

Academic procrastination and the performance of graduate-level cooperative groups in research methods courses

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Abstract: This study examined the extent to which academic procrastination predicted the performance of cooperative groups in graduate-level research methods courses. A total of 28 groups was examined (n = 83 students), ranging in size from 2 to 5 (M = 2.96, SD = 1.10). Multiple regression analyses revealed that neither within-group mean nor within-group variability pertaining to levels of procrastination predicted the group product (i.e., quality of article critique). However, cooperative groups that attained the highest levels of procrastination due to task aversiveness, on average, tended to be those with the lowest levels of performance on the group product. Groups with the lowest levels of achievement tended to be those containing students who reported procrastinating most frequently on performing administrative tasks (26.4% of the variance explained), keeping up with weekly reading assignments (8.8% of the variance explained), and writing term papers (11.8% of the variance explained). These three procrastination variables together explained 46.9% of the variance in performance. This finding suggests that level of academic procrastination appears to play an important role among graduate students with respect to the performance of cooperative learning groups.

Keywords: Cooperative learning, academic procrastination, graduate student, research methodology course

I. Introduction.

The goal of the present inquiry was to contribute to a program of research assessing the role of group dynamics on academic performance of graduate students by examining the potential relationships between personality variables and students' achievement levels in graduate methods courses. Our selection of academic procrastination as the personality variable of interest was based upon the findings of a previous study in which a link was found to exist between academic procrastination and achievement in the context of cooperative groups at the graduate level, with some groups displaying higher levels of procrastination than other groups (Onwuegbuzie and DaRos-Voseles, 2001). However, Onwuegbuzie and DaRos-Voseles' qualitative inquiry did not investigate directly whether procrastination predicted group outcomes. Subsequently, the purpose of the present investigation was to increase our understanding of the role of group dynamics on academic performance by examining the extent to which academic procrastination

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predicted performance of cooperative learning groups in graduate-level research methods courses. It was hypothesized that levels of academic procrastination would predict cooperative group outcomes. Cooperative learning, which dates back to the early 1960s or even to John Dewey's time (Johnson, Johnson, and Holubec, 1998), might be an effective educational approach simultaneously to help to reduce academic procrastination and to enhance academic performance of the learning groups.

Academic procrastination is a special form of procrastination that occurs in the academic settings. It involves knowing that one needs to carry out an academic task or undertake an academic activity, such as writing a term paper, studying for examinations, finishing a school-related project, or undertaking the weekly reading assignments, but, for one reason or another, failing to motivate oneself to do so within the expected time frame (Ackerman and Gross, 2005). Although there is no universally accepted definition, academic procrastination can be defined as the postponement of academic goals to the point where optimal performance becomes highly unlikely, resulting in a state of psychological distress (Ellis and Knaus, 1977; Ferrari, Johnson, and McCown, 1995). Academic procrastination has been a prevalent phenomenon on college and university campuses for decades. Ellis and Knaus (1977) estimated that approximately 95% of college students procrastinate on their academic work. Solomon and Rothblum (1984) reported that 46% of the surveyed "nearly always or always procrastinate on writing a term paper" (p. 505). Gallagher, Golin, and Kelleher (1992) found that 52% of the college students who participated in their study indicated having a moderate to high need for help regarding procrastination. More recently, Day, Mensink, and O'Sullivan (2000) noted that nearly 50% of college students procrastinate consistently and problematically. Özer, Demir, and Ferrari (2009) reported that 52% of the surveyed undergraduates in their study were labeled as procrastinators. Most recently, Klassen et al. (2010) found that 57% of one group and 59% of another group of the undergraduate participants in their research "report[ed] spending three hours or more per day in procrastination" (p. 372). Muszynski and Akamatsu's (1991) research on doctoral-level clinical psychology students led to the conclusion that cognitive and affective factors related to procrastination might significantly result in delay or even failure in completing their dissertations. Most disturbingly, graduate students have been found to procrastinate to a greater extent than do undergraduates, as illustrated by Onwuegbuzie's (2004) finding that graduate students are approximately 3.5 times more likely than are undergraduate students to report that they nearly always or always procrastinate on reading their weekly assignments. Onwuegbuzie (2004) noted that between 65% and 75% of graduate students in his study wanted to decrease their procrastination on these tasks.

