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When Students Fail to Meet Course Grade Goals: Effectiveness of Compensatory Control
Strategies Among First Generation College Going Students

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF ARTS

in Social Ecology

by

Jennica Skye Rogers

Thesis Committee:
Professor Jutta Heckhausen, Chair
Associate Professor Jessica Borelli
Professor Chuansheng Chen

2021

DEDICATION

To Meredith, my supportive fiancée. Thank you for encouraging me day in and day out, and for keeping my spirits high. I would also like to dedicate my thesis to my best friend, Kristen. We started this journey together as undergraduates, and one day soon we will cross the finish line together with our doctorate degrees. Thank you both for endlessly cheering me on.

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ABSTRACT OF THE THESIS

When Students Fail to Meet Course Grade Goals: Effectiveness of Compensatory Control Strategies Among First Generation College Going Students

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Master of Arts in Social Ecology

University of California, Irvine, 2021

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The current study investigated adaptive self-regulatory control processes after failing to reach a short-term academic grade goal in both first and continuing generation college going students. Data was collected via weekly surveys from a sample of 359 diverse students at a public Southern California university (45.4% Asian/Asian American, 34.5% Hispanic, 12.5% White; 56.9% first-generation). A mixed ANCOVA design and a series of hierarchical regressions revealed partial support that control strategies change experienced psychological distress after receiving a final course grade for first generation college going students (FGCS). Failing to reach a desired grade alone did not produce changes in psychological distress, however getting a grade higher than their original goal did produce lower psychological distress regardless of generation status. Moreover, in response to failure to attain a grade goal, FGCS who anticipated use of self-protective strategies in future courses had lower psychological distress in the following academic quarter. This result could be confounded by our findings that FGCS reported lower distress at both timepoints. Subsequent analyses showed FGCS were more likely to anticipate using self-protection and goal adjusting strategies if their course turned out to be more difficult than they had expected compared to continuing generation students. Thus, FGCS may come into the university better equipped to use self-regulatory control resources to navigate academic challenges which protects them from experiencing increased psychological distress after failing

to meet an academic goal. The current study highlights the importance of using adaptive self-regulatory control for FGCS both proactively and reactively to unmet academic goals.

Keywords: First generation college students, academic goals, goal attainment, psychological distress, compensatory control, selective primary control

INTRODUCTION

Self-regulatory control strategies are adaptive processes that are necessary for striving for control of one's environment. Adapting to unmet academic goals is important for students to persist and thrive in the college environment. Using these control processes after failing to meet an academic goal may benefit some students more than others, such as first generation college going students (FGCS). FGCS are those who are the first in their family to go to college (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). As such, they are challenged with striving for upward mobility by attending college and by setting higher expectations for themselves to avoid poor academic performances (Jury, Smeding, Court, & Damon, 2018). When academic goals are at risk of being unmet, initiating control by using compensatory secondary control (i.e. self-protective cognitions and re-adjustment of goals) and selective primary control (i.e. enhancing time and effort) can protect students from experiencing diminished psychological well-being (Heckhausen, Wrosch, & Schulz, 2010; Heckhausen, Wrosch, & Schulz, 2019; Haase, Heckhausen, & Wrosch, 2013). However, what remains unknown is if using these strategies after failing to meet an academic goal can be especially protective for FGCS in regards to their psychological distress.

Motivational Theory of Life-Span Development – Self-Regulatory Control

The theoretical framework of the motivational theory of life-span development (MDT) (Heckhausen & Schulz, 1995; Heckhausen, Wrosch, & Schulz, 2010) posits using self-regulatory control strategies is beneficial for adapting to changing goals. This adaptation is a function of exerting control over the environment to receive more positive outcomes. There are two processes for individuals to strive for control – primary and secondary control striving. Both allow for optimization of development when experiencing loss of control, however they differ in

regards to where individuals pull their control from. Primary control is achieved by engaging in behaviors geared at changing the environment to match their desired goals, whereas engaging in secondary control focuses on changing internal states to match the environmental circumstances (for review, see Heckhausen, Wrosch, & Schulz, 2010; 2019).

These control processes are important for pursuing an academic goal, particularly when the ability to achieve the goal is threatened. Poorer performance on their goal may require a student to engage in changing their behaviors, including investing more efforts, time, and persistence. These behaviors are specifically called selective primary control striving and increase engagement with academic goals (H. Heckhausen, 1991). However, a student may choose to disengage with the original goal by using secondary control processes to regulate their internal cognitions after experiencing poorer performance. These strategies include cognitively reappraising the failed goal to attribute it toward external forces, avoiding self-blame, engaging in downward social comparisons, and adjusting goal aspirations. These strategies are known as compensatory secondary control and are adaptive when experiencing failure to attain a goal (Heckhausen & Schulz, 1993; Heckhausen, 1999). Both of these strategies are particularly adaptive for protecting one from experiencing poorer psychological well-being following the loss of control (for review, see Heckhausen, Wrosch, & Schulz, 2019; Heckhausen, Chang, Greenberger, & Chen, 2013).

Self-Regulatory Control Striving and Well-Being

Using these strategies can be beneficial for protecting one's psychological well-being after not meeting an academic goal. However, empirical findings for psychological well-being following a failed academic goal in college students are mixed. For example, there is evidence engaging with academic goals by using selective primary control strategies can predict

psychological well-being years later (Heckhausen, Chang, Greenberger, & Chen, 2013), but empirical findings are more scarce for this process when using compensatory secondary control strategies. Both processes of self-protection and goal adjustment are compensatory secondary control strategies that theoretically protect individuals from experiencing loss-related emotions (Heckhausen & Schulz, 1995). However, their role for buffering negative emotions associated with failed academic goals in college students needs more empirical work.

Bermeitinger, Hellwig, Andree, Roick, & Ringeisen (2019) found students who failed to reach a desired grade on a specific exam were more likely to devalue their goal, a self-protective strategy, and reported more gain-related emotions than loss-related emotions. However, whether the devaluation of their goal resulted in a change in their emotional state was not investigated. Moreover, it is unclear whether goal adjustment strategies after failing to attain an academic goal protects college students' psychological well-being. Villarreal, Heckhausen, Lessard, Greenberger, and Chen (2015) found students who failed to reach enrollment goals downwardly adjusted their future goals which was associated with lower expectations one year later. However, this study did not find evidence that downwardly adjusting future goals had any impact on a student's psychological health. This indicates adjusting academic goals may be harmful for academic expectations in the short-term, but not necessarily on mental health of the student. The role of these strategies have not been tested on shorter-term academic goals, such as reaching a desired grade in a course. In addition, whether these control strategies benefit certain students over others has not been investigated. Particularly, the protective role of these strategies on traditionally disadvantaged college students' well-being has yet to be studied.

First Generation Students

Persistence to achieve a desired degree requires positive adaptations to the novelty of the college environment, where those who effectively adapt to challenges this environment provokes are more likely to persist to earn a degree (Tinto, 1993). However, due to a series of differences in background characteristics, certain students are traditionally thought to be at a disadvantage for this positive adaptation. For example, a plethora of research has demonstrated barriers and hardships unique to first generation college going students (FGCS) which makes academic persistence more difficult. FGCS are the first in their families to attend college, where neither of their parents earned a bachelor's degree (Terenzini, Springer, Yaeger, Pascarella & Nora, 1996). Because of this, the college experience is more likely to be novel and more challenging to navigate for these students. In addition, FGCS relative to continuing generation students are more likely to be from lower socioeconomic statuses (SES) where their financial stability is achieved by working more hours at part-time jobs (Choy, 2001; Lohfink & Paulsen, 2005; Willingham, 1985; Willingham & Breland, 1982; Tinto, 1975). They also more often belong to ethnic minority groups (Bui, 2002) and are more likely to have lower high school achievement and preparation (Pascarella, Pierson, Wolniak, & Terenzini, 2016; Planty, Bozick, & Ingels, 2006). These characteristics are important because they are intercorrelated and often explain why some students are able to succeed within an academic institution and social structure, while others may succumb to obstacles inherently deterrent of student success (Tinto, 1975; Choy, 2001).

