

How Is Family Support Related to Students' GPA Scores?: A Longitudinal Study

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Abstract

Previous studies on the influence of family support on college students' academic performance have yielded inconsistent results. Therefore, the present study aimed to examine the link between family support and students' university-level academic performance in a more detailed way. First, we sought to clarify how two distinct aspects of perceived family support—social support and economic support—affect college students' academic performance. Second, we sought to determine how these two aspects of family support influence not only cumulative GPA scores but also the overall trend (slope) and stability (variability) of students' GPA scores across semesters. The participants in this longitudinal study were 240 university students (62 men, 178 women). The results revealed that the level of perceived family *social* support was important not only as a "main effect" predictor of the magnitude and stability of their GPA scores across three successive semesters, but also as a factor that helped female students to succeed regardless of their level of family economic support. In general, the data suggest that family social support is more important to women's success in college than to men's.

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. . . if you can't depend on your family, who else is there?

—Comment posted to the online blog momaroo.com, 2-23-10

How is family support related to college students' academic success? To date, a number of studies have investigated the influence of family support on college students' academic performance. However, the results of these studies have revealed somewhat inconsistent effects. Some of these studies have reported non-significant associations. For example, Carlstrom (2005) found no significant relationship between the perceived availability of family support and college students' academic functioning. Similarly, studies by Spain (2008) and by Roman, Cuestas, and Fenollar (2008) both reported a non-significant relationship between family support and college students' academic achievement, although Roman et al. (2008) found that family support was significantly associated with students' self-esteem and certain aspects of learning approaches (i.e., deep processing and effort) that were positively correlated with academic achievement.

Other studies have reported weak-but-significant associations between family support and college students' GPA scores. For example, Alnabhan, Al-Zegoul, and Harwell (2001) investigated factors that influenced student performance in the education department at Mu'tah University in Jordan. Using factors derived from principal-axis factoring and orthogonal rotation, they found that the lack of family support weakly predicted lower university GPA scores, ($r = .09$). In another relevant study, Babaoye (2001) observed that family support was cited by black college students as a factor relevant to their academic performance, but provided no measure of statistical association that would enable us to estimate the size of its effect. Finally, Cutrona, Cole, Colangelo, Assouline, and Russell (1994) reported weak relationships in

two samples between perceived parental social support and college students' GPA scores ($r = .14$ in sample 1, $r = .10$ in sample 2).

The inconsistent results of these studies suggest that there might be moderators of the relation between family support and college students' academic performance. Most of the previous studies used measures of family social support, but there are other types of family support, such as material/economic support, that could also play a role. Because previous research has revealed that family social support can buffer the adversity caused by a lack of family economic support (Lempers & Clark-Lempers, 1990; Lee, Anderson, Horowitz, & August, 2009; North, Holahan, Moos, & Cronkite, 2008), we were interested in whether this buffering effect would also be found when the outcome measure was college students' academic performance.

Accordingly, in the current study, we sought to clarify how two different aspects of family support—social support and economic support—are related to college students' academic performance. More specifically, we sought to determine how these two aspects of family support influence not only cumulative GPA scores but also the overall trend (slope) and stability (variability) of students' GPA scores across semesters. Below, we provide some background on these major features of the current investigation.

Family Support and Academic Performance

Within educational psychology, much research is conducted on the factors that predict academic success (see Aronson, 2002 for a review). Within this research domain, several categories of predictors of college academic performance have been identified, including students' cognitive abilities (e.g., intelligence), general motivational factors (e.g., achievement

motivation), and students' interests in specific subject areas (see Schiefele, Krapp, & Winteler, 1991).

Given the empirical support for the importance of factors such as these, why should we study the relationship between *family support* and students' academic achievement? There are at least two reasons. First, as we noted at the beginning of this article, the previous research on family support and students' academic performance has yielded inconsistent results. Second, although DeBerard, Spielmans, and Julka (2004) found that college students' *individual* characteristics (including their intellectual ability, motivation, and specific interests) explained about 56% of the variance in their cumulative GPAs, there was still 44% of the variance left unexplained. We therefore think it likely that contextual factors such as family support and the nature of the school environment of the student also play an important role in this regard (e.g., Williams, Davis, Cribbs, Saunders, & Williams, 2002). Accordingly, in the present study, we examined the first type of context variable—family support—in relation to college students' academic performance.

Family support can be assumed to be an especially important family predictor of academic achievement. College students need family support because coping with academic demands is stressful enough that family supports are often welcome and helpful, and facilitate the student's coping and positive adjustment. This “stress-buffering hypothesis” is based on a number of converging empirical findings. First, Dyson and Renk (2006) found academia-related stress levels to be high in university students. Second, there is evidence that individuals frequently seek support within their nuclear and extended family and less frequently within their networks of friends (Cutrona, 2000; Pinkerton & Dolan, 2007). Third, most university students report regular contacts with their family when they are in their early academic years; and, when

dealing with academic challenges, students report their families to be their number-one source of support (Stecker, 2004). Finally, Klink, Byars-Winston, and Bakken (2008) found that students' levels of family support were related to their confidence in their capacity to deal with challenging academic experiences.

Another mechanism that might relate family support to academic performance is suggested by attachment theory and has been proposed by Cutrona and her colleagues (Cutrona et al., 1994). They argued that growing up in a secure, supportive family environment tends to foster high levels of self-efficacy (including academic self-efficacy) and therefore facilitate a range of usefully adaptive behaviors (including ones in the academic domain). Citing earlier work by Sarason and colleagues (Sarason, Pierce, & Sarason, 1990), Cutrona et al. described the perception of social support from parents as a kind of "safety net" that "permits active participation, exploration, and experimentation in a wide range of life experiences, resulting in the acquisition of coping strategies, skills, and self-confidence" (Cutrona et al., 1990, p. 369).

Family Social Support and Family Economic Support

Although family social support and family economic support are often "lumped together," the individual importance of these two factors is widely assumed. Modifying the definition of social support from Demaray et al. (2005), we defined family social support in the study as a student's perception of how much his or her family cares about, values, and encourages his or her efforts to succeed in college.

Lyubomirsky King, and Diener (2005) have asserted that family social support satisfies fundamental needs for acceptance, belonging, and love which cannot be satisfied by economic security alone. Family support is found to offer individuals a sense of security and comfort because it represents how much their parents care about them and are supportive of their goals

(Gonzalez-De Hass, Willems, & Holbein, 2005; Trusty & Lampe, 1997). Consistent with this assertion, McGee and Stanton (1992) found that perceived family social support was negatively correlated with adolescents' level of distress. Similarly, Hovey and Seligman (2007) reported that better family support was significantly associated with lower levels of anxiety and depression in college students, and Hamdan-Mansour, Puskar, and Sereika (2007) found that perceived family social support was a strong protective factor against adolescents' alcohol use.