Both undergraduates and graduate students report some level of academic procrastination, such as underestimating the time necessary to complete reading tasks, missing deadlines for submitting assignments, preparing for examinations, low course grades, and course withdrawal (Beswick, Rothblum, and Mann, 1988; Fritzsche, Rapp, and Hickson, 2003; Kachgal, Hansen, and Nutter, 2001; McCown, Petzel, and Rupert, 1987; Onwuegbuzie, 1999/2000, 2004; Semb, Glick, and Spencer, 1979). Indeed, academic procrastination is used by some college students as an excuse for their poor performance in test situations (Beck, Koons, and Milgrim, 2000), thereby protecting these students' levels of self-esteem by removing the possibility that their performance levels are due to intelligence deficits (Ferrari, 1991, 1992, 1994). However, undergraduate students perceive that their procrastination tendencies are a barrier to their academic success in college (Fritzsche et al., 2003; Kachgal et al., 2001). At the graduate level, academic procrastination is associated with various types of academic-related anxiety, such as

library anxiety (Collins and Veal, 2004; Onwuegbuzie and Jiao, 2000), writing anxiety (Fritzsche et al., 2003; Onwuegbuzie and Collins, 2001), and statistics anxiety (Onwuegbuzie, 1997, 2004).

Academic procrastination is a complex phenomenon with cognitive, affective, and behavioral components (Rothblum, Solomon and Murakami, 1986). Academic procrastination has been studied extensively by a variety of researchers because it can have serious consequences for students who are frequently faced with various academic deadlines and social pressures. Many studies treat academic procrastination as a self-defeating personality flaw that corresponds to the behavior pattern of choosing the short-term gains, such as free time and effort, over the long-term costs of academic performance (Baumeister, 1997; Baumeister and Scher, 1988). Tice and Baumeister (1997) concluded that although the procrastinators might obtain genuine benefits in the short run, their short-term “benefits are eventually more than offset by the costs, however, because the stress and illness suffered by procrastinators late in the task exceed and outweigh the initial benefits” (p. 458) and academic procrastination “apparently leads to stress, illness, and inferior performance” (p. 457). It also leads students to experience various psychological and behavioral problems, such as anxiety (Carden, Bryant, and Moss, 2004; Haycock, McCarthy, and Skay, 1998; Onwuegbuzie and Jiao, 2000; Wang and Englander, 2010), depression (Saddler and Sacks, 1993), shame (Fee and Tangney, 2000), cheating and plagiarism (Roig and De Tommaso, 1995), fear of failure (Schouwenburg, 1992), and task aversiveness (Schraw, Olafson, and Wadkins, 2007; Solomon and Rothblum, 1984). Fear of failure also is associated with perfectionism, evaluation anxiety, and low self-confidence (Moneta, Spada, and Rost, 2007; Solomon and Rothblum, 1984; Thompson and Dinnel, 2001).

Procrastinators who perceive a task as difficult and requiring effort to achieve a successful outcome are more likely to avoid or to postpone beginning a task (Deniz, Traş, and Aydoğan, 2009; Ferrari, 1991; Solomon and Rothblum, 1984). Self-regulation, such as setting goals and pursuing a plan to achieve results, likewise is a problem area for procrastinators (Senecal, Koestner, and Vallerand, 1995). However, procrastination also can be the result of “the systematic underestimation of the difficulty of the task while simultaneously overestimating the positive benefits of procrastination” (Schraw et al., 2007, p. 20). Senecal et al. (1995) reported that intrinsically motivated undergraduate students who participated in academic activities because they derived satisfaction and pleasure from their participation were less likely to procrastinate. However, identified regulation, a condition of self-regulation in which a behavior is perceived by an individual as important and connected to his or her personal goals and values (Deci and Ryan, 1991), was associated with higher levels of procrastination (Senecal et al., 1995).

Past research has paid prime attention to the nature, antecedents, etiology, and consequences of academic procrastination. Only a few studies and publications focus on coping strategies to help students reduce procrastination (Alexander and Onwuegbuzie, 2007; Onwuegbuzie, 2004; Sommer, 1990; Tullier, 2000; Vacha and McBride, 1993; Wang and Englander, 2010). These strategies include cognitive-oriented strategies such as identifying and prioritizing goals, allocating appropriate time and resources to each goal and cognitive reframing “in which individuals constructed explanations for their actions that framed those actions in a positive light” (Schraw et al., 2007, p. 20). Affective strategies aimed at augmenting the cognitive strategies include building confidence, maintaining a positive attitude, linking the personal meaning of the overall goal to the academic task at hand as the result of higher-level hope, and even serving as a stress-reduction mechanism. Other strategies to help reduce the effects of academic procrastination involve the instructors using measured approaches to class

assignments. Onwuegbuzie (2004) suggested that instructors might rely on more frequently graded assignments, with each based on a smaller increment in cognitive material so that less time is available for students to procrastinate in between assignments, thereby reducing the opportunity for academic procrastination. Going beyond these individually implemented strategies, Derry, DuRussel, and O'Donnell (1998) explored a collaborative process where cognitive workload can be distributed among group members. Small groups were found to be especially effective for individuals to deal with complex subjects or tasks.

