

Comparing Models for Generating a System of Activation and Inhibition  
of Self-Regulated Learning

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by

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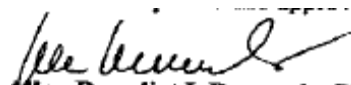
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## APPROVAL SHEET

This dissertation hereto entitled:

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INHIBITION OF SELF-REGULATED LEARNING

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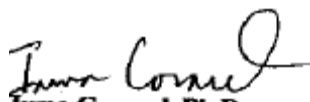


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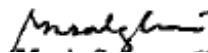
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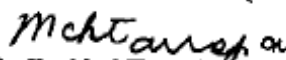
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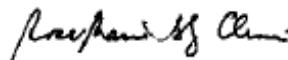


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## Abstract

The study investigated the effect of activation and negative affect on self-regulation. The activation factors are self-determination, disengagement, initiative, and persistence while negative affect is composed of worry, anxiety, thought suppression, and fear of negative evaluation. Separate measures were used for each factor and administered to 1454 collegiate students. A time-wave design was used where the activation and negative affect factors were administered in the first wave and the self-regulation in the second. It was hypothesized in the study that the effect of negative affect on self-regulation can be moderated by levels of activation factors. Three models were tested using Structural Equations Modeling (*SEM*) to determine which structure of negative affect and activation best generates self-regulation. The results show that activation and negative affect each differently affect self-regulation,  $p < .001$  ( $RMSEA = .054$ ,  $\chi^2 = 505.43$ ,  $GFI = .96$ ). Negative affect can increase self-regulation when mediated by activation,  $p < .001$  ( $RMSEA = .056$ ,  $\chi^2 = 527.22$ ,  $GFI = .96$ ). The effect of negative affect on self-regulation is weak if individuals possess high activation levels,  $p < .001$  ( $RMSEA = .05$ ,  $\chi^2 = 309.64$ ,  $GFI = .97$ ). The theoretical and educational implications of the findings are discussed.

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## Chapter 1

### The Problem and Literature Review

Students effectively learn by generating their own cognitive strategies and adapting these strategies to different situations. These strategies do not work well when individuals feel incapable to accomplish their goals. Feelings of apprehension and worry can interfere with an individual's information processing. The students who are aware and generate their own cognitive strategies and techniques in learning use self-regulatory processes. Self-regulation involves components such as goal-setting, time management, strategy use, self-monitoring, attribution beliefs, environmental structuring, and help-seeking. The use of self-regulation usually results in better academic performance as shown in different studies (ex. Azevedo & Cromley, 2004; Fok & Watkins, 2007; Glaser & Brunstein, 2007).

Among Filipino students, there are very few self-regulation components that emerge as significant predictors for mastery goal (Magno & Lajom, 2006). This suggest that self-regulation is poorly used and/or not used by college students (Correo, 1998; De Carvalho, Magno, Lajom, Bunagan, & Regodon, 2006; Dedel, 2002; Panganiban, 2005; Pulmones, 2005). Another compelling result is that self-regulation processes appear to decline during the adolescent stage (Raffaelli, Crockett, & Sheng, 2005). If self-regulation is not fully utilized then learning will not take place effectively. This problem occurs because some teachers do not encourage students to self-regulate their learning when teaching (Hofer, Yu, & Pintrich, 1998). There are actually no published reports about the status of Filipino college students' learning and teachers' status of teaching especially in their use of self-regulation strategies in the classroom on a national scale.

With this scenario, it is difficult to determine the nature of self-regulation among Filipino college students. Having this in mind, it is important to study the factors that activate the self-regulation of Filipino college students to facilitate their learning better.

Self-regulation is commonly seen as a process. Zimmerman (2001) explained when a person uses self-regulation, he passes through different phases. These are the forethought phase, performance phase, and the self-reflection phase. However, this researchers believes that Zimmerman's phases are just classifications of the skills and metacognitive processes needed for better performance. For instance, the forethought phase in the process does not actually explain how self-regulation is activated. The forethought phase is only composed of a set of skills.

Despite an increased interest of studies relating variables such as learning motivations, cognitive processes, and beliefs about the self to self-regulation, there is still a gap in identifying variables that serve as antecedents on how to start the self-regulation process (Blakey & Spencer, 1990; Collins, 1982; Corsale & Ornstein, 1971; Kluwe, 1982; Schneider, 1985; Lopez, Little, Oettingen, Baltes, 1998; Rock, 2005). To aid educational specialists in training and instructing students' with self-regulatory processes, there is a need to propose a model showing the activation of self-regulation. Specifically, there is a need to address how to help college students to self-regulate their learning because they need this skill to process effectively the information they need for their skills necessary to succeed in their study. Given this scenario, the study is significant in the area of teaching because educators can be guided to consider the activation factors that can help their students develop self-regulation.

Self-regulation should start with activating factors to make it more controllable. A system of activating factors that jumpstart self-regulation is characterized by explicit, sequential, and analytic operations. Self-regulation needs effort, will, choice, and desire in order to make it effective and valuable. According to Zimmerman (2005) that “self-regulation skills are of little value if people cannot motivate themselves to use them” (p.17). The action control theory by Kuhl (1981) explains that various mechanisms such as volition, will, and desire help maintain difficult intentions active in memory. In the present study, the proposed factors for the activation system are persistence (self-directed attention), initiative, disengagement (impulse control), and self-determination. It is hypothesized in the study that a student needs persistence, self-determination, disengagement, and initiative to activate self-regulation processes.

Aside from activating self-regulation, there is also a need to clarify the role of emotions in inhibiting the thinking processes such as self-regulation. Many studies have demonstrated that emotional stability predicts performance (e. g., Covington, 1992; Jagacinski & Nicholls, 1987; Sansone & Harackiewicz, 1996; Weiner, 1985; Wigfield & Eccles, 1989). The role of affect on self-regulation is explained in the mood-behavior model by Gendolla (2000) where affective character is central in the constitution of action preferences as well as the mobilization of action resources. This model views affect as having a positive impact and facilitating self-regulatory behavior which is a very common perspective in published researches in the field of educational psychology (Baumann & Kuhl, 2002; Beal, White, & Barros, 2005; Efklides, 2005; Turner, Thorpe, & Meyer, 1998). However, a different perspective is shown in personality theory studies where affect can be conceptualized as inhibitory to self-regulation undermining learning

(Bolte, Goschke, & Kuhl, 2002; Kuhl, 1994; Kuhl, 2000; Kuhl & Beckman, 1994; Sideridis, 2006). The varying perspectives in viewing the influence of affect on self-regulation are brought about by the nature of affect as activation or inhibition in the process of learning. In the present study, negative affect is hypothesized as an inhibition to self-regulation but leads to self-regulation depending on the individual's level of activation.

When predicting self-regulatory processes, the social cognitive theory focuses more on cognitive, attitudinal, and dispositional variables alone. The present study includes negative affect with an activation system to see how they interact and affect self-regulation. Negative affect is used as an interference system to the factors of activation and self-regulation. The factors of negative affect are worry, anxiety, fear of negative evaluation, and thought suppression. Worry is a tendency to engage in thought characterized by predominantly negative cognitions of the self and personal problems (Wells, 1994). On the other hand, students who are anxious have the motive to withdraw from the situation and there is a reduction on task-related effort (Geen, 1987). Fear of negative evaluation reflects fear of the loss of social approval (Leary, 1983). The study hypothesized that the factors of negative affect are inhibitory systems that interfere with self-regulation. The activation system even when affected by negative affect may still lead to self-regulation. However when the activation resources are low, it may not lead to self-regulation. These assumptions about the interaction of activation and negative affect will be tested in the present study.

The present study has important empirical and theoretical implications and are significant in educational psychology. First, it contributes to the growing literature on the

role of negative affect in learning. Considering that negative affect is mostly studied in the area of personality and clinical psychology, the present study explains how negative affect influences learning such as self-regulation. Second, the present study further elaborates the theory of action control by adding other variables with it in a theoretical model. The study included other factors that interplay with it to investigate its variation when other factors are present. Third, the present study extends the control value theory of academic emotions by including the interactive effect of negative affect and action control with self-determination on self-regulation. The control value theory sees negative affect such as anxiety as outcome factor that depends on the individuals control and self-regulatory behaviors. It is limited in explaining the possibility of negative affect affecting self-regulation.

The overall purpose of the study is to determine the interplay of activation and inhibition system in their effect on self-regulation. There is a need to investigate how the processes of activation and negative affect interact to produce goal directed behavior and this will be shown in the present study by three models. The three models are necessary because they provide three alternative ways of explaining how to generate self-regulation. The present study investigates the best model that increases the use of self-regulation. In the first model, the difference in the effects of the activation system and inhibition system on self-regulation will be investigated. In the second model, it will be shown that self-regulation is activated when negative affect is experienced. In the third model, individuals with high activation levels (self-determination, initiative, persistent, and able to disengage) and experiences negative affect are still able to self-regulate.

## Review of Related Literature

This section presents the relevant studies on self-regulation, action control, and negative affect. The arguments on developing self-regulation in the classroom setting and the studies showing its application are discussed. The weaknesses of previous studies on action control and self-determination are also discussed. The studies about different negative affects are shown and how they are related with learning and cognition. The concept of an activation system for self-regulation is justified as well as the role of negative affect on self-regulation.

### *Self-regulation*

Self-regulation is defined by Zimmerman (2002) as self-generated thoughts, feelings, and actions that are cyclically adapted to attain goals. Various studies have commonly associated self-regulation to better performance (Blakey & Spencer, 1990; Collins, 1982; Corsale & Ornstein, 1980; Kluwe, 1982; Lopez, Little, Oettingen, Baltes, 1998; Rock, 2005; Schneider, 1985), motivation (Corno & Mandinach, 1983), other cognitive processes (Ghatala, 1986; Schunk, Hanson, & Cox, 1987; Wang & Peverly, 1986), and beliefs about the self (Bandura & Schunk, 1981; Schunk, 1981, Schunk, 1983; 1984). Self-regulation is investigated as an outcome factor in numerous academic interventions. Previous studies have focused on self-regulation as explained by other psychological variables and outcome in academic programs.

Self-regulation is not a mental ability or performance skill but rather a process where learners transform their mental abilities into academic skills. Zimmerman (2002) explains self-regulation in a three-phase structure (forethought phase, performance phase, and self-reflection phase). When Zimmerman and Martinez-Pons (1988) established a



measure of self-regulation they arrived at 14 strategies that include self-evaluation, organizing and transforming, goal-setting and planning, seeking information, keeping records and monitoring, environmental structuring, self-consequences, and rehearsing and memorizing. Among these strategies, the basic component skills include: (1) setting specific proximal goals for oneself, (2) adopting powerful strategies for attaining the goals, (3) monitoring one's performance selectively for signs of progress, (4) restructuring one's physical and social context to make it compatible with one's goals, (5) managing one's time use efficiently, (6) self-evaluating one's methods, (7) attributing causation to results, and (8) adapting future methods. A students' level of learning has been found to vary based on the presence or absence of these key self-regulatory processes (Schunk & Zimmerman, 1994; 1998).

A direct application of self-regulation can be used in teaching. This means that self-regulatory processes can be taught to students. Schunk and Zimmerman (1998) showed in their study that when self-regulation was taught to students, it increased their motivation and achievement. Self-regulation can be taught through modeling by parents, teachers, coaches, and peers. There is much room for different research to propose ways on how to teach students to self-regulate since current literature focuses too much on its conceptualizations and factors that influence it. Zimmerman, Bonner, and Kovach (1996) raised issues that (1) few teachers are preparing students to effectively learn by themselves, (2) students are seldom given choices regarding academic tasks, (3) few teachers encourage students to establish specific goals for work and teacher learning strategies, (4) students are rarely asked to evaluate their own work, and (5) very few teachers assess students beliefs about their own learning. These issues were raised due to

the lack of models, strategies, methods, and techniques that teachers can use as exemplars in implementing the instruction for self-regulation. This notion is often raised because teachers rely mostly on strategic formulas in their process of teaching especially in the Philippine context (Magno, 2007). Teachers need to change their perspective about their belief on what learning is and what their teaching should become from conventional ways of teaching content. Since learners are believed to self-regulate their learning, teachers should concentrate on how to activate their students' self-regulatory processes. Focusing on techniques of teaching students to self-regulate concerns much of the need to identify ways to activate it which is proposed in the present study.

Some of the research attempts that translate self-regulation into the actual teaching practice were shown in the work of de la Fuente Arias, Justicia, and Garcia Berben (2006), Fok and Watkins (2007), and Paris and Paris (2001). It is important to mention these studies because self-regulation when used in teaching demonstrates different ways of activating it among students.

The study by de la Fuente Arias, Justicia, and Garcia Berben (2006) developed a teaching-learning process using the "Interactive Model of Regulated Teaching and Self-regulated Learning." In their new model, they improved the "presage-process-product" model of Biggs (2001) where the interactive dimension of the teaching-learning process becomes the primary function and the model explicitly incorporates the dimension of regulated teaching and self-regulated learning. They provided evidence that improvement of general teaching strategies, adjustments in the evaluation system, and improving specific teaching strategies (regulation of teaching) as implemented in their teaching-learning model have produced a general improvement in general learning behavior and in

students' specific learning strategies (self-regulated learning), as measured through the evaluation scales used.

The study by Fok and Watkins (2007) used a constructivist teaching approach which is typically a self-regulation technique and investigated its effect using the Learning Process Questionnaire (LPQ) and the Constructivist Learning Environment Scale (CLES). The constructivist technique employed involves students to give their own examples, authentic problems, testing own ideas, challenge each others' conceptualizations, group presentations, self-analysis, self-reflective thinking, and evidence to support ideas, and present ideas. The study found significant post-test gains among the high achieving group on the learning process and constructivist learning environment after the constructivist technique. This shows that a constructivist learning environment that includes self-regulation is effective in developing deeper approaches to learning.

Paris and Paris (2001) described 12 principles that teachers can use to design activities in classrooms that promote students self-regulation. They emphasized that self-regulation can be taught with explicit instruction, directed reflection, metacognitive discussions, and participation in practices with experts. Self-regulation can be promoted indirectly by modeling and activities that entail reflective analyses of learning.

There are also other studies that employed self-regulation in the classroom setting and tested the procedures on their effectiveness on students' performance in different tasks and subject areas.

The study by Glaser and Brunstein (2007) examined whether self-regulation procedures would increase the effectiveness of a writing strategies training designed to

improve 4th graders' (N = 113) composition skills. The strategy training included methods of direct instruction and cognitive modeling as well as phases of guided and independent practice to help students acquire effective strategies (e.g., the widely used story grammar strategy) for planning and redrafting stories. Students who were taught composition strategies in conjunction with self-regulation procedures were compared with (a) students who were taught the same strategies but received no instruction in self-regulation and (b) students who received didactic lessons in composition. Both at posttest and at maintenance (5 weeks after the instruction), strategy plus self-regulation students wrote more complete and qualitatively better stories than students in the 2 comparison conditions. They also displayed superior performance at a transfer task requiring students to recall essential parts of an orally presented story.

The study of Azevedo and Cromley (2004) examined the effectiveness of self-regulated learning (SRL) training in facilitating college students' learning with hypermedia. The training included planning (planning, subgoals, prior knowledge activation), monitoring (feeling of knowing, judgment of learning, self-questioning, content evaluation, identifying the adequacy of information), strategies (selecting new informational source, summarization, rereading, and knowledge elaboration), task difficulty and demands (time and effort planning, task difficulty, and control of context), and interest. Undergraduate students were randomly assigned to either a training condition or a control condition and used a hypermedia environment to learn about the circulatory system. Students in the self-regulation group were given a 30-min training session on the use of specific, empirically based self-regulation variables designed to foster their conceptual understanding; control students received no training. Pretest,

posttest, and verbal protocol data were collected from both groups. The SRL condition facilitated the shift in learners' mental models significantly more than did the control condition; verbal protocol data indicated that this was associated with the use of the SRL variables taught during training.

The study by Fuchs et al. (2003) assessed the contribution of self-regulated learning strategies, when combined with problem-solving transfer instruction, on 3rd-graders' mathematical problem solving. SRL incorporated goal setting and self-evaluation. Problem-solving transfer instruction taught problem-solution methods, the meaning of transfer, and four superficial-problem features that change a problem without altering its type or solution. The problem-solving transfer also prompted metacognitive awareness to transfer. The effectiveness of transfer plus SRL was contrasted with the transfer treatment alone and to teacher-designed instruction for 16 weeks. Students were pre- and posttested on problem-solving tests and responded to a posttreatment questionnaire tapping self-regulation processes. SRL positively affected performance.

A local study by Dedel (2002) taught students in an experimental group different strategies like orientation, planning, action, and checking (OPAC) strategies to enhance students' problem-solving skills and conceptual understanding in teaching selected topics in mechanics. Although the study did not explicitly mention that the OPAC strategies are self-regulation in itself. The strategies are similar with conceptualizations on the components of self-regulation. Consistent with the findings of other research, the OPAC problem-solving strategy used in physics instruction significantly enhanced students' achievement in terms of problem-solving skills and conceptual understanding.

Self-regulation is not only self-oriented but can be social in orientation as well which makes it applicable for individuals with collectivist orientation. For example, self-regulated students can seek help from others to improve their learning. In accordance with Bandura's (1986) description in the triadic reciprocity theory, self-regulation is determined by environment, personal factors, and behaviors. It was further explained by Zimmerman (1989) that there is no symmetry among these three determinants in explaining self-regulation.

Environmental influences may be stronger than behavioral or personal ones in some contexts or at certain points during behavioral interaction sequences. For example, in schools with a highly structured curriculum or a restrictive code for classroom conduct, many forms of self-regulated learning such as student planning or self-reward may be stifled. Conversely, in schools in which situational constraints are limited, such as alternative schools, personal or behavioral factors may be the dominant influence regulating functioning. Self-regulated learning occurs to the degree that a student can use personal (i.e., self-) processes to strategically regulate behavior and the immediate learning environment. (p. 329)

Furthermore, the relative strength and the temporal patterning of mutual causation among personal, environmental, and behavioral influences can be altered through (a) personal efforts to self-regulate, (b) outcomes of behavioral performance, and (c) changes in environmental context (Bandura, 1986).

The triadic reciprocity theory is the basic foundation of proposing for other influences of self-regulation such as an activation and inhibitory system. The broadness

of the triadic reciprocity enables researchers to expand the theory in lieu of the social cognitive theory. In the mid and late 1990's, research evidences of enabling an individual to self-regulate through conceptions of control and volition was gaining attention in literature. The conception of the influences of self-regulation explained by traditional dynamic theories was started by Kuhl (1994). Although Kuhl's work about action control and volition originated in the mid 1980's where he started to introduce concepts of action and state orientations and their influences on cognition-behavior which was then not formally labeled as self-regulation.

### *Action Control*

Action control is characterized by students who are able to monitor and adjust their goal-striving efforts (Perry, Hladkyl, Pekrun, & Pelletier, 2001). Kuhl and Beckmann (1994) defined action control as the ability to make timely decisions, commit to a course of action, initiate action, avoid procrastination, handle multiple competing demands, maintain challenging goals, and persist despite failures or setbacks. Kuhl (2005) differentiated the concept of self-regulation with action control, although they are closely linked. Action control concerns on focusing tasks and blocking other irrelevant tasks such as distractions and long term concerns. These distractions and other concerns are blocked by not attending to it. Self-regulation is different because it involves a temporal component of attending to various tasks successfully.

Perry et al. (2001) made a distinction between action control with that of academic control where both are dispositional attributes of students. Academic control concerns students' belief about the causes of their success and failures, whereas action control pertains to the amount of attention students devote to failures arising from their

goal striving. This definition of action control was adapted from the study of Perry et al. because they concentrated in one bipolar side of action control. The idea of action control is conceptualized as bipolar where one side describes state orientation and the other end is action orientation (goal striving). The concept of action orientation and state orientation was originally coined by Kuhl (1994). These two concepts were the results of the extraction when he did factor analysis on the items of the Action Control Scale (ACS). Action oriented individuals are characterized by enhanced performance efficiency and the ability to complete tasks after minor failures or setbacks. Individuals adapting a state orientation tend to have persistent, ruminative thoughts about alternative goals or affective states which reduces the cognitive resources available for goal striving.

The action oriented factors are disengagement, initiative, and persistence (Kuhl, 1994). Disengagement refers to the ability to detach from thoughts about alternative goals or undesirable events that may interfere with progress on the task at hand. Initiative is the ability to easily initiate or start a work or task where the individual is able to move forward with a task and escape from state oriented processing. Persistence is shown by individuals who are able to effectively maintain focus on an intention until the task is complete. Persistent individuals are not easily pulled off-task. Given the three factors, action oriented individuals can flexibly disengage from irrelevant concerns, effectively initiate required actions, and stay focused until tasks are complete (Diefendorff, Hall, Lord, & Stream, 2000). In the present study, the factors of action control are proposed as activation system of traits where possessing these traits makes an individual self-regulate. The factors of the action control scale are used in the current study with the addition of self-determination. Self-determination is also an activation system considering it is part



of the components of volition by Kuhl & Fuhrman (1998). Reeve, Nix, & Ham (2003) described the quality of self-determination to be volition in itself where there is a presence of unpressured willingness to engage in an activity. Self-determination is also characterized by perceived locus of control where an individual perceives that his or her behavior is initiated and regulated by personal or by environmental force (Ryan & Grolnick, 1986). Self-determination also involves perceived choice where a decision is arrived among given options (Cordova & Lepper, 1996).