On the other hand, family economic support is also important as a distinct aspect of family support. In the present study, family economic support refers to the financial support that an individual receives from his or her family. Although individuals are seldom supported financially by their families of origin throughout their entire lifespan, they often depend on family economic support during the difficult transition period between adolescence and young adulthood. Aquilino (1999) has noted that the lack of such support can impair individuals' ability to successfully establish adult roles. Furthermore, there is evidence that family economic support not only provides material well-being but also buffers individuals from the negative impact of life events. For example, Johnson and Krueger (2006) found that the influence of unique environment on life satisfaction increased as family financial resources decreased, but that for families with abundant financial resources, the influence of unique environment on life satisfaction was small (e.g., North, Holahan, Moos, & Cronkite, 2008).

Taken together, these data suggest that a high level of family *economic support* acts as a protective factor, whereas a low level of family economic support constitutes a risk factor, in regard to such outcomes as life satisfaction, the ability to cope with major stressors, and future success. A similar conclusion may apply to family *social support* as well. Multidisciplinary research from the past 30 years has provided abundant evidence for the cardinal role of social

support in successful coping (see Cohen, Gottlieb, & Underwood, 2000 for a review). Social support has been found to act as a stress buffer and to contribute to psychological and physical health (Cohen et al., 2000). In particular, family social support has been linked to more positive outcomes in studies of alcohol use (Hamdan-Mansour et al., 2007), distress (McGee & Stanton, 1992), happiness (North et al., 2008), anxiety and depression (Hovey & Seligman, 2007), and life satisfaction (Johnson & Krueger, 2006).

Three Aspects of Academic Performance: Overall Level, Slope, and Variability of GPA

The positive effect of social support on health, well-being, and adjustment is well established within the broad social support literature. It should be noted, however, that most of the studies on social support effects examine how support acts on the outcome variable, assessed at one particular moment in time. This is somewhat surprising because, most of the outcomes under investigation pertain to people's level of individual or relational functioning, which tend to vary over time. For this reason, social support researchers have been repeatedly called upon to conduct *longitudinal* studies for the purpose of examining the cross-temporal effects of social support (Cohen, 1988; Monroe & Johnson, 1992; Rook & Underwood, 2000).

Accordingly, in the present study we not only examined the separate effects of family economic support and family social support on students' university-level GPA scores, but also tracked these effects over the course of three semesters. This longitudinal approach enabled us to do more than examine individual differences in overall GPA scores, as previous studies have done. It also enabled us to study the academic performance *pathways* of the students in our study (cf. Bradbury, Cohan, & Karney, 1998), and thereby determine whether family support affects the improvement or deterioration of students' grades (as assessed by slope tests across semesters) and whether it contributes to the stability/instability of a student's academic

performance over time (as assessed by a measure of GPA variability across semesters). We hoped that these more detailed analyses would help to clarify our view of how family support is related to students' university-level GPA.

Hypothesis and Research Questions

Because the results of previous studies did not provide a basis for making empirically based predictions about what we should expect to find in our more detailed analyses, we made only the single general prediction that, overall, family support—especially family social support— should have a positive association with students' overall GPA scores. In addition, we tested to see whether family economic support moderated the relation between family social support and GPA. We did not attempt to make more fine-grained predictions regarding the dependent variables of GPA slope and GPA variability. Instead, we left it up to the data to educate us about the relations that are found when these more detailed analyses are conducted.

As a point of major theoretical interest, we also asked the data to inform us about both the "main effects" and the interactive effects of family social and economic support on our three major outcome measures (overall level, slope, and variability of GPA scores). For example, do economic support and family support have similar beneficial effects on students' academic performance? Do they exert their influences in different ways? Does the overall level of economic support provided by a family influence the relation between the level of family social support and students' grades? These are some of the more important research questions that the present study sought to address, using our three conceptually distinct measures of academic performance (overall level, slope, and variability of university-level GPA scores).

Finally, we wanted to explore potential gender differences in the relationship between family support and the three major outcome measures (overall level, slope, and variability of

GPA scores) that were the focus of our study. We therefore tested to see if the relations between the variables under study were moderated by the gender of the respondent.

Method

Participants

The initial sample included 373 undergraduate respondents who were enrolled in the Fall 2007 or the Spring 2008 semesters at the University of Texas at Arlington. The 373 participants completed our online survey and gave their consent for the University of Texas–Arlington to release their academic records as data for this study in the following semesters. However, because an important goal of the present study was to examine the change (slope) and the variance of the students' GPA scores across three consecutive semesters, the sample we used in our analyses included only the 240 students (62 men, 178 women) from the original 373 who were enrolled in each of these three semesters: Spring 2008, Fall 2008, and Spring 2009. Although the GPA data for the Summer of 2008 were also available for a subsample of the participants, however, we decided to examine the data for only the three long semesters, to optimize the sample size and the associated sensitivity of our statistical tests. Proportions based on ethnic backgrounds were 47.1% White/Anglo- American, 13.3% Black/African-American, 17.5% Asian-American, and 22.1% other/multiracial. Proportions based on ages were 50.0% 16-18 years old, 46.3% 19-21 years old, 0.8% 22-24 years old, 0.8% 25-27 years old, and 1.2% over 28 years old. No outliers were identified after applying the criterion of influential data points (Stevens, 1984).

The participants were recruited by means of the SONA experiment tracking software system via the Internet (the students could choose from a list of available studies the ones they would like to participate in). Each respondent received experimental participation credit for

completing the survey online. All students were given the alternative option of fulfilling this requirement by reading a short, research-focused article and writing a summary reaction to it.

Materials

The respondents to the online survey were asked to provide answers to items that assessed (1) personal background information, (2) family economic support, (3) family social support, and (4) their consent to release from their official university records various outcome measures that are relevant to different aspects of their university experience. The relevant measures that were included in the survey are described below. A few other measures that were included in the online survey are not relevant to the goals of the present investigation, and these additional measures will not be discussed here.

Personal background information. The participants were asked to report their gender and ethnicity. They then completed a set of items that concerned their reasons for attending the University of Texas at Arlington and the goals they were seeking to attain while attending the university. (This information about reasons and goals was not used as data in the present study.)