Cooperative learning is defined as “the instructional use of small groups so that students work together to maximize their own and each other’s learning” (Johnson, Johnson, and Smith, 1991a, p. iii). Johnson and his colleagues (Johnson and Johnson, 2009; Johnson et al., 1991a; Johnson, Johnson, and Smith, 1991b) recommended incorporating in cooperative learning groups the following five-component model to maximize performance outcomes: (a) positive interdependence, (b) face-to-face promotive interaction, (c) individual accountability, (d) social skills, and (e) group processing. Evidence from elementary, high school, and college levels indicates that cooperative learning promotes higher student performance in contrast to other instructional techniques (Johnson et al., 1991b; Johnson, Maruyama, Johnson, Nelson, and Skon, 1981; Meyers, 1997; Slavin, 1991, 1994; Bowen, 2000; Gillies, 2008; Moreno, 2009; Munoz, and Huser, 2008; Nagel, 2008; Stockdale, and Williams, 2004; Strom, and Strom, 2002; Williams, Carroll, and Hautau, 2005). Moreover, in contrast to instructional formats that emphasize individual learning, cooperative learning affects positively students’ attitudinal outcomes, such as increased task engagement and elevated levels of motivation, self-esteem, self-efficacy, and productivity (Crooks, 1988; Ghaith, 2003; Johnson, Johnson, and Maryuma, 1983; Klein and Schnackenberg, 2000; Lin, 2006; Mulryan, 1995; Nichols, 1996; Peterson and Miller, 2004; Serrano, and Pons, 2007; Wheelan and Lisk, 2000).

Cooperative learning is a subcategory of small group learning that has been widely researched. Indeed, Cuseo (1992) asserts that “cooperative learning is the most operationally well-defined and procedurally structured form of collaboration among students...” (p. 3). Upon completing a meta-analysis of cooperative learning studies conducted at the college level, Johnson and Johnson (1993) identified five reasons supporting the use of this instructional approach: (a) cooperative learning has a rich and long history of theory, research, and practice; (b) the research on cooperative learning has yielded findings that have validity and generalizability rarely found in the education literature; (c) cooperative learning concurrently affects many different instructional outcomes; (d) much is known about the essential elements that make it work; and, lastly, (e) cooperative learning creates opportunities that do not exist when students work individually or competitively.

According to the theory of adult learning, adult learners, generally, are self-directed learners who prefer a problem-centered approach towards learning, in contrast to a subject-content approach (Knowles, 1987). In addition, adult learners tend to validate the utility of new knowledge based on its applicability towards improving job effectiveness and overall performance. Moreover, adult learners’ motivation levels are influenced by a combination of extrinsic rewards and intrinsic motivators, such as self-esteem and self-respect. Cooperative learning, because of its emphasis on positive interdependence, individual accountability, and group processing, might be especially effective for adult learners enrolled in courses that are distinctly different from their preexisting experiences (e.g., research methods courses). Indeed, empirical research evaluating the impact of these techniques on graduate students’ instruction and learning outcomes indicates that graduate student participation in cooperative learning

activities elevates the frequency of meaningful learning opportunities in research methods courses (Collins and Onwuegbuzie, 2001; Onwuegbuzie, Collins, and Elbedour, 2003; Onwuegbuzie and DaRos-Voseles, 2001).

Utilizing qualitative analysis of graduate students' reflective journals, Onwuegbuzie and DaRos-Voseles (2001) found that the majority of graduate students enrolled in research methods courses reported positive overall attitudes towards working in cooperative-based groups on course assignments. However, quantitative analyses of students' performance levels at the course middle point indicated that the group of students who completed their assignments individually and were assessed individually received higher grades on the midterm exam ($d = 0.48$) in contrast to the students working in cooperative groups. Interestingly, the mean difference between the two groups (individual vs. cooperative) was not statistically significantly different at the conclusion of the course. In another study, Onwuegbuzie et al. (2003) examined the role that group composition plays in cooperative groups among graduate students. Utilizing group as the unit of analysis, results indicated that groups with the highest mean levels of research aptitude, as measured by mean group grades on the midterm and final examinations, produced cooperative learning projects (i.e., research article critique and research proposal) of the highest quality. Interestingly, the degree of heterogeneity of group composition (i.e., variability of individual scores on midterm and final course exams) influenced the quality of the group outcomes.

