frames metacognition as a construct comprising knowledge of cognition and regulation of cognition (Baker, 1989; Cross & Paris, 1988; Jacobs & Paris, 1987; Lin & Zabrucky, 1998; Nelson & Narens, 1990; Otani & Widner, 2005; Pareira-Laird & Deane, 1997; Schraw, 1997; Schraw & Dennison, 1994; Sungur, 2007). Knowledge of cognition refers to what learners know about themselves, their cognitive capacities, abilities, and limitations. This knowledge can be of three types: declarative, procedural, and conditional. Declarative knowledge corresponds to statable knowledge about one's general thinking and processing abilities, as well as learning strategies (e.g., one's knowledge that he/she does better in multiple choice questions than inference questions, that he/she performs better in a quiet environment, or that background knowledge facilitates learning new information). Procedural knowledge refers to knowledge about how to use strategies and procedures in order to optimize learning, and conditional knowledge corresponds to knowledge learners have about when and why to use strategies (Schraw & Dennison, 1994).

Regulation of cognition, on the other hand, refers to the active tracking of cognitive processes as they occur and the use of regulatory heuristics to facilitate cognitive performance (Baker & Brown, 1984; Flavell, 1979; Schraw & Moshman, 1995). According to Schraw (1994; also cf. Artzt & Armour-Thomas, 1992; Baker, 1989), regulation of cognition involves a number of specific skills, including planning, information management, monitoring, debugging, and evaluation all of which could be labeled either monitoring of cognition (one's on-line awareness of comprehension and task performance, and the ability to engage in periodic self-testing while learning) or control of cognition (the conscious and non-conscious decisions that we make based on the output of our monitoring processes) (Nelson & Narens, 1994). Research in metacognition

focuses on three main skills: knowledge of cognition, monitoring, and Control (Pressley & Ghatala, 1990; Schwartz & Perfect, 2004)

Although there seems to be general agreement on what the components of metacognition are, there is also consensus that the relationship between these components remains largely unclear and under-investigated (De Corte, Verschaffel, & Op't Eynde, 2000, Winne & Perry, 2000). This lack of insight into the relationship between metacognitive components constitutes a challenge to the development of the construct, its measurement, and its translation into training models in applied settings. Thus, in the present study, we set out to examine the interrelationships among the three metacognitive components (i.e., knowledge, monitoring, and control) as well as their distinctive contributions to academic achievement. In other words, given the key role of metacognitive sub-processes such as monitoring and control in learning, we have decided to examine metacognition under a three-component model in order to assess how it relates to/predicts college achievement. We hypothesize that breaking down regulation into its two main processes will give us a better insight into how it relates to performance.

Metacognition, Learning, and Academic Achievement

The relationship between metacognition and learning has been widely researched in the field of cognitive psychology, educational psychology, and classroom pedagogy. Compelling evidence from the metacognition literature suggest that metacognition is a strong predictor of academic success, and that metacognitively aware learners are more strategic and perform better than unaware learners (Pressley & Ghatala, 1990; Ruban, 2000; Smitely, 2001). In general, metacognition has been investigated from two main perspectives: (1) the extent to which knowledge and regulation of cognition relate to achievement, and (2) the malleability of metacognition and impact of interventions on metacognitive skills and academic achievement. In the following paragraphs, we focus our discussion on the first perspective which is central to the present study.

Within the first perspective, researchers have adopted two main approaches to measure metacognition: the first approach focuses on paper-and-pencil instruments such as inventories, questionnaires, and self-reports that tap awareness of metacognition. This approach is used in order to look at relationships between metacognitive awareness and different achievement measures (Schraw and Dennison, 1994; Sperling et al., 2004). The second approach on the other hand examines metacognitive judgments and monitoring accuracy and their relation to various reading and memory tests (Everson & Tobias, 1998; Nietfeld, Cao, & Osborne, 2005; Schraw, 1994).