Family economic support. The participants were asked to respond to four items, developed by the authors, about the level of economic support they received from their family. Specifically, they used a 4-point Likert scale (from strongly agree to strongly disagree) to respond to the following items: (1) My parents provide financial assistance so that I can attend UT-Arlington and work toward completing my degree. (2) Without my parents' financial help, I wouldn't be able to get a university education. (3) My parents "foot the bill" for most of my expenses as a college student. And (4) I have to pay for my own university education, without any financial support from family members (reversed item, self-provided economic support).

The reliability (measured as Cronbach's alpha) of this 4-item measure of family economic support was .88 in the present sample (scale $M = 2.91$, $SD = .91$).

Family social support. Family social support was measured by another four items developed by the authors. The participants used a 4-point Likert scale (from strongly agree to strongly disagree). The four items were as following: (1) My family members encourage me in my studies here at UT-Arlington. (2) My family members often question what I'm doing here at UT-Arlington, and wonder if my being here is worth all the time, effort, and money it involves (reversed item). (3) My family members often question the need for a university education (reversed item). And (4) My family members emphasize the value of a university education and help keep me motivated at times when I feel discouraged. In the present sample, the scale's reliability coefficient was .61 (scale $M = 3.55$, $SD = .41$).

The release consent. The final section of the online survey asked the participants to consent to allow the Office of Records to release their official grade data (their cumulative GPA for each successive semester). For those participants who consented to release their record information, the Office of Institutional Research Planning and Effectiveness and the Office of Records at UT-Arlington provided the requested information about the students' university GPA for each semester (see Table 1 for the means and SD s). (Please insert Table 1 here)

Procedure

To avoid informing participants of our specific research goals and hypotheses, the online survey was posted with the intentionally vague title, "A Survey of Factors Relevant to the University Experience." After each of the participants had been recruited and had logged on to participate in the study using the SONA system, they completed the four major sections of the

survey on line (personal background information, family economic support, family social support, and the consent to release their GPA scores in subsequent semesters).

Once the participants had formally consented for the university to release their grade information, their overall GPA scores for each subsequent semester were provided by the office of Institutional Research Planning and Effectiveness and the Office of Records. On the other hand, these data were not provided for any students who had completed the online survey items but had declined to release their GPA information for use in this research.

Results

The purpose of this present study was to examine the effects of family economic support and family social support on (a) students' cumulative GPA scores, (b) the linear change (slope) of these scores across the three semesters, and (c) the variance of these scores across three semesters. Based on the results of previous studies, we expected that both forms of family support could affect these outcome measures, and we sought to extend the research in this area by examining the "main" and "interaction" effects of these two predictors on the three outcome measures (cumulative GPA, GPA slope across semesters, and GPA variability across semesters). Because previous findings have been mixed and inconsistent, we did not make firm predictions, choosing instead to conduct more "fine-grained" tests that might help to clarify the underlying processes better than previous studies have done.

Did the Family Support Variables Predict the Students' Cumulative GPA Scores?

Based on the results of previous studies, we made only a single general prediction—that, overall, family support should have a positive association with students' overall GPA scores. We therefore sought to determine whether the two family support variables predicted the students' cumulative GPA (as assessed in the final semester of data collection—Spring 2009).

To answer this question, we used a multiple regression model in which family economic support and family social support, along with their multiplicative "interaction term," were used to predict the students' cumulative GPA scores. The Durbin-Watson test of the model showed that the residuals from the regressions were independent, and no problem of multicollinearity was found.

The regression model was significant, $F(3, 236) = 4.967$, $R^2 = 5.9\%$, $p = .002$. The results of this analysis revealed that the students' perceptions of family *social support* predicted their cumulative GPA scores, $b = .289$, $t(236) = 3.830$, $p < .001$, $sr^2 = 5.86\%$. However, the students' perceptions of family *economic support* did not predict their cumulative GPA scores, $b = -.024$, $t(236) = -.643$, $p = .521$, $sr^2 = .17\%$, and neither did the family social support X family economic support interaction term, $b = -.014$, $t(236) = -.165$, $p = .869$, $sr^2 = .01\%$. Therefore, the results supported our general prediction that perceived family support (in this case, perceived family *social support*) would positively predict college students' cumulative GPA scores—as perceived family social support increased, the students' overall GPA scores also increased.

Did the Family Support Variables Predict the Slope of Students' GPA across the Three Semesters?

Lacking any empirical precedents on which to base such predictions, we did not attempt to make any predictions regarding the dependent variables of GPA slope and GPA variability. Nevertheless, we next sought to determine whether the family support variables predicted the slope (i.e., the linear change) in the students' cumulative GPA scores across the three semesters. The slope (linear change) in GPAs across the three successive semesters was measured as the correlation between GPAs and semesters (dummy coded as 1, 2, and 3). To answer this question, we used the same multiple regression model described above to predict the slope of the

students' GPA scores across the three successive semesters for which the data were available. In this model, the "main effect" predictors of family economic support and family social support, and their interaction term were entered as predictors.¹ The Durbin-Watson test showed that the residuals from the regressions were independent, and no problem of multicollinearity was found.

The omnibus regression model was not significant, $F(3, 236) = .496$, $R^2 = 0.6\%$, $p = .686$. According to its results, neither family economic support nor family social support significantly predicted GPA slope as "main effect" predictors, $b = .046$, $t(236) = .762$, $p = .447$, $sr^2 = .24\%$; $b = .065$, $t(236) = .535$, $p = .593$, $sr^2 = .12\%$, respectively. In addition, the interaction between family economic and social support was also not a significant predictor of university GPA slope, $b = .081$, $t(236) = .586$, $p = .558$, $sr^2 = .14\%$. In summary, the results revealed that family economic support and family social support did not predict GPA slope across semesters, nor did their interaction term.

Did the Family Support Variables Predict the Variability of Students' GPA across the three semesters?

Our next test sought to determine whether the family support variables predicted the variability (instability) in the students' cumulative GPA scores across the three semesters which was calculated as the simple cross-semester variance in GPA for each participant. To answer this question, we used the same multiple regression model described above to predict the

¹ A more stringent test would require us to control for the first semester GPA (i.e., the Spring 2008 GPA) when testing the "slope" and "variance" models. When we did so, we found the same results as before (that is, the originally significant predictor was still significant at the same direction in each case, even after controlling for the Spring 2008 GPA score. However, because the Spring 2008 GPA score was itself significantly correlated with one of our two primary predictor variables, family social support, $r = .23$, $p < .001$, controlling for the Spring 2008 GPA score also "partials out" variance associated with our main predictor, creating an overly stringent and potentially misleading test of the predictive utility of the perceived family social support variable. For that reason, the results reported above do not control for the first semester GPA score as a covariate (for more on this type of situation, see Tabachnick & Fidell, 2007).

variance of the students' GPA scores across the three successive semesters for which the relevant data were available. In this model, the "main effect" predictors of family economic support and family social support, as well as their interaction were entered to predict GPA variance. The assumption of independent residuals from the regressions was met, and no problem of multicollinearity was detected.

