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The Effect of Active Learning Exercises on Academic Performance and Nonintellectual Learning Factors

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THE EFFECT OF ACTIVE LEARNING EXERCISES ON ACADEMIC PERFORMANCE AND NONINTELLECTUAL LEARNING FACTORS

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Title: The Effect of Active Learning Exercises on Academic Performance and Nonintellectual Learning Factors

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The current study examined the effect of an active learning-based teaching method on nonintellectual learning dispositions in students enrolled in general psychology. Expected outcomes included improvement in student nonintellectual learning factors, as well as improvement in student academic performance.

Two graduate student instructors and four courses of general psychology were recruited for participation. SAT scores, course grades, student ratings of teachers, and measures of nonintellectual learning factors were collected for analysis.

The analysis of student academic performance, teacher ratings, and change in nonintellectual learning dispositions as measured on the TRAC-R did not support study hypotheses. Rather, main effects were found for instructor. Across conditions, students rated Instructor B as preferred according to teacher ratings. Additionally, students in Instructor B's courses earned significantly higher grades than those enrolled in Instructor A's courses.

Based on these findings, it can be concluded that instructor influences significantly affected the results of the current study despite attempts to match instructors based on age and experience. Therefore, future research may consider recruiting tenured faculty who may be more knowledgeable regarding their potential influence on student academic performance and nonintellectual learning factors.

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Dedication

First and foremost, to my Lord and Savior, Jesus Christ, who has guided and directed me to this world of psychology, a world in which I find fulfillment, joy, amazement, and for which I have a passion that surpasses my wildest dreams. Thank you.

To my husband, Ben, without whom I may never have taken the road less travelled to achieve a milestone I never imagined. Thank you for so many things, but especially for understanding my dream and doing everything within your power to make it a reality. I love you.

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To my grandma who has always seemed to see something in me that I could never see in myself. Thank you for believing in and unconditionally loving who I was, who I am, and who I will become. I have come a long way.

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To my precious niece who is merely a toddler, and nonetheless, the smartest and most beautiful girl in the world. Thank you for inspiring me to continue learning and for reminding me that my job has only just begun. I adore you.

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Chapter 1: STATEMENT OF THE PROBLEM

There is a plethora of research examining factors that may or may not affect a student's academic performance and other factors related to college adjustment (i.e., seeking help from peers and teachers). Some of these factors, generally speaking, are factors associated with the professor (e.g., support of students, training), while others are associated with the student (e.g., academic performance, social network, motivation) (Martin, Swartz-Kulstad, & Madson, 1999).

Of importance to the current study were teaching method, a factor associated with the professor, and nonintellectual learning dispositions, a factor associated with the student. Research has shown that some teaching methods are superior to others in terms of student learning and at helping students to best retain course information (Balch, 2005; Benedict & Anderson, 2004; Lawson, Bodle, Houlette, & Haubner, 2006; Saville, Zinn, & Elliott, 2005). Thus, college professors develop and apply different teaching methods in order to communicate the necessary and required course material to a diverse group of students.

Students who enroll in college courses possess varying intellectual and nonintellectual learning factors that are associated with their overall performance (Larose, Robertson, Roy, & Legault, 1998). Intellectual learning factors are those which can be inferred based on a student's high school grade point average (GPA), and scores on such tests as the Scholastic Aptitude Test (SAT) and American College Test (ACT). Colleges and universities often utilize these scores and ratings as both inclusion and exclusion criteria during the application process, thereby limiting the number of applicants who purportedly are ill equipped for college work from being accepted for

admission. Nonintellectual learning factors, on the other hand, cannot be understood by assessing a student's academic achievements or educational test scores. These factors include fear of failure, quality of attention, and giving priorities to studies (Larose, Robertson, Roy, & Legault, 1998), and are not completely unrelated to intellectual factors. In fact, research has shown that nonintellectual learning factors, or dispositions, may influence a student's demonstration of his or her intellectual ability and is reflected in overall academic and college success (Larose, Robertson, Roy, & Legault, 1998).

Research has shown that active learning-based teaching methods are more affective than traditional methods, such as lecture, at improving student academic performance (Balch, 2005; Saville, Zinn, & Elliott, 2005). Furthermore, research has also determined that students who demonstrate adaptive college adjustment, as indicated by the measurement of nonintellectual factors, are more likely to also achieve academic success (Leong & Bonz, 1997). Despite these similar findings regarding the influence of teaching method and nonintellectual learning factors on academic success, there is a lack of research examining the effect of active learning-based teaching methods on nonintellectual learning factors. Thus, the purpose of the current study was to address this deficit in the research by examining the effect of a specific active learning-based teaching method on nonintellectual learning dispositions. Expected outcomes included improvement in student nonintellectual learning factors, as well as improvement in student academic performance.

Chapter 2: INTRODUCTION

Teaching Method

Research has shown that active learning-based teaching methods are effective at facilitating and enhancing students' acquisition of knowledge in various psychology courses (Biggs, 2003; Harton, Richardson, Barreras, Rockloff, & Latané, 2002; Kolar & McBride, 2003; Yoder & Hochevar, 2005; Zehr, 2004). Additionally, research demonstrates that active learning-based teaching methods are more effective than traditional teaching methods, such as lecture, at improving exam performance (Balch, 2005; Saville, Zinn, & Elliott, 2005), subjective course ratings (Balch, 2005; Benedict & Anderson, 2004), learning from educational videos (Lawson, Bodle, Houlette, & Haubner, 2006), and facilitation of the learning process (Balch, 2005; Benedict & Anderson, 2004; Saville, Zinn, & Elliott, 2005). These results indicate that professors seeking to successfully impart knowledge through teaching course material may better achieve this goal by selecting and implementing an active learning-based teaching method. Supporting these results, Brewer (2003) noted that William James, in his writings, emphasized that skilled professors should not apply mechanistic teaching methods, such as lecture, because these methods are not effective means through which to engage students in the material. Brewer also remarked that James emphasized the necessity of encouraging students to think critically and develop meaningful methods through which to remember course information. Therefore, it is clear that as early as the 17th century, active learning-based teaching methods were heralded as important and potentially superior to more traditional and mechanistic teaching methods.

Active learning, when considered as a compound word, can be simply understood as “being in physical motion” while in “the act, process, or experience of gaining knowledge or skill” (Dictionary.com, n.d.). Researchers, on the other hand, have defined active learning as “anything that students do in a classroom other than merely passively listening to an instructor's lecture” (Paulson & Faust, n.d.). More specifically, Meyers and Jones (1993) emphasized that “active learning involves providing opportunities for students to meaningfully talk and listen, write, read, and reflect on the content, ideas, issues, and concerns of an academic subject” (p. 6). These definitions indicate that an active learning-based teaching method is not one in which the professor simply lectures to students without regard for their involvement with the material, but one in which the professor involves students with the lecture material through any number of means, including lecture-based homework assignments and small group class discussions. Both researchers and professors have acknowledged the benefits of using active learning-based teaching methods and have worked to develop different approaches to encourage active learning in the classroom.

Connor-Greene (2005) examined the effect of a writing project assigned prior to class on understanding reading material and in-class discussions and developed an active learning-based teaching method she calls “question, quotation, and talking points,” or QQTP. QQTP is based on and involves written assignments that prompt students to create questions requiring more than basic knowledge of the assigned reading, to present quotations from the assigned reading they found controversial or interesting, and to write talking points for classroom discussion based on the assigned reading. After applying QQTP in two different undergraduate psychology courses, women and psychology and a

social construction of madness honors seminar, Connor-Greene found that students rated these assignments as helpful overall. Specifically, students rated the talking points portion of the assignment as most effective at preparing them for class discussion and assisting them in understanding the reading material. Creating questions based on the material was rated as the next most helpful portion of the assignment. According to Connor-Green, QQTP seems to be successful at encouraging students to engage with the course material in an active manner, thereby resulting in more effective learning and an overall ability to better understand course material.

Marek, Christopher, Koenig, and Reinhart (2005) were also interested in the effect of writing assignments on students' abilities to solidify and better understand knowledge and information covered in the course. In contrast to assignments created by other researchers that require students to take home a paper prompt or handout, Marek et al. created an internet-based writing assignment that required students to write a brief paper based on a series of specific questions while also drawing on personal experience relevant to the prompt topic (i.e., sleep). According to student reports, the writing assignment increased understanding of the prompt topic and was recommended for use in the future. Based on this student report finding, Marek et al. proposed that writing assignments may have supported student involvement with the prompt material as well as the course, emphasizing the potential for such assignments to encourage students to engage in active learning techniques.