In a study examining the relationship between metacognitive knowledge and metacognitive regulation, Schraw (1994) measured metacognitive knowledge by asking students to give estimates of their monitoring ability (Knowledge of their monitoring ability) on a series of multiple-choice reading tests. Metacognitive regulation was measured both at the local level through students' accuracy ratings after each test, and at the global level, that is rating accuracy after completion of the eight tests. Results from this study suggested that adult students do not vary in their metacognitive knowledge as much as they do in the regulation skills. Results also suggested that metacognitive knowledge and metacognitive regulation develop independently and that knowledge of cognition does not necessarily translate into a high degree of regulatory competence. Finally, Schraw found that differences in metacognitive knowledge translated into significant differences in test performance, confidence, and regulation of cognition, meaning that high monitors performed better and showed more confidence and accuracy than low monitors.

Everson and Tobias (1998) were interested in the relationship between metacognitive regulation in the form of knowledge monitoring accuracy and learning in college. Knowledge monitoring ability was measured as the mean differences across students' estimates of their knowledge in a particular domain (procedural and declarative) and their actual knowledge and skill as determined by their performance on a test. Learning was measured as grade-point average. Results from this study showed significant correlations between monitoring ability and end of course grades in English, the humanities, and students' overall GPA.

Schraw and Dennison (1994) developed a self-report measure of metacognition called the Metacognitive Awareness Inventory (MAI). The 52-item inventory tapped metacognitive knowledge and regulation. Schraw and Dennison used the MAI to examine relationships between the two components and explore its ability to predict performance. Results showed that there was strong support for the dissociation of two factors, the knowledge of cognition factor and the regulation of cognition factor. Interestingly, they found that the knowledge of cognition factor was related to higher test performance while the regulation of cognition factor was not.

In another study, Sperling et al. (2004) used the MAI to assess metacognitive knowledge and regulation in college students and reported correlations between the MAI and measures of academic achievement such as SAT scores and high school GPA. The results showed a significant correlation between the knowledge of cognition factor and the regulation of cognition factor, but no relation was found between MAI scores and academic achievement. On the other hand, the findings showed a negative correlation between MAI scores and credits dropped during the fall semester, which lead to the conclusion that metacognition as measured by the MAI may be related to the ability to manage the collegiate system. Finally, the findings showed a strong correlation between the MAI and the Learning and Study Strategies (LSS) Inventory.

Young and Fry (2008) examined the extent to which the knowledge and regulation components of the MAI relate to both broad and single measures of academic achievement in college, as measured by GPA and course grades, respectively. Results showed that both the knowledge of cognition and regulation of cognition factors (as well as the composite), were predictive of both GPA and course grades, which supports a monolithic model of the MAI in contributing to performance. However, the two scales were differentiated in comparing graduate and undergraduate students in metacognition, who showed significant differences in scores on the regulation factor but not the knowledge factor. Results from this study provide support for a two-factor model, even though these factors are correlated.

While findings from the research reviewed here suggest a close relationship between metacognition and academic performance, the nature of this relationship is still not clear and research has not yet come up with definite findings as to which of the main components of metacognition has a more direct impact on achievement. Findings from researchers such as Everson and Tobias (1998), Nietfeld et al. (2005), and Schraw (1994) claim a significant correlation between regulation of cognition and measures of academic achievement such as GPA, whereas other findings from Schraw and Dennison (1994), and Young and Fry (2008) show that the relationship between metacognition and achievement at university relates more to knowledge of cognition than regulation of cognition.

The Current Study

As it has been mentioned above, the present study is an attempt to examine relationships among three metacognitive components namely knowledge of cognition, monitoring, and control, and how each of these relates to academic performance as measured by grade-point

average (GPA). In the same vein, it further examines the MAI as a measure of metacognition and its ability to predict performance for high and low achieving college students. In other words, we investigate the existence of any logical links that make students' awareness of their cognition (the metacognitive knowledge dimension) and ability to control and monitor it (the metacognitive skills dimension) account for academic achievement at university level. Finally, the study explored the characteristics of high and low achievers as to metacognitive knowledge, regulation, and prediction of performance; the latest is investigated in order to find out the extent to which results from the present study corroborate findings attesting that both high and low achievers have low accuracy prediction of performance (Grabe, Bordages, & Petros 1990; Jacobson, 1990; Maki, 1998b), and that low achieving students tend to be over-confident on pre-test predictions because they have low monitoring skills (Hacker, Bol, Horgan, & Rakow, 2000).