Main effect of family social support. The omnibus regression model was significant, $F(3, 236) = 6.117, R^2 = 7.2\%, p = .001$. Its results showed that family *social* support significantly predicted the amount of variance (instability) in the student's cumulative GPA scores across the three semesters, $b = -.012, t(236) = -3.214, p = .001, sr^2 = 4.08\%$. The results further showed, however, that family *economic* support was not a significant main-effect predictor of GPA instability in this model, $b = -.002, t(236) = -.853, p = .395, sr^2 = .28\%$.

Interaction of family economic support and family social support. The family economic support X family social support interaction was a significant unique predictor in the model, $b = .001, t(246) = 1.98, p = .049, sr^2 = 1.5\%$. A plot of this interaction (see Figure 1) revealed that family *economic* support moderated the relation between family *social* support and GPA variance over time. When the level of family economic support (+1 *SD*) was high, the effect of family social support was non-significant and the students' GPA scores were relatively stable across semesters, $b = -.004, t(236) = -.643, p = .521, sr^2 = .16\%$. However, students' GPA scores became increasingly more stable across semesters as their level of family *social* support increased when their level of family economic support was either low (-1 *SD*), $b = -.020, t(236) = -3.947, p < .001, sr^2 = 6.15\%$; or moderate (0 *SD*), $b = -.012, t(236) = -3.214, p = .001, sr^2 = 4.08\%$. (Please insert Figure 1 here)

When viewed as a pattern, these findings suggests that students whose families take better care of their financial needs are freer to concentrate on their studies and are therefore able to achieve more stable cumulative GPA scores across semesters. On the other hand, students whose family's economic support is less adequate may be distracted from their studies by the necessity to work and/or by worries about their financial problems, distractions that may contribute to greater instability in their cumulative GPA scores across semesters. Fortunately, however, the data further suggest that families who are unable to fully provide for their students' economic needs can have a major impact on their academic success by providing them with high levels of social support. This type of support not only predicts the students' cumulative GPAs within semesters, but also appears to "buffer" students against the otherwise-disruptive effects of low economic support on GPA variability, as Figure 1 reveals.

It is important to note that our interpretation of the Figure 1 interaction, while both plausible and sufficient to explain the overall pattern of effects, is one that still needs to be tested at the level of the underlying process that we have inferred. Specifically, follow-up research needs to establish that greater instability in the semester GPAs of students with lower levels of family economic support is indeed attributable to the variations in their economic worries across time, and that family social support can provide the kinds of encouragement, reassurance, and practical assistance that helps students from getting sidetracked from their studies during periods of economic difficulty.

Were Any of these Findings Further Moderated by the Respondents' Gender?

In a final set of analyses, we tested to see if any of the previously reported findings were further qualified by the respondents' gender. We found evidence of such moderation for two of the interaction effects reported above, as indicated by the following three-way interactions.

A three-way interaction predicting GPA slope. First, the data revealed a significant three-way interaction of family economic support, family social support, and the students' gender in predicting the slope (i.e., the general trend) of their GPA scores across the three semesters. When compared to a simpler model that included the three main-effect predictors only (gender, family social support, family economic support) and their two-way interactions, a final model that included the three-way interaction was not significant overall, $F(7, 232) = 1.638, R^2 = 4.7\%, p = .125$. However, the incremental predictive variability of the three-way interaction accounted for a significant amount of variance in GPA slope, $\Delta F(1, 232) = 9.715, \Delta R^2 = 4.0\%, p = .002$; and the three-way interaction was the only significant predictor of GPA slope in the overall model, $b = .998, t(232) = 3.117, p = .002, sr^2 = 4.0\%$ (see Table 2 for other statistical values). (Please insert Table 2 here)

The post hoc tests revealed that family social support predicted GPA slope over time only for female college students whose family economic support was high, $b = .611, t(232) = 2.301, p = .022, sr^2 = 2.16\%$, but not for female students whose family economic support was low, $b = -.326, t(232) = -1.393, p = .165, sr^2 = .79\%$, nor for male students with high or low family economic support, $b = -.277, t(232) = -1.147, p = .253, sr^2 = .55\%$; $b = .378, t(232) = 1.514, p = .131, sr^2 = .94\%$, respectively (see Figure 2). (Please insert Figure 2 here)

In other words, when female students had high family social support and high family economic support, their GPA scores improved significantly across semesters; but when female students had high family social support but low family economic support, their GPAs revealed a slight, but non-significant, decline. In the overall data pattern, family social support was associated with GPA slope only for females who family economic support was high, but not for males in general or for females with low family economic support. These findings suggest that it

is the combination of high family economic support and high family social support that contributes to the increasing academic success of female students.

A three-way interaction predicting GPA variance. Second, the data revealed a significant three-way interaction of family economic support, family social support, and the students' gender in predicting the variance (instability) in their GPA scores. When compared to a simpler model that included the three main-effect predictors only (gender, family social support, family economic support) and their two-way interactions, a final model that included the three-way interaction proved to be significant overall, $F(7, 232) = 4.280$, $R^2 = 11.4\%$, $p = .002$. In addition, there was evidence for the incremental predictive validity of the three-way interaction of gender X family economic support X family social support, $b = .031$, $t(232) = 3.144$, $p = .002$, $sr^2 = 3.76\%$. Apart from this three-way interaction, the other unique predictor of GPA variability was the previously noted main effect predictor of family social support, $b = -.010$, $t(232) = -2.769$, $p = .006$, $sr^2 = 2.92\%$, and the interaction between family social and economic support, $b = .010$, $t(232) = 2.275$, $p = .024$, $sr^2 = 1.99\%$ (see Table 3). (Please insert Table 3 here)

A closer examination of this three-way interaction revealed that family social support predicted greater GPA stability for the female students who had a low level of family economic support, $b = -.031$, $t(232) = -4.335$, $p < .001$, $sr^2 = 7.18\%$, but not for the female students who had a high level of family economic support, $b = .011$, $t(232) = 1.363$, $p = .174$, $sr^2 = .71\%$. In addition, family social support marginally predicted greater GPA stability for the male students who had a high level of family economic support, $b = -.014$, $t(232) = -1.943$, $p < .06$, $sr^2 = 1.44\%$, but it did not significantly predict GPA stability for the male students with low family

economic support, $b = -.007$, $t(232) = -.959$, $p = .338$ $sr^2 = .35\%$ (see Figure 3). (Please insert Figure 3 here)

Only one effect in this pattern was clearly significant and had a substantial effect size. An examination of this effect revealed that female students were particularly likely to experience unstable GPA scores when they had low levels of both family economic support and family social support. However, having a high level of family social support appeared to buffer female students from experiencing unstable GPA scores. These findings indicate that a high level of family social support can have an important stabilizing influence on the GPAs of female students.