Researchers also have investigated the extent to which cooperative group members' characteristics predict the quality of group achievement outcomes at the graduate level (Collins, Onwuegbuzie, and DaRos-Voseles, 2004; DaRos-Voseles, Onwuegbuzie, and Collins 2003). For example, DaRos-Voseles et al. (2003) found that graduate students' levels of perfectionism predicted cooperative group outcomes. Also, Collins et al. (2004) reported that groups attaining the lowest scores on an article critique assignment tended to report the highest anxiety levels and were the most heterogeneous with respect to research anxiety.

Other research exploring the role of social interdependence—comprising cooperative orientation (i.e., each person has sufficient intrinsic motivation to attain goals coupled with the perception that the goals are attainable only if other group members also accomplish their goals, which results in promotive interaction because students within a cooperative learning group encourage and support each group member's achievement goals; Johnson and Johnson, 2000); competitive orientation (i.e., each person competes against peers towards attaining his/her goals, which results in negative interdependence and often leads to dysfunctional interaction because group members impede and inhibit each other's attempts to perform; Johnson and Johnson, 2000); and individualistic orientation (i.e., each person works independently towards his/her achievement goals without concern that the other peers also attain their goals; Johnson and Johnson, 2000)—in predicting the performance of cooperative learning groups indicated that graduate students' levels of individualism predicted achievement, as measured by the quality of article critiques produced by groups in the context of a graduate-level research methods course (Onwuegbuzie and Collins, 2002). Results revealed that groups containing students with the greatest individualistic orientation tended to produce the best article critiques, regardless of how heterogeneous the group was with respect to degrees of individualism.

Hancock (2004) assessed the degree to which graduate students' peer orientation (i.e., tendency of individuals to look to their peers for direction [e.g., values, identity, and codes of behavior]), which was classified as high versus low, predicted students' motivational levels and achievement as measured by a professor-constructed, criterion-referenced final examination. Results indicated that students with high peer orientation were considerably more motivated to

learn when exposed to cooperative-learning strategies than were students who had low peer orientation. However, the final examination scores did not statistically significantly distinguish the two groups.

The results of the reviewed studies in this article indicate that specific cooperative group members' characteristics (i.e., perfectionism, research anxiety, research aptitude, and peer vs. individual orientation) often predict the quality of group achievement outcomes in research methods courses at the graduate level. However, more empirically based studies that examine the impact of group characteristics on performance outcomes are needed (Onwuegbuzie and Collins, 2002).

II. Method.

A. Participants.

Participants were graduate students from a number of disciplines who were enrolled in five sections of an introductory-level research methods course at a midsouthern university in the United States. These students ($n = 83$) formed 28 groups ranging in size from 2 to 5 ($M = 2.96$, $SD = 1.10$). The same instructor taught all sections of the research methods course, thereby minimizing any implementation threat to internal validity (i.e., validity of findings being threatened by cooperative learning environment not being implemented to its fullest extent possible; Onwuegbuzie, 2003) resulting from differential selection of instructors (i.e., substantive differences between two or more of instructors prior to the implementation of the cooperative learning environment; Onwuegbuzie, 2003).

B. Setting.

All graduate students enrolled in educational degree programs were required to take the introductory-level research methods course. The semester-long (i.e., 16-week) course involved classes that took place once per week for three hours. The fact that all classes were held at the same time in the evening (i.e., 5 p.m. to 8 p.m.) minimized any implementation threat to internal validity resulting from differential time of day (i.e., substantive differences stemming from implementation of the cooperative learning environment at two or more different times; Onwuegbuzie, 2003).

C. Formation of Cooperative Learning Groups.

On the first day of class, students were asked to introduce themselves to the class, delineating their major, educational attainments and aspirations, current professional status, and interests. Students also were asked to form groups comprising 2-5 students based on similar majors or professional background. These criteria for group assignment were not directly related to aptitude or ability. Such assignment of groups by preferences is referred to as a modified stratified random assignment (Johnson and Johnson, 2000). Such an assignment was preferred over assignments such as simple random assignment because the latter likely would yield groups with different important characteristics such as proximity to each other's home (i.e., the further apart they live, the more difficult it would be for the group members to meet face-to-face outside class) and major (i.e., the more varied their majors, the more difficult it would be for the group

members to select an article to critique that the students would find equally relevant for their disciplines). In contrast, via a modified stratified random assignment, students selected group members based on relative similarity of these characteristics.