The action control factors and self-determination all reflect the act of volition. Volition centers around how free people feel while doing what they want to do (Pervin, 1992; Ryan, 1982). Volition occurs when the action is fully endorsed by the self and action control is made possible through it. Volitional approaches such as action control theory contain specific control strategies that serve as a support for motivational tendencies by warding off competitive tendencies (Deimann & Keller, 2006). Kuhl (1984) postulated strategies and assumed that as soon as an action tendency attains the status of a current intention, the motivational maintenance system is activated, and it gets access to the full repertoire of action control processes.

The closest studies that demonstrate action controls' influence on self-regulation was conducted by Perry, et al. (2001) and by Diefendorff, Hall, Lord, and Stream (2000). However in these studies they did not intend action control to be an activation agent for self-regulation. They only showed how dependent measures on performance varies when levels of action control is varied. In the present study action control is studied affecting self-regulation using a longitudinal design.

The study by Perry et al. (2001) varied academic control to moderate and high categories and action control into levels of high and low categories. The dependent variables that directly measured self-regulation are elaboration, self-monitoring, perceived control in the course, perceived control in life, class notes, and discussion with classmates. The other dependent measures were not reflective of self-regulation. When they correlated academic and action control with the self-regulation measures, only perceived control of the course and perceived control in life were found to be significant with weak correlation coefficients. When academic and action control were differed in their levels on the self-regulation measures, academic control had a significant main effect only on self-monitoring, perceived control in life, and perceived course control, while action control only had significant main effects on perceived control in life and class notes. No significant interaction effects were found on all self-regulation measures. The study by Perry et al. (2001) was only able to demonstrate consistent findings on the link between academic control and action control with perceived control in life and perceived control in course which is overlapping in the concept of control. The findings in this study implies the use of other powerful analyses in investigating the impact of academic and action control on self-regulation.

The results of the study of Perry et al. (2001) where self-regulation is studied under the categories of levels of action and state orientation yielded low power. The smallest sample for each cell is 43 (Given N in the study of Perry et al.) for each cell yield a low power statistic value of .63. For some cells a sample size of 52 was used which yielded a power value of .73 which is close to high. The maximum sample for each cell is 64 which yielded a power value of .8 which is acceptable. These low power values

in using a Two-Way Analysis of Variance in the study are indicative of the need to use alternative analysis in determining the effect of action and academic control on self-regulation. In the same way low to medium effect sized were obtained given the means and variances of action and academic control in the study. This shows that categorizing action control and academic control is not a good way of reporting their effect on self regulation. Another related issue is the accuracy of splitting the sample into high and low levels using median split which does not yield large discrepancy among the dependent measures. This is evident where there are only few significant differences on self-regulation was found.

Another earlier study by Diefendorff, Hall, Lord, and Stream (2000) measured self-regulation using a thought occurrence questionnaire and few significant predictors were found for each subscale of action control. The study found that (1) the off-task factor of thought occurrence is the only significant predictor of disengagement, (2) escape another thought occurrence factor is the only significant predictor of initiative, and (3) nothing predicted persistence. These findings are similar with few significant results with the later study by Perry et al. (2001). There are very few significant findings when action control is linked with the components of self-regulation. In these two studies, self-regulation is decomposed and its factors are investigated separately with action control. Self-regulation in the current study will be treated as a latent construct so that the decomposition of its factors will not interfere with the influence of action control.

The other studies that prove the effect of action control on self-regulation are shown by Bargh, Gollwitzer, Lee-Chai, Barndollar, and Trötschel (2001), Brandstätter, Lengfelder, and Gollwitzer (2001), and Muraven, Baumesiter, and Tice (1999). The

experiment by Bargh, et al. (2001) showed that goals can be activated even outside of awareness and then operate nonconsciously. In another experiment by Brandstätter, et al. (2001) showed that implementation intentions lead to immediate action initiation once the specified situation is encountered, even under conditions of high cognitive load.

These findings explain that the intention to achieve a certain goal is seen as an immediate determinant of goal achievement. When strong intentions are formed, it affects success on behavior. These studies by Bargh et al. (2001) and Brandstätter, et al. (2001) explain that when strong intentions are formed, individuals automatically activate goal-directed behavior. This shows that intents can be an activating agent for self-regulation. Even in the context of exercising performance like in the study of Muraven, et al. (1999) the effects of control on self-regulation holds true. They experimented on the results of repeated exercises of self-control in relation to self-regulatory strength over time. A sample of 69 college students spent two weeks doing one of three self-control exercises: monitoring and improving posture, regulating mood, or monitoring and recording eating. Compared with a no-exercise control group, the participants who performed the self-control exercises showed significant improvement in self-regulatory capacity as measured by quitting faster on a hand-grip exercise task following a thought-suppression exercise.

In more recent studies, action control in activating self-regulation becomes more complex when joined by other factors such as negative affect. The study by Fujita, Trope, Liberman, and Levin-Sagi (2006) and by Hagger and Chatzisarantis (2005) demonstrates that level of controllability is interacted with affective states. The idea of interacting action control with affect is shown in the theory of planned behavior that explains

variations of controllability. The theory importantly notes that an individual's overtly stated intention to act is the most proximal predictor of behavior. Intention which is an action control factor strengthens self-regulatory behavior by including the effect of a higher order variable such as affect (Bagozzi, Lee, & Van Loo, 2001).

The experiment of Fujita, et al. (2006) explained self-control through self-construal. They tested the hypothesis that the activation of high-level construal (which capture global, superordinate, primary features of an event) leads to greater self-control in six experiments. The results support the hypothesis that high-level construal led to decreased preferences for immediate over delayed outcomes, greater physical endurance, stronger intentions to exert self-control, and less positive evaluations of temptations that undermine self-control.

The study by Hagger and Chatzisarantis (2005) showed how behavior control interacts with affective and instrumental attitude, injunctive and descriptive norms using the theory of planned behavior. They found that affective attitudes, instrumental attitudes, injunctive norms, descriptive norms, perceived controllability, and self-efficacy latent factors are predictors of the behavioral intention factor. Intention also predicted these factors. All the findings support the hypothesis of the study using structural equations modeling as the analysis.

### *Negative Affect*

Self-regulation is undermined when an individual adapts a defensive reaction to efforts to protect their self-image by withdrawing or avoiding opportunities to learn and perform (Zimmerman, 2002; Schunk, 2001). These defensive reactions come in the form of negative affects that impact self-regulation (Efklides, 2005). According to Pekrun,

Goetz, and Titz (2002), negative affect can profoundly affect students' thoughts, motivations, and actions although there are not many studies in the field of educational psychology investigating these factors. The studies that demonstrate the impact of negative affect varies on their outcome measures such as coherent and intuitive judgment (Baumann & Kuhl, 2002), beliefs and behaviors that include deep strategy use, preference for difficulty, action and self-efficacy (Turner, Thorpe, & Meyer, 1998). The outcome variables in these studies do not directly measure self-regulation. There is a need to demonstrate the effect of negative affect on self-regulation since the path of its effect is clear. Turner, Thorpe, and Meyer (1998) explained that negative affect occurs when academically challenged students feel making mistakes, the greater would be their efforts at creating illusions of ability by lessening effort and concentrating on less strategic tactics. The outcome of negative affect is explained as self-regulation like strategic thinking but in the actual study Turner, et al. used different sets of beliefs and behaviors. The experiment of Bauman and Kuhl (2002) showed that when negative mood is high, the action control is decreased. They explained this result through the PSI theory where negative affect impairs access to extension memory including its representation of the integrated self. Accessing the extension memory also requires self-regulation strategy although it is not directly explained. The role of affect on self-regulation is supported in the explanation of Frijda (1993) where emotions in the same way as information, they are stored in memory with declarative and procedural knowledge and used in appraising situations. When a negative emotion is used in appraising an event or situation, strategic thinking and other self-regulatory measures are impaired. Moreover, negative affect carries performance consequences that co-occur with a task where it interferes with the

current performance activity (Beal, Weiss, Barros, & MacDermid, 2005). This interference of activity is described as opposition to learning facilitation.

According to Smith and Kirby (2001), specific negative affect is identified through appraisal. These specific negative affects are characterized by ruminations. Examples of negative affects that are ruminative to thought processes are goal blockage, anger, worry, and anxiety (Berkowitz, 1989; Carver & Scheier, 1998; Kelly & Barsade, 2001; Martin & Tesser, 1996). Rumination of thoughts occur when (1) goals are halted, (2) emotion is unrelated to current performance episodes, and (3) when it is an additional cognitive demand that interferes with performance. Beal, Weiss, Barros, & MacDermid. (2005) acknowledged that affect plays an important role in the initiation and persistence of ruminative thoughts.

The negative affect factors used in the present study that ruminate self-regulatory thoughts are anxiety, worry, fear of negative evaluation, and thought suppression. According to Hopko, Hunt, and Armento (2005) these negative affect states are (1) physiological states (such as anxiety and worry), (2) negative cognitions (such as fear of negative evaluation), (3) escape from and/or avoidance of performance-related situations (such as thought suppression), and (4) when an individual cannot avoid or escape the situation, they serve as performance deficits. These dimensions by Hopko, Hunt, and Armento (2005) provides a clear basis on the selection of specific negative affect states for the present study. These factors are good combinations in composing a negative affect measure since they have consistent and robust negative impact on performance and thought processes in different studies (Cassady & Johnson, 2002; Harris & Cumming, 2003; Powers, 2001; Seipp, 1991; Smith & Smith, 2002). Because of the consistent

findings, Eysenck and Calvo (1992) in their processing efficiency theory primarily accentuate state and trait anxiety as the central variables that negatively impact performance. Although in the present study, the performance refers to thought process in the form of self-regulation and not outcome performance such as test results.

Anxiety and worry are two separate constructs but they are related as evidenced in various studies (Davey, Hampton, Farrell, & Davidson, 1992; Davey, 1993; Gana, Martin, & Canouet, 2001). Worry is defined as a stream of negative thoughts (Kelly & Miller, 1999) while anxiety tends to include somatic tension, fear, and a subjective sense of unease (Barlow, 2002). The study of Kelly (2004) looked into the resemblance and difference of worry and anxiety and found that worry can be measured as a factor of anxiety. When anxiety was extracted with factors they did not strongly predict worry which indicates that the two constructs measure different things. Thought suppression is defined by Wegner and Zanakos (1994) as efforts to avoid unwanted thoughts and ideas. This construct is usually a characteristic of obsessive compulsive symptoms where unwanted thoughts keep on intruding and effort is suppressed. The study of McKay and Greisberg (2002) shows that thought suppression is related with worry and anxiety. Fear of negative evaluation is characterized by persisting self-devaluations and fear that others will scrutinize a person's actions in social or performance situations (Leichsenring, Beutel, & Leibing, 2007). Fear of negative evaluation is also marked by the fear of possible scrutiny by others (Geangu & Reid, 2006). Fear of negative evaluation is termed in some studies as social anxiety or social phobia (Spence, Rapee, McDonald, & Ingram, 2001).



*Learning Anxiety.* Anxiety is a common variable of study in the field of clinical, counseling, personality and social psychology. In educational psychology, anxiety studies are mostly in the context of testing. Anxiety is described as a negative activating experience. Learning anxiety is treated in the current study as domain specific to learning and there are two studies that support this claim. Marsh (1988) investigated experiences of anxiety during instruction and found a disattenuated correlation of  $r_d = .04$  between anxiety in mathematics and English lessons. Marsh and Yeung (1996) examined anxiety in four academic domains (mathematics, sciences, social studies, and English) by analyzing data from the National Educational Longitudinal Survey of 1988 among eighth graders. Using confirmatory factor analyses, they showed that academic anxiety in school-aged children is organized in a domain-specific way. They found very weak inter-correlations between domain-specific anxiety ratings, with the strongest relationships found between anxiety in conceptually similar academic domains (e.g., mathematics and science). Moreover, anxiety showed a greater degree of domain specificity than academic achievement in these domains (with grades as well as standardized test scores). Gottfried (1982) investigated anxiety among 141 fourth and seventh graders in four academic domains (reading, mathematics, social studies, and sciences). Significant negative correlations were found between anxiety and intrinsic motivation within domains (e.g., intrinsic motivation and anxiety involving mathematics) but not between domains (e.g., intrinsic motivation in mathematics and anxiety related to reading).

In a meta-analysis of 51 studies by Hembree (1990) using the Mathematics Anxiety Rating Scale (MARS), a mean correlation of  $r = -.06$  between mathematics anxiety and verbal performance is reported, as well as a correlation coefficient of  $r = -.34$

between the MARS scores and mathematical performance. This finding points to the domain specificity of anxiety based on the premise that, if anxiety were organized in a domain-transcending manner, then higher MARS scores would predict more anxiety in verbal domains, which would translate into significantly poorer verbal performance than evidenced by Hembree's nonsignificant correlation. Goetz, Frenzel, Pekrun, and Hall (2006) used confirmatory multitrait-multimethod factor analysis of the two-faceted dataset (emotions and domains) corroborated assumptions of domain specificity for learning anxiety. Furthermore, using multilevel analysis, the authors found that emotions were significantly more domain-specific than students' grades, with enjoyment being the most domain-specific of the three other emotions under investigation (anxiety, boredom, and anger).

*Worry.* Individuals who worry engage in thoughts characterized by predominantly negative cognitions of the self and personal problems (Wells & Matthews, 1996). Furthermore, Cartwright and Wells (1997) described that worrying is a syndrome of self-focused attention, negative self-appraisal, ruminative coping, and impairment of attention to the external world. Sarason, Sarason, & Pierce (1995) explained that in states of worry, self-referent processing functions withdraw attentional resources from other mental activities leading to performance decrements on attentionally demanding tasks. There is cognitive interference when an individual experiences worry. Individuals worrying become intolerant to uncertainty. This means that worrying makes a person unable to make decisions necessary for adaptive functions. This was demonstrated in the study of de Bruin, Rassin, and Muris (2006) where they found significant relationship between the Intolerance of Uncertainty Scale and state worry in a situation that elicits low to medium

levels of uncertainty. They concluded that only under certain conditions intolerance uncertainty-related personality characteristics seem to be predictive of worrisome thoughts. Malpass, O'Neil, and Hocevar (1999) came up with a model showing the effects of gender, self-efficacy, learning goal orientation, self-regulation, and worry on high-stakes mathematics achievement in a sample of mathematically gifted, primarily Asian American, high school students. They found that worry negatively correlated with self-efficacy, learning goal, and self-regulation. This supports other research showing that high worry is associated with low cognitive performance (Hembree, 1990; Pajares & Urdan, 1996; Seipp, 1991). Seipp (1991) recommended that studies predicting academic achievement would be better served by using only the worry component.

*Thought Suppression.* Thought suppression is triggered by various conditions including attempts of: (1) avoiding negative emotions, (2) controlling unwanted behaviors, (3) not revealing certain secrets or unwanted thoughts, (4) preventing thoughts that result in decreased performance, and (5) blocking mental contents that are unacceptable in themselves (Wegner, 1994). In the process of thought suppression, individuals become hypersensitive to the unwanted thoughts that lead to disruption of self-regulation. Purdon (1999) suggested that the suppression of thoughts increase in frequency due to: (1) the hyperaccessibility of other negative thoughts used as distracters; (2) the limited mental resources of the subjects; (3) the fact that deliberate attempts of altering an emotional state lead to a heightened importance of cues suggesting that the desired state has not been reached, so that efforts to block a negative state by replacing it with a positive one will prove counterproductive. Oaten and Cheng (2005) studied how self-regulation is depleted in relation to thought suppression. They found that when

individuals are exposed to a stressful exam, impaired performance happens and self-regulation decreases because thought suppression is adapted.

*Fear of Negative Evaluation.* According to Clark's model, fear of negative evaluation in adults is experienced when the individual seems to acquire a set of dysfunctional assumptions about the significance of social situations (Clark & Wells, 1995; Clark, 2001). These social situations are having (1) excessively high personal standards for social performance, (2) conditional beliefs concerning the consequences of performing in a certain way, and (3) unconditional negative beliefs about the self. The approach of a relevant social situation activates these assumptions. This leads to a perceived social danger, the prediction of personal failure and to the fallacious interpretation of benign or ambiguous social stimuli as signs of negative evaluation by others. This leads to increased levels of anxiety and the processing of the self as a social object involving both reduced processing of social cues and negatively biased processing of the external social situation. Some manifestations include internal sensation with negative observation by others, the presence of safety behaviors such as generally avoiding social situations and avoiding eye contact prevents the disconfirmation of these distortions, maintaining and strengthening them over time. The study of Schwartz, Snidman, and Kagan (1999) showed that temperamental characteristics such as behavioral inhibition or shyness are highly predictive of later social anxieties. They found that 61% of children categorized as highly inhibited at the age of two manifest fear of negative evaluation. Issues associating with how fear of negative evaluation affects self-regulatory processes are not yet been addressed and more research is needed. The fear of negative evaluation by others leads to distorted cognitive processing of the information.

The closest study that demonstrates this idea is the study of Horley, Williams, Gonsalvez, and Gordon (2004) where individuals with social phobia displayed hyperscanning of emotional expressions, such that they scanned the face more than control subjects but, relative to controls, they avoided foveal fixations on the eyes.

When individuals with fear of negative evaluation enter an anxiety-provoking social situation, their attention is focused on the perceived danger of failing to act appropriately and competently. The heightened social anxiety experienced in social situations is not simply a result of distorted self-perception but it is also due, in part, to the presence of distorted other-perception—the extent to which the individual believes that everyone will be (or is) watching, judging and rejecting (Beck, Emery, & Greenberg, 1985; Wells, 1997). Fear of negative evaluation is considered as a negative affect since socially anxious individuals tend to interpret social information in negative ways (Ledley & Heimberg, 2006).

*The Nature of an Activation System for Self-regulation*

The activation of self-regulation is shown in the components of action control and self-determination. Not only do these factors have shown evidence to affect self-regulation in experiments and longitudinal studies (e. g. Bargh et al., 2001; Brandstatter et al., 2001; Fujita, Trope, Liberman, & Levin-Sagi, 2006; Muraven & Baumeister, 1999), individuals possessing these characteristics when controlled engage well in terms of strategic thinking and effective monitoring to attain goals. Since action control and self-determination are good resources that lead to self-regulation, they can be considered as components of an activation system for self-regulation. In previous studies and even in available theories such as self-determination theory and value expectancy theory, control

and self-determination are often intended to produce better performance (Deci & Ryan, 1985). But these theories are bypassing certain social cognitive factors like self-regulation before the process leads to performance. Self-regulatory behaviors should come before performance because it explains much how effective performance can be achieved. The activation system is defined in the study as characteristics that make an individual engage to effectively self-regulate given a task. Such characteristics are in the form of action control and self-determination. This system is explained in the theory of planned behavior where an individual's overtly stated intention to act is the most proximal predictor of behavior. However, this activation system with components of control such as disengagement, persistence, and initiative are triggered when the individual experiences a situation needing self-regulation. These experiences include feelings of negative affect where the person needs to eliminate or diminish them. Self-regulation process is activated to diminish and eliminate situations where negative affect is experienced. Given this situation, the mechanism on how an activation system operates can be described as nonconscious occurrence of control that automatically leads to self-regulation (Bargh, et al., 2001).

*Activating Self-regulation when Negative Affect is Present*

It is hypothesized in the study that individuals are able to activate their self-regulation when negative affect is experienced. For example, when an individual is placed in an anxiety provoking mathematical problem, he/she may think of ways to diminish the anxiety by initiating strategies to solve the difficult mathematical problems. This hypothesis provides a general situation on how negative affect can lead to self-regulation. In this scenario, action–control and action–outcome expectancies are used to

appraise the overall controllability and probability of self-regulation when faced with a situation where control is needed (Pekrun, 2006).

The hypothesis that negative affect leads to self-regulation is explained by Gendolla and Brinkmann (2005) in the mood-and-information-integration perspective. In this model, they explain that:

the directive affect impact influences behavioral preferences, the informational emotion impact affects the execution of instrumental behavior. It explains and predicts how affect states influence resource mobilization for goal attainment, which is a central aspect of self-regulation. Specifically, the MBM posits that the informational mood impact influences the intensity and persistence of behavior, because people can use their mood states as information for behavior-related judgments and appraisals (p. 188).

The model by Gendolla and Brinkmann explains that individuals are able to direct their behavior and evaluate their judgment when they are able to use their affect regardless whether negative or positive to integrate with other information to reach self-regulation. Specifically negative affect can lead to self-regulation when the context calls for it or when people are confronted with a challenge and try to evaluate the level of demand in order to adjust the mobilization of resources.