Despite these disadvantages, FGCS do not differ from continuing generation students on academic performance measures, including writing and reading comprehension and critical thinking skills (Pascarella, Pierson, Wolniak, & Terenzini, 2016). Thus, FGCS face unique challenges which makes persistence more difficult, but these characteristics do not speak for the

merit of their cognitive abilities. As such, FGCS do not fail to persist in their academic careers due to lacking abilities to succeed. Perhaps facing these barriers creates differences in their motivational resources, such as the types of regulatory control used to persist and adapt through unmet academic goals.

Achieving Academic Goals on FGCS Self-Worth and Well-Being

Within an academic context, students' achievement goals reflect their sense of self-worth and belonging, where avoiding failure is protective of self-worth. FGCS have been identified as students who generally report lower levels of self-efficacy compared to continuing generation students (Aspelmeier et al., 2012; Metcalf & Wiener, 2018) where non-white FGCS show greater declines in academic self-efficacy across an academic term (Hood et al., 2020). Accordingly, students who have high academic self-efficacy are motivated to persist through academic hardships and challenges (Bandura, 1993). It is possible that FGCS may be more vulnerable for experiencing diminished well-being as a result of failure of achievement compared to continuing generation students.

Moreover, students' overall achievement is often reflected by the grades they receive (Covington, 2000). A student will attain their desired grade outcomes based on exertion of control over their motivational systems, behaviors, and environments (Bandura, 1997). When a student fails to reach their academic goals, regulating their own cognition can assist them in making appropriate adjustments to their future goals and protect them from internalizing their failed attempts. Self-efficacy and psychological distress in college students are closely related (Thompson, Her, Fetter, & Perez, Chavez, 2019), where reducing one's psychological distress also increases academic self-efficacy (Bani, Zorzi, Corrias, & Strepparava, 2020). In their first year of college, FGCS have lower self-acceptance and experience diminished well-being

compared to continuing generation students (Bowman, 2010). Thus, using compensatory secondary control such as adjusting their academic goal aspirations and engaging in downward social comparisons relative to how others performed may curb the negative affect experienced when failing to meet their goals. It is also possible engaging with the original goal by increasing their efforts and time needed to reach it could also protect these students from experiencing negative emotions associated with falling short of the original academic goal.

After failing to reach an academic goal, differences in changes in psychological distress between groups of students may be explained by individual differences in control striving behaviors. FGCS are tasked with exerting stronger motivational energy in order to reach their higher education goals. Goal engagement strategies such as selective primary control are thought to be more effective ways to exert control for lower SES students (Heckhausen, 2021). Typically engaging with attainable goals and disengaging from over ambitious goals helps students maintain a level of positive well-being. However, whether using compensatory control efforts versus exerting more selective primary control when goals are threatened is protective of psychological distress has not been studied in FGCS. Therefore, it is imperative to understand differences in underlying motivational-cognitive processes FGCS use when experiencing a failed academic goal in order to protect their psychological health after the fact. Perhaps FGCS who use selective primary and compensatory secondary control strategies after a failed academic goal can mitigate negative emotions experienced after failing to reach their academic goals.

The Present Study

The aim of this study was to determine whether the use of compensatory secondary control and selective primary control for first and continuing generation students changes psychological distress after experiencing a failed academic goal. Specifically, the current study

sought to determine if FGCS can protect themselves from experiencing psychological distress by using these control strategies after failing to reach a course grade goal. First, whether failing to reach a course grade goal elicits psychological distress regardless of generation status was investigated. Additionally, due to the novelty of the college environment and traditional barriers experienced by FGCS, FGCS were expected to experience greater psychological distress regardless of goal attainment or control strategy use compared to continuing generation students. In regards to control strategies, both groups of students should benefit by having reduced psychological distress after failing to reach their grade goal when anticipating future use of these control strategies. However, it is expected FGCS would experience a greater decrease in psychological distress compared to continuing generation students when utilizing these strategies after not reaching their grade goal. The specific hypotheses are as follows:

Hypothesis 1: Regardless of generation status, students who fail to reach their course grade goal will experience an increase in average psychological distress from the beginning of the academic quarter (T1) into the next academic quarter (T3) compared to those who reached their goals.

Hypothesis 2: FGCS compared to continuing generation students will show a greater increase on average psychological distress when failing reach their course grade goal.

Hypothesis 3: After failing to reach their course grade goal, students who use control strategies will buffer heightened psychological distress.

3a. Regardless of generation status, students who use selective primary and compensatory secondary control for future similar courses in response to failing to reach their course-grade goal will have lower psychological distress in the following academic quarter.

3b. Generation status is expected to change this relationship, where FGCS will be more likely to have the lowest psychological distress when responding to failure by using selective primary and compensatory secondary control strategies compared to continuing generation students.

CHAPTER 1

METHODS AND MATERIALS

Participants

This study used data from the Next Generation Undergraduate Success Measurement Project, collected at a large public research university in Southern California. The aim of the overarching project was to collect longitudinal data on undergraduate students' academic performance, well-being, and overall success over the course of two academic years. Recruitment emails were sent to all UCI freshman and junior students in the summer of 2019 with a 10% response rate. All students were enrolled at the university. Longitudinal data on students' experiences and success was collected using repeated surveys and college report data of N=1255 students. Analyses from this study used a subgroup of 359 students who received weekly surveys across 10 weeks (i.e. 1 academic term). These students received 1 hour of course credit in exchange for participation. This sample was primarily female (68.2%) consistent with other convenient college sampling demographics (Weigold & Weigold, 2021), and a little over half of participants were FGCS (56.3%). The majority of the sample were first year students (68.2% freshman, 31.8% juniors) where approximately half were majoring in a Science, Technology, Engineering, or Mathematics (45.7% STEM). Additionally, the sample was racially and ethnically diverse (45.4% Asian American, 34.5% Hispanic, 12.4% White, non-Hispanic, 6.4% other/unknown). The final sample included 279 participants who responded to both measures of psychological distress. (see Table 1 in Appendix B).

Procedure

At the beginning of the academic quarter (T1, 10-week quarter system), participants were asked to report their non-specific psychological distress (Kessler et al., 2002) and their expected course grade they wished to obtain in their most difficult course. One week after students took their final exams (T2), they received their final course grade and were asked to report whether they attained their grade goal by assessing whether they performed better than expected, as expected, or worse than expected. Next, they were asked to assess the likelihood they would engage in various control strategies, including goal adjustment, self-protection, and increased efforts and time for future similar difficult academic courses using an adaptation of the Optimization in Primary and Secondary Control Scale (Heckhausen, Schulz, & Wrosch, 1998). Finally, psychological distress was assessed three weeks into the next academic quarter (T3) (see Figure 1. in Appendix A for schematic). Administrative data was used to collect student information regarding whether they were first-generation college going students, their biological sex, academic grade level, their field of study, and race/ethnicity.

Measures

Attainment of Course Grade Goal: Participants were asked at the beginning of the academic quarter to report their expected grade percentage in their most difficult course. Following their final week of the quarter after they received their final course grade, it was assessed whether they failed to attain their course grade goal by asking, “think back to the beginning of the last term, was your grade in your most difficult course better, equal, or worse than expected?.” Students were the most likely to report performing as expected (better than expected $n=92$, 33%; as expected $n=108$, 38.7%, worse than expected $n=79$, 28.3%).

Non-Specific Psychological Distress: Participants were asked to report on the Kessler K10 scale of non-specific psychological distress. The K10 includes 10 items assessing how often during the

last 30 days they felt, for example, “depressed,” “hopeless,” and “anxious” where participants responded on a scale ranging from 1 (*none of the time*) to 5 (*all of the time*) (Kessler et al., 2002) (see Table 12 in Appendix C). Psychological distress was measured at T1, the beginning of the first academic term ($\alpha=.898$), then again at T3, three weeks into the next academic term ($\alpha=.928$). A sum score was calculated based on responses to each item at each time point. At the beginning of the academic quarter, most students reported having scores ranging from 0 to 15, equating to low levels of psychological distress ($n=218$, 60.7%; moderate $n=62$, 17.3%, high $n=39$, 10.9%, very high $n=21$, 5.8%). This pattern was consistent for the second time point (low $n=164$, 45.7%, moderate $n=43$, 12%, high $n=20$, 5.6%, very high $n=19$, 5.3%) (Welsch et al., 2020).

Generation Status: Generation status was assessed using administrative data provided by the university. Students were classified as first-generation college going students if neither of their parents or guardians had earned a bachelor’s degree. Those who had at least one parent or guardian earn a bachelor’s degree were considered continuing generation students.