Similar to the proposition of Marek et al. (2005), Christopher and Walter (2006) proposed that students who complete specific assignments that target primary sources of information will gain an increased understanding of psychological statistics and research

methods. Their study examined the effect of a writing assignment that required students to answer questions from primary information sources. These questions prompted students to interpret the content of reading material that illustrates concepts being covered and discussed in class. They posited four benefits of this writing assignment. First, students must integrate research method information with statistical information covered in the reading. Second, teachers can determine with a greater degree of certainty that students have not only read, but also are more likely to understand assigned reading. Third, the assignments afford students the opportunity to understand the "big picture" of the concepts presented, instead of just coming away from the reading with facts and unimportant details. Finally, the assignment can be used in any course, providing teachers with the opportunity to use the assignment in multiple statistics and research methods courses. In addition to these proposed benefits of the writing assignment, Christopher and Walter found that the class who completed the assignment performed better on exams than did the class who did not complete the assignment, supporting their initial hypotheses and the incorporation of an active learning-based assignment into course requirements.

Merwin (2003) similarly developed an active learning-based writing assignment that also incorporated a culminating in-class activity. This active learning assignment adapted the word game, Taboo, for use with assigned psychology terminology. Titled "Forbidden Words," Merwin's game requires students to describe certain psychology terms to a group of peers without using a specified list of "forbidden words" that would simplify the guessing task. Students are integrated into the development of the method by creating the list of forbidden words for each term to be described. Thus, students must

have read the assigned course material and achieved a basic understanding of the target words to be involved in the development of the game. Merwin used Forbidden Words as an in-class review before exams, and found that a majority of students (75%) endorsed the game as an effective test preparation and 71% believed that developing the game helped them to learn the concepts presented in the reading material. Although Merwin did not assess the effect of Forbidden Words on overall course or exam performance, it is clear that this active learning approach, according to students' personal ratings, encouraged students to review the material and improved their perception of their performance.

Many professors, in lieu of developing unique active learning-based teaching approaches or assignments, incorporate the use of study guides into their courses. Research on this type of active learning approach yields mixed results. Dickson, Miller, and Devoley (2005) examined the effectiveness of text-based study guides on student performance in introductory psychology courses. They found that students in classes that required completion of the study guide performed significantly better on multiple choice exams than students in classes not required to complete the study guide. Based on these findings, Dickson, Miller, and Devoley suggest several possible mechanisms that may explain the improved performance demonstrated by those students in classes that required completion of the study guide. First, authors propose that the study guide, which was coordinated with the course text, may have facilitated learning the course material through processing, practice, and application of the material in unique ways. Second, the study guide may have prompted students to become and remain engaged with the course material throughout the semester. Third, practicing multiple-choice questions on the

study guide may have aided students' test-taking ability and also reduce test anxiety, as well as potentially increasing their learning of the material. Finally, many study guide questions were also presented on course exams, providing exposure and practice for the students prior to examination. Based on these potential mechanisms, Dickson, Miller, and Devoley noted that time students spend learning course material must be spent in active-learning methods that encourage students to engage in the material in ways that correspond to the examination method of the course. Therefore, these findings and conclusions indicate that incorporating an active learning-based technique, such as a study guide, improves exam performance.

Similar to study guides, crib cards are guides students construct prior to an exam with the goal of including material on the crib card that will aid their overall exam performance. The act of constructing the card involves covering exam material and incorporating it onto the card, thus creating an individualized study guide and memory aid; this process may be considered an active learning method. In their study that examined the effectiveness of crib cards on exam performance, Dickson and Miller (2005) found that such memory aids do not enhance student performance. In contrast to the use of pre-made study guides provided to students by their professor, the creation of crib card study guides may have diverted students from productive study activities instead of encouraging such activities during the creation of the crib cards (Dickson & Miller, 2005). In a subsequent study examining the use of crib cards, Dickson and Miller (2006) found that students performed better on multiple choice exams when using cards constructed by other students than when using self-constructed cards. Based on these findings, the authors concluded that students make a greater effort to study and

understand exam material when they do not expect to use a study aid during the exam (Dickson & Miller, 2006). Students permitted to use a pre-constructed study guide or aid during an exam, therefore, do not actively engage in the material to the extent that they would when not expecting to use such an aid. These results regarding different forms of study guide use indicate, then, that a pre-constructed study guide required by the course syllabus or allowed by the professor for use on an exam may increase student exam performance, as well as encourage students to engage in active learning techniques.

Key to the completion of text-based assignments such as the QQTP (Connor-Green, 2005) and other general writing assignments is that students engage in reading the required text material associated with those assignments. Recognizing the possibility that many students will not read the required material despite required completion of a writing assignment, Uskul and Eaton (2005) examined an alternative strategy aimed at increasing the likelihood that students would read required text material before class. This alternative strategy incorporated the use of graded assignments that required students to provide essay, or long, answers to questions associated with the reading material. In addition to examining whether this assignment would increase the likelihood of students reading the material, Uskul and Eaton also examined whether these assignments would improve student performance on those exam questions presented on the graded writing assignment. Study findings indicate that the graded assignments did increase student performance on exam questions related to material presented on the assignments. Additionally, students endorsed having read more of the assigned text material when there was also a graded assignment required than when there was no assignment; students also responded with positive evaluations of this active learning strategy. Based on these

findings, Uskul and Eaton concluded that using long-answer questions on written assignments may be an effective method through which to increase timely student reading of the course text, especially when these assignments also contribute to the student's overall grade.

Gurung (2005) proposed that all study methods may not enhance student learning. In a study that assessed the actual methods students utilize to study course material, Gurung hypothesized that study habits that supported elaboration of material as well as metacognition would lead to higher exam scores while methods that reduce elaboration of material would lead to lower exam scores. Gurung found that the more students actively engaged with the course material through such methods as memorizing class notes, making up examples, reading the book, reading class notes, using mnemonics, and testing their knowledge, the higher were their exam scores. On the other hand, students whose study habits included listening to music, watching television, and using the internet earned worse exam scores than their peers. These results confirm the fact that not all study habits enhance student learning, and highlight the potential effectiveness of active learning-based methods.

In an earlier study, Gurung (2004) examined learning aids students use and whether or not the use of these aids was effective at enhancing student exam performance. Gurung emphasized that when pedagogical aids are used properly, they will enhance student learning and also have the potential to make students aware of the course material they do and do not know. Based on this proposal, Gurung hypothesized that students who perform poorly on exams early in the semester will employ the use of learning aids during the remainder of the semester. Examining student use of learning

aids, Gurung found that students who did not perform well on the semester's first exam reviewed the summary sections in the assigned text more often for the final exam than for the first exam. However, overall Gurung found that student use of learning aids did not change significantly and student study habits remained stable throughout the semester despite feedback regarding exam performance. These results indicate that students may not be utilizing study aids effectively or incorporating active learning methods to engage with required material. Based on these findings Gurung concluded that instructors should teach the best way to utilize pedagogical aids instead of simply informing students of aids available to them in the required text.

Some universities have developed specific courses to improve student learning. Hofer and Yu (2003) examined the effects of a "Learning to Learn" course that utilizes active learning techniques to teach students different mental processes associated with learning and also teaches students when to use different learning strategies to learn the course material. Hofer and Yu found that students enrolled in the "Learning to Learn" course experienced significant increases in both motivational and cognitive variables. Specifically, students' use of the active learning techniques of memorization, elaboration, organization, deep processing, planning, and metacognition increased. This study may indicate, therefore, that students who complete a course based on active learning methods specifically intended to increase students' personal motivation and cognitive skills for learning will see improvement in their course work and personal study time.

According to Biggs (2003) "teaching 'works' by getting students to engage in learning-related activities that help them attain the particular objectives set for the unit or course" (p. 9). Recognizing that each student enrolled in a given course presents with a

unique approach to learning, Biggs called attention to the importance of professors seeking to provide support for students who may need greater assistance in understanding and carrying out the "higher-level activities" (p. 9) essential in postsecondary education. Therefore, Biggs proposed an active learning-based teaching method that addresses the needs of both the advanced learners in a course and the more remedial learners, while also being clearly aligned with the course objectives. He referred to this method as "constructive alignment," (p. 11) calling attention to the components of constructive student learning and the professor's aligned teaching approach. More specifically, constructive alignment describes the active participation of the student in learning as the teacher presents course material in a manner that directly attends to the stated course objectives and assessment.