Advanced Tests Using the Latent Growth Curve Model.

As a more stringent test of how the mean levels and slopes of change in GPA scores were related to family social and economic support, we conducted growth curve analyses in which the association of the variance in the intercept and slope can be considered simultaneously. We expected that application of the Growth Curve Model would further validate the findings we have reported above.

In the latent growth curve model, we again used family social support, family economic supports, and their interaction to predict students' GPA scores (intercept) and the slope of their GPA across semesters (see Figure 4 for the model). The model required a minimum of 10 iterations to achieve balance. The model fit indicators indicated that the resulting model was only acceptable, $CFI = .99$, $NFI = .99$, $IFI = .99$, $RMSEA = .09$ [.04, .15]. Although its chi-square was highly significant, $\chi^2(df = 3) = 12.71$, $p = .005$, Kenny (2010) suggest that other indicators, such as NFI and IFI , instead of chi-square value should be considered because chi-square test is sensitive to sample size. An examination of the model's parameters revealed that

family social support significantly predicted GPA score as the intercept, $\beta = .23, p < .001$.

Specifically, as the level of their family social support increased, the students' GPA score also increased. No other significant effect was found in this model (see Figure 4). (Please insert Figure 4 here)

To explore the potential moderating effect of the students' gender, we then ran a multiple group analysis in which we re-tested the model with the male and female data treated as separate groups. The results revealed that the model appeared to fit the male and female data differently, $\chi^2 (df = 6) = 16.63, p = .011$. Specifically, they showed that family social support and family economic support were correlated with each other in the female data ($r = .29, p < .001$), but not in the male data ($r = .02, p = .886$). As before, family social support still positively predicted both the male students' and the female students' GPA intercepts, $\beta = .27, p = .032$; $\beta = .20, p = .010$, respectively. However, the interaction between family social and economic support significantly predicted the GPA intercepts for male students, $\beta = .27, p = .047$, but was only marginally significant for female students, $\beta = -.13, p = .093$ (see Figure 5). (Please insert Figure 5 here)

Finally, the model was examined at each of the high, medium, and low levels of family economic support. The results indicated that male students' family social support positively predicted their GPA intercepts when their family provided *high* and *medium* economic support ($\beta = .57, p = .004$; $\beta = .27, p = .032$, respectively; see Figure 6), whereas female students' family social support positively predicted GPA intercepts when their family provide *medium* and *low* economic support ($\beta = .20, p = .010$; $\beta = .34, p = .001$, respectively; see Figure 7). These findings indicate that family social support was more important for females when their family economic support was low and for males when their family economic support was high. This

pattern of results implies that family social support buffers the effect of economic adversity for females but not for males. (Please insert Figures 6 and 7 here)

Discussion

The results of the present study revealed that family support does indeed play an important role in students' university-level GPA scores, but that a nuanced understanding of its influence requires a more fine-grained examination of the data than previous studies have provided. To achieve such a detailed understanding, we divided our measures of family support into two main types—*family economic support* and *family social support*. We then used both support measures, along with their multiplicative interaction term, to predict three nuanced aspects of students' academic performance: their cumulative GPA scores within each of three semesters, the slope of their GPA scores across the three semesters, and the variability (instability) of their GPA scores across the three semesters.

Tests of the Hypothesized Link between Family Support and Overall GPA Scores

Our single prediction, based on the previous findings of Alnabhan et al. (2001) and Cutrona et al. (1994), was that greater perceived family support would be associated with greater cumulative GPA scores. This prediction was confirmed for the measure of perceived social support, but it was not confirmed for the measure of perceived economic support. This pattern of results suggests that perceived social support, rather than perceived economic support, might have been the uniquely predictive component that accounts for the findings of the previous studies by Alnabhan et al. (2001) and Cutrona et al. (1994). The fact that, in our study, family *social* support plays a prominent role in students' academic performance is consistent with previous descriptions of family social support as being the “bread and butter” source of support (Whittaker & Garbarino, 1983, p. 4) and as people's “central helping system” (Canavan & Dolan,

2000). Specially, our results revealed that family social support accounted for 5.86% of variance in college students' calmative GPAs when family economic support only accounted for less than 1% of the variance.

Finally, the advanced growth curve model analyses revealed that family social support was positively related to female students' GPA scores when their family economic support was low, but was positively associated with male students' GPA score when their family economic support was high. A possible explanation is that females view family social support as compensating for the family's inability to provide much economic support, whereas males are skeptical about the value of their family's expressed social support unless it is first accompanied by a relatively high level of family economic support. More research is needed to test the validity of this interpretation.

Other Findings

The remaining findings were unanticipated and concerned the remaining outcome measures of GPA slope and GPA variance over time. Interestingly, the significant effects that emerged for these measures also attested to the importance of family social support, with the influence of this variable particularly evident (and clearly significant) for the female students only.

GPA slope. The only significant effect for the outcome measure of GPA slope was the three-way interaction of the students' gender, perceived economic support, and perceived social support. The essential component of this interaction was that women whose families supported them financially performed significantly better over time as their level of family social support increased, whereas men whose families supported them financially did not show a similar benefit of also having their family's social support.

GPA variance. There were three significant effects for the outcome measure of GPA variance. First, the results revealed a significant "main effect" for family social support. In addition, family social support explained about 4.08% of the variance in the variation of GPAs. It revealed that students who reported higher levels of social support from their families had GPA scores that were less variable (i.e., more stable) across semesters than students who reported lower levels of social support. This finding suggests that family social support not only helps students to achieve a higher overall grade point average but also has a "stabilizing" influence on their performance over time.

Second, the results revealed a significant two-way interaction of family economic support and family social support in relation to GPA variance. A plot of this interaction (Figure 1) revealed that when the level of family economic support was high, the effect of family social support was non-significant and the students' GPA scores were relatively stable across semester. However, when the level of family economic support was low or moderate, students' GPA scores were significantly more stable across semesters as their level of family *social* support increased.

Third, and further emphasizing the importance of family social support to academic performance in college, the results revealed a three-way interaction of the student's gender, family economic support, and family social support in relation to GPA variance. A closer examination of this interaction revealed that family social support predicted greater GPA stability only for the female students who had a low level of family economic support. It did not predict stability differences for women with high family economic support or for male students in general. In other words, having a high level of family social support appeared to buffer female students from experiencing unstable GPAs, even when their level of family economic

support was low. These findings indicate that a high level of family social support can have an important stabilizing influence on the GPAs of female, but not male, students.