Control Strategies: Control strategies were measured at two time points, one at the beginning of the academic quarter, and again at the end. At the beginning of the academic quarter, participants were asked to report how likely it would be that they would make each of the following changes to their behavior if they discovered that their most difficult course that they have selected was more difficult than expected (see Table 13 in Appendix C). At the end of the academic term after receiving their final course grade, participants were asked, “Given your experiences in this difficult course, on a scale from 1 to 7, how likely it is that you will make each of the following changes in your behavior regarding difficult courses in the *future*?” Participants responded on a 1

to 7 scale where 1 represented “extremely unlikely” and a 7 represented “extremely likely.” (see Table 14 in Appendix C).

Selective Primary Control: Selective Primary Control included two measures on the OPS scale. Participants were asked how likely they would be to “increase your effort and time invested” and, “try harder to do well in assignments and exams.” These two items were combined and averaged to have one construct for selective primary control for week 1 of the first academic quarter ($\alpha=.867$) and after receiving their final grades ($\alpha=.921$).

Compensatory Secondary Control Strategies

Goal Adjustment: Goal adjustment was assessed by how likely students said they were to “adjust your grade aspirations” and “become more realistic in your aspirations” (adjusted OPS-Scales, Heckhausen, Schulz, & Wrosch, 1998). The two items of goal adjustment via the OPS scale were combined and averaged to create a measure of adjusting future similar goals for week 1 of the first academic quarter ($\alpha=.862$) and after they received their final grades ($\alpha=.865$).

Self-Protection: Self-protection strategies were assessed by whether student reported being likely to “remind yourself that other students are struggling too” and “tell yourself that it is not your fault.” (OPS). The two items of self-protection were combined and averaged to create a measure of using self-protection strategies for week 1 of the first academic quarter ($\alpha=.664$), and after receiving their final grades ($\alpha=.683$).

Covariate Variables: Administrative data was used to collect participants’ biological sex, academic grade level, field of study, and race/ethnicity. The analyses adjusted for the following as covariates.

Biological Sex: Biological sex was coded using a score of 0 for males and a score of 1 for females.

Grade Level: Participants reported their current grade level, either a freshman, continuing junior, or a transfer junior. No sophomores or seniors were assessed. Both continuing and transfer juniors were combined. Grade level was then dummy coded where a 1 represented freshman and a 0 represented juniors.

Field of Study: Students reported on their academic major. Students were classified as either a STEM (Science, Technology, Engineering, Mathematics) or non-STEM major. STEM majors were coded 1, where non-STEM majors were coded 0.

Race/Ethnicity: Participants reported their ethnicities based on four categories, White, non-Hispanic, Hispanic, Asian/Asian American, or Other/Unknown. Ethnicity was dummy coded to include in the analyses where a code of 1 represented the respective ethnicity category and a 0 non-group membership to the corresponding category.

CHAPTER 2

RESULTS

Preliminary Analyses

Before any analyses, distributions of variables to be used were examined. While both measures at each time point of psychological distress displayed marginal positively skewed distributions, no ceiling or bottom effects were observed. Thus, the original distributions were maintained for data analyses. All data were checked for influential outliers. No outliers were significantly influential, thus all data points were maintained for analyses. Furthermore, Little's (1988) test of Missing Completely at Random (MCAR) was conducted to determine what method to use to handle missing data, $\chi^2(37) = 49.26, p = .086$. This result indicated our data was missing completely at random. Thus, listwise deletion was used to handle the missing data.

To determine if missing data were contingent on psychological distress of participants, a series of chi-square analyses were conducted (see Table 2 in Appendix B; missing data percentages by variables). Missing data were first dummy coded where missing values were given a 1 and responses were coded as 0. Results indicate out of the initial 359 participants, 63.8% of the initial sample was maintained across participants who reported psychological distress at the beginning of the academic quarter and who reported it three weeks into the next academic quarter. To determine if missing data for psychological distress at T3 was contingent on psychological distress at T1, psychological distress was recoded to reflect categories based on determined cut off scores (Welsch et al., 2020). Low levels of psychological distress equates to a sum score ranging from 0-12, mild 13-16, moderate 17-22, and high levels of psychological distress ranging from 23-50. Next, a chi-square analysis was conducted to determine if those

with higher psychological distress at the beginning of the academic quarter were more likely to have missing data. Results indicate missing data was not contingent on levels of psychological distress at the beginning of the quarter, $\chi^2(3, N=340) = .667, p = .881$). Whether one participated in responding on the control strategies at T2 or responded on psychological distress at T3 did not vary by generation status, sex, grade level, or attainment of course grade goal.

Main Analyses

Zero-order correlations between the variables of interest were conducted to establish associations amongst each other (see Table 3 in Appendix B). Failing to attain a course grade goal was positively correlated with psychological distress at the end of the academic quarter ($r = .141, p = .031$). Additionally, adjusting future similar goals based on students' experience with their most difficult course was positively correlated with being a FGCS ($r = .209, p = .001$). The remaining control strategies, self-protection and selective primary control, were not associated with attainment of their course grade goal, nor psychological distress at the beginning or end of the academic quarter. Further, being Asian or Asian American was positively associated with psychological distress at the beginning of the academic quarter ($r = .113, p = .039$), and being White, Non-Hispanic was negatively associated with both psychological distress at the beginning ($r = -.174, p = .001$) and the end ($r = -.160, p = .013$) of the academic quarter.

To determine if non-specific psychological distress at both time points varied by any of the possible covariates to include in the analyses, a one-way ANOVA and a series of *t*-tests were conducted. Next, independent samples *t*-tests were conducted to determine if differences existed in psychological distress between students who declared being a STEM major or not, grade level, as well as if psychological distress varied by sex. For psychological distress at the beginning of the academic quarter, there were no significant differences between being in STEM or not,

$M_{diff}=.541$, $t(333)=.581$, $p=.561$, 95%CI(-1.29, 2.38), whether one was a freshman or junior, $M_{diff}=.285$, $t(338)=.287$, $p=.774$, 95%CI(-1.67, 2.24), nor by biological sex, $M_{diff}=-1.50$, $t(338)=-1.52$, $p=.130$, 95%CI(-3.44, .443). For differences amongst different race/ethnicities, there was a significant difference amongst groups, $F(3,332)=3.88$, $p=.010$) where additional Tukey post-hoc multiple comparison tests revealed significant group differences between those who were White, non-Hispanic and Asian/Asian American, $M_{diff}=-4.85$, $p=.004$, 95%CI(-8.54, -1.15), and those who were Hispanic, $M_{diff}=-3.98$, $p=.037$, 95%CI(-7.80, -.160). This indicated Asians and Asian Americans as well as Hispanics reported significantly higher psychological distress symptoms at the beginning of the academic quarter compared to White, non-Hispanics.

For psychological distress three weeks into the following quarter, no significant differences were found for STEM students compared to non-STEM students, $M_{diff}=.756$, $t(241)=.607$, $p=.545$, 95%CI(-1.70, 3.21)¹, nor grade level, $M_{diff}=.595$, $t(244)=.439$, $p=.661$, 95%CI(-2.078, 3.27), nor biological sex, $M_{diff}=-1.70$, $t(244)=-1.29$, $p=.198$, 95%CI(-4.30, .894). Next, a one-way ANOVA was conducted to determine if any significant differences existed between reported race/ethnicity. Results indicate no significant group differences amongst whether one is White, non-Hispanic, Asian/Asian American, Hispanic, or if participants reported Other/Unknown, $F(3,239)=2.16$, $p=.094$, for psychological distress three weeks into the next academic quarter.

To see whether there was a significant difference in psychological distress at the beginning of the academic quarter by whether someone attained their course grade goal at the

¹No significant differences existed on psychological distress at either time point by field of study, thus Science, Technology, Engineering, and Mathematical majors were categorized as STEM, and all other majors were classified as non-STEM for analyses.

end of the quarter, a one-way ANOVA was conducted. Results indicated psychological distress at the beginning of the academic quarter did not differ for those who ended up performing better than expected, as expected, or worse than expected $F(2,267)=1.07, p=.345$.