Overskeid (2000) proposed an alternative explanation about the role of negative affect on self-regulation. He argues that problem solving is motivated by feelings. He proposed that a person will experience a problem and engage in problem solving only if the person is in a state that feels aversive or if a mentally represented state becomes a goal by eliciting feelings more pleasurable than those that currently dominate. This

scenario is consistent with mood-and-information integration perspective by Gendolla and Brinkmann (2005). The only difference is that Overskeid (2000) uses motivation as an explanation where negative affect produces self-regulation.

It is necessary to look into the nature of negative affect that makes it propel self-regulation. Despite the large number of studies showing that negative affect has bad consequences on performance, the mood behavior model explains negative affect arousing achievement related behavior. Gendolla (2000) explains that specific emotions have stable motivational implications (e.g., anger and destruction of the anger-eliciting object or fear and escape from the fear-eliciting object). Furthermore he explains that emotions “prepare the body for action, which becomes evident in adjustments of the autonomic nervous system, and they urge the organism to behave in specific ways toward emotion-eliciting events. Furthermore, emotions have been conceptualized as processes rather than states. Accordingly, they arise over time and pass different steps or stages of (conscious or unconscious) information processing and evaluations of incidents that, in turn, result in different emotional reactions to them” (p. 387). When emotions are viewed as processes the individual can use it as resources to respond actively to situation. In responding to situations effectively individuals in turn use their self-regulation strategies.

#### *Interaction of SRL Activation Factors with Negative Affect*

It is hypothesized in the study that individuals who possess high levels of self-determination, initiative, disengagement, and perseverance are still able to self-regulate even when they experience negative affect. A different outcome on the effect of negative affect on self-regulation occurs if the activation system is low. The interaction of the activation factors with negative affect has a different effect on self-regulation depending



on their levels of activation. In Pekrun's control-value theory, negative affect such as anxiety is viewed as a prospective outcome emotion that when controlled, success is attained and failure is avoided (which is demonstrated in the previous hypothesis). The theory is limited in explaining the concurrent action of negative emotion with activation factors. Concurrent action between SRL activation and negative affect means that possessing high levels of self-determination, initiative, disengagement, and persistence (high SRL activation) with low levels of negative affect and even high levels of negative affect still increases self-regulation. On the other hand, individuals with low levels of self-determination, initiative, disengagement, and persistence (low SRL activation) with low and high levels of negative affect will lead to deregulation of strategies. The role of individual differences can largely account for the effect of negative affect whether it leads to negative consequences or goal-directed behavior. The present study will vary individuals' action control and self-determination into high and low levels to see whether the function of negative affect on self-regulation will change.

The study by Koole and Jostman (2004) confirmed that action- versus state-oriented individuals have strikingly different mood dynamics under varying levels of demand. In response to performance-contingent rewards, action-oriented participants displayed significant down-regulation of tense mood. This down-regulation was not so much apparent immediately after the reward induction but rather when moods were assessed 10 min afterward. No similar drops in tension were found among action-oriented participants in response to noncontingent rewards. This pattern supports PSI theory, which argues that the intuitive affect regulation strategies of action-oriented individuals are characterized by efficient down-regulation of negative affect, which grows stronger

over time. In the second study, they confirmed that action orientation, in conjunction with reward type, was a strong moderator of affective Simon effects (participants were to decide as quickly as possible whether the words were adjectives or nouns) to negative target words. In the noncontingent reward condition, the response latencies of both action- and state-oriented individuals displayed a Simon effect for negative target words. Thus, both action- and state-oriented participants showed evidence of unintentional, efficient, and fast activation of negative affect in the absence of external stressors. However, this pattern was dramatically different in the contingent reward condition. In response to performance-contingent rewards, the response latencies of state-oriented participants still displayed a Simon effect for negative target words. The response latencies of action-oriented participants, however, showed a nonsignificant reversal of the affective Simon effect: In response to performance-contingent rewards, action-oriented participants were nonsignificantly quicker in saying “positive” than in saying “negative” to negative target words.

### Conceptual Framework

The present study is concerned with how activation and inhibition systems interplay to generate self-regulation. The three models show alternative ways on how activation and inhibition increase self-regulation. These three models were tested showing the effects of activation factors (disengagement, initiative, persistence, and self-determination) and a set of negative affect (learning anxiety, worry, fear of negative evaluation, and thought suppression) on self-regulation. The three models are tested in the study to determine the best structure for explaining how self-regulation is generated. In the models, the concept of activation was drawn from the action control theory (Kuhl,

186). The set of negative affect were explained as deactivating states from Pekrun's (2006) control value theory. These theories were taken together to build a model in explaining how to best generate self-regulation.

The action control theory specifies the psychological mechanisms regulating the enactment and protection of an intention in the face of competing alternatives, debilitating thoughts, and a surfeit of unwanted emotions. The theory also describes individual differences in self-regulation that classifies people as action or state oriented on the basis of their ability to disengage alternative goals, initiate required actions, and to stay focused until the task is complete. Action control theory is concerned with characteristic differences in the enactment and maintenance of goals and the ability to protect activated goals from competing action tendencies through information-processing mechanisms such as allocation of attention, inhibition of extraneous cognitions, and emotion control mechanisms (Kuhl, 1986; 1994).

In the present study, only the factors of action orientation in the action control theory is included in the activation system (disengagement, initiative, and persistence). As explained in the literature review, disengagement refers to the ability to detach from thoughts about alternative goals or undesirable events that may interfere with progress on the task at hand. Initiative is the ability to easily initiate or start a work or task where the individual is able to move forward with a task and escape from state oriented processing. Persistence is shown by individuals who are able to effectively maintain focus on an intention until the task is complete. The action control theory only emphasized the roles of disengagement, initiative, and persistence and it does not include a component of negative affect in explaining the generation of self-regulation. On the other hand, the

value expectancy theory on emotions only considered the negative affect as an outcome and consequence of performance without regard for control. The control value theory states that the expectation to succeed on a task results to an affective state. In turn one's affective state can also affect one's expectation of success on a task (Pekrun, 2006). This theory explains that when a negative affect is experienced, then expectation of success on task becomes low. The three models tested in the present study showing the interplay of activation and inhibition provides a framework for explaining self-regulation with both social-cognitive and emotive factors.

In the first model, both the effects of the activation and negative affect on self-regulation are tested (see Figure 1). This model is tested to see the effect of activation system and inhibition system as separate latent factors. The theory of action control (Kuhl, 1994) and self-determination (Deci & Ryan, 1985) are separately explained in literature, although both have evidence of effects on performance and related to other thought processes such as self-regulation. The action control theory explains a consistent link between academic control and college success indicating that students with more control do better. The role of self-determination in the model coexists with action control. Self-determination theory explains that self-determination gives a person autonomous motivation involving a sense of volition and having the experience of choice (Gagne & Deci, 2005). Self-determination theory poses that individuals who have autonomous and controlled motivation are able to foster growth behaviors such as seeking out challenges, exercising skills, and pursuing one's interest (Deci & Ryan, 1985). Self-determination is a natural motivational force in all people that arises spontaneously out of the needs for competence. The effect of the activation system is differentiated with the inhibitory

system because the latter is composed of a set of negative affect that is proposed to deactivate and/or decrease self-regulation if action control and self-determination is weak. The factors involved in negative affect plays a distinct role on its consequences to self-regulation. For example, anxiety makes an individual vulnerable and unable to make a decision (Goetz, Frenzel, Pekrun, & Hall, 2006), worry interferes in cognitive processes (Wells & Matthew, 1995), thought suppression depletes negative resources, and fear of negative evaluation ruminate thoughts (Clark & Wells, 1995). However these are the general explanations for negative affect states. The present study puts negative affect in context as it interplays with the individual controllability of the situation. Aside from the first model, two other models are investigated where negative affect serves to initiate activation of self-regulation (second model) and the high levels of activation can still lead a person to self-regulate even when negative affect is present (third model).

The second model predicts that when individuals experience negative affect, self-regulation is activated (see Figure 2). It is activated for the purpose of diminishing the negative feelings. This is also explained in the action control theory where the psychological mechanisms regulates the enactment and protection of an intention in the face of competing alternatives, debilitating thought, and intrusion of unwanted emotions (Goschke & Kuhl, 1993). This hypothesis is demonstrated in research on test anxiety showing that high-anxious students worry about how well they are doing and regulate their behavior for future performance (Wigfield & Eccles, 1989). Baumann and Kuhl (2002) also showed this phenomenon in their experiment where participants down-regulated their negative affect because of the activation of action-oriented factors. This was shown by the significantly higher performance of action-oriented participants on a

series of tasks even when negative affect is induced. Situations where negative affect is experienced activates self-regulation because the experience of negative affect involves an appraisal where the feeling is assessed whether it is good or bad and the possible coping potential to be used.

The third model in the present study accounts for the individual differences in activating self-regulation where action control and self-determination are varied in high and low levels. The third model explains that individuals possessing high characteristics of the components of the activation system (disengagement, initiative, persistence, and self-determination) are still able to self-regulate even when they experience negative affect. On the other hand, individuals with low activation system when influenced with negative affect will not have enough resources to lead to self-regulation (see Figure 3). This can be shown in a situation where students instead of giving full concentration to the task, they divide their attention between the task and thoughts about evaluation and negative personal characteristics. As a result, anxiety influences memory and test performance in these students. On the other hand, students still show self-regulation because they possess high levels of self-determination and action control. This is explained by Clifford (1991) that students who are focused on the task rather than on themselves will not fear failure. Because these students are concerned about learning, they will select optimally difficult tasks that do not guarantee success at first attempt. When difficulties occur, these students are likely to reason that they used less than optimal strategies and reexamine their tactics. The control value theory of academic emotions (Pekrun, 2006) explains that control-related appraisals include self-directed beliefs underlying the subjective controllability of learning and its outcomes. This means

that when the appraisal is positive, more control is attained and better performance is achieved as compared when the appraisal is faulty. This comparison shows that negative affect states are moderated by volitional process to self-regulate behavior. The rise and fall of self-determination and action control support and interfere with their self-regulatory behavior. The third model provides explanation on the performance of students as individual differences. Turner, Thorpe, and Meyer's (1998) theory only show that students produce negative affect because of prior failure on difficult tasks and some students see this task as a challenge and thus not affected by negative affect. The model further extends this theory because high and low levels of action control and self-determination produce variation on the effects of negative affect in producing self-regulation.

Figure 1

*Effects of Activation System and Negative Affect on Self-regulation (Model 1)*

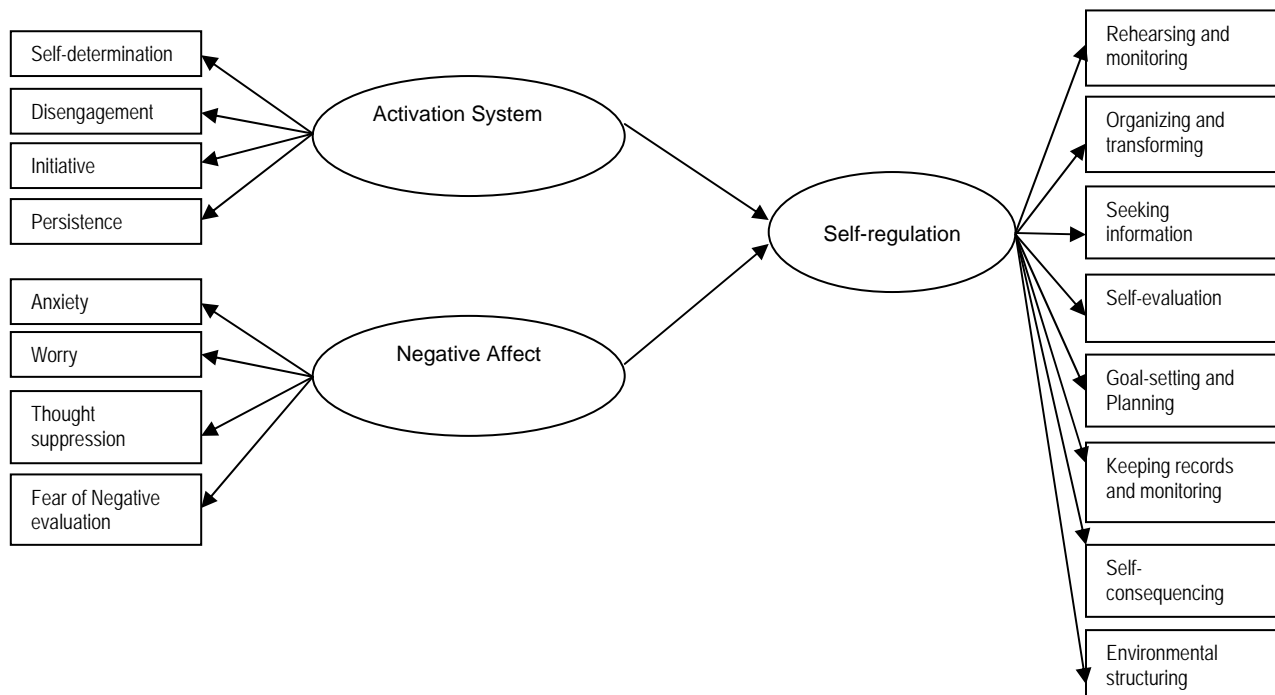


Figure 2

*Activation System Mediates the Effect of Negative Affect on Self-regulation (Model 2)*

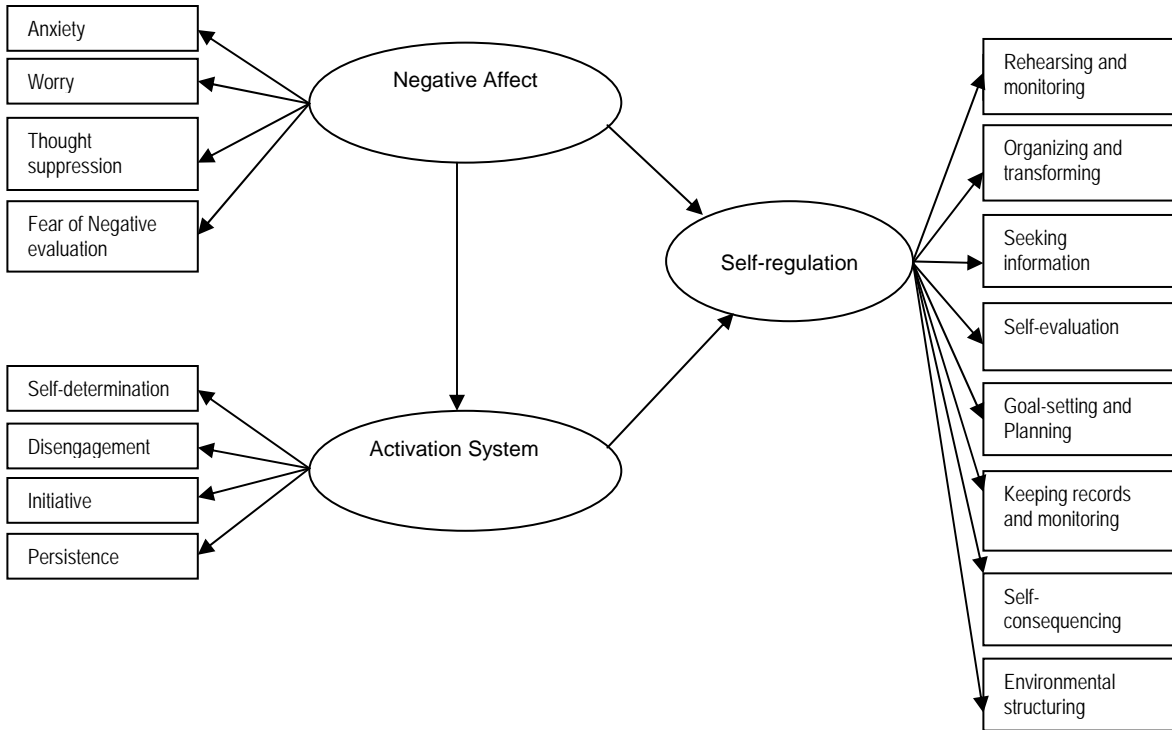
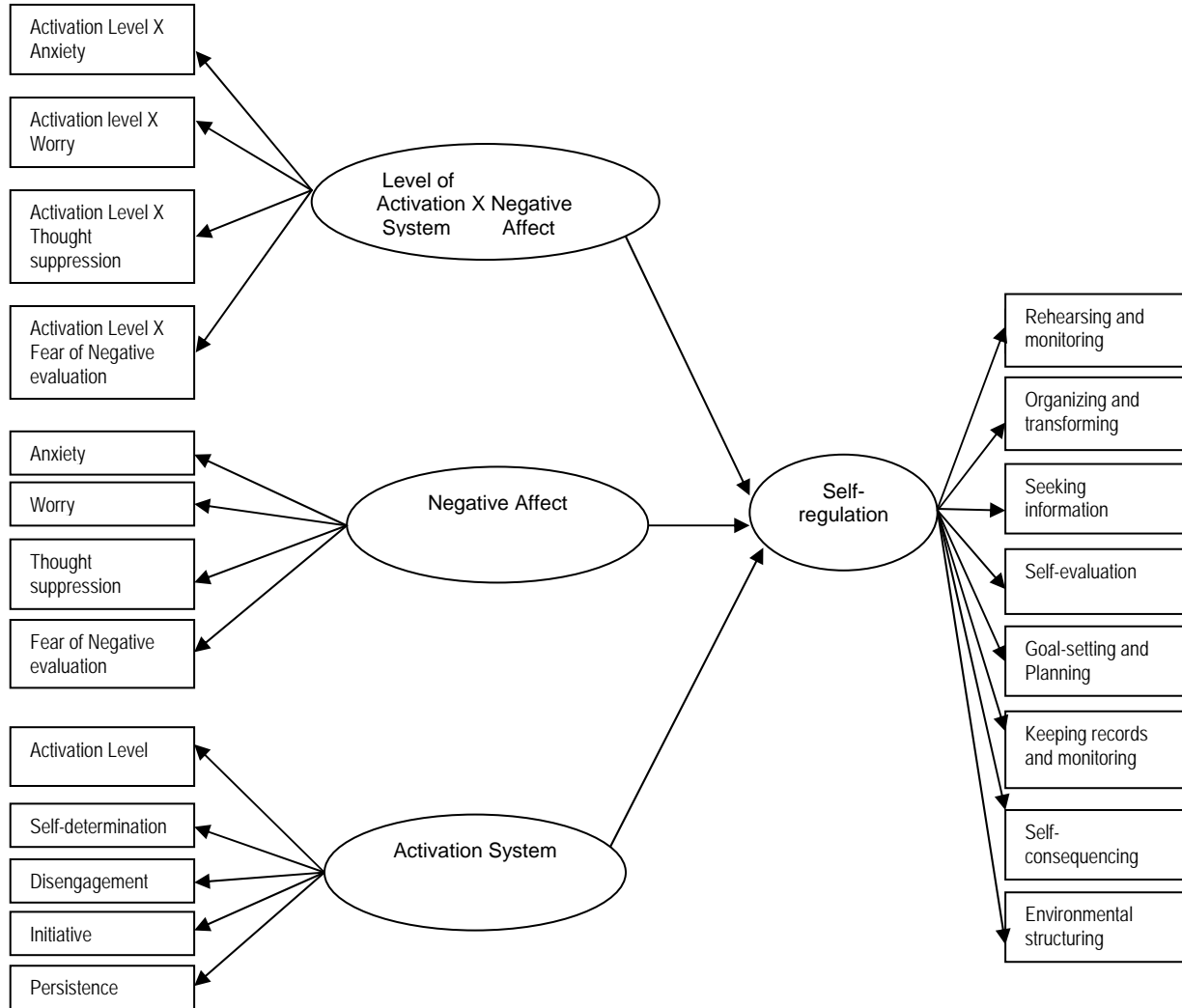




Figure 3

*Activation System Moderates the Effect of Negative affect on Self-regulation (Model 3)*



*Note.* X=interaction of two variables, Activation level=high and low activation

### Statement of the Problem

The present study aims to determine the effects of activation and inhibition (negative affect) systems on self-regulation among Filipino college students. In determining the activation and inhibition factors of self-regulation, three models were tested and compared to determine which one best generates the use of self-regulation in learning. The specific research questions are:

1. What is the level of Filipino college students' self-regulation, activation, and negative affect factors?
2. Are there significant relationships among the factors of activation, negative affect, and self-regulation?
3. Are the factors of activation, negative affect, and self-regulation measuring independent constructs?
4. Which model has the best fit in explaining the generation of self-regulated learning?
  - 4.1 Is the effect of the activation factors different with the effect of the inhibition factors on self-regulation (Model 1)?
  - 4.2. Can self-regulation be activated when negative affect is present (Model2)?
  - 4.3. Under what activation level will self-regulation increase even when affected by negative affect (Model 3)?