Gender differences. The three-way interactions for GPA slope and GPA variance both suggested that family social support is more important to women's success in college than to men's. Similarly, the results of the growth curve model analyses also suggested that family social support may buffer the female students from the effect of family economic adversity. But why should this be so?

One plausible explanation may be that female students—as compared to their male counterparts—cope differently with the stress they encounter during their university-level education. Several converging research findings are consistent with this interpretation. First, Day and Livingston (2003) found that, when confronted with identical stressors, women generally perceive their stress as being higher than males. Second, Misra, McKean, West, and Russo (2000) found that female college students reported higher stress from academic demands than male students did. Third, existing meta-analytic evidence shows that females usually seek social support more often than males when dealing with stress (Tamres, Janicki, & Helgeson, 2002). Fourth, Lempers and Clark-Lempers (1990) found that family social support can buffer the relationship between a lack of family economic support and depression/loneliness in female adolescents but not in male adolescents—a finding that is analogous to the present one.

Taken together, these findings suggest that female college students perceive higher levels of study-related stress, and therefore seek more family social support to help them cope with the stress they experience. In contrast, male students might cope differently with stress (e.g., find practical ways to deal with the situation or, failing that, to withdraw from the situation) or rely on other types of social support (e.g., peer support). Although research is needed to test this

interpretation, it is nevertheless in line with the assertion made by Cutrona (1996, p. 29) that “given the differences in the way that men and women are socialized in our society, certain kinds of support may be more easily accepted and used by each gender.”

Although the current data revealed that there was no average difference in the amount of family social support perceived by the male students ($N = 62$, $M = 3.47$, $SD = .46$) and the female students ($N = 178$, $M = 3.58$, $SD = .45$), $t(238) = -1.60$, $p = .110$, the *benefits* of having this type of support were clearly greater for the women than for the men. First, the women whose families supported them financially performed significantly better over time, depending on whether their level of perceived family social support was high versus low. However, in no case did the GPA slope of the men vary significantly according to the level of family social support they reported. Second, having a high level of family social support appeared to buffer female students from experiencing unstable GPAs when their level of family economic support was low.

This pattern of results is internally consistent, and is in line with other research findings showing that different types of support are more helpful to one gender than the other. For example, Asberg, Bowers, Renk, and McKinney (2008) found that social support was an important predictor of female college students' adjustment when dealing with university-related stressors (e.g., academic workload, financial issues), but that other forms of coping (e.g., avoidance) were more strongly related to male students' adjustment.

Some limitations of the present study should be noted. First, because this is a correlational study, our data can be used to identify suspected causal relationships but not to verify them. Second, because we included only those students who were enrolled in three semesters continuously, the current sample may not represent the entire population. It seems likely that students with lower GPAs or insufficient economic support were the ones who

dropped out of school. Therefore, the findings reported here might not generalize to individuals with low GPAs and/or low economic resources. Moreover, because the participants were college students in North Texas area, their living context may be different from individuals who live in a different state in the U.S or in a different country rather than the U.S. Although most of the participants might not live with their parents, their parents may still live in the state of Texas. Therefore, the family supports that they have received might differ from the family supports of other students whose parents live very far from them. The generalization of results needs to be used cautiously.

The other limitation in the current study was the relatively low Cronbach's alpha of the measure of perceived family social support ($\alpha = .61$), which may be because the measure contained only four items. Its lower alpha value may also be attributable in part to a double-barrel item with more than one idea or a restriction in variance caused by a trend toward a "ceiling effect" (i.e., the average score on this measure was 3.55 out of 4 points). It is impressive, therefore, that despite some degree of range restriction, our measure of perceived social support still emerged as the most consistent predictor in the following predictive models.

Conclusions

In summary, the effects of family support on the academic performance of college students appear to be complex. Moreover, this complexity is evident only in a study such as the present one, which examined how two distinct aspects of perceived family support—family economic support and family social support—were related to three distinct aspects of university-level GPA scores (overall GPA, GPA slope across time, and GPA variance across time).

In general, the results of this investigation revealed that the level of perceived social support that students receive from their families was important not only as a "main effect"

predictor of the magnitude and stability of their GPA scores across three successive semesters, but also as an interaction-term component that helped female students to succeed regardless of their level of family economic support. Additionally, college students' family social support was found to account for about 5.86% of the variance in the magnitude and about 4.08% of the variance in the stability of GPA scores although there might be a possibility of restriction of range in the measure of family social support. This implied family social support benefited college students' academic performance, and it buffered the economic adversity for female students (stable GPAs) and was also the apples of gold in pictures of silver when female students' family provide sufficient economic support (an increase in GPA slope). Moreover, students can never have too much family support---even if most students reported receiving a high level of family social supports, the higher social support the better academic performance. We therefore conclude that family support is indeed related to students' academic success in college, and we encourage other researchers to continue to investigate its effects with designs that can reveal the kinds of detailed findings that we have obtained.

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Table 1

Means and standard deviations of variables: GPAs, GPA slope, GPA variance, Family economic support, and Family social support

Variable	Mean	SD	Range
GPA			
Spring 2008	2.958	0.556	1.47 ~ 4.00
Fall 2008	2.962	0.531	1.24 ~ 4.00
Spring 2009	2.976	0.527	1.78 ~ 3.97
GPA slope	0.049	0.829	-1.00 ~ 1.00
GPA variance	0.015	0.026	0.00 ~ 0.23
Family economic support	2.92	0.909	1.00 ~ 4.00
Family social support	3.55	0.454	2.25 ~ 4.00

N = 240

Table 2

Moderated multiple regression on GPA slope by gender, family economic support, family social support, and their interaction