Two-way Mixed Repeated Measures Analysis of Covariance (ANCOVA)

A 2x3 mixed repeated measures analysis of covariance (ANCOVA) (2 Generation Status x 3 Attainment of Course Grade Goal) was used to test whether attainment of a course grade goal predicts an increase in psychological distress, and if this mean change in psychological distress from the beginning of the academic quarter to after receiving their final course grade was more significant for FGCS (see Tables 4, 5, and 6 in Appendix B). The two between-subjects factors were generation status and attainment of course grade goal. The within-subjects factor was the time point of psychological distress, either at the beginning of the academic quarter, or three weeks into the next academic quarter. The dependent variables of psychological distress were both continuous and normally distributed, and no influential outliers were detected. The Levene's test of equality of error variances was conducted to test the dispersion of variances in psychological distress from T1 to T3. Results indicate no violation of this assumption [$ps > .109$]. Sex, grade level, whether one was a STEM major, and race/ethnicity were all dummy coded and adjusted for in the analysis. None of the covariates were significant in the model for predicting a difference in psychological distress across the academic quarter.

Attainment of Course Grade Goal on Differences in Psychological Distress

FGCS did not differ from continuing generation students on attainment of their course grade goal, $F(2,214)=1.50, p=.150, \eta^2 = .018$. More importantly there was not a significant interaction between differences in psychological distress and generation status $F(1,214)=.046, p=.831, \eta^2 = .000$, nor was there was a significant three-way interaction between attainment of

course grade goal, generation status, and the timepoint of average psychological distress $F(2,214)=.034$, $p=.967$, $\eta p^2=.000$. Moreover, there was no significant mean level difference in psychological distress from the beginning of the academic quarter to three weeks into the next academic quarter, $F(2,214)=1.91$, $p=.150$, $\eta p^2=.018$, regardless of generation status. However, this result was qualified by a significant interaction between differences in psychological distress and attainment of a course grade goal, $F(2,214)=5.40$, $p=.005$, $\eta p^2=.048$, indicating a variation in psychological distress over time as a function of goal attainment (see Figure 2 in Appendix A). Specifically, for those who performed better than expected, psychological distress on average decreased from the beginning of the quarter ($M=14.58$, $SD=.9.01$) into the next academic quarter ($M=11.58$, $SD=8.17$). However, those who performed as expected did not significantly differ on average psychological distress at the beginning of the quarter ($M=12.21$, $SD=.7.95$) into the next quarter ($M=11.65$, $SD=9.35$). Similarly, neither did performing worse than expected from the beginning of the quarter ($M=13.73$, $SD=8.24$) into the next quarter ($M=14.79$, $SD=11.08$).

Generation Status and Differences in Psychological Distress

There was a significant between-subjects effect of differences in psychological distress from T1 to T3 where FGCS reported lower levels of psychological distress at the beginning of the academic term ($M=12.42$, $SD=7.57$) compared to continuing generation students ($M=14.72$, $SD=9.28$) regardless of attainment of their course grade goal, $F(1,214)=4.18$ $p=.042$, $\eta p^2=.019$ (see Figure 3. in Appendix A). This pattern remained the same for reported psychological distress into the next academic quarter where FGCS reported lower psychological distress ($M=11.56$, $SD=9.09$) compared to continuing generation students ($M=13.80$, $SD=10.13$). However, mean psychological distress did not differ from the beginning of the academic quarter into the next quarter by generation status, $F(1,214)=.046$, $p=.831$, $\eta p^2=.000$.

Hierarchical Multiple Regression with 3-Way Interactions

A series of three different hierarchical regression analyses were conducted to test whether the anticipated use of control strategies in future courses after failing to reach an academic grade goal buffers an increase in psychological distress for FGCS (see Table 8 in Appendix B). Prior to analyses, all continuous control strategies (self-protection, goal adjustment, and selective primary control) were mean centered to address the possibility of collinearity. Attainment of course grade goal was re-coded to reflect whether one reached or failed to reach their course grade goal. Participants who reported performing as expected or better than expected were coded as 0 reflecting that they reached their course grade goal, whereas those who reported performing worse than expected were coded as 1. The first step in each hierarchical regression model included sex, race/ethnicity, academic major, grade level, and prior psychological distress at the beginning of the quarter. Step two in each hierarchical regression included generation status and attainment of their course grade goal, as well as their interaction. Step 3 in each model included the corresponding control strategy along with a three-way interaction between generation status, attainment of course grade goal, and the control strategy.

All necessary assumptions were tested. First, it was verified there was a linear relationship between each predictor variable on psychological distress at the end of the academic quarter. Next, all residuals were confirmed to be normally distributed and variation of inflation (VIF) tests were conducted. A VIF value above 10 indicates a problem of unnecessary multicollinearity, thus this cut off score was used to investigate whether multicollinearity was detected in any of the models (Hair et al., 2010). None of the predictors included in the hierarchical regression analyses displayed a value greater than 2.97, indicating there was no detected problem of multicollinearity between any of the predictors on psychological distress

measured in the next academic quarter. Finally, it was verified the variance of error terms did not significantly vary across each value of the predictors, ensuring the data did not violate the assumption of homoscedasticity.

Anticipation of Future Use of Self-Protection Strategies for FGCS

The first hierarchical regression tested whether FGCS who used self-protection strategies showed a decrease in psychological distress when adjusting for initial psychological distress and demographic characteristics (see Table 9 in Appendix B). The first step in the model included psychological distress from the beginning of the academic quarter to serve as a baseline. Additionally, sex, ethnicity, whether students were in STEM, and grade level were included. The results for the first step in the hierarchical multiple regression revealed this model was statistically significant where the predictors in this block explained 40.8% of the variation in psychological distress at the end of the academic quarter, $F(7,206)=21.95$, $p<.001$, $R_{adj}^2=.408$. However, baseline psychological distress was the only significant focal predictor in this model, $b=.743$, $\beta=.644$, $p<.001$, 95%CI(.621,.864). The second step added in generation status, goal attainment performance (performed worse than expected vs. as expected or better) as well as the interaction between generation status and goal attainment performance. This model was statistically significant, and these additional predictors explained an additional 2.3% of the variation in psychological distress at the end of the academic term, $F(3,203)=2.77$, $p=.043$, $\Delta R^2=.023$. However, the interaction between generation status and attainment of course grade goal was not significant, $b=-1.44$, $\beta=-.057$, $p=.519$, 95%CI(-5.84, 2.95). The third and final step added the compensatory secondary control strategy of self-protection, as well as the interaction between generation status, attainment of course grade goal, and the reported likelihood that self-protection strategies would be used in the next academic quarter in a similar course. While

anticipating use of self-protective strategies in future courses was not a significant predictor in the model, $b=.215$, $\beta=.036$, $p=.535$, 95%CI(-.466,.896), the interaction was marginally significant where first generation students who failed to attain their course grade goal but were 1 standard deviation above the mean for using self-protection strategies had the lowest psychological distress, $b=-1.86$, $\beta=-.116$, $p=.048$, 95%CI(-3.71, -.017).

When plotting the three-way interaction and testing the statistical significance of slope differences between failing to attain their course grade goal and generation status for high and levels of self-protection, the slope differences were statistically significant, indicating a trend of lower psychological distress for first generation students who planned to utilize self-protection strategies in future courses ($t=2.10$ $p=.036$) (see Figure 4 in Appendix A). However, this final step was not statistically significant and only explained an additional 1.1% of the variation in psychological distress three weeks into the next academic quarter, $F(2,201)=1.99$, $p=.139$, $\Delta R^2=.011$.

Anticipation of Future Use of Goal Adjustment for FGCS

The same series of steps were ran for the next hierarchical regression, except now looking at the likelihood one would use goal adjustment strategies in future difficult courses if turned out to be the same in difficulty (see Table 9 in Appendix B). However, the likelihood of using goal adjustment strategies did not explain a change in psychological distress at the end of the academic term, nor did the interaction between generation status, attainment of course grade goal, and goal adjustment strategies.

Anticipation of Future Use of Selective Primary Control Strategies for FGCS

The third and final hierarchical regression added in the likelihood of selective primary control strategies into the third step, followed by the interaction between generation status, attainment of course grade goal, and selective primary control strategies (see Table 9 in Appendix B.). This interaction also did not explain a significant amount of variation in psychological distress at the end of the academic term.