Method

Participants

Sixty-eight students from the Faculty of Letters and Human Sciences and 20 students from the Faculty of Education-Rabat, a total of 88 third-year university students were the participants in this research. The group consisted of 38 males (43.2%) and 50 females (56.8%) with an age range between 19 and 28 years, inclusive (M= 21.34, SD= 1.68).

The choice to include only third-year university students was motivated by a number of reasons: first and mainly, third-year students have accumulated enough experience with learning so that they would have a relatively mature understanding of their own learning processes, enabling them to meaningfully engage with the metacognitive statements in the inventory. Second, the accumulation of course grades over the two previous years in college provided a relatively stable measure of achievement measure. Finally, given the fact that Morocco is an Arabic-French bilingual country, English department students were selected to participate in this study to avoid the limitations and reliability issues related to translating existing instruments.

Measures

Data for the first phase of the present study consisted of scores from the Metacognitive Awareness Inventory (MAI) and the students' cumulative GPA in their first two years at university.

The Metacognitive Awareness Inventory (MAI). The Metacognitive Awareness Inventory (Schraw & Dennison, 1994) is one of the most comprehensive surveys that assess metacognitive awareness for adult learners. This comprehensive inventory (see Appendix 1) consists of 52 statements allowing an in-depth assessment of metacognition. The MAI was selected because it provides a reliable assessment of metacognitive awareness among older students, it has good psychometric properties, and easily adapts to the three-component model of metacognition tested in this study.

Its two component categories, namely Knowledge and Regulation of Cognition can be divided into 8 sub-components, which allow computing scores for individual subcomponents. While the Knowledge component comprises statements of declarative knowledge (knowledge about self and strategies), procedural knowledge (knowledge about strategy use), and conditional knowledge (why and when to use strategies), the regulation component provides statements about planning (setting goals), information management (organization), monitoring (assessment of learning and strategy use), debugging (comprehension-error correction strategies), and evaluation (end of task analysis of performance and learning effectiveness). Statements from the

inventory are rated in a 5-point Likert scale ranging from 1: I never or almost never do this, to 5: I always of almost always do this.

Since one of the objectives in the present study is to test a three-component model of metacognition (knowledge, monitoring, and control) as opposed to Schraw's two-component model (knowledge and regulation), the items in the MAI were grouped to form the three above-mentioned factors. While no changes were made to the knowledge of cognition scale, items from the regulation scale were divided into monitoring and control subscales based on whether the items reflected monitoring or control processes. The monitoring scale included items such as: "I ask myself periodically if I am meeting my goals", "I consider several alternatives to a problem before I answer", and "I ask myself if I learned as much as I could once I finish a task", and the control scale comprised items such as: "I consciously focus my attention on important information", "I ask others for help when I don't understand something", and "I organize my time to best accomplish my goals". The rationale behind testing the three-component model of metacognition is to look closely at the interaction between monitoring and control and how it relates to performance. (Cronbach's alphas for the reliability of the MAI originally and within the three-component model are presented in the results section)

Confidence Rating. One item tapping achievement confidence was added at the end of the MAI. This confidence in academic achievement was measured by asking participants to rate how well they thought they would perform in upcoming final exams that were scheduled one week hence. Ratings were on a 4-point scale (1=very well, 2=quite well, 3=average, 4=bad).

Students' two-year GPA. Academic performance of the participants was measured by their cumulative GPA for the two years spent at university. In Morocco, (following the French system) successfully completing two years at university gives students the chance to join what is called "les grandes écoles" (literally translated into "the big schools": Schools of engineering, architecture, and commerce). As proof of the successful completion of the two first years at a university, students get a 'Diploma of General University Studies'; the translation of the French 'Diplôme d'études universitaires generals' (DEUG). In this system, DEUG GPA scores range from 0 to 20 with 10 being the average score and 12+ being the criterion for distinction at the end of the second year.

This mark is a cumulative average of 16 modules the students have taken during their first two years. The "DEUG" GPA was used as a measure of academic performance rather than a one-time test that would not reflect the students' real academic level and would not be reliable enough to help categorize students as high and low achievers (in the present study we use DEUG scores and GPA interchangeably). Finally, a number of studies in the area of metacognition and self-regulated learning used cumulative GPA as a measure of academic performance and argued that it is a reliable measure in research (Everson & Tobias, 1998; Nietfeld et al, 2005; Schraw, 1994; Trainin & Swanson, 2005; Young & Fry, 2008).