Variables	<i>B</i>	<i>SE</i>	<i>sr</i>²	
Dependent variable: GPA slope				
<u>Step 1</u>				
Gender	-0.011	0.123	0.000	<i>R</i> = .070
Family economic support	0.049	0.061	0.003	<i>R</i> ² = .005
Family social support	0.062	0.122	0.001	<i>Adj. R</i> ² = -.008
<i>Intercept</i>	0.049	0.054		
<u>Step 2</u>				
Gender	-0.014	0.126	0.000	<i>R</i> = .085
Family economic support	0.044	0.062	0.002	<i>R</i> ² = .007
Family social support	0.066	0.125	0.001	<i>Adj. R</i> ² = -.018
Gender*Family economic support	0.029	0.138	0.000	$\Delta R^2 = .002$
Gender*Family social support	0.102	0.276	0.001	
Family economic*social support	0.086	0.141	0.002	
<i>Intercept</i>	0.038	0.056		
<u>Step 3</u>				
Gender	-0.056	0.124	0.001	<i>R</i> = .217
Family economic support	0.030	0.061	0.001	<i>R</i> ² = .047
Family social support	0.097	0.123	0.003	<i>Adj. R</i> ² = .018
Gender*Family economic support	0.027	0.136	0.000	$\Delta R^2 = .040^{**}$
Gender*Family social support	0.105	0.271	0.001	
Family economic*social support	0.078	0.139	0.001	
Gender* Family economic*social support	0.998 **	0.320	0.040	
<i>Intercept</i>	0.019	0.055		

N = 240; ** *p* < .01

Table 3

Moderated multiple regression on GPA variance by gender, family economic support, family social support, and their interaction

Variables	B	SE	sr²	
Dependent variable: GPA variance (instability across time)				
<u>Step 1</u>				
Gender	-0.001	0.004	0.000	$R = .231^{**}$
Family economic support	-0.001	0.002	0.002	$R^2 = .054$
Family social support	-0.012 **	0.004	0.044	$Adj. R^2 = .042$
<i>Intercept</i>	0.015	0.002		
<u>Step 2</u>				
Gender	-0.002	0.004	0.001	$R = .277^{**}$
Family economic support	-0.002	0.002	0.003	$R^2 = .077$
Family social support	-0.011 **	0.004	0.035	$Adj. R^2 = .053$
Gender*Family economic support	-0.004	0.004	0.003	$\Delta R^2 = .023$
Gender*Family social support	0.001	0.008	0.000	
Family economic*social support	0.010 *	0.004	0.021	
<i>Intercept</i>	0.014	0.002		
<u>Step 3</u>				
Gender	-0.004	0.004	0.003	$R = .338^{**}$
Family economic support	-0.002	0.002	0.005	$R^2 = .114$
Family social support	-0.010 **	0.004	0.029	$Adj. R^2 = .088$
Gender*Family economic support	-0.004	0.004	0.003	$\Delta R^2 = .038^{**}$
Gender*Family social support	0.001	0.008	0.000	
Family economic*social support	0.010 *	0.004	0.020	
Gender* Family economic*social support	0.031 **	0.010	0.038	
<i>Intercept</i>	0.014	0.002		

$N = 240$; * $p < .05$; ** $p < .01$

[Figure 1]

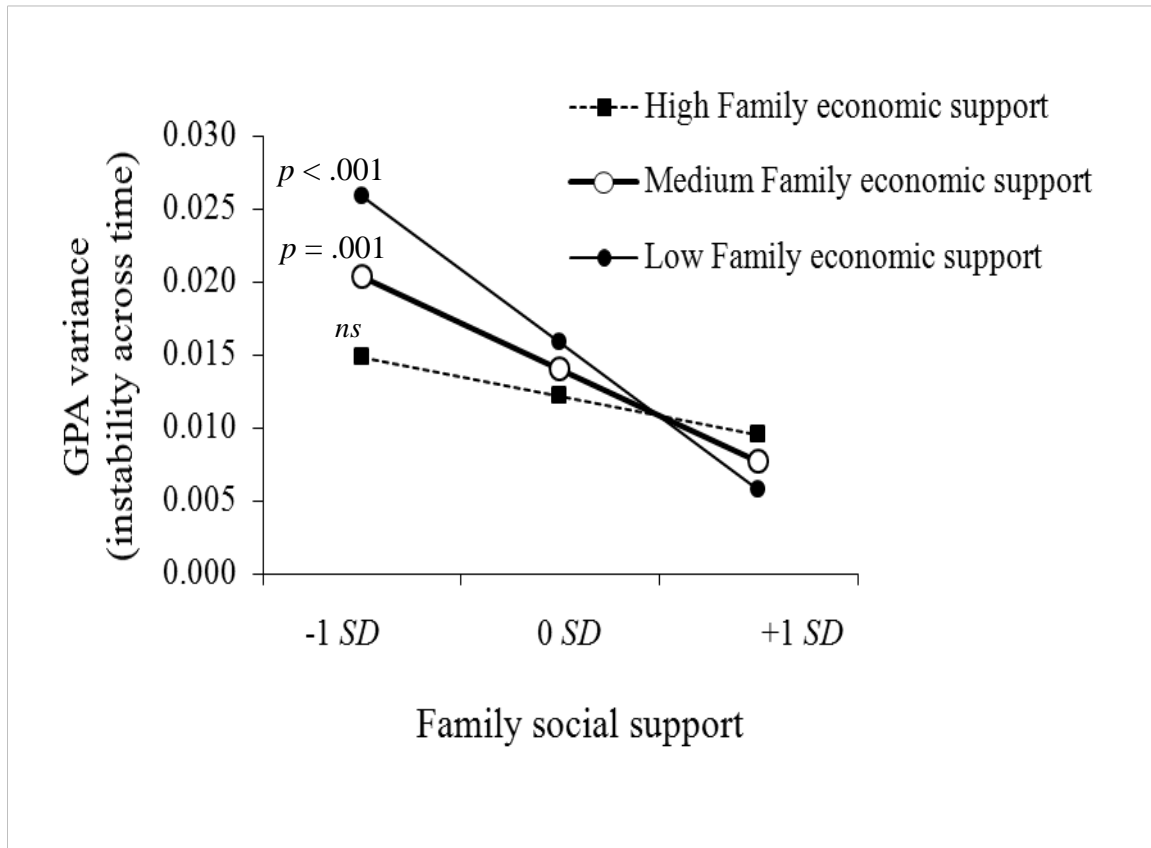


Figure 1. Family economic support (FES) moderates the relationship between GPA variance (i.e., instability across time) and family social support (FSS).