## Chapter 2

### Method

#### *Research Design*

The study made use of a two time wave design to infer the causality between activation and inhibition on self-regulation. A time wave design is conducted where one or more groups of participants are studied at several points in time (Trochim & Donnelly, 2006; Trochim & Land, 1982). This design takes place over time where there are at least two (and often more) waves of measurement (Cook & Campbell, 1979). Data are collected for each variable at each time. Data are compared among participants at each point in time to assess both inter-individual changes. The two primary purposes of the design are 1) to describe patterns of change, and 2) to describe the direction and magnitude of causal relationships between variables (Menard, 1991). Patterns of change can be represented numerically, graphically, or mathematically. Explanation of change requires the introduction of other variables into the theoretical or statistical model. Causal relationships may be inferred if the independent and dependent variables co-vary, and the relationships cannot be attributed to another independent variable. The time gap in administering the measures for the independent variable can vary from 2-4 weeks, 6-8 weeks, and 10-12 to allow an in-depth analysis (Menard, 1991).

In the present study, the time wave design is executed by administering first the measures for the activation system (Action Control Scale and the Perceived Self-determination) and inhibition system (Learning Anxiety subscale of the Academic Emotion Questionnaire, Fear of Negative Evaluation, Penn State Worry Questionnaire, and White Bear Suppression Inventory) and self-regulation in another period of time to

describe the direction of the causal relationship among them (Anderson & Gerbing, 1988; Bentler & Chou, 1987). The gap between the two time frames of administration is two weeks which is sufficient (Menard, 1991).

### *Participants*

The participants in the study were 1454 college students ages 16 to 21 from different courses who are studying in different colleges and universities in the National Capital Region (NCR). The participants are college students from De La Salle University-Manila, De La Salle-College of Saint Benilde, Philippine Normal University, University of Sto. Tomas, Rizal Technological University, Dominican College, and Perpetual Help College-Las Pinas. Among the participants, 57.96% are females and 42.04% are males, 19.3% has been in the dean's list and 80.7% has not been in the dean's list, 22.94% has experienced failing a course in college and 77.06% has never failed a course, 24.04% are not living with both parents and 75.96% are living with both parents, 8.59% are under a scholarship while 91.04% are not, majority of them are in their first year of college (31.04%), 93.2% are single, and a large percentage (27.67%) are taking nursing courses while other courses have high variability.

College students were preferred because the measures are relevant for them and the activities they engage in their school and studying. The situations in the measures refer to activities in college such as the course activities, school involvement, group works, and class projects and assignments. The sampling technique employed was purposive where the selection criteria to be included in the sample includes: (1) Currently enrolled and studying in any college in NCR, (2) taking up more than 9 units of courses, (3) having experienced taking exams and exposed to a variety of learning methods such

as group work, reporting etc. in school, (4) upper classmen who are in their third year and fourth year in college (upper classmen are said to be more expert in the use of cognitive strategies), and (5) did not experience failing and dropping a course in the duration of studying in college.

In the sampling, 2000 participants were given the survey questionnaire who qualified to be included in the selection criteria. The number of participants was reduced because some were not able to complete the questionnaire during the second wave of assessment. The participants who did not answer the specific self-regulation method that they use in the questionnaire were also excluded. Those who missed to answer several items on a subscale in the measures were also excluded. The residuals were obtained for each participant and those with residuals greater than 7.0 was excluded in the analysis because their scores are very far from the regression line. A total of 1454 participants were left for analysis which is 72.7% of the original sample.

### *Instruments*

There were seven instruments used in the study: The Self-Regulated Learning Interview Schedule (SRLIS) was used to measure self-regulation. To measure SRL Activation, the Action Control Scale (ACS) and the Perceived Self-determination (PSD) were used. To measure SRL Inhibition (Negative Affect), the learning anxiety subscale of the Academic Emotion Questionnaire (AEQ), Fear of Negative Evaluation (FNE), Penn State Worry Questionnaire (PSWQ), and the White Bear Suppression Inventory (WBSI) were used. All the items in the scales refer to students in their study such as doing assignments and project, studying for a test, group work, class presentation, and

answering a test. These academic situations are reflected in the scales through the instruction.

*Self-Regulated Learning Interview Schedule (SRLIS)*. The SRLIS instrument was constructed by Zimmerman and Martinez-Pons (1986) with eight open-ended questions and scales. Each participant would rate the questions in terms of how frequent they use the strategy (see Appendix A). The measure is composed of eight self-regulation strategies that include rehearsing and memorizing, organizing and transforming, seeking information, self-evaluation, goal-setting and planning, keeping records and monitoring, self-consequencing, and environmental structuring. Six different learning contexts were described to each student: in classroom situations, when studying at home, when completing writing assignments, when completing mathematics assignments, when preparing for and taking tests, and when poorly motivated to complete homework.

In answering the SRLIS, the participant is tasked to report the self-regulation method they use in each situation in an open ended question. If the student failed to give an answer, a probe is given about any particular method use if they are having difficulty in the situation encountered. If the student failed to suggest any self-regulating learning strategies, questioning was discontinued for that learning context. After responding, the participant rated how frequent is method used. If the student mentioned one or more strategies, they are instructed to rate the consistency with which each strategy was used according to the presented 4-point scale with categories ranging from seldom (1) to most of the time (4). The responses on the strategy given by the participants for each questions were coded under the specific self-regulation that they belong.

In the studies of Zimmerman, the measure has gone construct validation specifically convergent validity of the RSSRL scale and standardized measures of students' achievement. Principal-components analysis was performed followed by an oblique factor rotation. The correlation between rotated Factors I and II was .57; between rotated Factors I and III, it was .43; and between rotated Factors II and III, it was .36. Initial research on various scoring systems for the SRLIS indicated that a consistency-weighted score for each reported strategy was optimally predictive of students' achievement. Those results were reported along with definitions and examples of each of the 14 strategies by Zimmerman and Martinez-Pons (1986).

*Action Control Scale (ACS).* The ACS (German version is the HAKEMP) is a forced-choice self-report measure developed by Kuhl (1985) to assess differences in action–state orientation. In the present study, only the action orientation subscale is used. The items on the scale depict brief scenarios that occur in everyday life and require selection of one of two options that indicate what the participant would do. Since its original development, the ACS has gone through three revisions, the most recent version being the ACS-90. The ACS-90 consists of 36 items, divided equally into three subscales measuring disengagement (“I can soon put the idea of failing out of my mind”), initiative (“I look for a way that the problem can be approached in a suitable manner”), and persistence (“I usually get so involved in what I’m doing that I never think to ask whether it’s worthwhile”) (Kuhl & Beckmann, 1994). The 36 items reflect each a bipolarity of the two factors and organized into 12-items (see Appendix B). Preoccupation, hesitation and volatility represent a state orientation, characterized by an intense focus on past, present, and future outcomes associated with failure, coupled with intrusive rumination. While the

disengagement, initiative and persistence depicts an action orientation, represented by goal monitoring and enactment and significantly less focus on failure outcomes.

Confirmatory factor analysis provided evidence of three scales with excellent fitness indices. The internal consistency of the items are high (Cronbach's  $\alpha = .71$ ).

*Perceived Self-determination (PSD)*. The PSD developed by Reeve, Nix and Ham (2003) measure the qualities of perceived self-determination: perceived locus of causality, volition, and perceived choice. An example of an item is “I feel I am doing what I wanted to be doing.” The instrument is unidimensional where one global score of self-determination is obtained. According to Judd, Jessor, and Donovan (1986), using only a few items per scale maximizes the chance for unidimensional measurement and minimizes the chance that multiple constructs will emerge. It is composed of nine items (see Appendix C). For each item a 1-4 response scale was used (not at all true to very much true). In creating the items, the authors used only the precise term or experience that they reviewed in the introduction used in their writings about self-determination. The internal consistency of the scale is high ( $\alpha = .81$ ).

*Academic Emotion Questionnaire (AEQ)*. The anxiety subscale of the AEQ developed by Pekrun, Goetz, and Perry (2005) was used in the study. The anxiety scale is composed of six-items used to assess college students' anxiety about their academic performance in the course. An example of an item is “I get so nervous that I don't even want to begin to study.” Students responded to each item using a four-category Likert scale (1 = not at all true, 4 = completely true; Cronbach's  $\alpha = .81$ ). A five-month test-retest reliability estimate based on a separate sample revealed acceptable stability over time,  $r(632) = .61, p < .01$ .



*Fear of Negative Evaluation (FNE)*. The FNE by Watson & Friend (1969) in its full version is originally composed of 30 items designed to measure the fear of receiving negative evaluation from others (see Appendix E). Scores on the FNE essentially reflect a fear of loss of social approval. The items measure ineffective social behavior that would incur disapproval of others. An example of an item is “I am afraid that people will not approve of me.” The short version of the FNE by Leary (1983) is used with 12 items responded in a four-point scale (1=not at all characteristic of me, 2=slight characteristic of me, 3=very characteristic of me, 4=extreme characteristic of me). The average item total score correlation is .72. Internal consistency is .94 for a sample of 205 college students and .96 for a separate sample of 154 respondents. It remained stable with a test-retest correlation of .78 over a month period and .94 from a separate sample of 29 respondents. A known-group validity was demonstrated by comparing a sample of subjects who scored in the upper 25 percentile of the FNE with respondents from the lower 25 percentile. The high FNE group sought more approval from others and avoided disapproval. The short version was correlated with the full version of the FNE and the correlation was .96. Criterion-related validity was shown with the scores of FNE correlated with anxiety, avoidance, and the degree to which respondents were bothered by an unfavorable evaluation from others.

*Penn State Worry Questionnaire (PSWQ)*. The PSWQ by Meyer, Miller, Metzger, and Borkovec (1990) is a 16-item instrument designed to measure trait worry (see Appendix F). An example of an item is “When there is nothing more I can do about a concern, O worry about it more.” The PSWQ measures worry as a construct independent of anxiety and depression. The norm reported a mean of 48.8, SD=13.8 (Females=51.2,

Males=46.1). Higher scores suggest a stronger worry. The internal consistency of the items is high with an alpha of .93. With a one-month test-retest correlation on a separate sample of 73 undergraduate students, a coefficient of .93 is obtained. The PSWQ has been shown to correlate in predicted directions with other emotional disturbances questionnaires such as self-esteem, perfectionism, and environmental stress. The PSWQ does not appear to be affected by social desirability resources.

*White Bear Suppression Inventory (WBSI)*. The WBSI by Wegner and Zanakos (1994) is a 15 item questionnaire designed to measure thought suppression (see Appendix G). It identifies whether individuals exposed to emotion producing thoughts will fail to habituate them overtime. An example of an item is “I have thoughts that I cannot stop.” The norm indicates a mean score of 45.8 among university men and 47.6 among university women. The items are answered in a Likert scale (4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree). The internal consistency is high with alphas ranging from .87 to .89. Test-retest correlation of .92 with one week interval was obtained. The WBSI has excellent convergent validity with significant correlations with the Beck Depression Inventory, Maudsley Obsessive Compulsive Inventory, Sensitization Subscale of the Repression-Sensitization scale, State-Trait Anxiety Inventory, and Anxiety Sensitivity Inventory.

### *Procedure*

Students from selected colleges and universities in the NCR were requested to answer a series of questionnaires. In the actual administration, informed consent was obtained from the college respondents. Those who were willing to participate in the study were also given the set of questionnaires to be answered. The respondents were

monitored while answering the questionnaires in case questions would arise. The set of questionnaires were given to the students' professors who administered it in class. The administration of the scales took one hour to complete. After completing the answers for all the questionnaires, the students were thanked and debriefed about the purpose of the study.

The administration of the two sets of instruments took place on two different time frames. In the first wave, the action control scale, self-determination scale, learning anxiety subscale of the Academic Emotion Questionnaire, Fear of Negative Evaluation, Penn State Worry Questionnaire, and the White Bear Suppression Inventory were administered. After two weeks, the Self-Regulated Learning Interview Schedule was administered to the same respondents for the second wave. The same respondents were tested during the second wave administration by repeated measures.

#### *Data Analysis*

*Data Cleaning.* The responses of the participants were encoded in a spreadsheet and the means for each subscale in the questionnaires were computed. The participants who did not answer several items in a subscale were excluded. Mean replacement was used for some items with no answers. In the process, the mean for entire item number is obtained and this value was used to replace the missing answer of a participant in an item.

*Descriptive Statistics.* The mean and the standard deviation were used to report the levels of each measure in the scales. An interpret of the means for the measures were created based on the scales for SRLIS (1.0-2.5 seldom, 2.6-4.0 most of the time), ACS (1.00-1.75 never, 1.76-2.5 rarely, 2.51-3.25 often, 3.26-4.00 always), perceived self-

determination, AEQ, White Bear suppression inventory (1.00-1.75 strongly disagree, 1.76-2.5 disagree, 2.51-3.25 agree, 3.26-4.00 strongly agree), fear of negative evaluation (1.00-1.75 not at all characteristic of me, 1.76-2.5 slight characteristic of me, 2.51-3.25 very characteristic of me, 3.26-4.00 extreme characteristic of me), and Penn State worry questionnaire (1.00-1.99 not at all typical, 2.00-3.00 somewhat typical, 3.01-4.00 very typical).

All the factors of the measures were intercorrelated to establish their relationship. The covariance among the variables were also obtained and entered as part of the procedure to conduct the Structural Equations Modeling.

*Structural Equations Modeling (SEM).* The *SEM* was used as the major analysis in the study. The measurement models of the three latent factors (activation, inhibition, and self-regulation) were first established to show that they are independent from each other. Confirmatory Factor Analysis was conducted to compare the goodness of fit of the measurement models and the parameter estimates of the loading for each latent factor were assessed. Four measurement models were tested: (1) The first measurement model is a three latent factor model where they are correlated. (2) The second measurement model is a two factor model where activation and negative affect were combined in one latent construct and correlated with self-regulation. (3) The third measurement model is also a two factor model where self-regulation and negative affect were combined in one latent construct and correlated with activation system. (4) The fourth measurement model is a one factor model, where all manifest factors are placed in one latent construct. The goodness of fit indices of these four measurement models were compared by arranging the Root Mean Square Error Approximation (RMSEA) from highest to lowest and the

chi-square values are subtracted. The measurement model with the largest difference in the chi-square is said to have the best fit (Kenny & Kashy, 1992).

Three models were tested in the study. In the first model, the effect of the activation system and negative affect on self-regulation is assessed as latent variables.

In the second model, the effect of negative affect on self-regulation mediated by action control is also assessed as latent variables. The Sobel test was used to test whether the activation mediates the effects of negative affect on self-regulation. The Sobel test determined whether the activation latent factors carry the effect of negative affect as an exogenous latent variable to self-regulation as an endogenous latent variable. The Sobel value was likewise tested for significance.

In the third model, the interaction effect of both activation system (high and low) and inhibition system on self-regulation was assessed. The average scores of the activation measures were partitioned into high and low using the mean split ( $M=2.79$ ). The low activation scores were coded as “1” and high activation scores were coded as “2.” The coded activation level (high and low) was multiplied with the scores of each negative affect manifest variable as an interaction terms. The interaction terms were entered as one latent exogenous variable. This procedure enables to explain the moderation of activation level on the effect of negative affect on self-regulation (refer to Chin, Marcolin, & Newsted, 1996; Schermelleh-Engel, Klein, & Moosbrugger, 1998). The structural equation is with moderation is denoted by  $\eta = \alpha + \gamma_1\xi_1 + \gamma_2\xi_2 + \gamma_3\xi_1\xi_2 + \zeta_1$  where  $\eta$  is self-regulation,  $\xi_1$  is activation,  $\xi_2$  is negative affect,  $\xi_1\xi_2$  is the multiplicative terms where  $\xi_1$  is categorical (high and low activation), and  $\zeta_1$  is the error term. The

activation factors together with the coded activation level as manifest and negative affect factors were again entered in the *SEM*.

Noncentrality and Single Sample Fit Indices were also used to evaluate the goodness of fit of the three models.

The noncentrality measures represent a change of emphasis in assessing model fit. Instead of testing the hypothesis that the fit is perfect, it tests how bad is the fit of the model in reference to the statistical population and how accurate is the population badness-of-fit from the sample data. The obtained Root Mean Square Error Approximation (*RMSEA*) measure was used to determine the best fitting model. Values of the *RMSEA* index below .05 indicate good fit, and values below .01 indicate outstanding fit (Steiger, Shapiro, & Browne, 1985). The *RMSEA* compensates for model parsimony by dividing the estimate of the population noncentrality parameter by the degrees of freedom.

Single sample goodness of fit indices was also used to evaluate the models. The noncentrality fit indices used to assess the three models are Joreskog (*GFI* and *AGFI*: Values above .95 indicate good fit), Bentler-Bonett, Relative Fit Index/Bollen's rho (*RFI*: values close to 1 indicate a relatively good fit), Incremental Fit Index/Bollen's delta (*IFI*: values close to 1 indicate a relatively good fit), and Comparative Fit Index/McDonald's Fit index (*CFI*: values close to 1 indicate a relatively good fit, values above .95 are acceptable) (Browne & Cudeck, 1989).

To determine the invariance between the model with high and low activation group, the Maximum Likelihood Chi-square ( $\chi^2$ : the minimized discrepancy function is most fitted model; discrepancy function =  $\chi^2/df$ , values of 5 and below are good fit),

Akaike Information Criterion (*AIC*: the smallest Akaike criterion is chosen over other several models), Schwarz's Bayesian Criterion (The smallest Schwartz Criterion value is chosen over other several models), and Browne-Cudeck Cross Validation Index (better models will have smaller cross-validation indices) were compared. These indices were compared to determine the best model in explaining the activation of self-regulation. Differences among the Chi-square goodness of fit parameters were compared across measurement and structural models to identify the change in goodness of fit (Anderson & Gerbing, 1988).

To further assess the moderation of activation levels, two separate SEM was conducted on the effect of negative affect on self-regulation for participants with high and low levels of activation. The effect sizes, statistical powers, and parameter estimates were compared for the sample with high and low activation level. The effect size of negative affect on self-regulation is assessed by converting the parameter estimate into a *t*-value and this is further converted into a Cohen's *d* (see Rosenthal & Rosnow, 1991). The Cohen's *d* is used as an estimate of effect size which is the magnitude of an effect. Unlike significance tests, the effect size index is independent of sample size (Wilkinson, & APA Task Force on Statistical Inference, 1999). Small effect size range from 0.0 to 0.2, moderate effect size is .21 to .5, and large effect size is .51 and above (Cohen, 1988). Statistical power is the probability of rejecting a null hypothesis that is in fact false (Reyes & Magno, 2007). Cohen (1988) considers .80, more or less, as the acceptable power for a study and, equivalently, .20 as the acceptable probability of committing a Type II error in the rejection of a null hypothesis.

## Chapter 3

### Results

The Means and Standard Deviations of the factors of self-regulation, activation system, and negative affect are shown. These factors are also intercorrelated using the Pearson  $r$ . Three models were tested showing the activation of self-regulation using Structural Equations Modeling. The goodness of fit indices of the three models were also reported.

#### *Level of Activation, Negative Affect, and Self-regulation*

Table 1 shows the means, standard deviation, and the internal consistency of the factors of self-regulation as well as the components of the activation and negative affect.

The means for the factors of the self-regulation are all high as compared to the means obtained for the activation system and negative affect. All of the means for the self-regulation is within  $M=3.08$  to  $M=3.38$  which indicates that the self-regulation factors are most of the time used. For the activation system the mean values range from  $M=2.70$  to  $M=2.89$ . The subscales on disengagement, initiative, and persistence are all often used while the mean for the items on perceived self-determination was strongly agreed by the participants. The mean values for the negative affect range from  $M=2.66$  to 2.74. For anxiety, the mean indicates that the participants agree on the items ( $M=2.67$ ). For fear of negative evaluation, the mean is interpreted as very characteristic of the participants ( $M=2.73$ ). For worry, the mean of the scores is somewhat typical ( $M=2.66$ ). And for thought suppression, the mean is indicates that the participants agree in on the items ( $M=2.74$ ).



The standard deviation indicates that the scores in all the factors are not highly dispersed. The reliabilities of the scales for the negative affect have high internal consistencies ranging from .77 to .86. However, the reliabilities of the scales for the activation system show moderate internal consistencies ranging from .60 to .76. The scale for self-regulation has a high internal consistency with a Cronbach's alpha of .81.

Table 1

*Means and Standard Deviations of Self-regulation, Activation System, and Negative Affect*

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Cronbach's alpha</i>
Self-regulation (SRL)				.81
Rehearsing and Memorizing	1454	3.31	0.70	
Organizing and Transforming	1454	3.08	0.72	
Seeking Information	1454	3.28	0.73	
Self-evaluation	1454	3.19	0.75	
Goal-setting and Planning	1454	3.34	0.71	
Keeping Records and Monitoring	1454	3.38	0.69	
Self-consequencing	1454	3.22	0.76	
Environmental Structuring	1454	3.30	0.74	
Activation System				
Disengagement	1454	2.70	0.34	.60
Initiative	1454	2.78	0.38	.70
Persistence	1454	2.82	0.39	.76
Self-determination	1454	2.89	0.38	.65
Negative Affect (Inhibition)				
Learning Anxiety	1454	2.67	0.42	.77
Fear of Negative Evaluation	1454	2.73	0.48	.86
Worry	1454	2.66	0.44	.83
Thought Suppression	1454	2.74	0.37	.80

*Note.* For SRL, seldom=1, most of the time=4; For activation system, 1=never, 2=rarely, 3=often, 4=always; For learning anxiety and thought suppression, 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree; For fear of negative evaluation, 1=Not at all characteristic of me, 2=Slight characteristic of me, 3=Very characteristic of me, 4=Extreme characteristic of me; For worry, 1=not at all typical, 2-3=somewhat typical, 4=very typical

*Relationship of the Factors of Activation, Negative Affect, and Self-regulation Factors*

The factors of self-regulation, activation system, and negative affect were intercorrelated to determine the magnitude of their relationships. Their significance was also tested. Table 2 shows the intercorrelations among the factors of activation, negative affect, and self-regulation.