D. Base Groups.

The cooperative learning group that was utilized involved the use of base groups (Smith, Johnson, and Johnson, 1992). Base groups contain members who work cooperatively beyond the class assignment(s) and classroom context (Johnson and Johnson, 2000). The aim of these base groups was to promote stable group membership and group cohesiveness. Students were encouraged to stay together during the entire course so that the level of cooperativeness would be maximized.

E. Article Critique.

A major course requirement that was undertaken via cooperative learning groups involved a detailed written critical evaluation of a published research report (i.e., article critique). The primary goal of the article critique was to provide an opportunity for students to develop skills in evaluating published research articles using principles of the scientific method. Each group completed one article critique.

F. Instruments.

Academic procrastination was measured via the Procrastination Assessment Scale-Students (PASS; Soloman and Rothblum, 1984). This measure was selected because of its excellent psychometric properties that have been documented in numerous studies (cf. Yao, 2009). The first part lists six academic tasks: writing a term paper, studying for examinations, keeping up with weekly reading assignments, performing administrative tasks, attending meetings, and performing academic tasks in general. Respondents complete three rating scales for each of the six tasks indicating the frequency with which they procrastinate on that task (1 = Never procrastinate; 5 = Always procrastinate), whether their procrastination on the task is a problem (1 = Not at all a problem; 5 = Always a problem), and whether they want to decrease their procrastination on the task (1 = Do not want to decrease; 5 = Definitely want to decrease). The PASS items pertaining to (a) the frequency with which respondents procrastinate on a task and (b) whether their procrastination on that task is a problem were summed to provide an overall measure of academic procrastination, with total scores ranging from 12 to 60. Higher scores are indicative of greater self-reported academic procrastination. The second section of the PASS asks students to think of the last time they procrastinated on writing a term paper and to indicate how much each of 26 reasons reflects why they procrastinated (1 = Not at all reflects why I procrastinated; 5 = Definitely reflects why I procrastinated).

Using exploratory factor analysis to examine the dimensionality of the PASS, Solomon and Rothblum (1984) identified two factors, namely, fear of failure and task aversiveness. The fear of failure and task aversiveness subscales formed one set of dependent measures, and the following subscales formed a second set of dependent measures: writing a term paper, studying for examinations, keeping up with weekly reading assignments, performing administrative tasks, attending meetings, and performing academic tasks in general. For the present study, the

coefficient alpha reliability estimates were 0.85 (95% CI = 0.80, 0.89) for the overall PASS scale, 0.64 (95% CI = 0.49, 0.74) for the fear of failure factor, 0.76 (95% CI = 0.65, 0.84) for the task aversiveness factor, 0.76 (95% CI = 0.63, 0.84) for writing a term paper, 0.74 (95% CI = 0.60, 0.83) for studying for examinations, 0.82 (95% CI = 0.72, 0.88) for keeping up with weekly reading assignments, 0.92 (95% CI = 0.88, 0.95) for performing administrative tasks, 0.88 (95% CI = 0.81, 0.92) for attending meetings, and 0.81 (95% CI = 0.71, 0.88) for performing academic tasks in general.

For the article critique, three rubrics were used. The first rubric consists of a 5-point Likert-format scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) that was designed to provide a score for the summary of the selected research article. This scale contains 35 items (e.g., "The conceptual/theoretical framework is summarized adequately"), such that scores range from 35 to 175. The second rubric, also consisting of a 5-point Likert-format scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), assesses how accurately the 150-item reviewer checklist is completed. Each response on the reviewer checklist is rated on the 5-point Likert-format scale, such that the second rubric contains 150 items, whose scores range from 150 to 750. The third rubric, also a 5-point Likert-format scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), was designed to assess the narrative for the critique section of the article. This rubric contains 50 items that evaluate all components of the critique section (i.e., title, abstract, introduction/literature review, methods, results, discussion), such that scores range from 50 to 300. This third rubric also assesses the extent to which the critique section is free from grammatical and typographical errors and follows APA guidelines. Scores from the three rubrics were converted into percentages. From these percentages, a final score was derived using the following weighting scheme: 35% for the summary rubric, 25% for the reviewer checklist, and 40% for the critique narrative. Thus, each article critique received a group score on a 100-point scale.

G. Analysis.

For each group, we computed the mean and standard deviations pertaining to students' scores on the PASS. We generated 28 sets of group scores. We used group as the unit of analysis. Using groups themselves as the unit of analysis, rather than the individual scores, decreases the possibility of the statistical independence assumption being violated and systematic error being created (McMillan, 1999).