Procedure

Participants were tested just before final exams of the Fall term. A meeting with the students was arranged, with the head of the English department and the professor who was teaching them. Professors were both briefed about the research objectives and data collection procedure prior to meeting the students. Students were informed about the researcher's visit in the beginning of the class period and an explanation was given to them as to the purpose of his visit which is to collect data using a questionnaire and recruit students for a workshop (the latter is reported elsewhere). Near the end of the class period, the researcher introduced himself to the

students and explained to them the importance of participating in similar studies as a way to contribute to research. In addition to that, the researcher explained how important it was to understand each item of the inventory before answering, and rate it as accurately as possible.

Prior to completing the inventory, respondents were asked to provide their age and gender information in a section attached to the inventory. The researcher distributed the inventory and explained to the students that the information they would provide would remain confidential and used only for the purpose of the research. Participants were informed that data analysis would be conducted in the United States and that their information would be de-identified. Finally, the researcher explained the scale and encouraged students to ask questions if they had problems understanding the inventory items. Indeed, students asked questions about a number of items, particularly Item 4 of the inventory, which probed the ability to "pace oneself during study," so the researcher provided an explanation and a few practical examples. Students were then asked to make their confidence ratings. The item was explained and students were told to be as accurate as possible. Finally, permission was secured from the students to obtain records of grades (DEUG scores) from the department office.

Results

Table 1 presents the descriptive statistics for the MAI Total and its subscales. The first row shows the total MAI mean for the whole group. This mean score includes students' ratings of the 52 items of the MAI. The second and third rows respectively have mean scores and standard deviations for knowledge of cognition and regulation of cognition based on Schraw's two-component model of metacognition, while the fourth and fifth rows have means and standard deviations of monitoring and control relating the three-component model of metacognition suggested in the present study.

Table 1. *Means and Standard Deviations for MAI Scores for All Participants*

	Minimum	Maximum	Mean	SD
MAI Total	1.98	4.56	3.78	.44
Knowledge of Cognition	2.12	4.59	3.68	.47
Regulation of Cognition	1.91	4.62	3.83	.50
Monitoring	2.31	4.83	3.71	.55
Control	1.67	4.82	3.89	.52

The first goal in this study was to examine scale reliabilities for alternative models of the MAI component scales and to investigate the relationships among the knowledge and regulation components of metacognition. Cronbach's alpha for the total 52 items of the MAI was .89, and based on Schraw's two-component model of metacognition, the knowledge of cognition factor has a reliability of .76, while the regulation of cognition has a reliability of .87. Based on the three-component model suggested and adopted in the present study, knowledge of regulation has a reliability of .76 while the two subcomponents of regulation have a reliability of .81 for control and .79 for monitoring. This model was suggested in order to look at how the two main components of regulation differentially predict achievement in college.

The second goal of the present study was to examine the extent to which metacognition predicts academic performance. The correlations among MAI scales and between MAI scales and GPA are presented in Table 2.

Table 2. *Inter-correlations among Subcomponents of Metacognition and GPA*

	MAI Total	Knw. of Cog.	Reg. of Cog.	Monitoring	Control
Knw. of Cognition	.77**				
Reg. of Cognition	.95**	.56**			
Monitoring	.86**	.50**	.90**		
Control	.92**	.54**	.96**	.75**	
GPA	.44**	.11	.52**	.45**	.52**

** Correlation is significant at the 0.01 level (2-tailed)

The knowledge of cognition and regulation scales were moderately inter-correlated, however, the knowledge of cognition scale was relatively less correlated with the whole instrument and with regulation and its components. More importantly, while results show that MAI can be a good predictor of GPA, correlations between subscales of the MAI and GPA clearly indicate that this correlation is driven by the monitoring and control scales rather the combination of these and knowledge of cognition. The latter does not predict GPA at all.

To better visualize the role of metacognition within subgroups of high- and low-achievers, students were categorized based on the DEUG score. This was done based on the DEUG criterion for distinction in the Moroccan and French educational systems where a distinction starts at the score of 12 out of 20 (12/20) and above (as explained in the measures section). Students with DEUG scores of 12 and higher were classified as high achievers (n=38); students with DEUG scores lower than 12 were classified as low achievers (n=50). Table 3 shows means and standard deviations for the MAI and its subscales among high and low achievers.