Subsequent Analyses

Proactive Planned Use of Control Strategies at the Beginning of the Quarter

Subsequent analyses were conducted to determine if FGCS were more likely to use certain control strategies throughout the academic quarter. Independent samples *t*-tests were conducted to determine if the anticipated use of goal adjustment, self-protection, or selective primary control reported throughout the quarter differed by generation status. Specifically, differences in the reported likelihood a student would engage in these control strategies if their course turned out to be more difficult than expected was assessed by generation status. FGCS were more likely to report anticipating the use of self-protection strategies ($M=3.79$, $SD=1.73$) compared to continuing generation students ($M=3.04$, $SD=1.51$), $t(241)=-3.54$, $p<.001$, 95%CI(-1.17, -.334). Likewise, FGCS were more likely to report anticipating the use of goal-adjustment strategies ($M=4.51$, $SD=1.69$) compared to continuing generation students ($M=3.76$, $SD=1.92$), $t(277)=-3.42$, $p=.001$, 95%CI(-1.17, -.315) (see Figure 5 in Appendix A). However, no significant differences were found for the likelihood of using selective primary control for FGCS ($M=6.04$, $SD=1.02$) and continuing generation students ($M=6.06$, $SD=1.01$), $t(304)=.149$, $p=.882$, 95%CI(-.214, .249).

CHAPTER 3

DISCUSSION

Using selective primary and compensatory secondary control strategies as conceptualized by the motivational theory of life-span development (MDT) (Heckhausen & Schulz, 1995; Heckhausen, Wrosch, & Schulz, 2010) are found to protect individuals from experiencing diminished psychological well-being in a multitude of contexts. The current study sought to determine whether psychological distress could be reduced greatest for FGCS who used these strategies after failing to reach an academic goal within a college context. Our first two hypotheses were related to whether failing to attain a course grade goal puts students at risk for experiencing psychological distress following the unmet goal, particularly more so for FGCS.

Contrary to what we expected, failing to attain a course grade goal had no effect on changes in psychological distress from the beginning of the first academic quarter to the three weeks into the next academic quarter for neither first or continuing generation students. Rather, both groups of students who performed better than they had originally expected on attaining their course grade goal showed an average significant decrease in psychological distress. Although prior literature has focused on the consequences on psychological well-being from experiencing failure, these results indicate outperforming one's original academic goal can decrease psychological distress.

The third hypothesis sought to determine after failing to reach a course grade goal, if FGCS benefitted more from the use of self-regulatory control strategies compared to continuing generation students in regards to protecting themselves from increased psychological distress. When actually failing to attain their course grade goal at the end of the academic quarter, there were no differences between first and continuing generation students on psychological distress

on anticipated use of goal adjustment and selective primary control strategies for future similar academic goals. However, FGCS who reacted by anticipating use of self-protection strategies in future courses did experience a decrease in psychological distress. Continuing generation students had similar levels of psychological distress regardless of anticipating future use of these strategies, thus they did not particularly benefit from anticipating on implementing them in future similar courses as FGCS did.

Moreover, our study found FGCS report lower levels of psychological distress at both the beginning of their first academic quarter and three weeks into their next academic quarter compared to continuing generation students regardless of attainment of their course grade goal. This finding was unexpected as other studies have found no differences in psychological distress between first and continuing generation students (Martinez, Sher, Krull, & Wood, 2009). A few potential factors could explain why this particular study yielded lower psychological distress for FGCS.

First, subsequent analyses revealed that at the beginning of the first academic quarter, FGCS were more likely than continuing generation students to anticipate changing their goal aspirations to become more realistic, as well as avoiding blame as a means of self-protection if their course turned out to be more difficult than originally anticipated. These findings perhaps indicate FGCS do not differ in psychological distress from their peers because they are already using strategies to protect themselves from experiencing distress as the academic quarter progresses. This would be consistent with prior studies finding that students of marginalized groups acquire unique experiences which contribute to their abilities to overcome adversity (Yosso, 2005; Carales & Lopez, 2020). Particularly, FGCS may come into the university with enhanced abilities to utilize self-protection and goal adjustment strategies as a means of

protection against diminished psychological well-being. This would reflect a selection effect for FGCS at the level of a Research I-university with highly selective undergraduate admission criteria, which are particularly hard for FGCS to meet.

On the other hand, FGCS collectively at this university could be experiencing factors which inherently protect them from experiencing declines in their psychological health. FGCS traditionally feel less belonging compared to continuing generation students at 4-year institutions (Gopalan & Brady, 2019). A lower sense of belonging is associated with mental health problems. For example, students' sense of belonging at their university is associated with lower internalizing problem behaviors (Pittman & Richmond, 2009). This pattern may differ depending on the amount of representation they have once at their university. For this sample, the university has a high prevalence of undergraduate first-generation college going students (~60%). Having such high representation within their university could contribute to these students' sense of belonging. Future studies should continue to investigate differences in the individual culture each university fosters and how this positively impacts underrepresented students' mental health.

Apart from generation status, the role compensatory secondary control strategies have on protection of diminished psychological well-being as a response to an unmet goal very well may differ by race and ethnicity. While this study adjusted for race and ethnicity in the main models, the sample were largely Asian/Asian American students (45.4%). There is evidence that the use of compensatory secondary control strategies (goal-adjustment and self-protection) are not used when encountering failure in academic pursuits in Asian societies (Wong, Li & Shen, 2006; Wong, Li, Sun, & Xu, 2014). Preliminary analyses in this study found Asian and Asian Americans as well as Hispanic individuals on average had higher psychological distress at the beginning of the academic quarter compared to White, non-Hispanic individuals. However, the

direct relationship between control strategy use on changes in psychological distress for these students was not assessed. Thus, it would be important for future studies to investigate differences amongst various cultures and ethnic groups for the different roles control strategies may have on protecting students from decreased mental health outcomes as a consequence of academic goal performance.

Limitations

A few limitations should be noted concerning this study. First, students were chosen to participate based on their desire to participate in exchange for one course credit. Thus, a convenience sample was used to obtain participants. The incentivization of one course credit may not have been enticing enough to participate across the 10-week academic term, especially for freshman students who were not worried about fulfilling credit requirements yet. Moreover, because participation had low incentivization, students who participated were likely to be particularly motivated and conscientious, which may limit generalizability to all college students.

Another limitation is the timing of measurements of psychological distress. While the interest of the study was whether change in psychological distress carried over into the next academic quarter depending on anticipation of future use of control strategies, psychological distress was measured three weeks into the following academic quarter. The intermittent break between quarters may have influenced the level of psychological distress the students reported experiencing when reporting three weeks into the next academic quarter. Moreover, attrition is always a mechanism of concern in longitudinal data. The attrition of participants who initially reported on psychological distress at the beginning of the quarter to three weeks into the next academic quarter was 22.3%. Thus, those who chose to stop their participation may have underlying differences compare to those who continued, impacting these findings.

Public Policy Implications

There is evidence of successful intervention efforts aimed at improving psychological health and academic performance for underrepresented students. For example, lower SES students who become aware of their unique strengths show increases in psychological well-being and persistence through academic challenges (Hernandez, Silverman & Destin, 2021). Additionally, higher institutional support mediates the relationship between stress on progress toward academic goals for first generation students where friend and family support did not (Garriott & Nisle, 2018). We also know underrepresented students who adopt a “growth mindset” are more likely to have improved motivation and thus show higher academic performances as a consequence (Blackwell Trzesniewski, & Dweck, 2007; Yeager et al., 2016). Because FGCS are motivated to attend college to attain upward mobility, they set high expectations for themselves to avoid poor performance on their academic goals (Jury, Smeding, Court, & Darnon, 2018). Thus, institutional support can be provided by highlighting these students’ strengths in terms of their capacity for personal agency through implementing self-regulatory control when facing unmet academic goals or academic challenges.

CHAPTER 4

CONCLUSIONS

This study reveals important differences in the psychological repercussions of control strategy use as a function of goal attainment outcome. Specifically, this study found that using self-protective strategies after academic setbacks is associated with reduced psychological distress for FGCS, but not for continuing generation college students. Moreover, FGCS were less distressed compared to their peers at both the beginning of their first academic quarter, as well as three weeks into the next quarter. Subsequent analyses reveal that FGCS are more likely to anticipate use of goal adjustment and self-protective strategies throughout the academic quarter when their course becomes more difficult compared to continuing generation students. This indicates the possibility that FGCS begin their goal pursuit already planning on implementing these strategies throughout the course. However, after actually receiving their final course grade, they do not benefit from responding to a failed academic goal by planning to adjust their future course grade goals.