The major analysis undertaken in the present study was an all possible subsets (APS) multiple regression (Onwuegbuzie and Daniel, 2003; Thompson 1995). Specifically, a series of APS multiple regression analyses was used to identify which of the procrastination dimensions, if any, predicted the group product (i.e., article critique). Using this technique, all possible models involving one or both of the independent variables were examined. This method of analysis has been recommended by many statisticians (e.g., Onwuegbuzie and Daniel, 2003; Thompson, 1995). In fact, in APS regression, separate regressions are computed for all independent variables singly, all possible pairs of independent variables, all possible trios of independent variables, and so forth, until the best subset of predictor variables is identified according to some specified criterion. For this study, the criterion used was the maximum proportion of variance explained (R^2), which provides an important measure of effect size (Cohen, 1988).

Squared semi-partial correlation coefficients indicate the amount by which R^2 is reduced if a particular predictor variable is removed from the regression model. In other words, squared semi-partial correlation coefficients identify the unique contribution of the predictor variable as a proportion of the total variance of the dependent variable (Cohen, 1988). Similarly, squared partial correlation coefficients represent the unique contribution of the predictor variable as a proportion of R^2 . In the current study, the squared partial correlation coefficient (i.e., R^2) was utilized directly as an effect size estimate, as recommended by Cohen (1988). According to Cohen (1988), for multiple regression models in the social and behavioral sciences, squared partial correlation values between 2% and 12.99% suggest small effect sizes, values between 13% and 25.99% indicate medium effect sizes, and values of 26% and greater suggest large effect sizes. These same criteria were used to assess whether the proportion of variance explained by the predictor variables, R^2 , was suggestive of a small, medium, or large effect.

III. Results.

The Shapiro-Wilk test (Shapiro and Wilk, 1965; Shapiro, Wilk, and Chen, 1968) did not indicate that the distribution of article critique scores was non-normal $W = 0.97$, $p > 0.05$, thereby justifying the use of multiple regression. In addition, evaluation of assumptions of linearity and homogeneity revealed no threat to multiple regression analysis.

The first APS multiple regression analysis involved overall level of academic procrastination, specifically, within-group mean procrastination score and within group standard deviation of procrastination score, yielding two predictor variables. This analysis revealed that neither variable predicted the dependent variable, namely, article critique scores $F(2, 25) = 1.04$, $p > 0.05$; $R^2 = 0.07$; Adjusted $R^2 = 0.003$.

The second APS multiple regression analysis involved the two factors that characterize why college students procrastinate: fear of failure and task aversiveness. Specifically, the predictor variables were the within-group mean and within-group standard deviation pertaining to fear of failure and task aversiveness, yielding four potential predictors. This analysis revealed that a model containing mean procrastination level associated with task aversiveness provided the best fit to these data $F(1, 26) = 3.42$, $p < 0.05$. This model explained 32.5% of the variation in article critique scores (Adjusted $R^2 = 7.5\%$). Using Cohen's (1988) criteria for assessing the predictive power of a set of predictor variables in a multiple regression model, the proportion of variance explained indicates a large effect size. An inspection of the studentized residuals generated from the model (Myers, 1986) suggested that the assumptions of normality, linearity, and homoscedasticity were met. Using the Bonferroni adjustment, none of the studentized residuals suggested that outliers were present.

The third APS multiple regression analysis involved the frequency with which students procrastinated on the six academic tasks: writing a term paper, studying for examinations, keeping up with weekly reading assignments, performing administrative tasks, attending meetings, and performing academic tasks in general. Specifically, the predictor variables were the within-group mean and within-group standard deviation pertaining to each of these six tasks, yielding 12 potential predictors. This analysis revealed that a model containing mean procrastination level associated with writing a term paper, keeping up with weekly reading assignments, and performing administrative tasks provided the best fit to these data $F(3, 24) = 7.07$, $p < 0.001$. This model explained 46.9% of the variance in article critique scores (Adjusted $R^2 = 40.3\%$). Using Cohen's (1988) criteria, the proportion of variance explained indicates a very

large effect size. An inspection of the studentized residuals generated from the model (Myers, 1986) suggested that the assumptions of normality, linearity, and homoscedasticity were met. Using the Bonferroni adjustment, none of the studentized residuals suggested that outliers were present.

The squared semi-partial coefficients revealed that procrastination associated with performing administrative tasks was the best predictor of the group performance on the article critique, explaining 26.4% of the variance. Procrastination associated with writing a term paper was the next best predictor of group performance explaining 11.8% of the variance, and procrastination associated with keeping up with weekly reading assignments accounted for 8.8% of the variance in group performance. Also, an examination of the structure coefficients, using a cutoff correlation of 0.3 recommended by Lambert and Durand (1975) as an acceptable minimum value, suggested that all three variables made important contributions to the model. The fact that both the standardized and structure coefficients pertaining to all variables were noteworthy indicates that none of these constructs acted as suppressor variables (Thompson, 1998; Thompson and Borrello, 1985).