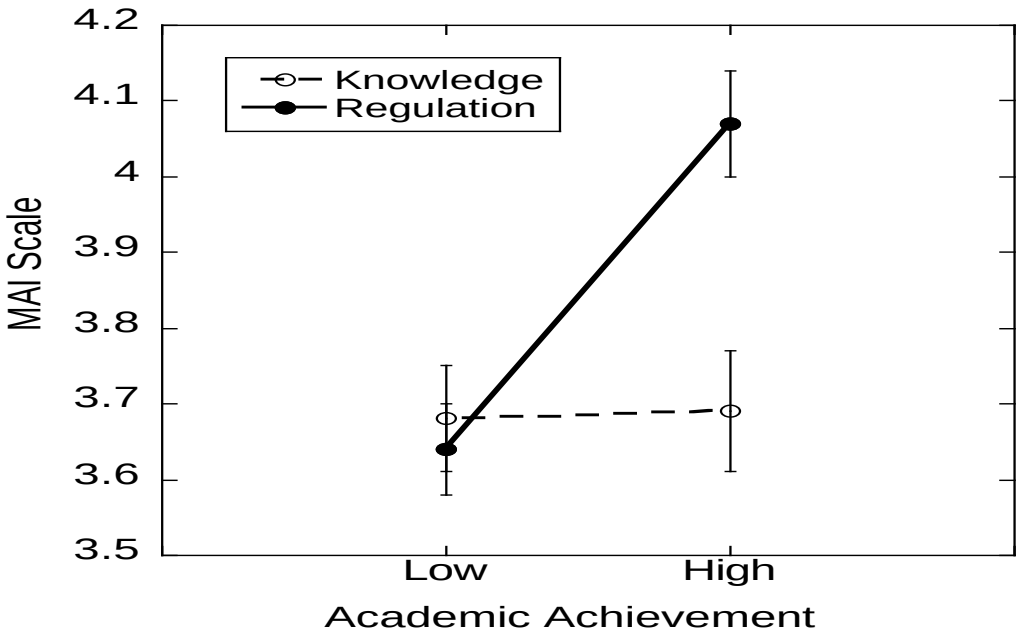
Table 3. *Means and Standard Deviations of the MAI among High and Low Achievers*

	High Achievers		Low Achievers	
	M	SD	M	SD
MAI Total	3.95	.44	3.65	.40
Knowledge of Cognition	3.69	.48	3.68	.47
Regulation of Cognition	4.07	.49	3.64	.42
Monitoring	3.95	.54	3.52	.48
Control	4.17	.51	3.71	.44

The results show a significant difference between high and low achievers in MAI total, $t(86) = 3.22$, $p < .05$, however, the differences between high and low achievers were specific to the regulation components. Scale scores for the MAI were analyzed in a 2 (Academic achievement group: high, low) x 2 (MAI scale: knowledge, regulation) repeated measures ANOVA, in which the MAI scale was measured within-subjects. The interaction between metacognition scale and achievement, shown in Figure 1, was significant $F(1.86)= 22.10$, $p<.001$. This shows that the metacognitive advantage among high-achieving students was totally driven by the regulation factor of metacognition. To examine whether the advantage of high achievers could be further localized to the monitoring or control component of regulation, we analyzed metacognitive scores in a 2 (Academic achievement group) x 2 (MAI scale: monitoring, control). This interaction was not significant $F(0.000044)= .001$, $p=.98$ showing

that the advantage in regulation among high achievers was equally attributable to the two sub-components of regulation namely, monitoring and control.

Figure 1. *MAI Scale Scores as a Function of Academic Achievement*



The third and last goal of the present research was to examine the relationship between confidence rating and achievement both for the whole group and groups by achievement. Results are shown in Table 4.