While engagement in self-regulatory control is more beneficial for students of lower socioeconomic statuses for persisting in reaching academic goals (Heckhausen, 2021), this study highlights differences in which specific self-regulatory control behaviors are protective of psychological distress and which are less effective when academic goals go unmet for FGCS. These results provide evidence that FGCS at highly selective universities are more adept at using compensatory secondary control strategies to protect their psychological health when facing unmet academic goals. They proactively anticipate using goal adjustment and self-protection strategies when if they do encounter setbacks in their course work, and also report responding to

failure by using anticipating future use of self-protective strategies. While differences between first and continuing generation students are typically seen as negative and are explored through deficit-based models (Gorski, 2011), more research should focus on understanding how these students' abilities to self-regulate control over their behaviors through adaptive responses when facing academic challenges can increase persistence as well as improving psychological health. Thus, future studies should continue to investigate responses to unmet academic goals for underrepresented students at various universities to understand whether these findings are generalizable to college students across the United States and at different types of institutions.

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APPENDIX A: FIGURES

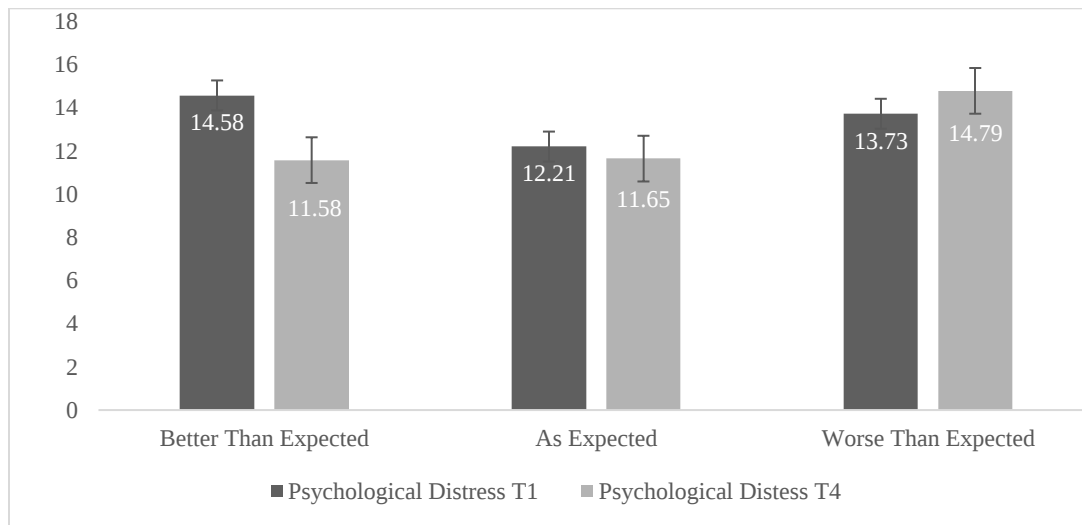
Figure 1.

A Schematic of the Timepoints Which Variables Were Assessed

T1: Week 1 of academic quarter	T2: One week following academic quarter	T3: Week 3 of next academic quarter
- Grade goal in most difficult course - Psychological distress - Anticipated control strategies for the quarter	- Attainment of course grade goal (better than expected, as expected, worse than expected) - Reactive control strategies for future courses	- Psychological distress

Figure 2.

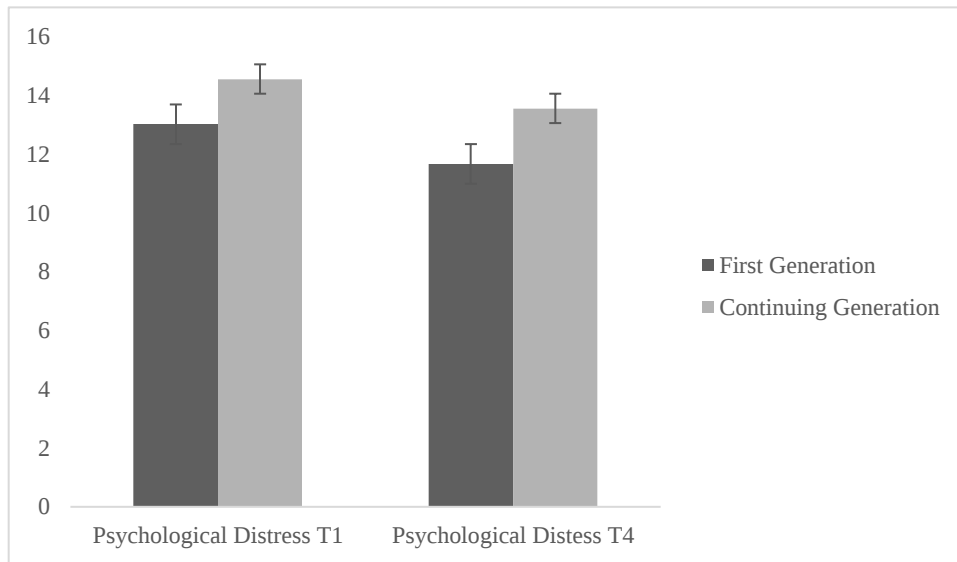
Outperforming Goals Decreases Psychological Distress



Note. A significant interaction between average change in psychological distress by whether one attained their course grade regardless of generation status. Those who performed better than expected show a significant decrease in average psychological distress from the beginning of the first academic quarter into the next academic quarter.

Figure 3.

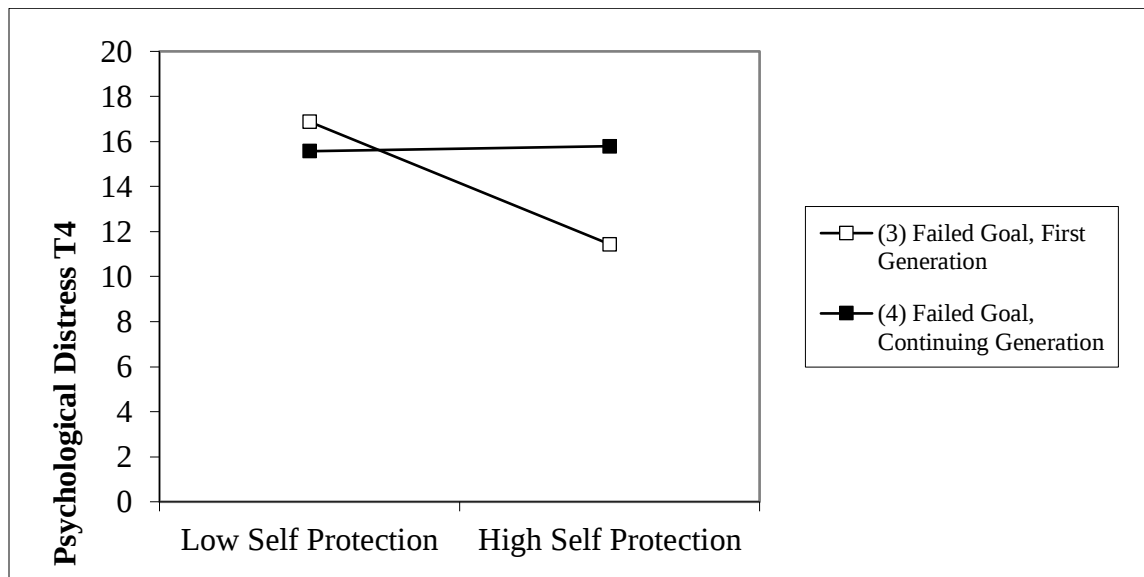
First Generation Students Have Lower Psychological Distress At Both Timepoints



Note. Between-subjects main effect of generation status on average changes in psychological distress from the beginning of an academic quarter into the next quarter, where FGCS were more likely to show lower psychological distress at both timepoints compared to continuing generation students (see Table 7).