IV. Discussion and Conclusion.

The purpose of this study was to investigate the extent to which academic procrastination predicted performance of cooperative learning groups in graduate-level research methods courses. The first result indicated that neither within-group mean nor within-group variability pertaining to overall level of procrastination predicted the group product (i.e., quality of article critique). However, the picture changed when examining the various dimensions of academic procrastination. Specifically, cooperative groups that attained the highest levels of procrastination due to task aversiveness, on average, tended to be those with the lowest levels of performance on the article critique. This finding is consistent with research indicating that procrastinators who perceive a task as difficult and requiring effort to achieve a successful outcome are more likely to report task aversiveness as a reason for procrastination (Ferrari, 1991; Solomon and Rothblum, 1984). Moreover, the fact that level of academic procrastination associated with task aversiveness predicts lower performance likely reflects students' perceptions that the article critique was a demanding task that required significant cognitive effort to achieve success.

In addition, groups with the lowest levels of achievement tended to be those containing students with the highest tendencies to procrastinate on performing administrative tasks, keeping up with weekly reading assignments, and writing term papers. This finding is consistent with the bulk of the research on academic procrastination, which indicates that procrastination on academic-related tasks leads to lower achievement levels (Beswick et al., 1988; Fritzsche et al., 2003; Kachgal et al., 2001; McCown et al., 1987; Onwuegbuzie, 1999/2000; 2004; Semb et al., 1979). Interestingly, academic procrastination associated with performing administrative tasks was by far the best predictor of group outcome, explaining 26.4% of the variance. This result might stem from the fact that for cooperative learning groups to be successful, they need to be organized.

These results suggest that graduate students who demonstrate procrastination tendencies also might have problems with self-regulation, such as defining goals and implementing a plan to achieve results. It is likely that graduate students, generally, are goal oriented because they are pursuing academic degrees and, therefore, are motivated to succeed. However, the tendency to

procrastinate is consistent with the finding of Senecal et al. (1995), who found that higher levels of procrastination are associated with identified regulation, a condition of self-regulation in which a behavior is perceived by an individual as being important and connected to his or her personal goals and values (Deci and Ryan, 1991). Although, this association appears counter-intuitive, it is possible that it might reflect students' perceptions regarding difficulty of a research course, in general, and the article critique, in particular. Senecal et al. (1995) speculated that despite the value placed by students on taking a course to reach their academic goals, they might not be interested in the course content. This limited interest might contribute to procrastination in completing course assignments.

The heterogeneity of the groups with respect to academic procrastination did not predict group performance at any stage of the analysis. This finding is somewhat in contrast with the results from previous studies of cooperative learning groups involving graduate students. In particular, DaRos-Voseles et al. (2003) found that groups that tended to be the most homogeneous with respect to self-oriented perfectionism and other-oriented perfectionism and the least homogenous (i.e., most heterogeneous) with respect to socially prescribed perfectionism tended to attain the highest levels of performance. Further, Collins et al. (2004) documented that heterogeneity of anxiety levels was the most important predictor of the quality of the group product, explaining 13.2% of the variance in achievement. Also, Onwuegbuzie et al. (2003) found a positive relationship between degree of group heterogeneity of midterm examination performance and scores on the article critique. However, the present finding regarding group heterogeneity is more in line with the results of Onwuegbuzie and Collins (2002), who found that groups that are more individualistic tend to produce better research article critiques, regardless of how heterogeneous the group is with respect to levels of individualism. These findings combined suggest that the role that group heterogeneity plays in the achievement process is complex, warranting further research.

The present findings have several practical implications for graduate-level cooperative learning groups. For example, instructors might consider dividing cooperative learning projects into parts and require that groups submit each part at regular intervals for formal or informal evaluation. Moreover, instructors might consider creating smaller in-class collaborative group projects. The products developed as a result of the groups' collaboration can be linked to the final group product due at the end of the semester. Formative assessment measures implemented throughout the semester might help to reduce academic procrastination within groups and hence improve group outcomes. This practice might assist students to self-manage time and course requirements more efficiently. In addition, providing opportunities for students to obtain peer feedback via grading rubrics might help keep students focused and cognizant of the instructor's expectation. Whatever interventions are implemented, it is essential that their effects on academic procrastination be monitored carefully.