Table 4**.** *Correlations for Performance Confidence with GPA and with Metacognitive Component Scores.*

	GPA	MAI Tot.	MAI Kn	MAI Reg	Monitor	Control
ALL PARTICIPANTS	-.43**	-.33**	-.15	-.36**	-.39**	-.31**
High Achievers Only	-.19	-.05	.02	.08	-.22	.001
Low Achievers Only	-.32*	-.40**	-.31*	-.40**	-.35*	-.38**

**. Correlation is significant at the 0.01 level (2-tailed)

Correlations among Confidence judgment, GPA and metacognitive components for all participants were calculated. Results show an overall negative correlation between GPA and confidence rating. However, examining correlations between GPA and confidence rating in high

and low achievers shows that confidence rating is negatively correlated with GPA for low achievers while it shows no correlation in high achievers. Results also show that confidence rating is negatively correlated with the MAI and all its subscales for low achievers while they show no relation for high achievers.

Discussion

The present study explored relationships among components of metacognition, and between metacognition and academic performance measured by GPA. In the same vein, it examined the extent to which confidence relates to metacognition and academic performance.

For the first objective here-above, findings indicate a strong correlation among metacognitive components both in the two-component and the three component factors. These findings support previous attempts to look at relations among metacognitive factors in the MAI (Schraw, 1994; Sperling et al., 2004, Young and Fry, 2008).

When it comes to the relation between achievement and metacognition, high achievers showed more awareness of their metacognitive knowledge and skills than low achievers, and while scores for general metacognition are not significantly different, scores for metacognitive regulation and its subcomponents show a wider gap between the two groups. This finding supports those of Schraw (1994) and Young and Fry (2008) who found that more experienced and less experienced learners differ in metacognitive regulation but not in metacognitive knowledge. The results also show a significant correlation between overall metacognition and GPA, as well as a strong correlation between regulation and GPA. These results support the findings indicating that metacognition is set of skills that are highly correlated to academic success (Garcia & Pintrich, 1994; Pintrich 1994), and that metacognition is a strong predictor of academic success in college (Ruban, 2000; Smitely, 2001). It also corroborates with research indicating that metacognitively aware learners are more strategic and perform better than unaware learners (Garner &Alexander, 1989: Pressley & Ghatala, 1990). However, a closer look at the interaction between achievement and sub-components of metacognition showed the correlation between metacognition and achievement to be driven only by the regulation component of metacognition. This finding raises questions as to the inconsistency in the literature on metacognition and achievement which could be due to the varying involvement of knowledge in measuring metacognition, while the operative elements are really only monitoring and control.

Regarding the third goal of this study, results indicate that, in the whole sample, there was a negative relationship between confidence and both metacognition and GPA but when one looks at group differences among high and low achievers, the negative correlation was only true for low achievers, since confidence results for high achievers show no relationship with neither metacognition nor GPA. This is in support of findings by Jacobson, (1990), and Maki, (1998b) indicating that both high and low achievers have low accuracy prediction of performance, and that low achieving students tend to be over-confident on pre-test predictions because they have low monitoring skills (Hacker et al., 2000).

Implications and future research

As findings from the present research indicate, metacognition and more particularly regulation of cognition is central to effective learning. Consequently, it is essential that instructors devote time to tapping their students' metacognitive knowledge and regulation, and accordingly plan subsequent metacognitive training for those lacking metacognitive skills. This

can be easily done via the MAI, the easy-to-use instrument in classroom settings which is not only a reliable tool for measuring metacognition, but a rich metacognitive-strategy base for planning remedial training that targets specific aspects of metacognition. Furthermore, the MAI could be used as an instrument to predict students' performance in college if it is administered with placement and/or entrance tests in college. This could provide instructors with a strong and reliable tool to anticipate students' low performance and remedy to it through both effective placement of students or tutoring programs for at-risk students. Future research should use experimentation to examine effective methods of training students in metacognitive skills that link to academic achievement. Moreover, it would be interesting to design a metacognitive intervention that is based on the skills in the MAI to assess the extent to which metacognition, as measured by the MAI, links to performance in an experimental setting.

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Appendix 1: *the Metacognitive Awareness Inventory*

The Inventory

The information hereunder shall remain confidential and used only for the purpose of the present research.

Full Name: Age: Gender: M F

Email address:

Section 1

Directions: Listed below are statements about what people do while learning. Five numbers follow each statement (1, 2, 3, 4, 5) below and each number means the following:

1 means "I **never or almost never** do this."
2 means "I do this **only occasionally."**
3 means "I **sometimes** do this." (About **50%** of the time.)
4 means "I **usually** do this."
5 means "I **always or almost always** do this."