According to Biggs (2003) students who utilize active learning techniques apply a "deep" approach to learning (p. 16), emphasizing that these students have more successful and effective study habits, as well as more supportive learning techniques and motivation, which lead to greater overall success in coursework; these learners seek to understand course material (p. 12). On the other hand, students who utilize a "surface" approach to learning do not use effective study habits or supportive learning techniques, but seek to complete a learning task; these learners recall facts, but lack comprehension of the course material (p. 12). The professor's challenge using Biggs' method is to apply an active learning-based teaching method that meets each student at their level of proficiency and enables them to grow closer to becoming a deep or deeper learner. Essentially, Biggs' method places the onus of responsibility on the professor to assess the learning proficiency of the students in his or her course and develop a method utilizing

active learning-related activities that will facilitate successful completion of the course. Presumably students will earn at least an average grade, while at the same time acquiring new methods through which to learn academic material if the method designed by Biggs is utilized. Biggs' method calls attention to the fact that professors are only able to control those factors which they introduce into the classroom, and that despite the many factors a student may bring to the learning environment (e.g., motivational level, interest), the professor's main goal is to establish a teaching technique that will lead to academic success for all students, regardless of prior ability.

Biggs' (2003) view of teaching may seem biased as it emphasizes the responsibility of professors to enable student academic success is important for focusing faculty on personal teaching method as both a philosophy and an approach to teaching. However, Biggs notes that professors are only able to control what *they* bring into the academic learning environment, and must consider the diversity of students enrolled in a given course who present with varying scholarly abilities.

Faculty might assume that students accepted into college have achieved either an acceptable score on an admission test or an appropriate high school GPA sufficient for predicting college success. However, such scores measure preexisting intellectual factors and, although important to students' postsecondary educational pursuits, represent only one domain of academic success. Nonintellectual learning factors, or those factors not directly related to a student's performance on tests of intellectual ability, also contribute to academic success and may be affected by teaching method.

Nonintellectual Learning Factors

Intellectual factors refer to a student's intellectual skills and abilities, such as aptitude and intelligence (Larose, Robertson, Roy, and Legault, 1998). Nonintellectual learning factors, on the other hand, is a general term that refers to a set of beliefs, emotions, and behaviors associated with a student's academic performance (Larose, Robertson, Roy, and Legault, 1998). Although intellectual factors influence college student success, scores of research studies have found that nonintellectual factors demonstrate greater predictive ability than intellectual factors at determining academic success, and are measured in order to assess student adaptation to college (Larose, Robertson, Roy, & Legault, 1998; Gerdes & Mallinckrodt, 1994; Strage, 2000).

Andersson (2003) found mixed results in a study examining the opinions held by professors from two different academic departments regarding whether they believed cognitive or non-cognitive factors are important for study success. Professors in the Department of Social Welfare placed more importance on non-cognitive factors, whereas professors in the Department of Business Administration placed more importance on cognitive factors. Andersson noted that these results imply that it may be beneficial for academic programs to reach a consensus regarding the factors important for study success, especially when considering students for admission to their programs. Such an agreement might enable students to achieve greater academic success or potentially improve a student's adjustment to college because expectations and opinions about success are known and could be used to encourage student goals or strategies.

Strage (2000) examined the differential influence both intellectual and nonintellectual factors had on the academic success and the adaptation to college of

Hispanic, White, and South-East Asian-American students. In an assessment of nonintellectual factors, Strage found that higher ratings of student rapport with professors was associated with both college success and adjustment across all three groups of students thereby emphasizing the important role professors play in the future achievement students attain. Strage also reported that differences in family background, motivational style, and parental style impacted each student differently, underscoring the impact nonintellectual factors may have on student success and adjustment. For example, the South-East Asian-American students had to overcome family pressures to achieve both academic success and successful adjustment to college, while the Hispanic students experienced both high levels of emotional support and autonomy from their family. These findings led Strage to note that focusing on student Grade Point Average (GPA) to the exclusion of nonintellectual factors does not provide academic programs with the clearest picture of the dynamics and expectations students bring with them into their college academic career.

In addition to the expectations teachers have regarding the importance of intellectual or nonintellectual factors, students face many intrapersonal, environmental, interpersonal, and academic challenges when entering college (Ross, Niebling, & Heckert, 1999). Some students are able to develop or improve coping mechanisms that help them to manage the many changes occurring in their academic experience; these coping mechanisms can be considered nonintellectual factors of adjustment. In a study that examined both the challenges and academic success of college students with learning disabilities, Barga (1996) found that students employed both positive and negative coping techniques to deal with the rigors of college life. Positive techniques included applying

self-improvement techniques and management strategies to help with courses. The negative technique used was referred to as “passing,” indicating that students kept their learning difficulties secret from others. Barga questions whether colleges and universities apply effective teaching techniques capable of teaching a diverse population of students, because the findings of this study showed that students with learning disabilities, for example, developed negative and potentially detrimental coping mechanisms in order to adjust to, and succeed in, college. Thus, students coping with an array of nonintellectual issues are at risk for similarly developing disabling coping behaviors associated with their academic performance. In addition to emphasizing the influence of nonintellectual factors on student adjustment to college, this study highlighted the importance of teachers understanding these factors and adjusting their teaching approach to better address the challenges presented by a diverse student population.

Like Barga (1996), Ross, Niebling, and Heckert (1999) recognized that students endure many stressors, both new and recurring, when beginning their college education. Their study examined the specific sources and nature of these stressors. They found that many of the sources of stress identified by students on their survey were related to students’ adjustment to college living: change in sleeping habits, vacations/breaks, change in eating habits, new responsibilities, and increased class workload. Murff (2005) similarly argued that the stressors experienced by college students may impair their ability to achieve educational success. Together these results suggest that student success may be affected by a student’s ability to develop coping mechanisms to adapt to the many changes introduced during college life.

In contrast to the idea that stressors negatively impact student adjustment to college and academic success, Szafran (2001) found that students who registered for more course hours earned higher GPA's than those who registered for fewer course hours. Contrary to Ross, Niebling, and Heckert's (1999) conclusion that students identify increased class workload as a stressor, many students are able to independently adjust to the increased workload and course load to strive toward, and even achieve, academic success (Szafran, 2001). However, Szafran also found that students who registered for an increased load of more difficult courses experienced discouragement and did not feel appropriately challenged to adjust to the increased demand on their time, instead performing more poorly in their courses. Considering these results regarding course difficulty, Szafran proposed that advisers become more involved in helping students select courses that more closely match their ability level in order to encourage enhanced adjustment and success during the first academic year.

As Barga emphasized in his 1996 study these students may apply different coping mechanisms when faced with the stressors of adjusting to their postsecondary academic and social life; again, these coping mechanisms can be considered a demonstration of yet another nonintellectual factor that influences adjustment. Leong and Bonz (1997) examined the effect of student coping styles on adjustment to college, as well as general academic success in college. They found that those students who applied active coping strategies, defined as "doing something positive to solve the problem," experienced higher levels of adjustment as indicated on the Student Adaptation to College Questionnaire (SACQ) (Baker & Siryk, 1989). Active coping specifically seemed to exert a positive impact on student academic and personal emotional adjustments. Based on

these results, Leong and Bonz recommend that counselors invest time in teaching students active coping skills to aid their overall adjustment to college, an approach similar to that recommended by Szafran (2001).

It is clear, based on the extant research, that counselors may serve an influential and helpful role in assisting incoming students' adjustment to the stressors of college life and acquiring the coping skills necessary for academic success. Olszewski-Kubilius and Laubscher (1996) examined the effect a college and career counseling program had on the college adjustment of economically disadvantaged but intellectually gifted students. Students completed the counseling program before applying to and beginning college by attending monthly day-long seminars covering nonintellectual factors and other topics such as study and organizational skills and choosing a college to match their interests. Three years after completing the counseling program, students were assessed for overall adjustment to college. Olszewski-Kubilius and Laubscher found that these students experienced more difficulty with adjusting to living away from home and the dorm life than did controls, but overall they experienced no more difficulty than controls in their academic and personal emotional adjustment. This may indicate that even at-risk students are able to develop and adapt learning strategies in order to improve the likelihood of positive adjustment to college and is consistent with Barga's study on the coping mechanisms of college students with learning disabilities (1996).

Programs designed to enhance students' college experience is one option to help enhance student adjustment to college. However, some students also seek counseling at their university's mental health center to meet this important adjustment need. DeStefano, Mellott, and Petersen (2001) were interested in the effect of mental health counseling on

student adjustment to college and conducted a study to compare SACQ (Baker & Siryk, 1989) scores of students who sought mental health services with controls. Students completed the SACQ two times, once after their counseling intake and once six to eight weeks into treatment; controls completed the SACQ during similar time periods. DeStefano et al. found that students who sought counseling demonstrated significantly lower scores on the pretest measure than did controls, but scored significantly higher on the posttest measure suggesting that participation in counseling may have a positive impact on student adjustment to college. These results were particularly salient for Social, Personal, and Academic Adjustment, and demonstrate the necessity for some students to be assisted in more direct way toward positive adjustment to college.