Table 2

*Correlations among Self-regulation, Activation System, and Negative Affect*

Self-regulation	Activation System				Negative Affect			
	Disengagement	Initiative	Persistence	Self-determination	Anxiety	Fear of Negative Evaluation	Worry	Thought Suppression
Rehearsing and Memorizing	0.12*	0.16*	0.14*	0.12*	-0.10*	-0.03	-0.05*	0.01
Organizing and Transforming	0.11*	0.12*	0.16*	0.14*	-0.06*	-0.01	-0.05	-0.01
Seeking Information	0.09*	0.08*	0.08*	0.08*	-0.06*	-0.02	-0.07*	-0.01
Self-evaluation	0.11*	0.15*	0.13*	0.14*	-0.05	0.00	-0.01	0.00
Goal-setting and Planning	0.13*	0.10*	0.10*	0.09*	-0.10*	-0.03	-0.08*	-0.05*
Keeping Records and Monitoring	0.12*	0.14*	0.14*	0.13*	-0.07*	0.01	-0.07*	0.00
Self-consequencing	0.09*	0.14*	0.10*	0.13*	-0.11*	-0.01	-0.05*	0.00
Environmental Structuring	0.11*	0.14*	0.10*	0.11*	-0.12*	-0.04	-0.07*	-0.01
<b>Negative Affect</b>								
Anxiety	0.14*	0.04	0.19*	0.14*				
Fear of Negative Evaluation	0.07*	0.03	0.16*	0.17*				
Worry	0.07*	0.01	0.19*	0.08*				
Thought Suppression	0.15*	0.10*	0.25*	0.29*				

\* $p < .05$

The correlation coefficients among the factors of self-regulation and activation system are all significant,  $p < .05$ , although the strengths are from weak to moderate. For the negative affect, anxiety and worry have significant correlation coefficients with most

self-regulation components,  $p < .05$ . Thought suppression had only one significant correlation and fear of negative evaluation have no significant relationship with any of the self-regulation factors. The relationship among the factors of self-regulation that is significant with the negative affect factors has a negative magnitude. This shows that the lower the negative affect such as anxiety and worry, the higher the use of self-regulation strategies. The relationship between the activation and negative affect factors have a positive magnitude and almost all correlation coefficients are significant,  $p < .05$ . The positive magnitude shows that the activation factors increases with the negative affect factors. Many of the correlation coefficient values have weak to moderate strength.

*Measurement Models for the Activation, Inhibition, and Self-regulation*

Before the proposed models of the activation, negative affect, and self-regulation were tested, four measurement models were constructed to establish the independence of the variables used in the study. Establishing the independence of the three latent constructs was necessary to ensure that the factors are not multicollinear or overlapping. The four measurement models include a first model where activation, negative affect, and self-regulation are related in a common factor model (see Appendix H). A second measurement model consists of a two-latent factor model where each pair of the three constructs (activation, negative affect, and self-regulation) was combined. Under this, there are two measurement models. In the first model, negative affect and activation system are placed in one latent constructed (see Appendix I) while in another model, negative affect and self-regulation are placed in one latent construct (see Appendix J). And lastly, a one-factor model was constructed where all manifests are placed in one latent variable (see Appendix K). The results show that activation, negative affect, and

self-regulation are independent factors. Their specific manifest variables do not load together in one latent construct. For example, when negative affect and self-regulation were together in one latent construct, the factors of self-regulation loaded negatively with the negative affect factors. In the same way, when all factors are placed in one latent construct, the factors of negative affect did not load significantly. Another indication is the goodness of fit of the three measurement models where the separate factors are combined did not show adequate fit across different parameters (see Table 3). The three factor model with separate factors was the only one with adequate fit. This is an indication that there is no overlap among the three factors. The change in  $\chi^2$  in Table 3 shows the comparison of the goodness of fit of the four measurement models.

Table 3

*Goodness of Fit of the Measurement Models*

Model	$\chi^2$	Df	$\chi^2/df$	GFI	TLI	RMSEA	$\Delta\chi^2$
One-Factor Model	3484.46	104	33.5	.46	.37	.15	
Two-Factor Model A	3175.47	103	30.83	.51	.42	.14	308.99 <sup>a</sup>
Two-factor Model B	1226.45	103	11.91	.82	.79	.09	2258.01 <sup>b</sup>
Three-factor model	507.97	101	5.03	.94	.92	.05	2976.25 <sup>c</sup>

A=activation and negative affect are combined in one latent factor, B=negative affect and self-regulation are combined in one latent factor, a=one factor model – two factor model A, b=one factor model – two-factor model B, c=one-factor model B – two-factor model B.

Three alternative models are tested to determine the interplay between activation system and negative affect and their effect on self-regulation.

*The Effect of Activation and Inhibition on Self-regulation (Model 1)*

In the first model as shown in Figure 4, the effect of activation system and negative affect on self-regulation is significant. The activation system increases the use of self-regulation by 1.63 with all its factors having significant parameter estimates,  $p < .001$ . On the other hand, the negative affect decreases self-regulation at .39 also with all its factors significant,  $p < .001$ . In this case negative affect is an inhibitory system to self-regulation.

For the first model, the minimum chi-square value is  $\chi^2 = 505.43$ ,  $df = 102$ ,  $p < .05$ , and its discrepancy function is 4.96 which is a reasonable goodness of fit of the model. The Root Mean Square ( $RMR = .02$ ,  $RMSEA = .052$ ) and Joreskog ( $GFI = .96$  and  $AGFI = .94$ ) indicate that the model shows an adequate goodness of fit. However, the results in using Bentler-Bonnet's Normed Fit Index ( $NFI = .70$ ), Relative Fit Index ( $RFI = .64$ ), Incremental Fit Index ( $IFI = .74$ ), and Comparative Fit Index ( $CFI = .74$ ) show estimates far from goodness of fit. The Hoelter estimate indicates that at alpha level .05, a sample size of 128 is enough to make the first model acceptable, and at alpha .01, a sample size of 139 is necessary.

*Activation as Mediating the Effect of Negative Affect on Self-regulation (Model 2)*

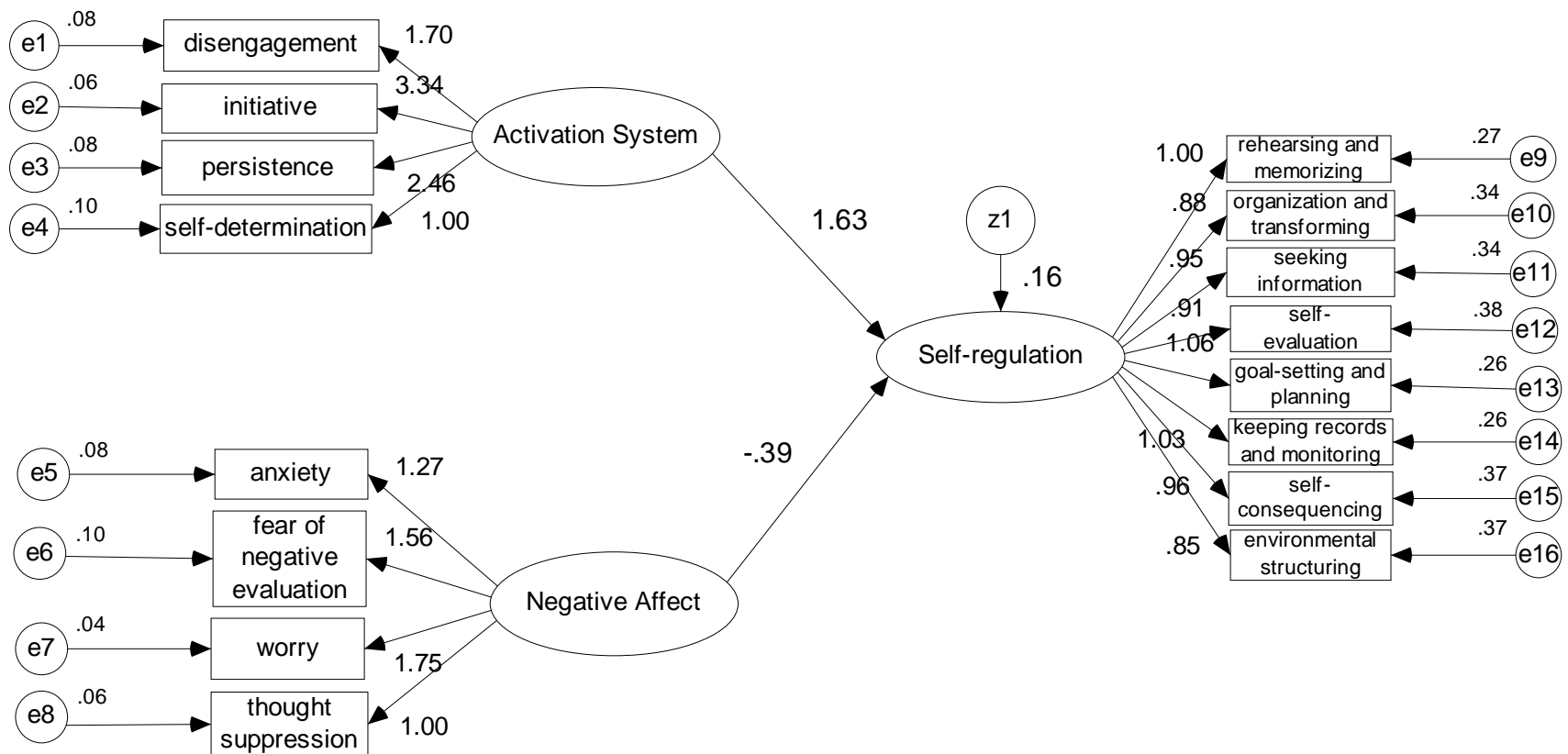
The second model as shown in Figure 5 indicates that when the direct effect of negative affect on activation system is positioned, its effect becomes positive and it is also significant,  $p < .001$ . The activation system still have a significant effect on self-regulation,  $p < .001$  even when negative affect influences the activation system. All the factors remain to be significant but the parameter estimates of the activation system were lowered from the first to the second model (disengagement = 1.45\*\*\*, initiative = 2.48\*\*\*,

persistence=2.31\*\*\*, self-determination=1.00\*\*\*) because of the influence of negative affect as its exogenous factor. This model shows that negative affect can indirectly activate self-regulation. The Sobel test was conducted and showed that the activation system is a significant mediation factor between negative affect and self-regulation,  $p < .05$ .

For the mediation model, the minimum chi-square value is  $\chi^2=487.27$ ,  $df=101$ ,  $p < .05$ , and its discrepancy function is 4.82 which is a good model fit. The Root Mean Square ( $RMR=.017$ ,  $RMSEA=.051$ ) and Joreskog ( $GFI=.96$  and  $AGFI=.94$ ) indicate that the model shows an adequate goodness of fit. However, the results are not consistent in using the Bentler-Bonnet's Normed Fit Index ( $NFI=.71$ ), Relative Fit Index ( $RFI=.65$ ), Incremental Fit Index ( $IFI=.75$ ), and Comparative Fit Index ( $CFI=.75$ ) which shows inadequate fit. Hoelter estimate indicate that at alpha level .05, a sample size of 375 is enough to make the second model acceptable, and at alpha .01, a sample size of 409 is necessary.

Figure 4

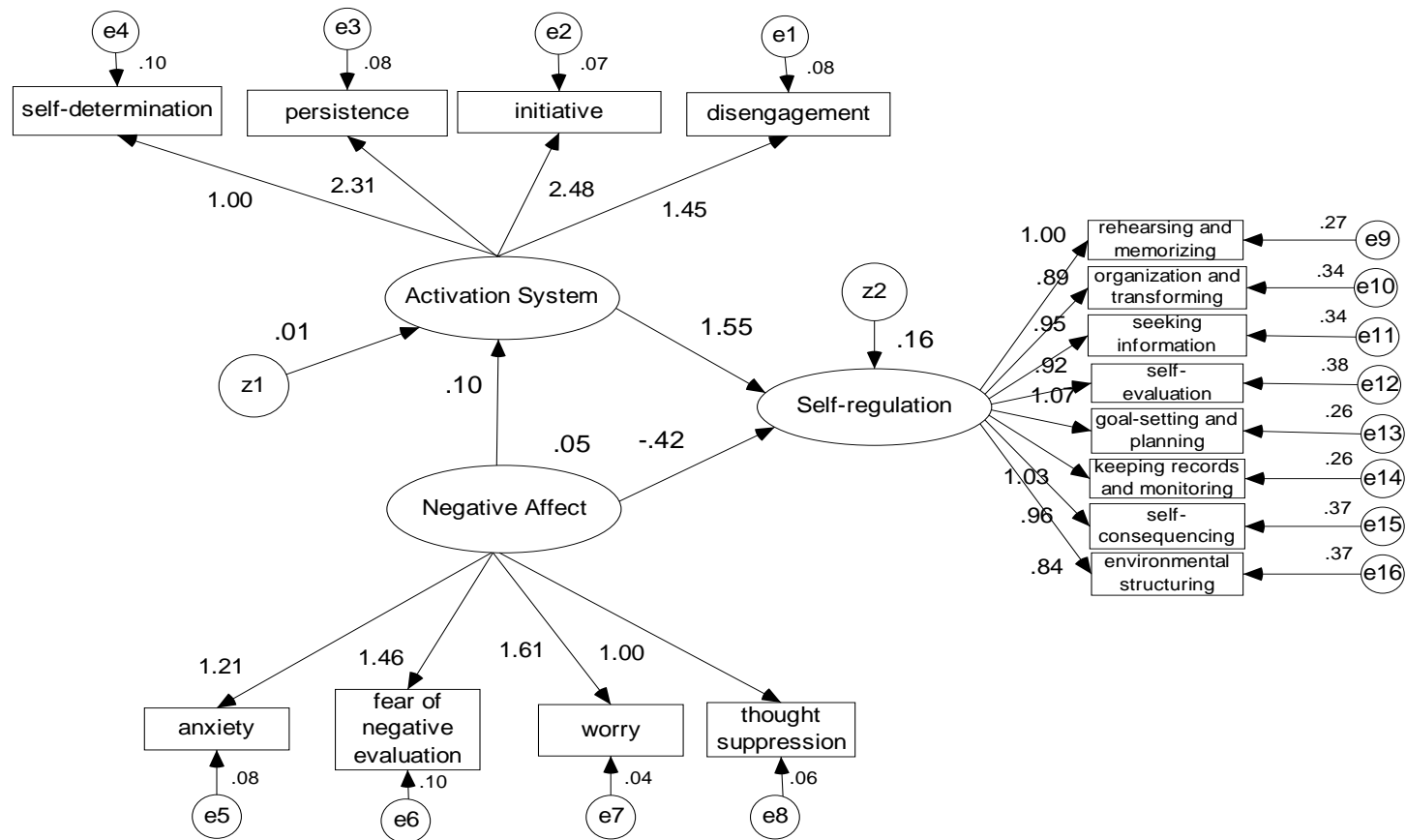
Model 1: Effects of Action Control, Self-determination, and Negative Affect on Self-regulation



Note. All parameter estimates are significant,  $p < .001$

Figure 5

Model 2: Action Control and Self-determination Mediates the Effect Negative Affect on Self-regulation

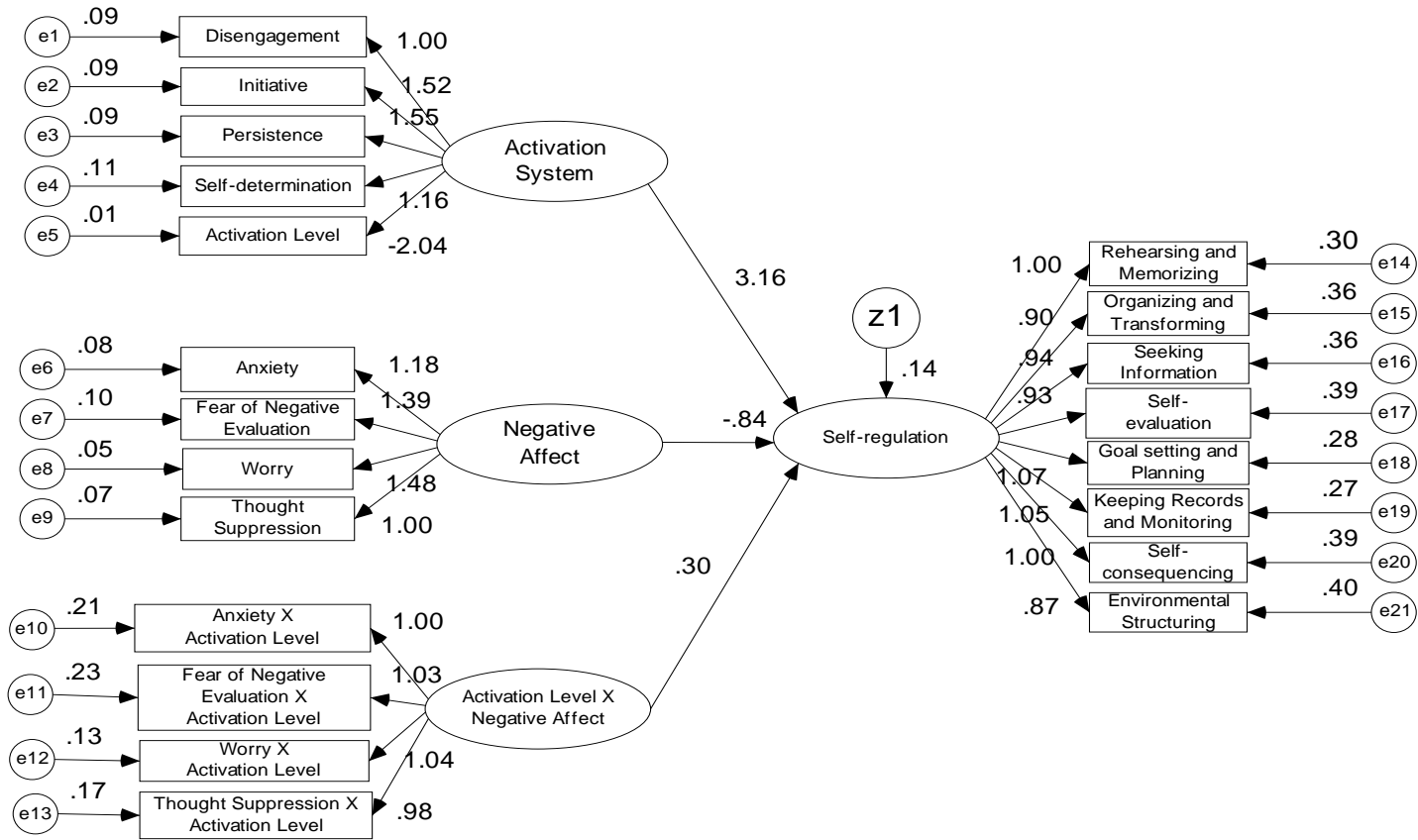


Note. All parameter estimates are significant,  $p < .001$



Figure 6

Model 3: Activation System Moderates the Effect of Negative affect on Self-regulation



Note. All parameter estimates are significant,  $p < .001$

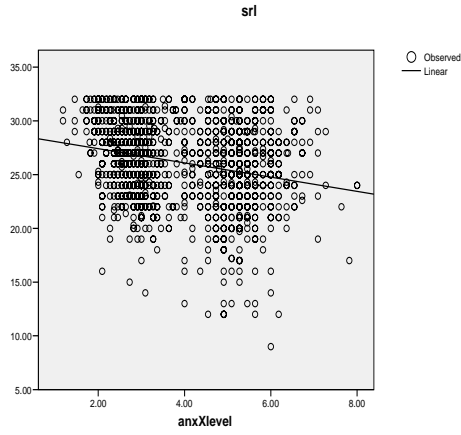
*Activation Level Moderating the Effect of Negative Affect on Self-regulation (Model 3)*

In the third model as shown in Figure 6, the activation system is partitioned into high and low levels and this is interacted with the factors of negative affect. The interaction terms are derived by multiplying the coded activation level (high “2” and Low “1”) to each manifest of the negative affect (anxiety, fear of negative evaluation, worry, and thought suppression). This procedure is conducted to determine whether the high and low activation system can moderate the effect of negative affect on self-regulation. In this model, negative affect decreases self-regulation by .84 ( $p < .001$ ), while the activation system increases self-regulation by 3.16 ( $p < .001$ ). The interaction between levels of activation (high and low) and factors of negative affect are significant as well,  $p < .001$ . This means that an increase in the activation level which decreases the effect of negative affect leads to increase in self-regulation (.30\*\*\*), on the other hand a decrease in the activation level increases negative affect and decreases self-regulation. This indicates that the activation system moderates the effect of negative affect on self-regulation.