After reading each statement, **circle the number** (1, 2, 3, 4, or 5) that best describes you, using the scale provided. Please note that there are **no right or wrong answers** to the statements in this inventory. It is a simple matter of what is **true** for you.

Thank you very much for your participation!

Statement	Scale
1. I ask myself periodically if I am meeting my goals.	1 2 3 4 5
2. I consider several alternatives to a problem before I answer.	1 2 3 4 5
3. I try to use strategies that have worked in the past.	1 2 3 4 5
4. I pace myself while learning in order to have enough time.	1 2 3 4 5
5. I understand my intellectual strengths and weaknesses.	1 2 3 4 5
6. I think about what I really need to learn before I begin a task	1 2 3 4 5
7. I know how well I did once I finish a test.	1 2 3 4 5
8. I set specific goals before I begin a task.	1 2 3 4 5
9. I slow down when I encounter important information.	1 2 3 4 5
10. I know what kind of information is most important to learn.	1 2 3 4 5

11. I ask myself if I have considered all options when solving a problem.	1 2 3 4 5
12. I am good at organizing information.	1 2 3 4 5
13. I consciously focus my attention on important information.	1 2 3 4 5
14. I have a specific purpose for each strategy I use.	1 2 3 4 5
15. I learn best when I know something about the topic.	1 2 3 4 5
16. I know what the teacher expects me to learn.	1 2 3 4 5
17. I am good at remembering information.	1 2 3 4 5
18. I use different learning strategies depending on the situation.	1 2 3 4 5
19. I ask myself if there was an easier way to do things after I finish a task.	1 2 3 4 5
20. I have control over how well I learn.	1 2 3 4 5
21. I periodically review to help me understand important relationships.	1 2 3 4 5
22. I ask myself questions about the material before I begin.	1 2 3 4 5
23. I think of several ways to solve a problem and choose the best one.	1 2 3 4 5
24. I summarize what I've learned after I finish.	1 2 3 4 5
25. I ask others for help when I don't understand something.	1 2 3 4 5
26. I can motivate myself to learn when I need to	1 2 3 4 5
27. I am aware of what strategies I use when I study.	1 2 3 4 5
28. I find myself analyzing the usefulness of strategies while I study.	1 2 3 4 5
29. I use my intellectual strengths to compensate for my weaknesses.	1 2 3 4 5
30. I focus on the meaning and significance of new information.	1 2 3 4 5
31. I create my own examples to make information more meaningful.	1 2 3 4 5
32. I am a good judge of how well I understand something.	1 2 3 4 5
33. I find myself using helpful learning strategies automatically.	1 2 3 4 5
34. I find myself pausing regularly to check my comprehension.	1 2 3 4 5

35. I know when each strategy I use will be most effective.	1 2 3 4 5
36. I ask myself how well I accomplish my goals once I'm finished.	1 2 3 4 5
37. I draw pictures or diagrams to help me understand while learning.	1 2 3 4 5
38. I ask myself if I have considered all options after I solve a problem.	1 2 3 4 5
39. I try to translate new information into my own words.	1 2 3 4 5
40. I change strategies when I fail to understand.	1 2 3 4 5
41. I use the organizational structure of the text to help me learn.	1 2 3 4 5
42. I read instructions carefully before I begin a task.	1 2 3 4 5
43. I ask myself if what I'm reading is related to what I already know.	1 2 3 4 5
44. I reevaluate my assumptions when I get confused.	1 2 3 4 5
45. I organize my time to best accomplish my goals.	1 2 3 4 5
46. I learn more when I am interested in the topic.	1 2 3 4 5
47. I try to break studying down into smaller steps.	1 2 3 4 5
48. I focus on overall meaning rather than specifics.	1 2 3 4 5
49. I ask myself questions about how well I am doing while I am learning something new.	1 2 3 4 5
50. I ask myself if I learned as much as I could have once I finish a task.	1 2 3 4 5
51. I stop and go back over new information that is not clear.	1 2 3 4 5
52. I stop and reread when I get confused.	1 2 3 4 5

Section 2
Please underline the answer that applies to you.

1. How well do you think you will do in the upcoming finals?

very well quite well average bad