Figure 4

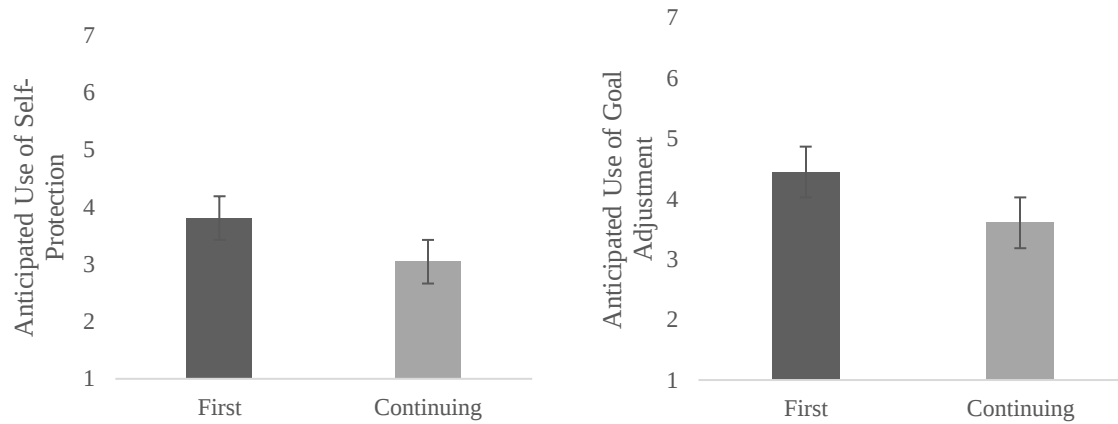
Psychological Distress Decreases for FGCS Who Anticipate Future Use of Self-Protection



Note. 3-way interaction between generation status, goal attainment performance, and the likelihood of use of self-protection skills in future similar courses. First generation students who anticipate using self-protection strategies in future courses show a decline in psychological distress after failing to reach their course grade goal.

Figure 5

FGCS at the Beginning of the Quarter Are More Likely To Anticipate Using Self-Protection and Goal Adjustment Strategies Compared to Continuing Generation Students



Note. Independent means t-tests reveal first generation students were more likely at the beginning of the academic quarter to report anticipating to use compensatory secondary control strategies in their most difficult course if it turned out to be more difficult than expected.

APPENDIX B: TABLES

Table 1.

Demographic Breakdown of Participants Who Reported Their Psychological Distress at Both T1 and T3 ($n=279$)

	Worse Than Expected		As Expected		Better Than Expected		N Total
	Non-First Generation	First Generation	Non-First Generation	First Generation	Non-First Generation	First Generation	
Sex							
Male	12 (12.8%)	12 (12.8%)	18 (19.1%)	22 (23.4%)	14 (14.9%)	16 (17%)	94 (33.7%)
Female	21 (11.4%)	34 (18.4%)	23 (12.4%)	45 (24.3%)	31 (16.8%)	31 (16.8%)	185 (66.3%)
Ethnicity							
Asian American	11 (9.7%)	21 (18.6%)	18 (15.9%)	24 (21.2%)	19 (16.8%)	20 (17.7%)	113 (40.5%)
Hispanic	4 (4.4%)	18 (19.8%)	6 (6.6%)	34 (37.4%)	7 (7.7%)	22 (24.2%)	91 (32.6%)
White (non-Hispanic)	6 (17.6%)	4 (11.8%)	6 (17.6%)	3 (8.8%)	13 (38.2%)	2 (5.9%)	34 (12.2%)
Other/undecided/unknown	12 (29.3%)	3 (7.3%)	11 (26.8%)	6 (14.6%)	6 (14.6%)	3 (7.3%)	41 (14.7%)
Grade Level							
Freshman	22 (11.1%)	34 (17.1%)	28 (14.1%)	52 (26.1%)	29 (14.6%)	34 (23.6%)	199 (71.3%)
Junior	9 (16.1%)	9 (16.1%)	9 (16.1%)	10 (17.9%)	10 (17.9%)	9 (16.1%)	56 (20.1%)
Transfer Junior	2 (8.3%)	3 (12.5%)	4 (16.7%)	5 (20.8%)	6 (25%)	4 (16.7%)	24 (8.6%)

Table 2.

Number and Percentages of Missing Data

Variable	N Cases Missing	% Missing
Sex	0	0%
Ethnicity	4	1.1%
Grade Level	0	0%
Generation Status	0	0%
Psychological Distress T1	19	5.3%
Self- Protection Strategies (averaged)	98	27.3%
Goal Adjustment Strategies (averaged)	89	24.8%
Selective Primary Control Strategies (averaged)	85	23.7%
Psychological Distress T3	113	31.5%
Attainment of Course Grade Goal	80	22.3%

Table 3.

Zero-Order Pearson Correlations Between Variables of Interest

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. First Generation	-	-	1												
2. Failed Goal	-	-	-.011	1											
4. T3 Psychological Distress	12.52	9.63	-.098	.141*	.674**	1									
5. Self-Protection	3.76	1.64	.068	.078	-.052	-.034	1								
6. Goal Adjustment	4.37	1.71	.209**	.009	-.006	-.058	.415**	1							
7. SPC	5.58	1.31	.109	-.097	-.095	-.019	.172**	.289**	1						
8. Female	-	-	.084	.044	.082	.082	.053	-.002	.082	1					
9. STEM	-	-	-.044	-.016	-.032	-.039	-.010	-.038	.053	-.099	1				
10. Freshman	-	-	.052	.006	-.016	-.028	.078	.044	.054	-.08	-.069	1			
11. Asian/Asian American	-	-	.008	.018	.113*	.082	-.022	-.088	-.094	.004	.119	.040	1		
12. Hispanic	-	-	.001	.014	.016	.017	.027	.086	.103	-.015	-.047	-.028	-.675**	1	
13. White, Non-Hispanic	-	-	.041	-.013	-.174**	-.160*	-.027	-.025	-.060	-.028	-.099	.026	-.351**	-.279**	1

Note. ** denotes a p-value <.001

* denotes a p-value of <.05

Table 4.

Descriptive Statistics of Repeated Measures ANCOVA

	Attainment of Course- Grade Goal	Generation Status	<i>M</i>	<i>SD.</i>	<i>N</i>
Psychological Distress T1	Worse Than Expected	Continuing Generation	15.59	9.77	29
		First Generation	12.27	6.59	37
		Total	13.73	8.24	66
	As Expected	Continuing Generation	11.61	8.06	31
		First Generation	12.55	7.94	55
		Total	12.21	7.95	86
	Better Than Expected	Continuing Generation	16.54	9.41	39
		First Generation	12.40	8.12	35
		Total	14.58	9.01	74
	Total	Continuing Generation	14.72	9.28	99
		First Generation	12.43	7.57	127
		Total	13.43	8.42	226
Psychological Distress T3	Worse Than Expected	Continuing Generation	16.93	11.29	29
		First Generation	13.11	10.76	37
		Total	14.79	11.08	66
	As Expected	Continuing Generation	11.32	10.20	31
		First Generation	11.84	8.93	55

	Total	11.65	9.35	86
Better Than Expected	Continuing Generation	13.46	8.71	39
	First Generation	9.49	7.07	35
	Total	11.58	8.17	74
Total	Continuing Generation	13.81	10.13	99
	First Generation	11.56	9.09	127
	Total	12.54	9.60	226

Table 5.

Within-Subjects Repeated Measures Mixed ANCOVA Results

Predictor	SS	df	Mean Square	F	<i>p</i>	ηp^2
Psychological distress	0.007	1	0.007	.007	.987	.000
Psychological distress x Sex	9.83	1	9.83	.368	.544	.002
Psychological distress x Asian	10.57	1	10.57	.396	.530	.002
Psychological distress x Hispanic	3.26	1	3.26	.122	.727	.001
Psychological distress x White	7.77	1	7.77	.291	.590	.001
Psychological distress x STEM major	1.65	1	1.65	.062	.804	.000
Psychological distress x Freshman	6.98	1	6.98	.262	.609	.001
Psychological distress x First Generation	1.22	1	1.22	.046	.831	.000
Psychological distress x Attainment of Course Grade Goal	288.2	2	144.1	5.40	.005*	.048
Psychological distress x First Generation x Attainment of Course Grade Goal	1.81	2	0.903	.034	.967	.000
Error(Psychological distress)	5706.38	214	26.67			

Table 6.

Between-Subjects Repeated Measures Mixed ANCOVA Results

Predictor	SS	df	Mean Square	F	<i>p</i>	ηp^2
Intercept	3033.94	1	3033.94	23.08	.000**	.097
Female	83.68	1	83.68	.637	.426	.003
Asian	95.29	1	95.29	.725	.396	.003
Hispanic	26.21	1	26.21	.199	.656	.001
White	147.74	1	147.74	1.12	.290	.005
STEM	83.33	1	83.33	.634	.427	.003
Freshman	9.03	1	9.03	.069	.794	.000
First Generation	549.70	1	549.70	4.18	.042*	.019
Attainment of Course Grade Goal	502.90	2	251.45	1.91	.150	.018
Generation Status x Attainment of Course Grade Goal	499.74	2	249.97	1.90	.152	.017
Error	28131.72	214	131.46			

Table 7.