Based on research that emphasizes the predictive ability of nonintellectual factors on academic success, Larose, Robertson, Roy, and Legault (1998) view student adjustment to college through the lens of nonintellectual learning dispositions. Students possess these nonintellectual learning dispositions as a function of their beliefs, emotions, and behavioral factors that interact with their experiences in the college learning setting. In agreement with the research of DeStefano, Mellott, and Petersen (2001), Barga (1996), Szafran (2001), and Olszewski-Kubilius and Laubscher (1996), Larose et al. propose that student nonintellectual learning dispositions are factors that professors have the ability to address through advising, special programs, and developmental education courses that potentially improve academic success and student adjustment to college. In a study that utilized the Test of Reactions and Adaptations to College (TRAC), a measure Larose et al. created to assess student adjustment to college according to nonintellectual learning dispositions, they found that nonintellectual learning dispositions made a unique and

significant contribution to student success in college beyond that indicated by intellectual factors, such as GPA. These results reveal that in addition to professors emphasizing intellectual academic success, it may be even more beneficial for students if their professors additionally address nonintellectual learning dispositions through such avenues as advising and adapting teaching methods to consider a variety of learning styles and needs.

Purpose of the Current Study

The professional literature indicates that there are many teaching methods effective at improving student performance, use of study techniques, and engagement in relevant course material. Studies have also indicated that specific counseling programs or other interventions applied outside the typical college course setting influence student adjustment to college as indicated by nonintellectual factors (DeStefano, Mellott, & Petersen, 2001; Olszewski-Kubilius & Laubscher, 1996; Martin, Swartz-Kulstad, & Madson, 1999). However, a pool of research that directly assesses the effect of teaching method on nonintellectual learning factors is nonexistent, despite the fact that research has shown a relationship between adjustment to college as indicated by measures of nonintellectual factors and improved academic success (Strage, 2000; Barga, 1996; Murff, 2005; Szafran, 2001; Larose, Robertson, Roy, & Legault, 1998). Researchers examining college adjustment have posed questions regarding the effectiveness of current teaching methods to enable academic success in the contemporary diverse college population (Barga, 1996) and suggest that advisers provide greater assistance to students when selecting appropriate course work that will support student adjustment (Szafran, 2001; Leong & Bonz, 1997).

The purpose of the current study was to assess the effect of an active learning-based teaching method on nonintellectual learning dispositions, indicators of student adjustment to college, as measured by the Test of Reactions and Adaptations to College-Revised (TRAC-R) (Larose, Robertson, Roy, & Legault, 1998). Largely based on Biggs' (2003) constructive alignment teaching method, the experimental teaching method incorporated the use of Class Participation Exercises (CPE) that present questions based on the course's assigned reading. To apply the CPE method, professors create question-based written assignments intended to encourage students to read the assigned section of the text and to engage with the relevant material. CPE assignments may be assigned either daily or weekly and address the topics that will be covered in the prescribed time period. During class, professors engage students by covering the material addressed on the CPE, and draw students into discussion about their answers to questions on the CPE. Students may be involved in classroom discussion with the professor as a large group, or may be divided into smaller peer groups in order to cover the CPE questions and engage in discussion based on the day's lecture.

To test the study hypotheses, the CPE method was applied in general psychology courses according to the course material being covered during a particular class period or topical unit. Scores on the separate belief, emotion, and behavior subscales of the TRAC-R were used to determine if the CPE method effected significant change on specific subscales of the TRAC-R non-intellectual measure when comparing CPE and non-CPE taught classes. A student reaction survey was administered to assess whether the experimental teaching method was viewed more favorably by student participants than the control, or lecture, teaching method.

Study Hypotheses

It was predicted based on the review of the literature that the classes receiving experimental CPE method teaching would show overall higher average grades than control classes (non-CPE methods). Average grades have been viewed as a measure of academic performance and success in the teaching literature and as being positively influenced by active learning-based teaching methods (Balch, 2005; Biggs, 2003; Harton, Richardson, Barreras, Rockloff, & Latané, 2002; Kolar & McBride, 2003; Saville, Zinn, & Elliott, 2005; Yoder & Hochevar, 2005; Zehr, 2004).

Secondly, it was predicted that TRAC-R scores would improve in the desired direction from pre- to post-testing for both experimental and control conditions attributed to the passage of time and student adjustment to college level work. However, a greater significant change was expected for the experimental condition classes. More specifically, it was predicted that scores on the Test Anxiety, Fear of Failure, and Belief in Easiness subscales would decrease while scores on the Exam Preparation, Seek Help from Teachers, Quality of Attention, Assistance from Peers, Giving Priorities to Studies, and Belief in Work Methods subscales would show significant increases for all classes, but with greater significant changes noted between TRAC-R testing time one and time two for the experimental condition classes.

Third, higher ratings on the Class Reaction Surveys were expected for experimental condition classes than for control condition classes. Differences in graduate student instructor satisfaction were not expected to be significant or to confound results because both instructors were graduate students who were novice instructors.

Chapter 3: METHOD

Participants

A total of 96 students were recruited during the first three weeks of the 2007 spring academic semester via the researcher's presentation in four classes of college level general psychology. Although students were provided with the opportunity to participate in this research study, they were also informed that participation in this particular study was not a course requirement and that no special credit would be received for participating. Student participants were required to sign an informed consent (Appendix A) that documented the nature and commitment required to participate in the study and information for contacting the researcher. Students were asked for their consent to obtain their SAT score submitted upon their university matriculation and assured of the confidentiality of this information.

Two graduate student instructors, Instructor A and Instructor B, who taught two university sections of general psychology each and were deemed to be novice instructors had been previously recruited. Each instructor taught one control condition class and one experimental condition class. Both were female instructors between the ages of 23 and 32. Both instructors signed an informed consent that documented the nature and commitment required for participation in the study and asked for their consent to provide the researcher with a class grade average at the completion of the semester (Appendix B).

All four sections of general psychology were held throughout the 14 week semester in the same classroom. Instructor A's first section was held Monday, Wednesday, and Friday from 1:00 p.m. until 2:00 p.m. Instructor A's second section was held Monday, Wednesday, and Friday from 2:15 p.m. until 3:15 p.m. Instructor B's first

section was held Tuesday and Thursday from 3:00 p.m. until 4:30 p.m. Instructor B's second section was held Tuesday and Thursday from 5:00 p.m. until 6:30 p.m.

Materials

Test of Reactions and Adaptation to College-Revised. Participants completed the TRAC-R (Larose, Robertson, Roy, & Legault, 1998) at both the beginning and end of the spring 2007 academic semester. The 73 item questionnaire assesses nonintellectual learning factors and is divided into two sections. Section I consists of 49 questions which are answered using a seven point Likert scale ranging from Never True to Always True. Section II consists of 24 questions that are answered using a seven point Likert scale ranging from Total Disagreement to Total Agreement. Participants must select a whole number ranging from one to seven. The questionnaire measures nine subscales that are contained in three general categories: emotion, behavior, and belief. The emotion category subscales are Test Anxiety (TA) and Fear of Failure (FF). The behavior category subscales are Exam Preparation (EP), Seek Help from Teachers (SHT), Quality of Attention (QA), Assistance from Peers (AP), and Giving Priority to Studies (GP). The belief category subscales are Belief in Easiness (BE) and Belief in Work Methods (BWM). According to Robertson, DeCoster, and Larose, TRAC-R internal consistency ratings range from .75 to .88 and it exhibits adequate factorial structure (as cited in Van Heyningen, 1997). See Appendix C for an example of this measure.

Class grade. At the completion of the 2007 spring semester, graduate student instructors provided the researcher with course grades for each section of general psychology. This information was based on the grades of all students in the particular section regardless of participation in the study in order to ensure confidentiality of

participants. The graduate student instructors were responsible for making an accurate calculation of the grades for each of their general psychology sections, and provided it in percentage of points earned.

SAT scores. Individual student participant SAT scores were obtained as a standard score of student ability. Total SAT scores composed of Verbal and Math scores were obtained for the current study. These scores were used to compose ability distributions for each of the four general psychology sections involved in the study. Distribution results were used as a covariate in order to control for class ability composition between groups. Scores were obtained using university identification numbers that were provided when informed consent documentation was completed. SAT scores were not shared with graduate student instructors and were not linked to participant name.