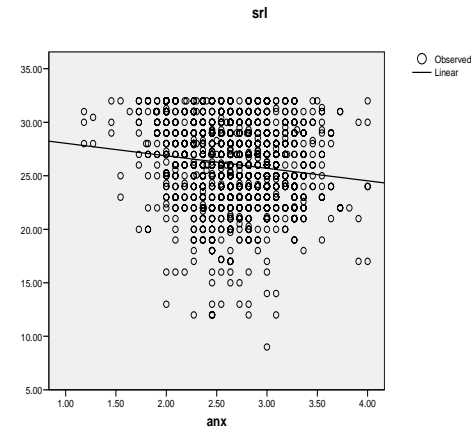
Figure 7 shows the scatterplot of the relationship between each negative affect factor interacted with high and low activation and self-regulation. The scatterplot for the relationship between each negative affect and self-regulation is also shown beside the slope with multiplicative interaction terms.

Figure 7

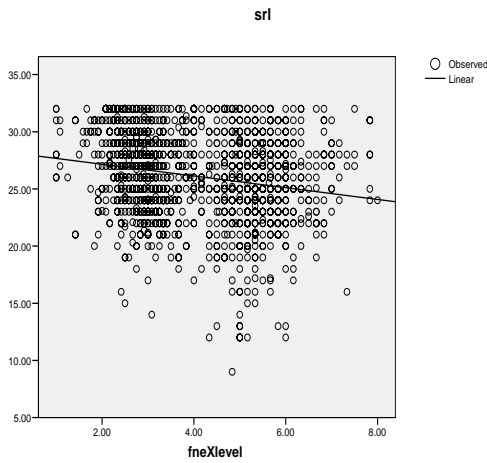
*Slope between Interaction of Negative Affect with Activation Level and self-regulation*



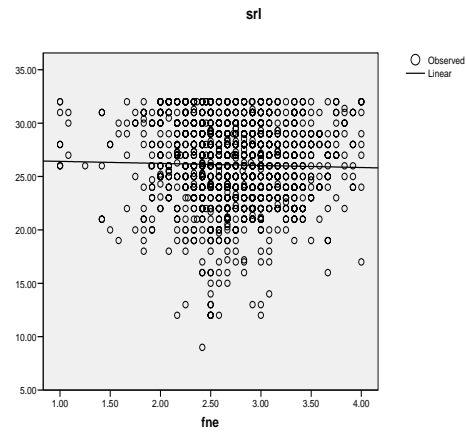
$R=.24, p<.001$



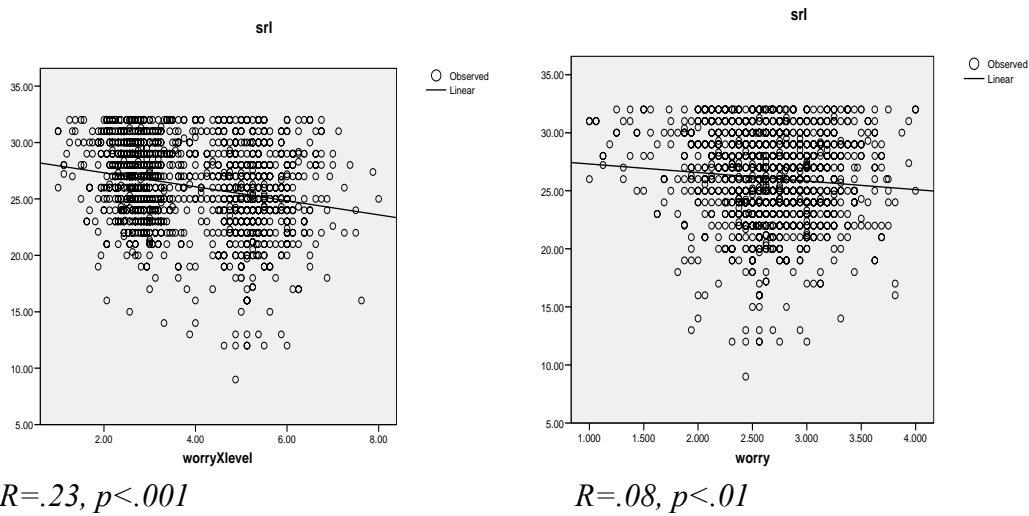
$R=.13, p<.001$



$R=.19, p<.05$

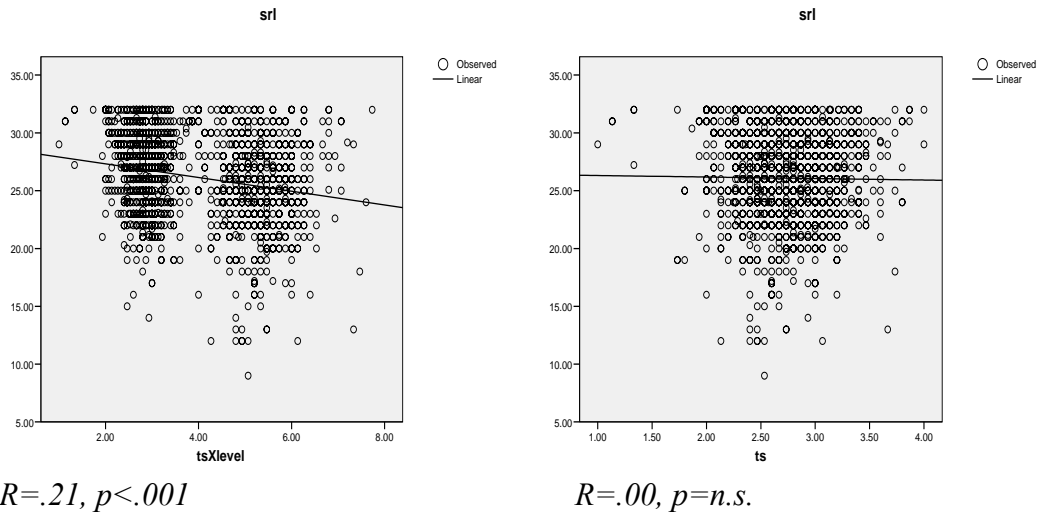


$R=.03, p=n.s.$



$R = .23, p < .001$

$R = .08, p < .01$



$R = .21, p < .001$

$R = .00, p = n.s.$

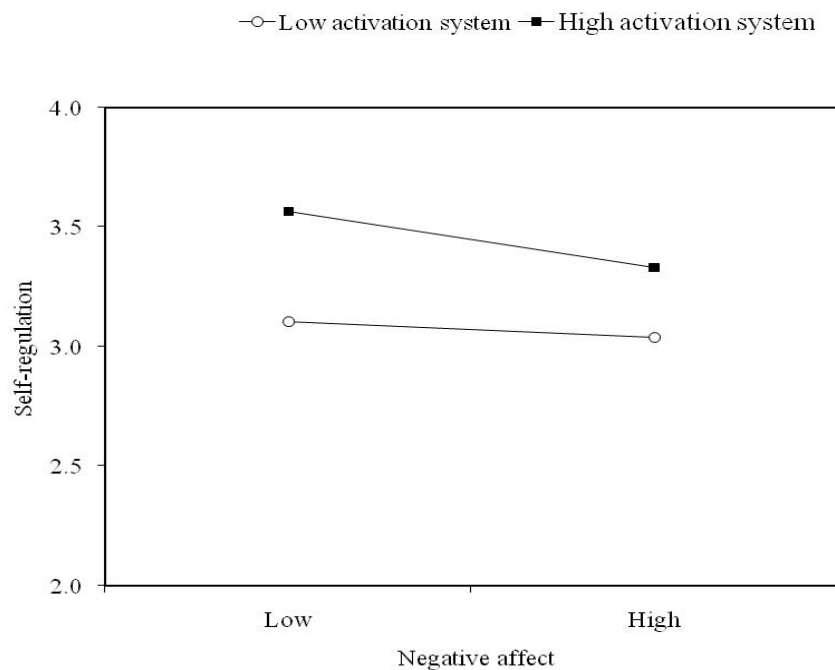
Note. Level=high and low activation, anx=anxiety, fne=fear of negative evaluation, ts=thought suppression.

The scatterplots in figure 7 show that the relationship between self-regulation and the interaction of a negative affect with activation level is more linear as compared with the relationship between negative affect without multiplicative terms and self-regulation. This means that the relationship between negative affect and self-regulation was met when it is moderated by levels of the activation system.

The simple slope of the interacted terms between negative affect and activation system in predicting self-regulation is shown to determine under what condition can negative affect affect self-regulation. The total scores of the negative affect were summated as well as for the activation system factors. The negative affect and activation summated scores were centered by subtracting their means to each raw score. The centered scores were multiplied as an interaction term. These centered scores together with self-regulation were then entered into the Structural Equations Modeling and the regression weights were estimated (Schermelel-Engel, Klein, & Moosbrugger, 1998). The regression values were entered to produce simple slopes. The slope of interaction shows that under high activation, self-regulation increases with low negative affect. On the other hand, self-regulation decreases if negative affect is high and activation is low.

Figure 8

*Two Way Moderated Relationship between Negative Affect and Self-regulation*



For the interaction model, the minimum chi-square value is  $\chi^2=309.61$ ,  $df=64$ ,  $p<.05$ , and its discrepancy function is 4.84 which is reasonable fit of the data for the said model. The Root Mean Square ( $RMR=.022$ ,  $RMSEA=.05$ ) and Joreskog ( $GFI=.97$  and  $AGFI=.95$ ) indicate that the model shows goodness of fit. The results are consistent in using the Bentler-Bonnet's Normed Fit Index ( $NFI=.98$ ), Relative Fit Index ( $RFI=.97$ ), Incremental Fit Index ( $IFI=.98$ ), and Comparative Fit Index ( $CFI=.98$ ). The Hoelter estimate indicates that at alpha level .05, a sample size of 393 is enough to make the third model acceptable, and at alpha .01, a sample size of 438 is enough.

In comparing the three models, the third model that shows the interaction between negative affect and activation level have the best fit. However each model explains the theory in a progressive manner. To compare the fit of the three models, parsimony-adjusted measures and the Browne-Cudeck were used. Table 4 shows the comparative fit indices of the three models tested.

Table 4

*Comparison in the Goodness of Fit of the Models*

Measure	Model 1	Model 2	Model 3
Parsimony Ratio	.85	.84	.82
Akaike Information Criterion ( <i>AIC</i> )	573.43	557.23	363.61
Browne Cudeck Criterion ( <i>BCC</i> )	574.24	558.10	364.13
Bayes Information Criterion ( <i>BIC</i> )	753.72	742.15	506.22

The goodness of fit of the three models using comparative fit indices show that Model 3 consistently have the best fit. In using the four comparative fit indices, model 3 show the lowest values as compared with the first and second model.

Since the third model shows to have the best fit, it is studied further by comparing the effect sizes, statistical powers, and goodness of fit of the effect of negative affect on

self-regulation between groups with high and low activation system. The group is divided according to those with high and low activation system using a mean split ( $M=2.79$ ). For each group, the effect of negative affect on self-regulation was again assessed using Structural Equations Modeling. For each group, the effect sizes, statistical powers, goodness of fit of the effect of negative affect on self-regulation were compared. Table 5 shows the effect sizes, statistical powers, and goodness of fit indices.

Table 5

*Parameter Estimates, Effect Size, and Statistical Power in the Effect of Negative Affect on Self-regulation*

Estimates	Effect of Negative Affect on SRL for High Activation System	Effect of Negative Affect on SRL for Low Activation System
Unstandardized Parameter Estimate	-.336***	-.078
Standardized Parameter Estimate	-.257***	-.036
Z value	-5.321	-.800
N	714	740
Effect Size (Cohen's d)	-1.46	-.22
Statistical Power	.69	.13
Chi-Square	106.09***	163.53***
Df	53	53
Discrepancy Function	2.002	3.085
RMSEA	.037	.053

\*\*\* $p < .001$

For the group with high activation system, the effect of negative affect on self-regulation is significant with corresponding high effect size (-1.46) and high statistical power (.69). For the group with low activation system, the effect of negative affect on self-regulation is not significant with a corresponding low effect size (-.22) and poor statistical power (.13). The goodness of fit for both groups is adequate.

The best model as indicated by the comparative fit indices and noncentrality indices is the third model. The third model shows that negative affect decrease and self-regulation increases under high activation levels. Larger negative effect size was obtained between negative affect and self-regulation with high levels of activation and this also corresponds with high statistical power. However, under low activation, the relationship between negative affect and self-regulation is weak. This corresponds to low effect size and low statistical power. The findings show that the activation system can moderate the effect of negative affect on self-regulation. Not only did the moderation turn to be significant, but it also showed to be the best fit.



## Chapter 4

### Discussion

Generally, self-regulation is generated when individuals show increased system activation. When one experiences states of negative affect mediated by activation system factors, one can still exercise self-regulation. Thus when one possesses high levels of activation, negative affect is decreased and one can exercise self-regulation. The participants' level of the activation factors are not so high as reflected in their mean scores. These participants' use of their activation factors that help them control thought distractions and ruminations were found to be inconsistent (as reflected in the Cronbach's alpha). This indicates that facilitating self-regulation would be difficult if initial characteristics such as the activation factors are not very high. However, the experience of the negative affect states is more consistent indicating that they can cause intrusions to self-regulation. The relationship among the factors of activation, negative affect, and self-regulation as examined using the Pearson's  $r$  is not very high although most are significant. This indicates that these factors act independently which is supported by the measurement models and they are best studied in a causal model. In the results of the correlation analysis, self-regulation increases significantly with the factors for activation. Although for the factors of negative affect, only anxiety and worry decreases as self-regulation increases. This further demonstrates that when anxiety and worry are high, the use of self-regulation is not optimal. In these findings, anxiety and worry served as inhibitors for self-regulation. But the correlation coefficient as an analysis is not strong enough to conclude on the role of both the activation and negative affect factors on self-regulation. The Structural Equations Modeling, a more powerful analysis tool can

provide a stronger basis for elucidating the role of the factors under study as activation and inhibitions for self-regulation.

*Level of College Students' Self-Regulation, Activation, and Negative Affect*

It was found in the study that the means for the factors of the self-regulation are all high as compared to the means obtained for the activation system and negative affect. Previous reports on the use of self-regulation among college students show a decline at this age group and these strategies. If they are used at all, they are used ineffectively (Correo, 1998; de Carvalho, Magno, Lajom, Bunagan, & Regodon, 2006; Dedel, 2002; Panganiban, 2005; Pulmones, 2005; Hofer, Yu, & Pintrich, 1998; Raffaelli, Crockett, & Sheng, 2005). The results of the means for self-regulation do not conform to the reports from previous studies. The mean results of the self-regulation only indicate how frequently students use the strategies studied. However, the scores do not account for how effective college students implement and use the different self-regulation strategies. The high mean levels for self-regulation indicates only that the reported self-regulation strategies are most of the time used.

The mean levels for the factors action control and self-determination are not that highly extreme. These mean levels suggest that these processes are only often used. This can be explained by the nature of adolescent cognition which is still volatile (Sternberg, 2006). During the adolescent age, individuals believe that there are many possible ways to construct ideas and solve problems and they arrive with many possibilities of integrating this information. Aside from their beliefs, their heightened social interaction with peers makes them preoccupied. This belief enables them to welcome any information available and have difficulty disengaging from many pervasive thoughts.

This inability to control distractions tends to make them preoccupied which in turn explains low mean levels of action control and self-determination.

The mean levels for the negative affect factors are also not highly extreme. This is indicative that students are able to control and manage experiences of negative affect. The low negative affect also indicates that the participants are not extremely disturbed when they experience negative affect states like anxiety, worry, fear of negative evaluation, and thought suppression. However, it is very important to include the other factors in the study in order to explain the relatively low levels of negative affect. For example, it could be that the negative affect levels have no strong effect considering participants having high activation levels or because individuals are able to self-regulate. Details of these explanations are found in the later sections.

*Relationships among the Factors of Activation, Negative Affect, and Self-regulation*

It was found in the study that all factors of the activation system are significantly related with self-regulation. The magnitude of the relationship strongly suggests that the use of the activation system increases self-regulation which was further tested using the structural equations modeling analysis. The significant relationship of these two factors indicates that the ability of controlling debilitating thoughts and distractions increases individuals monitor and plan their goals effectively. This result has been consistently supported by previous studies (Diefendorff, Hall, Lord, & Stream, 2000; Perry, Hladkyl, Pekrun, & Pelletier, 2001).

The correlations also indicate that some factors of negative affect were negatively correlated with the factors of action control while others did not significantly correlate. Anxiety is consistent in having a negative and significant relationship with all self-

regulation measures. This supports the processing theory where anxiety at high levels decreases performance such as self-regulation (Eysenck & Calvo, 1992; Hopko, Hunt, & Armento, 2005). Worry also had a significant and negative correlation with all factors of self-regulation except for organizing and transforming and self-evaluation. Organizing and transforming is not related to worry because this strategy does not take much effort to execute. Even under states of worry, individuals can still engage in organizing and transforming activities. Self-evaluation is also not crucially affected by states of worry. Individuals can evaluate themselves without too much worrying because this strategy is attributed on the self and others are not involved in the process of evaluation. There is no risk of offending other people because the individual only evaluate him/herself safely. Thought suppression and fear of negative evaluation are not significantly related with the factors of self-regulation except for goal setting and planning resulting to a negative magnitude.

The low strength of the correlation coefficients in the results satisfies the assumption of doing further analysis such as the Structural Equations Modeling. This indicates that the variables cannot be simply studied as correlations but rather by looking at their structure as models and their effects on each other.

*Measurement Models for the Activation, Inhibition, and Self-regulation*

The independence of the activation, negative affect, and self-regulation as latent constructs were established by testing four measurement models. Generally when the four models were compared in their goodness of fit, a three factor model of the three constructs had the best fit indicating independence of the three constructs. The worst fit occurred when all the factors were forced in one latent construct. When negative affect

and self-regulation were placed in one latent construct, the path estimates of the factors of self-regulation were negative. However they were positive for negative affect. This is a good indication that they should not be treated as one latent variable. When negative affect and the activation factors were placed in one latent construct, the factors of negative affect did not have significant parameter estimates.

The measurement models indicate that it is very safe to study activation, negative affect, and self-regulation as separate constructs. The theoretical implications of these three factors can be assumed because they all represent different constructs. The patterns in the results also indicate that the choices of the specific components for each of the latent constructs are valid measure for activation, negative affect and action control (Netemeyer, Bearden, & Sharma, 2003). The validity is inferred because when two separate constructs were combined as one latent construct, not only did it gained a bad fit, but consistently patterns in the parameter estimates occurred among its factors (see Appendix I and J).

*The Effect of Activation and Inhibition on Self-regulation (Model 1)*

The results of the study show a progression of three models in generating self-regulation. This progression provides three different ways of activating self-regulation. The first model further demonstrated the basic assumptions in earlier studies that the activation system with factors of self-determination, disengagement, initiative, and persistence increases the use of self-regulation, while negative affect with factors of anxiety, worry, thought suppression, and fear of negative evaluation decreases the use of self-regulation (Geen, 1987; Kuhl, 1985; 1994; Leary, 1983; Matthews & Wells, 1996; Perry, Hladkyj, Pekrun, & Pelletier, 2001; Wells, 1994).

Having the activation factors increase self-regulation further supports the action control theory. It can be assumed that the factors of disengagement, initiative, persistence, and self-determination are activation systems for self-regulation. They are best explained as a system because of their combined structure in directly increasing self-regulated learning. This capability of the activation system is further demonstrated in models 2 and 3. This activation system consistently increases self-regulation regardless of its effect on self-regulation as either mediated or moderated. The use of action control factors and self-determination taken together as an activation system when used effectively enables the individual to execute self-regulation at high levels of use. There is ease in the execution of self-regulation due to the activation system because the individual first uses his ability to effectively remove unwanted thoughts and distractions. When the thought processes are clear, then self-regulation is executed efficiently.

The effect of negative affect on self-regulation supports the processing theory where negative affect negatively impacts performance (Eysenck & Calvo, 1992; Hopko, Hunt, & Armento, 2005). This result is consistent across different studies and confirms that states of negative affect not only decreases performance but the ability and processes to perform task such as self-regulation. When negative affect impacts self-regulation negatively, it plays its role as an inhibitor of self-regulation. Negative affect as an inhibition becomes a hindrance for an individual to engage in processes that would execute performance effectively such as goal setting and monitoring which are self-regulation processes. The combined feelings of anxiety, worry, fear of negative evaluation, and thought suppression serve their function to intrude thought processes because self-regulation is not used or used in low frequency. The inhibitive role of

negative affect is further proven when the activation system is used a moderator n model 3. However, the function of negative affect as an inhibition changes when the activation system mediates the effect of negative affect on self-regulation. This is demonstrated in model two.