These results contribute to a program of research assessing the role of group dynamics on academic performance of graduate students by identifying the relationships between dimensions of academic procrastination and graduate students' achievement levels in the context of a research methods course. Figure 1 illustrates the proportion of variance in group outcomes across 21 personality variables assessed in studies utilizing different samples of graduate students enrolled in educational research methods courses. Inspection of Figure 1 indicates that two of the dimensions of academic procrastination, namely, procrastination level associated with task aversiveness and procrastination level associated with performing administrative tasks were part of the top five personality variables in terms of the proportion of variance explained in group

performance. Viewed in this context, the results of this current study underscore the importance of academic procrastination in cooperative learning settings. Cumulatively, the personality variables identified in Figure 1 comprise a composite of personality variables impacting cooperative group performance in graduate-level research methods courses. However, the implications of this composite are restricted because the samples were predominantly female and White, which are typical demographic characteristics of graduate students enrolled in educational degree programs. Therefore, as noted by Collins, Onwuegbuzie, and Jiao (2009), additional research utilizing samples representing a wider range of demographics is needed to expand this important line of research.

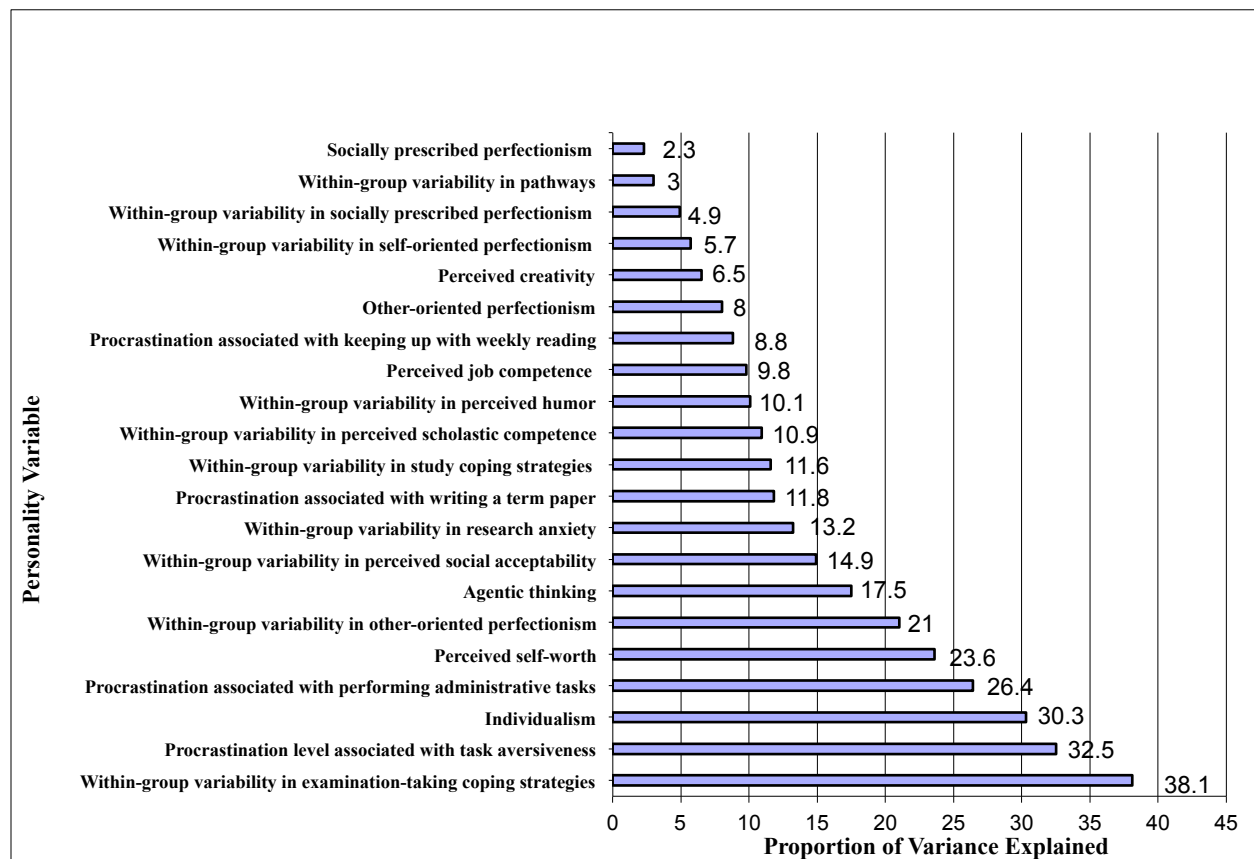


Figure 1. Proportion of variance explained in-group performance per personality variable utilizing different samples of graduate students.

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