Classroom Participation Exercise (CPE). The experimental teaching method that was examined is based on the application of written assignments given during the class period. These assignments consisted of up to 10 critical thinking and application questions that corresponded directly to the lecture topics and were given either daily or weekly according to the graduate student instructor's syllabus. Assignments were to be completed prior to class, and were collected and graded as complete or incomplete according to the graduate student instructor's syllabus guidelines. During lecture, the graduate student instructors addressed the CPE material and randomly elicited responses from students, called on volunteers for their responses, or directed students to share their responses with one other student or in a small group. Discussion time varied depending upon the nature of the specific question. Class participation handouts corresponded to a

specific topic; thus, they may carry over to the next lecture. Appendix D is an example CPE assignment. .

Class Reaction Survey. Class Reaction Surveys (CRS) were administered at the conclusion of the course. This survey measured student interest in the course material, motivation to learn the material, and satisfaction with the course format (see Appendix E). The CRS consisted of 12 items rated on a one to five scale. Ten of the items examined student level of agreement with a statement related to the course, course material, or material presentation from strongly disagree to strongly agree. The final two items requested the student provide an overall rating of the course and their overall participation in the course as compared to participation in other courses. Total scores for the CRS were obtained by adding the ratings of all 12 questions. The survey was created as a brief measure to assess student satisfaction by the researcher and has not been normed.

Procedures

Two classes used a traditional teaching approach (usually lecture) while two other classes used the CPE experimental method. As previously noted, each instructor taught one control class and one experimental class. Graduate student instructors used the same general psychology text and drew exam questions from the same text bank for all four classes; however, exams were not identical. All exams across classes were presented in multiple-choice format.

At the time of informed consent, student participants completed the first TRAC-R questionnaire (Appendix C) and provided the name of their general psychology professor and university identification number on the cover page of the assessment measure; this

administration was conducted during class time. At the end of the 2007 spring academic semester, student participants completed the TRAC-R questionnaire a second time; this administration was also conducted during class time. During both administrations of the TRAC-R, student participants provided their university identification number for the purpose of ensuring that each student participant that completed the first TRAC-R also completed the second TRAC-R. To participate in the study, students were required to complete both administrations of the TRAC-R; students who did not complete one of the questionnaires were not included in the statistical analysis.

Chapter 4: RESULTS

Participant Attrition

Four university sections of general psychology students from the classrooms of two graduate student instructors were recruited during the first three weeks of the 2007 spring academic semester. At the time of recruitment, a total of 286 students were enrolled in the four sections; 154 of these students signed informed consent to participate in the study and completed the pretest measure (TRAC-R). Totals ranged from 30-45 participants in each of the four classes. A total of 75 participants were enrolled in the experimental condition at pretest. A total of 79 participants were enrolled in the control condition at pretest.

A total of 110 students completed the posttest measures. The students who completed posttest measures (TRAC-R and CRS) in the four classes ranged from 24 to 33 per class. One participant did not complete the CRS. All data corresponding to this participant was excluded from analysis. Data corresponding to nine additional participants were removed due to missing responses in TRAC-R protocols at either pretesting or post testing. Therefore, data sets for a total of 96 student participants were included in the subsequent analyses with a total of 53 taught by Instructor A and 43 taught by Instructor B. Table 1 displays the resulting distribution of participants across instructors and conditions.

Table 1

Participants by Instructors and Conditions

	Condition		
	Control	Experimental	Total
Instructor			

A	23	30	53
B	24	19	43
Total	47	49	96

Equivalency Analyses

Participant SAT scores were obtained via the university computer database. Although an attempt was made to secure scores for all student participants, academic officials noted that SAT scores were not available for students who had transferred into the university or who had submitted alternate test scores (i.e., ACT) upon matriculation. Therefore, SAT scores could not be obtained for 10 participants in the experimental condition and 12 control condition participants. However, data sets for students without SAT scores remained in most of the other analyses. Given that missing data was equally distributed across the four conditions in this study (16, 17, 18, 23), it was believed that the missing SAT scores would not affect the outcome of this equivalency analysis.

A t-test was used to determine whether the SAT scores means were equivalent across instructors (A & B) and conditions (experimental and control) at pretesting. Table 2 illustrates the results of this analysis. No significant differences in pretest means was found for SAT scores between the groups again supporting the assumption that these groups did not differ significantly in academic ability. Because the distribution of SAT scores was found to be abnormal, a log10 transformation was completed on these scores before all analyses were attempted.

Table 2

Equivalency Analysis of SAT Pretest Means Across Instructors and Conditions

	t	df	p

Instructor	Condition			
A/A		-.620	38	.539
B/B		.115	32	.909
A/B	Exp	.332	37	.742
A/B	Control	-.401	33	.691

*p<.05

Two separate MANOVAs were used to test for equivalency of TRAC-R subscale scores across Condition and Instructor at pretest. Tables 3 and 4 illustrate the results of these analyses. For Condition, 8 of the 9 subscales showed no significant overall differences between the experimental and control condition participants (F=1.23). However, a significant difference for the TRAC-R subscale, Belief in Easiness (BE) ($F(1, 95) = 8.044$, $p = .006$) was found in this analysis. An examination of the control and experimental condition means indicated that the control condition participants reported a greater belief that those who earn high academic grades do so without effort ($M = 46.38$) than the experimental group participants ($M = 51.41$) at pretest.

Table 3

Equivalency of TRAC-R Pretest Means Across Conditions

	F	df	p
TRAC-R Subscale			
TA	.437	1	.510
FF	.100	1	.753
EP	.027	1	.870
SHT	1.864	1	.175
QA	.011	1	.915
AP	1.289	1	.259
GP	.556	1	.458
BE	8.044	1	.006*
BWM	1.093	1	.299

*p<.05

Similarly, no overall difference in the pretest TRAC-R subscales according to Instructor (F=1.013) was found for 8 of the 9 subscales. However, a significant between-group difference in the Belief in Work Methods (BWM) subscale ($F(1, 95) = 5.775$, $p = .018$) was found in this analysis. An analysis of means for these scores showed that students in classes taught by Instructor B ($M = 53.12$) had a greater degree of belief that developing more effective work methods would support improved academic performance than those taught by Instructor A ($M = 48.19$).

Table 4

Equivalency of Pretest Means Across Instructors

	F	df	p
TRAC-R Subscale			
TA	.370	1	.544
FF	.078	1	.780
EP	2.046	1	.156
SHT	.419	1	.519
QA	.476	1	.492
AP	.923	1	.339
GP	.013	1	.910
BE	2.730	1	.102
BWM	5.775	1	.018*

*p<.05

Teaching Method Analyses

TRAC-R. A 2 (Condition) x 2 (Instructor) repeated measures MANOVA was used to determine the effect of the experimental teaching method (IV) on change in TRAC-R subscale mean scores from pretest to posttest. This analysis was completed by including all 9 TRAC-R subscales in the analysis. No main effects for Instructor ($F(1, 95) = .330$, $p = .963$) or Condition ($F(1, 95) = 1.458$, $p = .177$) were found. Additionally no interaction effects were significant ($F(1, 95) = .983$, $p = .460$). However, an examination of the 9

TRAC-R subscales revealed a significant change in the Belief in Easiness (BE) change scores for Condition with the control condition participants showing an increase in their belief that those who earn high academic grades do so without effort (*M* = 4.617, *SD* = 9.273). In addition, a significant change in the Belief in Work Methods (BWM) change scores for Instructor x Condition (BWM) subscale (*M* = -.667, *SD* = 8.909). This result showed that both Instructor B's classes reported a decreased belief in the importance of developing more effective work methods in order to improve academic performance (*M* = -1.069, *SD* = 8.628), whereas only the control condition taught by Instructor A indicated a decrease in their belief in developing more effective study methods (*M* = -4.000, *SD* = 9.045). The experimental condition taught by Instructor A showed a significant increase in the belief that developing more effective work methods would improve academic performance (*M* = 2.467, *SD* = 8.419). Thus, an effect of instructor for the experimental group only in the BWM subscale was found. Tables 5 and 6 illustrate the results of the BE change analysis. Tables 7 and 8 illustrate the results of the BWM change analysis.