*Activation as Mediating the Effect of Negative Affect on Self-regulation (Model 2)*

The effect of negative affect on self-regulation changes when individuals are able to use their activation system upon experiencing states of intrusion and rumination (as shown in model 2). In this case negative affect can be considered as an activation system and not as inhibition anymore. Based on the findings, negative affect can be an activation of self-regulation because individuals who experience these intrusive states are able to appraise their emotions and ultimately use self-regulation strategies. When individuals experience negative affect, they have the tendency to activate their self-regulation with their desire to move away from their undesirable state such as the experience of anxiety, worry, thought suppression, and fear of negative evaluation. This supports that action-oriented and self-determined individuals are more likely to report that they incurred thought intrusions during self-regulation of a task (Deifendorff, Hall, Lord, & Stream, 2000). The person experiencing the negative affect uses self-regulation as an internal agency to control his actions and produces a positive outcome (Pekrun, 2006).

The progression from model one to model two shows that action control and the negative affect factors can serve as activation of self-regulation depending how these variables are positioned. Considering the theories that explain action control and the negative affect through the value expectancy theory and mood-information-integration provides independent perspective on how self-regulation is explained. For instance, just

by considering the action control theory alone, one dismisses the idea that negative affect states are just considered as inhibition factors without viewing the possibility that negative affect could be an activating agent for self-regulation. On the other hand, just by considering the value expectancy and moon-information-integration neglects the idea on what context negative affect states can become activation or deactivation to self-regulation. It is best to consider putting together these factors that can possibly activate self-regulation in order to determine clearly their unique effects. A progression of analysis from the first model to the second model enabled to explain what structure can make negative affect an activation and inhibition to self-regulation.

*Activation Level Moderating the Effect of Negative Affect on Self-regulation (Model 3)*

Having established the role of negative affect on the previous model, the next step in this theory-building on action control, self-determination, and processes of self-regulation is to show that the experience of such negative affect on self-regulation depends on the level of action control. While the second model demonstrates the role of negative affect as activation system, it falls short of explaining under what conditions an individual activates his/her self-regulation when experiencing negative affect. The theories of Gendolla (2000) and Pekrun (2006) explain that individuals appraise the experience of their emotional states. However, an explanation of the context where negative affect can become activation in the form of an appraisal to self-regulation is not yet provided, and this is tested in the third model. The third model shows that negative affect decreases when the activation is high and consequently the individual self-regulates. On the other hand, negative affect increases if activation is low and decreases the use of self-regulation. However, the findings of Deifendorff, Hall, Lord, and Stream



(2004) explained that action control is independent of negative affect because of non-significant results. Previous studies also take activation such as action control into high and low levels and looks into its direct effect on self-regulation which produces low statistical power (ex. Perry et al., 2001). In the present study when action control is moderated as a multiplicative interaction term to predict self-regulation, the results became significant. The interaction term is further proven to be an effective way to study the activation of self-regulation by producing a more linear relationship as compared when the relationship between negative affect and self-regulation have no interaction. This is evident that when the factors are inter-correlated, low to moderate correlation coefficient values were produced. This means that activation needs to be studied as an interaction term with negative affect which indeed produced more linear relationships in the results. The model with activation as moderator shows further that differentiating of the activation system into high and low will affect self-regulation differently. The results suggest that the extent of the ability to initiate activities is particularly relevant for managing everyday thought-related failures.

High levels of the activation system do not only facilitate self-regulation but manage negative affect as well (activation and negative affect having a positive relationship). This activation system is not only for specific learning strategies such as self-regulation but can also be applied to controlling negative affect as shown in the second model and the measurement model with three factors. This indicates a more domain general effect of action control where it can be applied to various contexts (Deifendorff, Hall, Lord, & Steam, 2000).

In cases where the activation of the individual is low, negative affect decreases the use of self-regulation. This means that negative affect's role as thought rumination takes place when individuals do not have the necessary characteristics to manage it, making the person self-regulate less. Such low scores in the activation system means that the person exhibits a weak sense of control and is unable to disengage from distractions. This inability heightens one's negative affect and self-regulation is not effectively carried out. This result supports the findings of Gailliot, Schmeichel, and Baumeister (2006) where decrease of controllability, increases individuals' negative related thoughts and anxiety, and self-regulation is decreased. Inversely, increased controllability lessens anxiety and leads to more effective use of self-regulation. This phenomenon occurs among highly adaptive students where even in the face of negative events that could cause them to experience negative affect are still able to self-regulate because of their high activation. For example, when a student is faced with several requirements in school, instead of giving up because of the experience of negative affect, they still continue and think of more ways to self-regulate in order to manage their tasks. They are propelled to self-regulate more and able to control their negative affect because they are self-determined and they have the ability to disengage in other tasks that would interfere with their concentration of finishing the task. The third model can also explain how Filipino college students think. The model explains that when Filipino college students engage in academic tasks, they are able to use their self-regulation because they possess self-determination and are able to disengage from intrusive thoughts and consequently set aside their negative feelings. It takes one's self-determination and control in order for

one's negative feelings not to intrude in thinking and engaging in self-regulation processes.

Incorporating the activation and the role of negative affect with self-regulation in a model addresses the need to arrive with theories that explain the activation of self-regulatory processes. The model where self-regulation is increased because of possessing high activation provides a key process in explaining how it can be sustained. For example, students are able to sustain their self-regulation when under academic pressure because of their desire to attain their goals and they do not give in to their negative emotions. The model is presently limited in the academic and learning context but it can be applied to different contexts such as sports, health, creative activities etc. The models provide effective ways to incorporate the link of activation and self-regulation process into instruction. In the schools setting, teachers can teach students how to manage their negative emotions by using skills to control them.

There are available models that include emotions in a model of self-regulation (ex. Leventhal & Scherer, 1987). But these models view self-regulation as an appraisal to emotions, and self-regulation just turns out to be a form of coping to problematic situations where negative affect states are experienced. The model showing activation as a moderator to the effect of negative affect on self-regulation demonstrates that affect is not usually appraised but would depend on the individuals' level of activation. The role of activation level as a moderator determines whether the attainment and sustenance of self-regulation is met. The activation is not simply viewed as a direct effect on self-regulation as in the action control theory, but rather a condition for achieving self-regulation. What is still needed in theory on self-regulation is to test process models

under conditions where it will work. The past century has already addressed this needed direction by coming up with models explaining the process of self-regulation. Available process theories on self-regulation show a variety of mediational variables before self-regulation occurs. These pathways need to be explained under which conditions they work best and what conditions undermine it and this was demonstrated in the third model.

Zimmerman (2002) said that to make self-regulation work, one needs “effort, will, choice, and desire in order to make it effective and valuable” (p. 69). This study takes this a step further. It implies that, self-regulation is attained not only through indiscriminate will, choice, and desire, but rather through the will, choice, and desire to control disruptions to their thoughts, and sustain this control given one’s self-determination in accomplishing a task. Possessing the ability to persist, initiate, and disengage makes self-regulation achievable.

Most theories and models of self-regulation emphasize its inherent link with goals. The present study addresses not only direct links to self-regulation, but also the operation of activation and inhibition factors on self-regulation. The inclusion of the influence of activation and negative affect on self-regulation further explains human functioning by showing a part of the integration and interaction of social cognitive and emotive factors. By understanding the role of the activation and inhibition systems on self-regulation, teachers and other educational practitioners will be able to work with students to assist them in learning effective ways to manage their learning despite undesirable conditions.

When self-regulation was conceptualized in the 1980's, most researchers' concern was to address how students become masters of their own learning. The models tested in the study did not only show how students can attain self-regulation, but the condition under which negative affect can inhibit or activate it. In the perspective of motivation to self-regulation, there had been previous models showing the mediational role of motivation to self-regulation. These mediational factors only provide the process on how self-regulation is attained (ex. Theories of learning motivation on self-regulation). A more pressing question is how self-regulation is strengthened under aversive conditions such as negative affect and this was tested in the study.

Zimmerman (2001) indicates that there is a need to offer theories that explains the process of self-regulation that merit learning. The models shown in the study provide a process under which self-regulation can operate and a condition under which it is inhibited or activated. The model extends operant theories and processes of self-regulation by specifying variables (action control and self-determination) in view of the controllability of the "self" (Commitment, self-control, impulsivity) that produces self-regulation (Mace, Belfiore, & Hutchinson, 2001).

There is confusion on the concepts of self-regulation and control. It was shown in the model that controllability is distinguished with self-regulation. The results showed that controllability such as the activation system when used at high levels increase self-regulation and serves as a protective factor from negative affect. The concepts of control and self-regulation are distinguished as shown in the measurement models and studying them as separate constructs.

Given the findings in the study, teachers can teach students self-regulation strategy effectively if they can motivate students to develop their self-determination, and ability to disengage, initiate, and persist. However, teachers should be cautious of exposing students to feelings of negative affect because heightening it can reduce their strategic thinking especially those with low activation system. To clearly monitor the self-regulation of students, teachers should assess students' level of action control and self-determination to determine if they can work well when experiencing negative affect. Teachers can teach self-regulation strategies to students further by motivating them to be self-determined and show more effort in their studies. Self-regulation can be further developed if students are taught how to disengage from intrusive thoughts, persist to work on tasks, and initiate their own work.

The present study was limited only on using two waves for administering the measures. It did not further look into recursive effects of the activation and negative affect on self-regulation as what other causal models are tested. The participants in the study were not randomly selected and were only selected using non-probability sampling (purposive). The specific characteristics of the participants such as maturity and demand characteristics were not controlled. Most results tend to have significant outcomes as influenced by a large statistical power because of the large sample size. The correlation coefficients of the factors have a low to moderate strength yet they turned to be significant because of the large sample size.

## Chapter 5

### Summary, Conclusion, and Recommendations

#### *Summary*

The study tested three models in explaining how self-regulation is generated. In the first model, the difference in the effects of the activation and inhibition system on self-regulation was investigated. In the second model, it was proposed that self-regulation is activated when negative affect is experienced. In the third model, it was proposed that individuals with high activation levels (self-determination, initiative, persistent, and able to disengage) who experience low negative affect are able to self-regulate better.

The activation factors are based on the action control (initiative, persistent, and disengagement) and self-determination theory. These factors are activation of self-regulation because individuals possessing these characteristics are able to control thought intrusions such as negative affect. When individuals control ruminative thoughts, they engage well in terms of strategic thinking and effective monitoring to attain their goals (Bargh et al., 2001; Brandstatter et al., 2001; Fujita, Trope, Liberman, & Levin-Sagi, 2006; Muraven & Baumeister, 1999). On the other hand, the negative affect factors are worry, anxiety, fear of negative evaluation, and thought suppression because these factors undermine self-regulation when an individual adapts a defensive reaction in their effort to think and engage in cognitive and metacognitive processes (Eflikes, 2005; Pekrun, Goetz, & Titz, 2002; Schunk, 2001; Zimmerman, 2002).

It is already established in previous studies that action control and self-regulation increases the use of self-regulation strategies while negative affect ruminative thoughts by decreasing self-regulation. There are also available theories that explain negative affect

states promoting achievement behavior. What is still needed in theory is to define certain conditions where processes that lead to self-regulation will work better and conditions where this process can be undermined. Such conditions can be explained through activation and inhibition of self-regulated learning. This is carried out by moderating high and low levels of the activation system on the effect of negative affect on self-regulation.

In the present study 2000 college students as participants were initially given a set of questionnaires that measured the activation, negative affect, and self-regulation factors. Only 1454 participants completed the questionnaires and were included in the analysis. The questionnaires were administered using a longitudinal design where the measures for the activation and negative affect were first administered at one time and the self-regulation in another period among the same participants.

Measurement models were first established before testing the three proposed models. The measurement models indicate that the activation, negative affect, and self-regulation are independent as latent constructs. The three proposed models were proven using Structural Equations Modeling (SEM). It was found that the activation system increased self-regulation and the negative affect decreased self-regulation which served as an inhibition system (model 1). Negative affect can become an activation of self-regulation when it is mediated by the activation system (model 2). But the direct effect of negative affect on self-regulation is negative. It was found that self-regulation can be achieved better by individuals possessing high levels of activation even in the presence of negative affect, as compared to individuals who are low in their activation (model 3). The third model also showed to have the best fit and it explains best in generating self-



regulation. Larger effect size and statistical power was obtained in the effect of negative affect on self-regulation among participants with high activation levels.

### *Conclusions*

It is concluded in the study that individuals particularly students are able to generate self-regulation if they highly use control for debilitating thoughts by disengaging, persisting, initiating, and having self-determination. Self-regulation can also be generated when students are able to manage their negative affect by using action control. Students' with high levels of this activation system was able to self-regulate even when they experience negative affect. Self-regulation works best even in the presence of negative affect when individuals' activation system is high. Regulation of one's learning is facilitated by individuals' possessing high self-determination and is able control intrusive thoughts.

### *Recommendations*

*Future studies on Activation of Self-regulation.* The following recommendations are provided for future research on activation system and negative affect on self-regulation:

1. Experimental manipulations can be made where participants are directly exposed to cognitive inhibition situations and then self-regulation is observed. Because of the limitations of a longitudinal design in a structural model, experimental manipulations on negative affect can directly infer its effect on self-regulation. The measure of self-regulation should be specific on a task when observed after being exposed to a negative affect in the form of cognitive inhibition situations. Consistent results should be obtained to prove the reliability of the findings.

2. Given that negative affect increases with the activation system, further models can be tested using other varieties of negative affect to determine if it will yield the same or different results. The negative affect used in the study are only limited to anxiety, worry, fear of negative evaluation, and thought suppression. There are still a variety of negative affect that can be used to inhibit or might activate self-regulation. Using other negative affect will identify which ones can specifically activate or really inhibit self-regulation under certain conditions.

3. Since the mode is only limited to action-orientation factors, other models can be tested including the state orientation subscale of the action control to see its role in activating or inhibiting self-regulation. Including state orientation in the model can further test the divergent effect of action-state orientations on self-regulation. Having both action and state orientation together in a model can show how different they are in terms of their effects on certain outcomes variables such as self-regulation.

*Developing Self-regulation.* The following are recommendations for teacher to further develop the self-regulation of their students:

1. Considering that low mean scores were obtained for activation of self-regulation, teachers need to start to integrate self-regulation strategies in their teaching and instruction so that students will realize its importance and benefits in their learning. Teachers who commonly teach content and academic skills inside the classroom need to improve their teaching skills by not only teaching content but self-regulation strategies as well. If students learn and develop self-regulation strategies, they become more independent in their learning, and teaching content will be more efficiently carried out. If

learning is improved through self-regulation instruction, it should reflect high scores on national and regional assessment of students' performance.

2. Considering that activation and negative affect can initiate the use of self-regulation, it is important to assess students' level of self-regulation to determine if there is improvement in their use of the strategies and their learning. Considering that there is decline in the students use self-regulation strategies during adolescence (Raffaelli, Crockett, & Sheng, 2005), assessment of self-regulation of students provide teachers how to further help them improve these skills. Assessment of self-regulation will also indicate which specific component of self-regulation is commonly used and misused by students. The teacher having knowledge on this enables them to teach students how to effectively use strategies that is undermined.

3. Considering that the activation system is important in initiating self-regulation, values integration made for each lesson or unit can focus on developing students' self-determination, initiative, persistence, and disengagement that can lead to the use of self-regulation strategies. Values integration should not only focus on traditional values but also on values needed for learning. If students are able to value why they need to develop self-determination, initiative, persistence, and disengagement, they will be able to apply it in their studies and become more autonomous learners.

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## Appendix A

### *Self-regulated Learning Interview Schedule*

**Instructions:** Answer the following questions as fully as you can. The quality of your responses reflects the kind of learning strategies you use. After answering the questions rate your answer using the scale below how often is your answer effective.

1. Assume your teacher is discussing with your class the history of the Philippine revolution. Your teacher says that you will be tested on the topic the next day. *What method do you use to help you learn and remember the information being discussed?* (Rehearsing and memorizing)

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

2. Assume your teacher asked your class to write a short paper on a topic on the history of the organization in school that you belong to. Your score on this paper will affect your course card grade. *In such cases, what method in particular will help you plan and write your paper?* (organizing and transforming)

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

3. Teachers usually expect much accuracy with students' math home work. Many of these assignments must be completed without the help of the teacher. *What particular method do you use when you don't understand a math problem when you're already at home?* (seeking information)

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

4. When completing homework assignments such as science reports or English grammar exercises, *what method do you use in particular for checking your work after it is finished?* (self-evaluation)

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

5. Most teachers give important tests at the end of the semester/term, and these tests greatly affect course grades. *What particular method do you use for preparing for these tests?(Goal-setting and planning)*

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

6. When taking a test in school, *what particular method do you use for obtaining as many correct answers as possible?(keeping records and monitoring)*

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

7. Many times students have difficulty completing homework assignments because there are other more interesting things they would rather do, such as watching TV, daydreaming, or talking to friends. *What particular method do you use to motivate yourself to complete your homework under these circumstances?(self-consequencing)*

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

8. Some students find it easier if they can arrange the place where they study. *What particular method do you use for arranging the place where you study?(environmental structuring)*

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*How often do you use this method? (Put a circle on the number)*

Most of the time ←-----→ Seldom  
 4        3        2        1

Appendix B

*Action Control Scale*

Read each situation and there are two possible responses provided. Rate each response how often you do them. Encircle the number of your choice for each response.

P=Preoccupation      D=Disengagement      (1-12)  
 H=Hesitation          I=Initiative              (13-24)  
 V=Volatility            P=Persistence            (25-36)

	Always	Often	Rarely	Never
1. While listening to the teacher and I can't find my pen anywhere to take notes:				
P1. I have a hard time concentrating on the lesson	4	3	2	1
D1. I put it out of my mind after a little while	4	3	2	1
2. If I've worked for weeks on one school project and then everything goes completely wrong with it:				
P2. It takes me a long time to adjust myself again	4	3	2	1
D2. It bothers me for a while	4	3	2	1
3. When I'm aiming to be a dean's list and have failed every time:				
D3. I can soon put the idea of failing out of my mind	4	3	2	1
P3. The thought that I failed keeps running through my mind	4	3	2	1
4. If I my paper for a class accidentally fell on the floor and became wet:				
D4. I would manage to fix it quickly	4	3	2	1
P4. It would take me a long time to think what to do	4	3	2	1
5. If I have to talk to a group mate for a project and, repeatedly, can't find him or her:				
P5. I can't stop thinking about it, even while I'm doing something else	4	3	2	1
D5. I easily forget about it until I see the person	4	3	2	1
6. When I've bought a lot of school supplies at the store and realize I don't need all of them:				
P6. I can't usually concentrate on anything else	4	3	2	1
D6. I easily forget about it	4	3	2	1
7. When I am told that my school report has been completely unsatisfactory:				
D7. I don't let it bother me for too long	4	3	2	1
P7. I feel paralyzed	4	3	2	1
8. If I'm stuck in traffic and miss an important class with a strict teacher:				
D8. At first, it's difficult for me to start do anything else	4	3	2	1
P8. I quickly forget about it and do something else	4	3	2	1
9. When I am solving a mathematical problem I can't seem to get it right:				
P9. I gradually lose heart	4	3	2	1
D9. I just forget about it and do something else	4	3	2	1
10. When a low score in a test gets me down:				
P10. I have trouble doing anything at all	4	3	2	1
D11. I find it easy to distract myself by doing other things	4	3	2	1
11. When several school requirements go wrong on the same day:				



P11. I usually don't know how to deal with it	4	3	2	1
D11. I just keep on going as though had happened	4	3	2	1
12. When I have put all my effort into doing a really good job on a major school requirement and the whole thing doesn't work out:				
D12. I don't have too much difficulty starting something else	4	3	2	1
P12. I have trouble doing anything else at all	4	3	2	1
13. When I know I must finish my final school report soon:				
H1. I have to push myself to get started	4	3	2	1
I1. I find it easy to get it done and over with	4	3	2	1
14. When I am getting bored with one of my school subject:				
H2. I have trouble getting up enough energy to do anything at all	4	3	2	1
D2. I quickly find something to do	4	3	2	1
15. When I am getting ready to tackle a difficult math problem:				
H3. It feels like I am facing a big mountain that I don't think I can climb	4	3	2	1
I3. I look for a way that the problem can be approached in a suitable manner	4	3	2	1
16. When I have to solve for a difficult math problem in a test:				
I4. I usually don't have a problem getting started on	4	3	2	1
D4. I have trouble sorting things out in my head so that I can get down to working on the problem	4	3	2	1
17. When I have to make up my mind about what I am going to do when I get some unexpected free time in my class schedule:				
H5. It takes me along time to decide what I should do during this free time	4	3	2	1
D5. I can usually decide on something to do without having to think it over very much	4	3	2	1
18. When I have an assignment to do at home:				
H6. It is often hard for me to get the work done	4	3	2	1
I6. I usually get it done right away	4	3	2	1
19. When I have a lot of important school requirements to do and they must all be done soon:				
H7. I often don't know where to begin	4	3	2	1
I7. I find it easy to make a plan and stick with it	4	3	2	1
20. When I have to choose between enrolling in two classes with both exemplary teachers, but I can't do both of them:				
I8. I quickly begin one thing and forget about the other thing I couldn't do	4	3	2	1
H8. It's not easy for me to put the other thing I couldn't do out of my mind	4	3	2	1
21. When I have to finish an unpleasant assignment:				
I9. I do it and get it over with	4	3	2	1
H9. It can take a while before I can bring myself to it	4	3	2	1
22. When I am facing a big school project that has to be done:				
H10. I often spend too long thinking about where I should begin	4	3	2	1
I10. I don't have any problem getting started	4	3	2	1
23. When I have a boring assignment:				
I11. I usually don't have any problem getting through it	4	3	2	1
H11. I sometimes can't get moving on it	4	3	2	1
24. When I am obliged to do a school requirement that is not very interesting:				
I12. I do it and get it over with	4	3	2	1