Repeated Measures ANCOVA Differences in Psychological Distress by Generation Status

	T1		T3	
Generation Status	<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>
First Generation	192	13.02(8.32)	135	11.67(12.52)
Continuing Generation	144	14.56(8.59)	111	13.56(9.87)

Note. Means and standard deviations (in parentheses) of psychological distress (sum score where higher values equals higher psychological distress) for first and continuing generation students measured at the beginning of the academic quarter (T1), and the beginning of the next academic quarter (T3).

Table 8.

Hierarchical Regression Analyses Results for All Three Models

Model	Predictor						
		b	β	<i>p</i>	R^2_{adj}	<i>F</i>	ΔF
1	(constant)	11.56		0.00**	.428	1.99	.139
	T1 Psychological Distress	.735	.637	.000**			
	Female	.569	.028	.597			
	Asian/Asian American	-.143	-.008	.943			
	Hispanic	.160	.008	.938			
	White, non-Hispanic	-.664	-.023	.782			
	STEM major	.256	.013	.800			
	Freshman	-.389	-.019	.732			
	First Generation	-.147	-.008	.902			
	Failed Attainment of Goal	3.971	.189	.021*			
	Generation Status x Goal Attainment	-1.38	-.055	.535			
	Self-Protection strategies	.215	.036	.535			
	Generation Status x Goal Attainment						
	x Self-Protection	-1.86	-0.12	.048*			
2	(constant)	12.45		.000**	.444	1.69	.188
	T1 Psychological Distress	.744	.651	.000**			
	Female	.586	.029	.573			
	Asian/Asian American	-.724	-.038	.713			
	Hispanic	-.391	-.019	.845			
	White, non-Hispanic	-1.79	-.062	.434			
	STEM major	-.270	-.014	.785			
	Freshman	-.330	-.016	.764			

	First Generation	.078	.004	.947		
	Failed Attainment of Goal	3.72	.177	.025*		
	Generation Status x Goal Attainment	-1.01	-.039	.644		
	Goal-Adjustment Strategies	-.079	-.014	.808		
	Generation Status x Goal Attainment x Goal Adjustment	-1.27	-.089	.121		
3	(constant)	12.88		.000**	.453	.360
	T1 Psychological Distress	.760	.667	.000**		.698
	Female	.511	.025	.626		
	Asian/Asian American	-.497	-.026	.801		
	Hispanic	-.491	-.024	.805		
	White, non-Hispanic	-1.74	-.059	.449		
	STEM major	-.247	-.013	.803		
	Freshman	-.541	-.025	.622		
	First Generation	-.236	-.012	.839		
	Failed Attainment of Goal	3.29	.155	.043*		
	Generation Status x Goal Attainment	-.954	-.037	.657		
	Selective Primary Control	.346	.048	.397		
	Generation Status x Goal Attainment x Selective Primary Control	-.334	-.018	.749		

Note. *p <.05; **p<.01

All values and variables reflect step 3 in each of the three hierarchical regressions tested. Sex was coded as 0 for males, 1 for females; academic major was coded as 0 for non-STEM and 1 for STEM; grade level was coded as 0 if the student was in their junior year, and 1 if they were

freshman; attainment of goal was coded 0 if they succeeded at reaching their course grade goal by either performing as expected or better than expected and coded as 1 if they indicated they performed worse than expected. All control strategies was mean centered using the sample mean prior to creating interaction terms

Table 9.

Hierarchical Regression Model Results – Self-Protection Model

Step	R	R ²	R ² _{adj}	SE	ΔR ²	ΔF	Sig. F change
1	.654	.427	.408	7.30	.427	21.95	.000
2	.671	.450	.423	7.21	.022	2.77	.043
3	.679	.460	.428	7.17	.011	1.99	.139

Note. Hierarchical regression model with three steps to determine if the 3-way interaction between generation status, attainment of course grade goal, and self-protection significantly predicts psychological distress above and beyond demographic variables, and the interaction between generation status and attainment of course grade goal.

Table 10.

Hierarchical Regression Model Results – Goal-Adjustment Model

Step	R	R ²	R ² _{adj}	SE	ΔR^2	ΔF	Sig. F change
1	.668	.446	.428	7.20	.446	24.49	.000
2	.683	.466	.441	7.12	.020	2.64	.050
3	.689	.475	.444	7.09	.009	1.69	.188

Note. Hierarchical regression model with three steps to determine if the 3-way interaction between generation status, attainment of course grade goal, and goal-adjustment significantly predicts psychological distress above and beyond demographic variables and the interaction between generation status and attainment of course grade goal.

Table 11.

Hierarchical Regression Model Results – Selective Primary Control Model

Step	R	R ²	R ² _{adj}	SE	ΔR^2	ΔF	Sig. F change
1	.680	.463	.445	7.18	.463	26.55	.000
2	.693	.481	.456	7.10	.018	2.49	.061
3	.695	.483	.453	7.13	.002	.360	.698

Note. Hierarchical regression model with three steps to determine if the 3-way interaction between generation status, attainment of course grade goal, and selective primary control significantly predicts psychological distress above and beyond demographic variables, and the interaction between generation status and attainment of course grade goal.

APPENDIX C: MEASUREMENT ITEMS

Table 12.

Psychological Distress Items at the Beginning of the Academic Quarter (T1) and Three Weeks into the following quarter into the Next Academic Quarter (T3)

		T1		T3	
Measure	"During the past 30 days, how often did you feel..."	Min	Max	<i>M(SD)</i>	<i>M(SD)</i>
Items	1. Tired out for no good reason	0	4	2.06 (1.14)	2.01(1.24)
	2. Nervous	0	4	2.20(1.03)	1.85(1.15)
	3. So nervous that nothing could calm you down	0	4	.982(1.16)	.877(1.15)
	4. Hopeless	0	4	1.12(1.20)	1.11(1.27)
	5. Restless or fidgety	0	4	1.65(1.22)	1.43(1.30)
	6. So restless you could not sit still	0	4	.950(1.20)	.739(1.19)
	7. Depressed	0	4	1.31(1.26)	1.18(1.33)
	8. That everything was an effort	0	4	1.68(1.22)	1.63(1.34)
	9. So sad that nothing could cheer you up	0	4	.803(1.10)	.793(1.15)
	10. Worthless	0	4	.977(1.25)	.923(1.29)

Table 13.

Items on the OPS Scale at the Beginning of the Academic Quarter (week 1)

Measure	"How likely is it that they you will make each of the following changes to your behavior if you discover that your most difficult course was more difficult than you expected?"	Min	Max	<i>M(SD)</i>
Selective Primary Control				
	1. Try harder to do well in assignments and exams	1	7	6.08(1.06)
	2. Increase your effort and time invested in this course	1	7	6.01(1.10)
Compensatory Secondary Control				
Self-Protection	1. Remind yourself that other students are struggling too in this course	1	7	4.17(1.98)
	2. Tell yourself that it is not your fault if you are struggling in this course	1	7	2.75(1.87)
Goal-Adjustment	1. Adjust your grade aspiration for this course	1	7	4.09(2.01)
	2. Become more realistic in your aspirations for this course	1	7	4.34(1.88)

Table 14.

Items on the OPS scale at the end of the academic quarter (week 10)

Measure	"Given your experiences in this difficult course, how likely it is that you will make each of the following changes in your behavior regarding difficult courses in the future"	Min	Max	<i>M(SD)</i>
Selective Primary Control				
	1. Try harder to do well in assignments and exams	1	7	5.64(1.35)
	2. Increase your effort and time invested in this course	1	7	5.52(1.37)
Compensatory Secondary Control				
Self-Protection	1. Remind yourself that other students are struggling too in this course	1	7	4.40(1.88)
	2. Tell yourself that it is not your fault if you are struggling in a similar difficult course	1	7	3.12(1.86)
Goal-Adjustment	1. Adjust your grade aspiration for this course	1	7	4.25(1.87)
	2. Become more realistic in your aspirations for this course	1	7	4.48(1.77)