Table 5

MANOVA for BE Main Effect for Condition on the TRAC-R

	F	df	p
BE	7.954	1	.006*

*p<.05

Table 6

BE Main Effect for Condition on the TRAC-R

	Pretest	Posttest
Instructor		

Control	46.38 (9.509)	51.00 (10.626)
Experimental	51.41 (7.799)	50.41 (10.691)
Total	48.95 (8.994)	50.70 (10.607)

Table 7

MANOVA for BWM Effect for Instructor x Condition on the TRAC-R

	F	df	p
BWM	4.090	1	.043*

*p<.05

Table 8

BWM Effect for Instructor x Condition on the TRAC-R

	Pretest		Post test	
Instructor	Control M (SD)	Exp M (SD)	Control M (SD)	Exp M (SD)
A	49.87 (11.644)	46.90 (8.231)	45.87(12.650)	49.37 (10.568)
B	53.08 (10.463)	53.16 (10.007)	52.38 (11.492)	51.63 (10.986)
Total	51.51 (11.055)	49.33 (9.379)	49.19 (12.384)	50.24 (10.676)

CRS. Participant CRS scores for each class were collected at posttesting and were combined and averaged. A two-way (Condition x Instructor) ANOVA was used to test the hypothesis that satisfaction with the attended course would be higher for the experimental condition classes than for the control condition classes. A significant effect was found for Instructor ($F(1,95) = 14.704$, $p = .000$). Contrary to the predicted hypothesis that no effect for Instructor would be found, Instructor A showed significantly

lower scores (*M* = 38.92, *SD* = 9.59) on this measure than Instructor B (*M* = 45.53, *SD* = 6.89), indicating that students reported more satisfaction with Instructor B than Instructor A. No effect for teaching method was found as had been predicted. Table 9 illustrates this analysis.

Table 9

ANOVA for CRS Scores

	F	df	p
Instructor	14.704	1	.000*
Group	.658	1	.419
Instructor x Group	.037	1	.848

*p<.05

Academic Performance

Graduate student instructors provided grades for each of their classes according to percentage of total points earned; grades for both study participants and non-participants were included in this analysis. However, students who did not complete three of the four required class exams were excluded from this calculation, as it was the opinion of the graduate student instructors that these students effectively dropped the course through their non-participation. Grades for 252 students were included in this analysis. A two-way (Condition x Instructor) ANOVA was used to test the hypothesis that academic performance in experimental conditions would exceed academic performance in control conditions. Contrary to the predicted hypothesis that no effect for Instructor would be found, a significant difference was found for Instructor ($F(1,95) = 4.032$, $p = .046$). Specifically, students in Instructor A's courses earned significantly lower grades in both the experimental (*M* = .7286, *SD* = .12334) and control condition classes (*M* = .6768, *SD*

= .16875) than did students in Instructor B's experimental (*M* = .7370, *SD* = .13365) and control (*M* = .7414, *SD* = .14791) classes. No effect for teaching method was found as had been predicted. Table 10 displays this analysis.

Table 10

ANOVA Results for Academic Performance

	F	df	p
Instructor	4.032	1	.046*
Condition	1.693	1	.194
Instructor*Condition	2.380	1	.124

*p<.05

Chapter 5: DISCUSSION

Hypotheses

The current study introduced new research to examine the effect of an active learning-based teaching method on non-intellectual learning factors. It was hypothesized that experimental classes receiving CPE method teaching would show overall higher average grades than control classes (taught as usual). It was also hypothesized that TRAC-R scores would improve in the desired direction from pre- to post-testing for both experimental and control groups attributed to the passage of time and student adjustment to college level work. Finally, it was hypothesized that higher ratings on the Class Reaction Surveys, a measure of student satisfaction of their course, would be more evident in the experimental classes than in the control classes. However, these hypotheses were not supported by the results of this study.

An analysis of SAT scores across classes at pre-test indicated equivalency of pre-intervention ability in the four classes studied and the number of missing SAT scores were consistent across the groups. Therefore, it was assumed that average grades provided for each class were an accurate representation of post-intervention ability for each of the four groups in the study. Results of the average grades analysis revealed that students in Instructor B's courses earned significantly higher grades than those in Instructor A's courses thereby disaffirming that students in the CPE section would earn higher grades than those in control classes taught as usual. Rather, the analysis indicated an effect of instructor on student grades. This finding is contrary to previous studies (Balch, 2005; Saville, Zinn, & Elliott, 2005) pointing to improvement in student grades

resulting from instruction method rather than factors associated with graduate student instructors. These factors are explored later in this discussion.

At pre-test, students in Instructor B's courses reported a greater Belief in Work Methods (BWM) on the TRAC-R measure than students in Instructor A's courses, suggesting that they held a stronger belief that developing more effective work methods would improve their academic performance. However, at post-test this discrepancy was not evident. This finding may simply indicate a regression toward the mean on this subscale over the course of data collection or may actually reveal that students in Instructor A's courses actually developed a greater belief in their personal work methods as a result of participation in the active learning-based teaching method. The change in this scale for condition, however, was not statistically significant in nature, showing a trend in this direction, but not significantly so.

At pre-test, students in the control condition classes reported a greater Belief in Easiness (BE) than students in the experimental condition classes on this subscale of the TRAC-R, indicating that they endorsed more belief that those who earn high academic grades do so without effort. However, at post-test, this discrepancy was no longer evident. This suggests that the preparation involved in the completion of Classroom Participation Exercises (CPE) associated with the experimental condition may have supported student views that course work is easier, thus diminishing the discrepancy evident at pre-test. Similar to the lack of discrepant scores evident for the BWM scale, this finding may also suggest a regression toward the mean rather than a real change in score. So, while this finding was not statistically significant, it may indicate some benefit

from the use of CPE in the classroom for some students but may only be one aspect of improved student learning.

Instructor Influences

Student ratings provided by the Class Reaction Survey (CRS) indicated that students differentially rated Instructors in this study. Despite efforts to equally match graduate student instructors on age and experience, students in Instructor B's courses provided more positive ratings regarding interest in course material, class structure, level of participation in class, level of motivation to learn material, and the instructor's presentation of material. This trend was contrary to the study's hypothesis, but consistent with several studies indicating the importance of Instructor characteristics to student learning and ratings of course success. For example, Schaeffer, Epting, Zinn, and Buskist (2003) examined student and faculty perceptions on effective teaching and found that both students and faculty agreed on eight of the top 10 faculty qualities and behaviors most important for exemplary teaching in college. These factors included: approachable, creative and interesting, encouraging and caring, enthusiastic, flexible and open-minded, knowledgeable, realistic expectations and fair, respectful. These factors were not measured in the current study. Perhaps poorer ratings of Instructor A may be explained by lower levels of these eight important factors described by Schaeffer et al.

Similarly, a Benson, Cohen, and Buskist (2005) study focused on examining the relationship between student-professor rapport and student attitudes and behaviors. Their results revealed that professors who successfully established rapport with students were more likely to have students who attended classes, paid attention to material during class,

and enjoyed the presented course material. Perhaps Instructor B in the current study was more proficient at establishing rapport with her students than Instructor A.

On the other hand, a study by Blackhart, Peruche, DeWall, and Joiner (2006) examined the factors that influence student evaluations of teachers and found that a student's average grade in the course and instructor rank account for only 12% of the variance evident in teacher evaluation ratings. Based on this finding, Blackhart et al. concluded that teaching evaluation ratings are significantly affected by factors that are unrelated to effectiveness of teaching but rather that student evaluations may be more greatly affected by such factors as non-intellectual factors as measured in the current study. The researchers further suggest that students who perform well in a given course may attribute their performance to their professor and thus, rate them higher. This suggestion is consistent with results of the current study, as students in Instructor B's classes earned higher average grades and provided more positive teacher ratings than did those in Instructor A's classes.

Ginexi (2003) also conducted a study examining the context under which students complete class reaction surveys. Results of the study indicate that students who expect a low grade at the conclusion of a course are more likely to respond to a reaction survey from a negative perspective. Further, students who expect a higher final course grade are more likely to provide positive and favorable ratings. These conclusions are consistent with the current study's findings that students in Instructor B's classes provided more positive ratings and also earned higher grades than those in Instructor A's courses.

Strage (2000) also found that higher ratings of student rapport with professors were associated with both college success and adjustment. Based on this research, current

results may suggest that students experienced a lower level of rapport than was necessary in order to experience or recognize significant change in non-intellectual learning factors as measured by the TRAC-R. Strage (2000) and Barga (1996) emphasize the importance of teachers understanding factors associated with college adjustment, or non-intellectual factors, and creating teaching approaches that address the challenges faced by students. Perhaps the graduate student instructors in the current study do not, at this point in their career, have a sufficient understanding of the non-intellectual factors that affect their students, thus contributing to low levels of reported change in these factors across groups and instead, more attribution to Instructor characteristics.