H12. It can take a while before I can bring myself to do it	4	3	2	1
25. When I have learned a new and interesting computer software in school:				
V1. I quickly get tired of it and do something else	4	3	2	1
P1. I can really get into it for a long time	4	3	2	1
26. When I'm working on a research that is very important to me:				
V2. I still like to do other things in between working on it	4	3	2	1
P2. I get into it so much that I can work on it for a long time	4	3	2	1
27. When I'm watching a really good movie for a class requirement:				
P2. I get so involved in the film that I don't even think of doing anything else	4	3	2	1
V2. I often want to get something else to do while I'm watching the movie	4	3	2	1
28. When I have been busy for along time in reading an interesting book:				
V3. I sometimes think about whether what I'm doing is really worthwhile	4	3	2	1
P3. I usually get so involved in what I'm doing that I never think to ask whether it's worthwhile	4	3	2	1
29. When I read a textbook that interests me:				
P4. I usually remain so interested in it that I read the entire article	4	3	2	1
V4. I still often skip to another chapter before I've finished the first one	4	3	2	1
30. When classes are over and I am having a good time:				
V5. After a while, I really feel like doing something completely different	4	3	2	1
P5. I don't even think about doing anything else until the end of vacation	4	3	2	1
31. When one of my classmates brings up an interesting topic for discussion:				
P6. It can easily develop into a long conversation	4	3	2	1
V6. I soon loose interest and want to go do something else	4	3	2	1
32. When I am busy working on an interesting project:				
V7. I need to take frequent breaks and wok on other projects	4	3	2	1
P7. I can keep working on the same project for a long time	4	3	2	1
33. When I am having an interesting conversation with my teacher:				
P8. I can talk to him or her the entire day	4	3	2	1
V8. I prefer to go do something else after a while	4	3	2	1
34. When it turns out that I am much better at a course than my other classmates:				
V9. I usually feel like doing something else	4	3	2	1
P9. I really like to keep studying	4	3	2	1
35. When I read something I find interesting:				
V10. I sometimes still want to put the article down and do something else	4	3	2	1
P10. I will sit and read the article for along time	4	3	2	1
36. When I am trying to learn something new that I want to learn:				
P11. I'll keep at it for along time	4	3	2	1
V11. I often feel like I need to take a break and go do something else for a while	4	3	2	1

Appendix C

*Perceived Self-determination*

The following are some situations that are experienced in school. Rate the following items using the scale below:

1 = Strongly Disagree

2 = Disagree

3 = Agree

4 = Strongly Disagree

	Strongly Agree	Disagree	Agree	Strongly Disagree
1. I feel I am doing only what others wants me to do (R).	1	2	3	4
2. I feel I am doing what I wanted to be doing.	4	3	2	1
3. I feel I am pursuing goals that are my own.	4	3	2	1
4. I feel a relaxed sense of personal freedom.	4	3	2	1
5. I feel free after accomplishing a goal.	4	3	2	1
6. I feel pressured. (R)	1	2	3	4
7. I believe I have a choice over which solution I will use to solve a problem.	4	3	2	1
8. I feel that it is my own choice as to which problem to solve.	4	3	2	1
9. I feel that I have the control to decide if I will participate well.	4	3	2	1

\*R=Reverse scoring

## Appendix D

*Academic Emotion Questionnaire*

This questionnaire refers to emotions you may experience when studying. Before answering the questions please recall some typical situations of studying which you have experienced during the course of your studies. Read each items carefully and RESPOND USING THE SCALE PROVIDED.

1 = Strongly Disagree

2 = Disagree

3 = Agree

4 = Strongly Disagree

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. When I look at the books or handouts I still have to read, I get anxious.	4	3	2	1
2. I get tense and nervous while studying.	4	3	2	1
3. When I can't keep up with my studies it makes me fearful.	4	3	2	1
4. I am having an apprehension whether I'm able to cope with all my school work.	4	3	2	1
5. The subject scares me when I don't fully understand it.	4	3	2	1
6. I get tense whether I have properly understood a new lesson.	4	3	2	1
7. I get so nervous a day before a test that I don't even want to begin studying.	4	3	2	1
8. While studying I feel like distracting myself in order to reduce my anxiety.	4	3	2	1
9. When I have to study I start to feel queasy.	4	3	2	1
10. As time runs out, my heart begins to race.	4	3	2	1
11. I get tense when the time is up and I am not yet finished with some items in a test.	4	3	2	1

Appendix E

*Fear of Negative Evaluation*

For the following statements please indicate how each is true about you when engaged in your studies using the following the scale:

1 = Not at all characteristic of me

2 = Slight characteristic of me

3 = Very characteristic of me

4 = Extreme characteristic of me

1. I worry about what other people will think of me.	4	3	2	1
2. I am concerned when I assert an idea because people might form an unfavorable impression of me.	4	3	2	1
3. I am frequently afraid of other people noticing my shortcomings.	4	3	2	1
4. I worry about what kind of impression I am making on other people.	4	3	2	1
5. I am afraid that others will not approve me.	4	3	2	1
6. I am afraid that others will find fault about me.	4	3	2	1
7. Other peoples' opinion of me bothers me.	4	3	2	1
8. I worry about what my classmates may be thinking about me.	4	3	2	1
9. I am usually worried about what kind of impression I make.	4	3	2	1
10. I am affected if I know others are judging me.	4	3	2	1
11. I think I am too concerned with what others think of me.	4	3	2	1
12. I often worry that I will say or do the wrong things.	4	3	2	1

Appendix F

*Penn State Worry Questionnaire*

Encircle the number of the scale that best describes how are each of the 16 items true about you when engaged in studying and attending classes. Encircle the number that best describes you using the following scale.

1	2	3	4
Not at all Typical	Somewhat typical		Very Typical

1. I worry if I don't have enough time to do all my work.	4	3	2	1
2. My worries about my work load overwhelm me.	4	3	2	1
3. I tend to worry how well others will do their part on a group project.	4	3	2	1
4. All activities I engage in make me worry.	4	3	2	1
5. I know I shouldn't worry, but I just can't help it.	4	3	2	1
6. When I am under pressure, I worry a lot.	4	3	2	1
7. I am always worrying when a requirement is given.	4	3	2	1
8. I find it difficult to dismiss worrisome thoughts of failing.	4	3	2	1
9. I start to worry about everything else that I have to do.	4	3	2	1
10. I worry about everything especially when there is a requirement.	4	3	2	1
11. When there is nothing more I can do, I worry about it more.	4	3	2	1
12. I've been worried for a long time.	4	3	2	1
13. I notice that I have been worrying about all the assigned tasks to others.	4	3	2	1
14. Once I start worrying for a forthcoming event, I can't stop it.	4	3	2	1
15. I worry all the time.	4	3	2	1
16. I worry about events to come until they come.	4	3	2	1

Appendix G

*White Bear Suppression Inventory*

This survey is about your thoughts when you study and engage in academic tasks. There is no right or wrong answer. Please respond honestly to each of the items below. Be sure to answer every item by encircling the number of your choice before each statement.

1 = Strongly Disagree

2 = Disagree

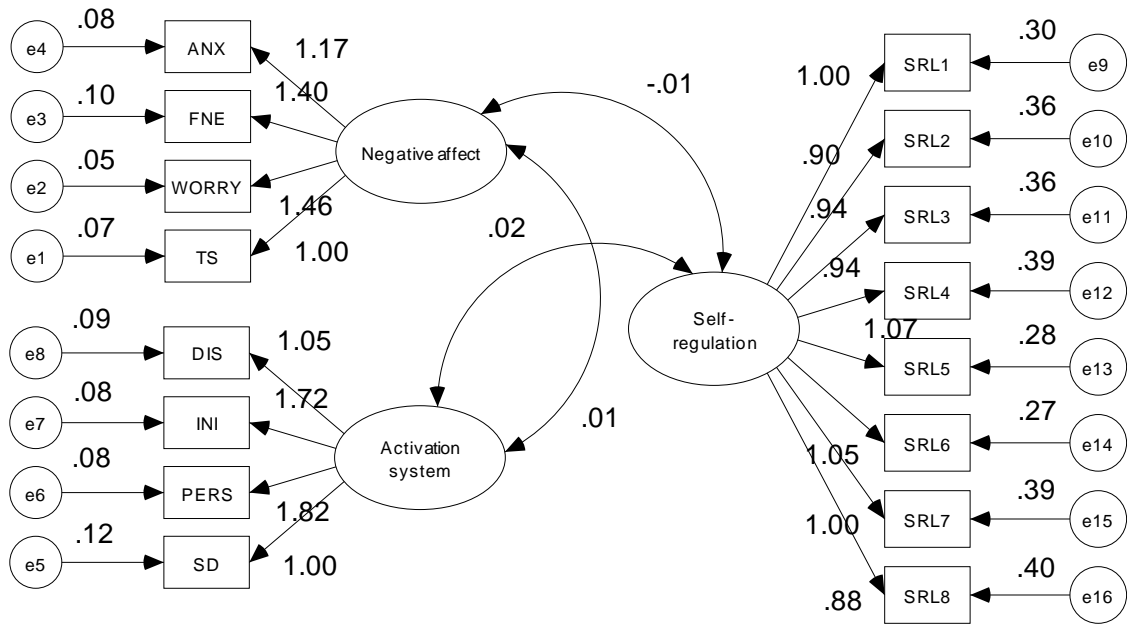
3 = Agree

4 = Strongly Disagree

1. There are things I prefer not to think about.	4	3	2	1
2. I wonder why I have the thoughts I do.	4	3	2	1
3. I have thoughts that I cannot stop.	4	3	2	1
4. There are images that come to mind that I cannot erase.	4	3	2	1
5. My thoughts frequently return to one idea.	4	3	2	1
6. I wish I could stop thinking of certain things.	4	3	2	1
7. My mind races so fast I wish I could stop it.	4	3	2	1
8. I try to put problems out of my mind.	4	3	2	1
9. There are thoughts that keep jumping into my head.	4	3	2	1
10. There are things that I try not to think about when.	4	3	2	1
11. Sometimes I really wish I could stop thinking about the things that I have to do.	4	3	2	1
12. I do things to distract myself from my intervening thoughts.	4	3	2	1
13. I have thoughts that I try to avoid.	4	3	2	1
14. There are many thoughts that I have that I don't tell anyone.	4	3	2	1
15. I stay busy just to keep thoughts from intruding in my mind.	4	3	2	1

## Appendix H

### *Three-Factor Measurement Model*



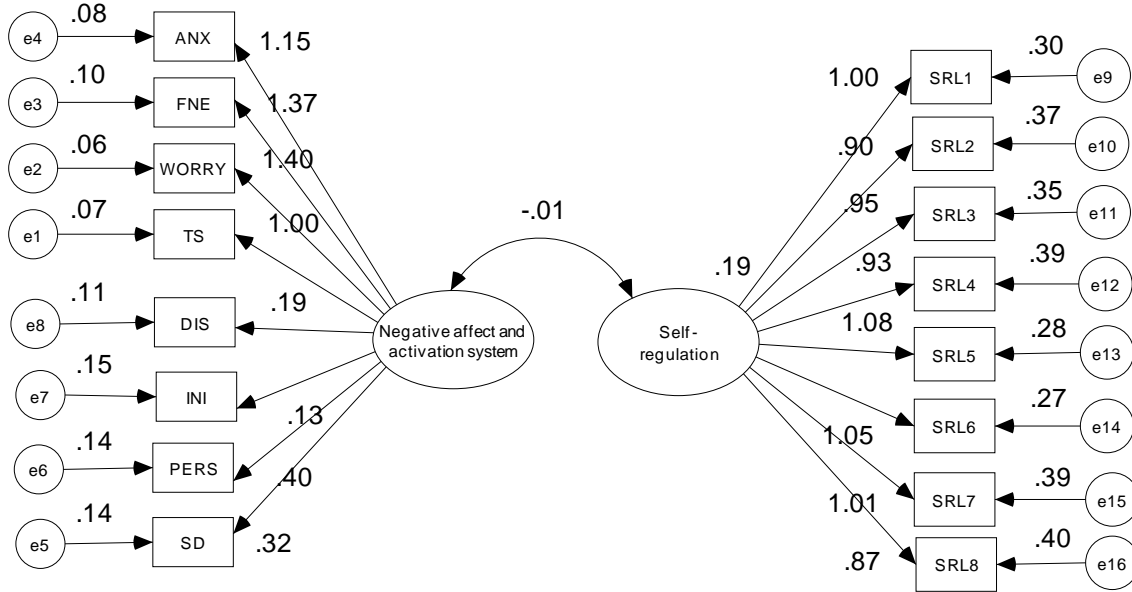
*Note.* ANX=anxiety, FNE=Fear of Negative Evaluation, TS=Thought Suppression, DIS=disengagement, INI=Initiative, PERS=Persistence, SD=Self-determination, SRL1=rehearsing and memorizing, SRL2=organizing and transforming, SRL3=seeking information, SRL4=self-evaluation, SRL5=goal-setting and planning, SRL6=keeping records and monitoring, SRL7=self-consequencing, and SRL8=environmental structuring. All parameter estimates are significant at .01. The estimates among the latent constructs are covariance,  $p < .01$ .



Appendix I

Two-Factor Measurement Model:

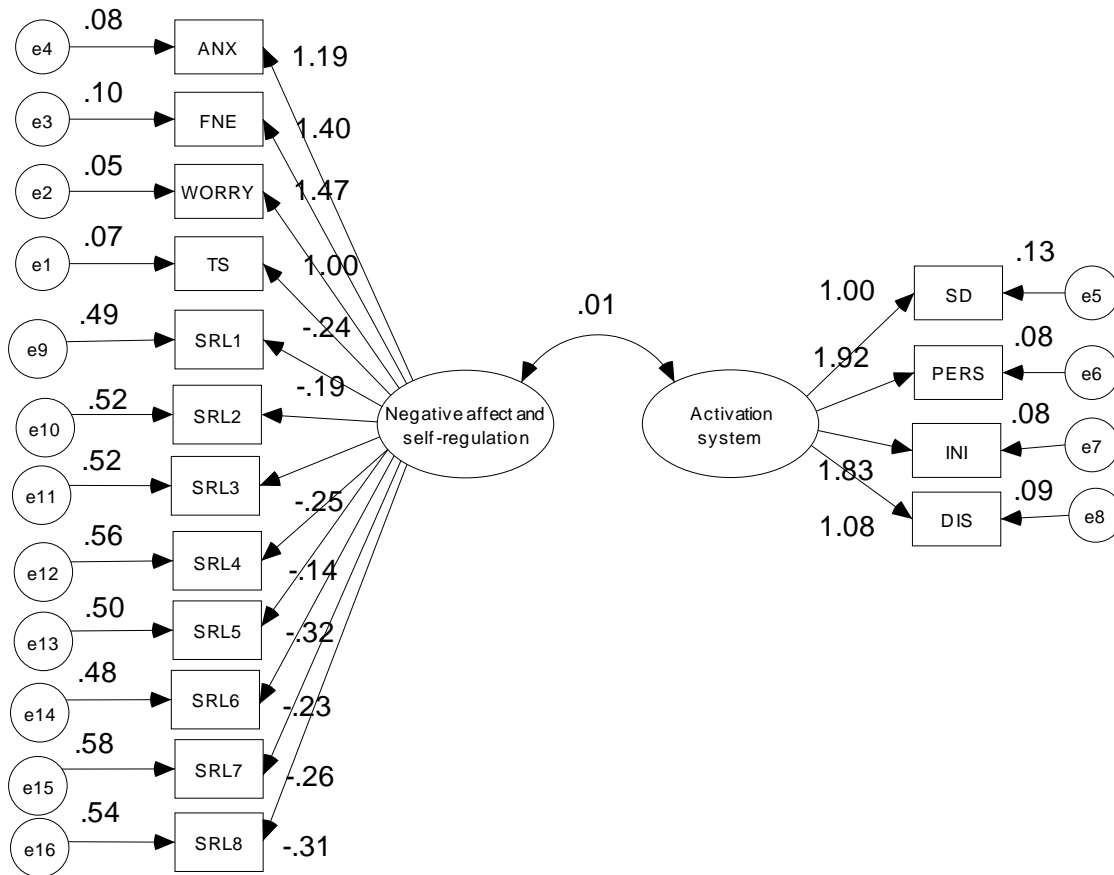
A. Negative Affect and Activation System in One Latent Factor



Note. ANX=anxiety, FNE=Fear of Negative Evaluation, TS=Thought Suppression, DIS=disengagement, INI=Initiative, PERS=Persistence, SD=Self-determination, SRL1=rehearsing and memorizing, SRL2=organizing and transforming, SRL3=seeking information, SRL4=self-evaluation, SRL5=goal-setting and planning, SRL6=keeping records and monitoring, SRL7=self-consequencing, and SRL8=environmental structuring. The relationship between combined negative affect and activation system to self-regulation is not significant. All parameter estimates are significant at .01. The estimates of the two latent constructs is a covariance,  $p < .01$ .

Appendix J

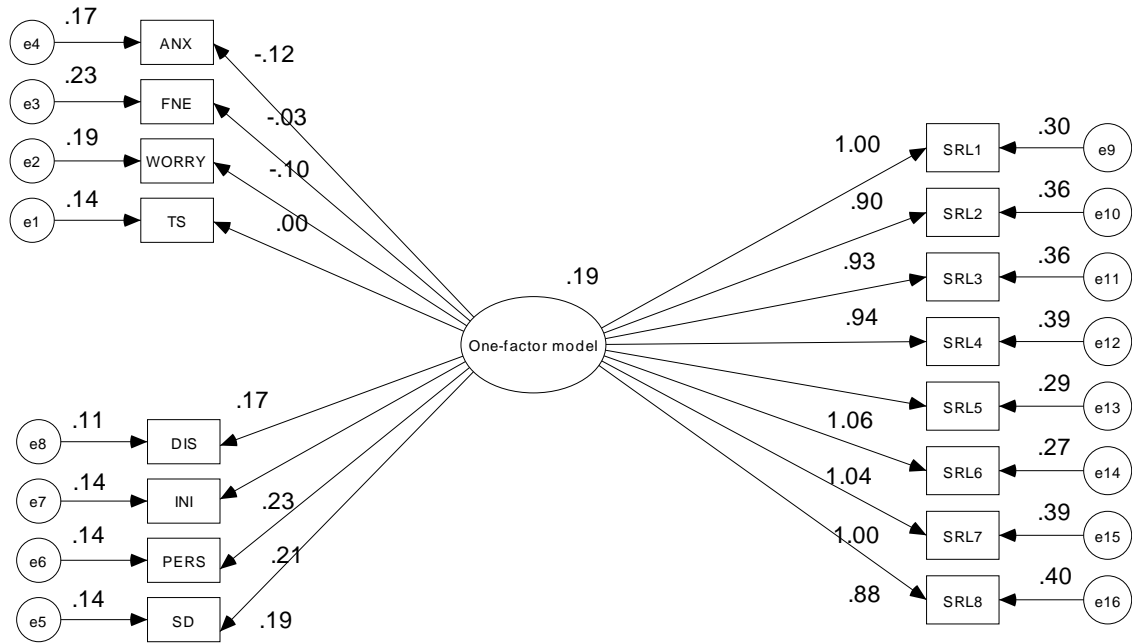
*Negative Affect and Self-regulation in One Latent Factor*



*Note.* ANX=anxiety, FNE=Fear of Negative Evaluation, TS=Thought Suppression, DIS=disengagement, INI=Initiative, PERS=Persistence, SD=Self-determination, SRL1=rehearsing and memorizing, SRL2=organizing and transforming, SRL3=seeking information, SRL4=self-evaluation, SRL5=goal-setting and planning, SRL6=keeping records and monitoring, SRL7=self-consequencing, and SRL8=environmental structuring. All parameter estimates are significant at .01. The estimates of the two latent constructs is a covariance,  $p < .01$ .

Appendix K

*One-Factor Measurement Model*



*Note.* ANX=anxiety, FNE=Fear of Negative Evaluation, TS=Thought Suppression, DIS=disengagement, INI=Initiative, PERS=Persistence, SD=Self-determination, SRL1=rehearsing and memorizing, SRL2=organizing and transforming, SRL3=seeking information, SRL4=self-evaluation, SRL5=goal-setting and planning, SRL6=keeping records and monitoring, SRL7=self-consequencing, and SRL8=environmental structuring. All parameter estimates are significant except for fear of negative evaluation, worry, and thought suppression.