Limitations and Future Research

Based on the results of the study, and lack of similar research, the current study can be considered as a pilot study for future research that examines the effect of active learning exercises on non-intellectual learning factors. As is the case with many pilot studies, certain limitations were evident in the current study that may be resolved in future research.

First, participants' SAT scores were used as a pre-intervention equivalency measure for the four groups of recruited participants. However, some students did not have SAT scores on file with the university registrar due to their admission into the University being based on ACT scores or transfer status. The researcher determined that the distribution of SAT scores would not be greatly affected by the missing data due to the assumption that missing scores may be consistent with a trend toward the mean, providing continued equivalency with a complete data set and that classes are not ranked and filled according to student ability, but instead are filled in a random fashion

according to student preference, course scheduling, and other extraneous factors that were not assessed in the current study. A more accurate measure of equivalency that may have been used to ensure all participant data was included in the equivalency analysis is most recent GPA on file with the university registrar. A limitation to this measure, though, is the uncertainty of the comparison of students' high school and community college grades given differing grading scales and grade inflation practices at some schools. A more accurate measure of pre-intervention ability is important to use in future studies to assure pre-intervention equivalency.

Findings of the current study did not support the hypothesis that active learning-based teaching methods will affect positive change on student performance as measured by course final grade and non-intellectual learning factors as measured by the TRAC-R, an overall measure of college adjustment. However, factors such as professor-student rapport and professor understanding of non-intellectual factors may have influenced the current results.

Although graduate students instructors for the current study were matched for age and teaching experience, their relative inexperience as compared to tenured colleagues may have interfered with administering the experimental teaching method in an effective manner. Moreover, Larose, Robertson, Roy, and Legault (1998) concluded that the non-intellectual factors measured by the TRAC, an earlier version of the TRAC-R, are changeable. Additionally, these researchers concluded that non-intellectual factors as measured on the TRAC affect academic achievement, which in turn may then influence change in the intellectual factors. Future research, therefore, may benefit from the

participation of experienced faculty who have seasoned teaching skills and experience in recognizing and fostering students' non-intellectual factors.

Regarding participant selection, Padilla-Walker, Zamboanga, Thompson, and Schmersal (2005) found that when extra credit was provided for participation in a research project, students who earned below average and average letter grades were less likely to choose to participate than students with above average grades. Researchers hypothesized post-hoc that students with A letter grades participated in research in order to earn extra credit to secure a high grade for the course. Another hypothesis was that these students participated for the educational benefit and opportunity for participation. Based on these results, it is possible that the current study did not appeal to a larger number of students due to the lack of extra credit incentive, thus affecting sample size and participant diversity. Future research may consider offering an incentive in order to recruit students who are not academic achievers. A measure of student motivation to achieve may be helpful to assure more diversity in learners the sample.

On the other hand, pre-test differences between groups on the TRAC-R BWM and BE scales may have contributed to the insignificant findings of the analysis. Although attempts were made to ensure equality between groups, the complexity of the student experience (Strage, 2000; Barga, 1996; Ross, Niebling and Heckert, 1999) were not formally accounted for in this study. That is, context differences such as time of day classes were held, classroom characteristics, number of students in each class, etc. were not measured. Future research may want to consider some of these as co-variants in their analyses.

Insignificant results may also be accounted for due to sampling attrition during the study. At pre-test, 154 students signed consent to participate in the study. However, only 110 students completed post-test measures, with 14 sets of data removed due to incompletion or other complications previously noted. Therefore, an attrition rate of 37% was evidenced and may have further restricted the sample used in this study. A larger sample size representing more than four academic classes would increase both diversity and power of the CPE methods on grades and non-intellectual learning factors.

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APPENDIX A

Informed Consent Form-Faculty

You are invited to participate in a research study examining the effect of an experimental teaching method on student learning factors. The following information is provided in order to help you make a decision regarding your participation in this study.

You have been asked to participate in this study because you are a spring 2007 instructor of two sections of PSYC 101. The purpose of this study is to assess the effect a teaching method based on Class Participation Exercises may have on student learning factors. Participation will require you to utilize the experimental teaching method in one section of PSYC 101 and a standard lecture method in the other section. I am asking you to permit students in your PSYC 101 spring 2007 courses to complete the Test of Reactions and Adaptations to College-Revised (TRAC-R) twice during the semester: once during the first three weeks of the course and once during the final two weeks of the course. Surveys will be completed in-class and take approximately 20 minutes to complete. A class reaction survey will also be completed in-class during the final week of the course and take approximately five minutes to complete. Additionally, I am asking you to provide me with an overall class average grade based on the grades of all students in the course regardless of their participation in the study. You will be responsible for making an accurate calculation of this overall grade, and will provide it in numerical form according to the four point scale used for grading.

If you agree to participate in this project, information from the surveys and overall average grade will be considered only in combination to ensure confidentiality of the students involved in the study. This data will be used to identify class averages and overall group profiles. Again, individual student responses will not be used in this study in any way and all of this information will be kept confidential.

Your participation in this study is voluntary. You may choose not to participate in this study, and may withdraw at any time. Your decision will not result in any loss of benefits to which you are otherwise entitled. If you choose to participate, all information will be held in strict confidence and will have no bearing on your employment at IUP or on services you may receive from the University.

If you choose to participate in this study, please sign the statement on the back of this form and return it to the principal investigator listed below. You have been provided with an extra copy of this form to take with you. If, after reading the informed consent and asking any questions, you choose not to participate in this study, please return this form unsigned to the survey proctor. Thank you.

Principal Investigator
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238A Uhler Hall
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Voluntary Consent Form:

I have read and understand the information provided on this form regarding the current research study. I consent to be a voluntary faculty participant in this study. I understand that any information I provide will remain confidential and that I may withdraw at any time. I have received an unsigned copy of this Informed Consent Form to keep.

Name (print):_____

Signature: _____

Date: _____

Phone Number: _____

Email: _____

Best days and times to reach you:_____

I confirm that I have informed the above participant regarding the purpose and nature of their involvement in this study. They have also been informed of any risks and benefits that may be associated with their participation. I have answered any questions they had and witnessed the above signature.

Date: _____

Investigator's Signature:_____

APPENDIX B

Informed Consent Form - Student

You are invited to participate in a research study examining the effect of an experimental teaching method on student learning factors. The following information is provided to help you make an informed decision regarding your involvement in this study.

The purpose of this study is to assess the effect a teaching method based on Class Participation Exercises may have on student learning factors. Your participation in this study will require that you complete a survey at the beginning of the semester and at the end of the semester. Surveys will be completed in class and take approximately 20 minutes to complete. You will provide the name of your PSYC 101 professor, as well as your university identification number on the survey. Your participation will also require that you allow the principle investigator to obtain your SAT scores from the university registrar; these scores will be obtained utilizing your university identification number. At the end of the semester you will be asked to complete a reaction survey to assess your overall satisfaction with the course.

The information gathered from the surveys will only be used in combination with the information gathered from the completed surveys of other students and will not be linked to the identity of the respondent. Thus, your responses will not be identified in any way and the information collected from you will remain confidential. SAT scores will not be linked to the identity of the respondent and will not be shared with your professor.

It is important that you understand your participation in this study is voluntary. You may choose not to participate in this study, and may withdraw at any time. Your decision to withdraw will not result in negative consequences or impact your standing in your general psychology class. Should you choose to withdraw, notify the proctor administering the survey or the lead researcher. Once notified of your withdrawal, the lead researcher will destroy all information pertaining to your involvement in the study.

Should you choose to participate in this study, all information which you provide will remain confidential and will not influence your academic standing or other services to which you are otherwise entitled. You will be an anonymous participant in the survey, indicating that your professor will not be informed of your survey responses. You will only be identified to the lead researcher according to your student identification number in the event you choose to withdraw from the study, at which time your number will be requested and your results retrieved in order to be destroyed.

If you have any questions, please ask them before signing this informed consent form indicating your agreement to participate in this study. If you do not have any questions and would like to participate in this study, please sign the statement on the back of this form and return it to the survey proctor before completing the first survey. You have been provided with an extra copy of this form to take with you. If, after reading the informed

consent and asking any questions, you choose not to participate in this study, please return this form unsigned to the survey proctor.

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Voluntary Consent Form

I have read and understand the information provided on this form regarding the current research study. I consent to be a voluntary participant in this study. I understand that any information I provide will remain confidential and that I may withdraw at any time. I have received an unsigned copy of this Informed Consent Form to keep.

Student Identification Number:_____

Name (print):_____

Signature: _____

Date: _____

Phone Number: _____

Email: _____

I confirm that I have informed the above participant regarding the purpose and nature of their involvement in this study. They have also been informed of any risks and benefits that may be associated with their participation. I have answered any questions they had and witnessed the above signature.

Date: _____

Investigator's Signature:_____

APPENDIX C

TEST OF REACTIONS AND ADAPTATIONS TO COLLEGE-REVISED (TRAC-R)

COVER PAGE

UNIVERSITY IDENTIFICATION NUMBER: _____

GENERAL PSYCHOLOGY PROFESSOR: _____

TEST OF REACTIONS AND ADAPTATIONS TO COLLEGE-REVISED (TRAC-R)

Instructions

This inventory is designed to measure your behaviors and attitudes in situations related to your educational experiences. If you have never been in one of the situations, imagine as clearly as possible what your reaction would be if this were to happen.

On your answer sheet you will find a series of letters from A to G next to the number of each of the questions. Each letter represents a number from 1 to 7. For Section I, use the following scale to indicate how often the item is true about you:

NEVER	A	B	C	D	E	F	G	ALWAYS
TRUE	1	2	3	4	5	6	7	TRUE

For Section II, use the following scale to indicate the degree to which you agree or disagree with the item:

TOTAL	A	B	C	D	E	F	G	TOTAL
DISAGREEMENT	1	2	3	4	5	6	7	AGREEMENT

Make sure you use a No. 2 pencil and completely fill in the circle for your answer. If you change your answer, erase completely.

Section I

NEVER TRUE	A 1	B 2	C 3	D 4	E 5	F 6	G 7	ALWAYS TRUE

1. After an exam, I feel so tense that I have an upset (nervous) stomach.

2. I get so nervous and confused when taking an examination that I get stuck on questions that I thought I knew the answers to.

3. When I take exams, I have completed all the homework, reviewed all of my notes, and completed all of the recommended readings that will be on the test.

4. I have taken exams even when I have not studied all of the material to be included.

5. I waste a lot of time studying before asking my teacher for help when I experience difficulty in understanding the classroom material.

6. When I am studying and there are questions which have answers in the back of the book, I look at the answers first.

7. When I work alone, I often do not concentrate effectively on the task at hand.

8. Before an exam, I wonder if my score will prevent me from passing the course.

9. I sometimes think that if I fail an exam, I will flunk out of school.

10. When I need help in my classes, I often find another student able to help me.

11. Whenever I am handed an exam, my heart beats faster.

12. After an exam, I am so wound up that it takes me hours to calm down.

13. When I take an exam, I have studied all the relevant material.

14. When I do not understand an idea, I avoid asking the teacher questions.

15. When I stumble over a problem or a reading that I do not understand, I waste a lot of time thinking of all sorts of other things.

16. During exams, I fear failing.

17. After an exam, I think of the consequences if I do not pass the course.

18. I don’t ask for help from other students when I don’t understand the subject matter presented in class.

19. During exams, nervousness prevents me from doing well.

20. During exams, I sweat more than on other occasions.

21. The night before an exam, I do not arrange enough time to review the material.

22. When I ask a teacher a question, I don’t dare ask him/her to repeat if I didn’t understand the first time.

23. In my classes, I skip any problem or idea that is hard for me to understand the first time.

24. During my exams, I find myself thinking about what will happen if I fail.

25. When I’m sure that I don’t understand a problem or an idea, I ask other students for help as soon as possible.

26. During exams, I have a sick feeling.

27. During exams, I feel my heart beating faster.

28. When I take my exams, I recognize all the key ideas from each of the chapters that I studied for the exam.

29. I hesitate to ask for help from my teacher when I need to have something cleared up.

30. While studying, I have too many other things on my mind to fully concentrate on the task.

31. During exams, I’m afraid that I will not get my degree.

32. During the first couple of weeks of the course, I seek the help of other students so we can help each other study if we have difficulty with the course content.

33. My state of mind before an exam influences my performance.

34. Before exams, negative thoughts and feelings disturb my performance.

35. I take my exams after having spent the time necessary to completely understand all the material to be covered.

36. I ask questions if there is something that I do not understand when I am in class.

37. When I work alone, my studying is easily interrupted.

38. Before exams, I fear that failing might spoil my academic record.

39. When I take my exams, I know that I have done everything I can in order to be well prepared.

40. The night before an exam, I work very hard to make sure I know the material thoroughly.

41. I go to exams without having understood the subject matter as well as I should.

42. I see professors at their office if I need help in better understanding course material.

43. When part of the subject matter is difficult to understand, I meet the professor immediately in order to discuss it.

44. When coursework such as reading or problems becomes too complicated, my mind wanders.

45. I find it difficult to work effectively when I study at home in the evening.

46. I find it embarrassing to ask other students to help me with school subjects.

47. When the course content is difficult to understand, I would rather manage on my own rather than ask another student for help.

48. I think it's normal for other students to give me a little help for certain, more difficult reports, problems, or readings.

49. I am reluctant to see other students after class when I need information clarified.

Section II

TOTAL DISAGREEMENT	A 1	B 2	C 3	D 4	E 5	F 6	G 7	TOTAL AGREEMENT

50. Certain people obtain excellent grades without truly studying hard.

51. At school, the key to success is to study regularly.

52. I have difficulty dedicating a lot of time and energy to academic success.

53. Those who have excellent grades probably don't need to work hard in order to understand certain ideas or problems.

54. I believe that it is more important to have good study habits than to have special aptitudes in order to be successful in college.

55. I'm not sure that I am ready to work very hard to succeed in a program in which I'm interested.

56. Students who get excellent grades in school only need to review their class noted in order to understand the class material.

57. In the majority of cases, it is work and motivation rather than special aptitudes that explains why certain students have excellent grades.

58. I am so determined to succeed in my professional life that I am willing to accept the daily sacrifices which my studies impose on me.

59. Most students who have high grades need to study very little before an exam in order to get those high grades.

60. There are quite a few students who are not particularly gifted but who get excellent grades because of their disciplined study habits.

61. I'm not certain that I am interested in giving up good times in order to succeed in my studies.

62. I am ready to drop enjoyable activities in order to ensure my academic success.

63. Right now, my studies are more important than my personal or social life.

64. I find it difficult not to see my friends when I have studying to do.

65. I neglect my studies when I am invited to go out with friends.

66. People who excel in school do not need to study for hours in order to succeed.

67. Those who have the best grades are often those who study the least.

68. Those who have the best grades in school do not need to work as hard as other students.

69. Those who have high grades do not need to study for very long the night before an exam.

70. In order to succeed in school, it is not as important to have natural ability as it is to have a strong work ethic and good study habits.

71. Many succeed in school because they work in a consistent and effective manner.

72. Good work habits and motivation lead to success even for people who are not particularly skilled for school work.

73. It is useless to try to struggle to succeed in school if you do not have a special aptitude for school work.

APPENDIX D

Class Participation Exercise

1. What do you think is meant by “cognitive development”?

2. How would a 5 year old define a friend? Give an example.

3. How would you, as a young adult, define a friend? Give an example.

4. How do you think babies (0-2) understand and learn about the world around them? Give an example.

5. Describe the behavior of children (ages 2-4). How do they play? What are they learning?

6. Give an example of egocentrism.

7. Provide an example to support the idea that children (ages 7-12) can think logically.

8. Identify a strength and a weakness of Piaget’s theory.

9. What are some things that parents can do to stimulate/enhance cognitive development in children?

10. Compare the results of the Temperament Scale that you took in class with the descriptions of you as a baby that you obtained from your parents. What is the same? What has changed?

APPENDIX E

Student Identification Number_____

Class Reaction Survey

I would like to know your reaction to this course of study in General Psychology. Please read each of the following statements and respond using a five- point scale where one (1) is STRONGLY Disagree (SD) and five (5) is STRONGLY AGREE (SA).

Strongly Disagree----------**Strongly Agree**

1 2 3 4 5

___1. The instructor made it clear course information might be important.
___2. I found the material in this course to be interesting.
___3. I was motivated to learn this material.
___4. I attended class on a regular basis during this course.
___5. There was enough variety in the classes to keep me reasonably alert.
___6. The instructor provided exercises so that we could practice the material.
___7. I felt as though I participated actively in the learning of course material.
___8. I think the level of discussion during class was interesting.
___9. I found this course material to be relevant to my life.
___10. I want to learn more about the information presented in this course.

___11. What is your overall rating of this course?

a. Excellent
b. Good
c. Satisfactory
d. Fair
e. Poor

___12. How much did you participate in this course in comparison to other courses?

a. Much more
b. Slightly more
c. The same

d. Slightly less
e. Much less