[Figure 2]

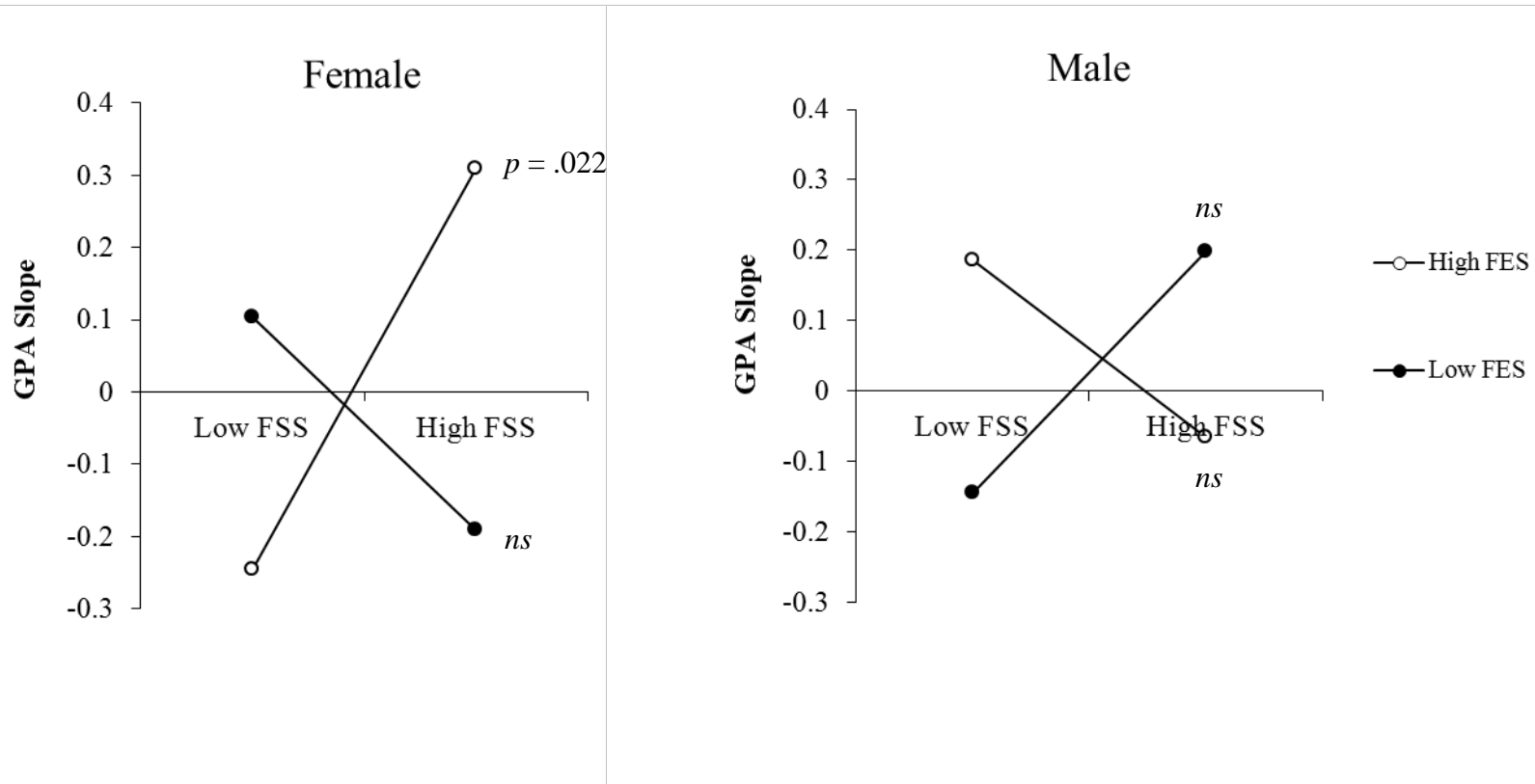


Figure 2. Family economic support (FES) moderates the relationship between GPA slope and family social support (FSS) for each gender.

[Figure 3]

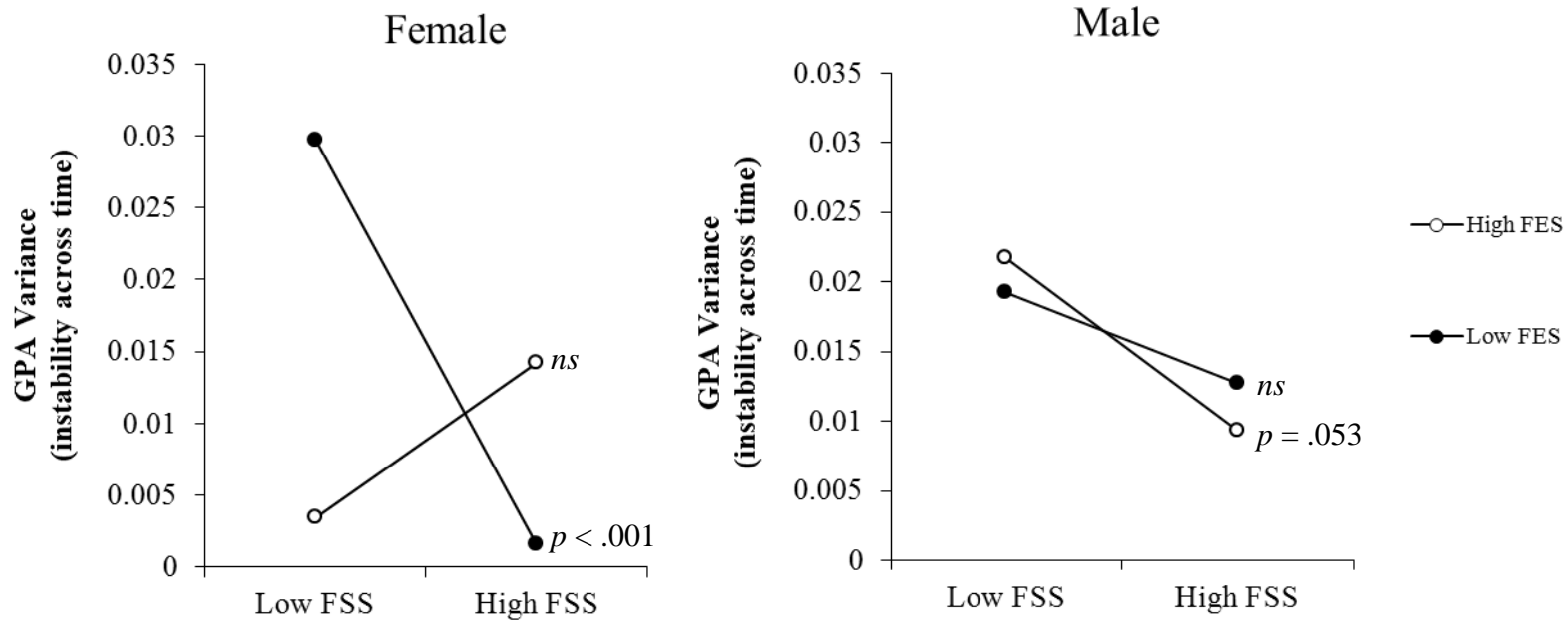


Figure 3. Family economic support (FES) moderates the relationship between GPA variance and family social support (FSS) for each gender.

[Figure 4]

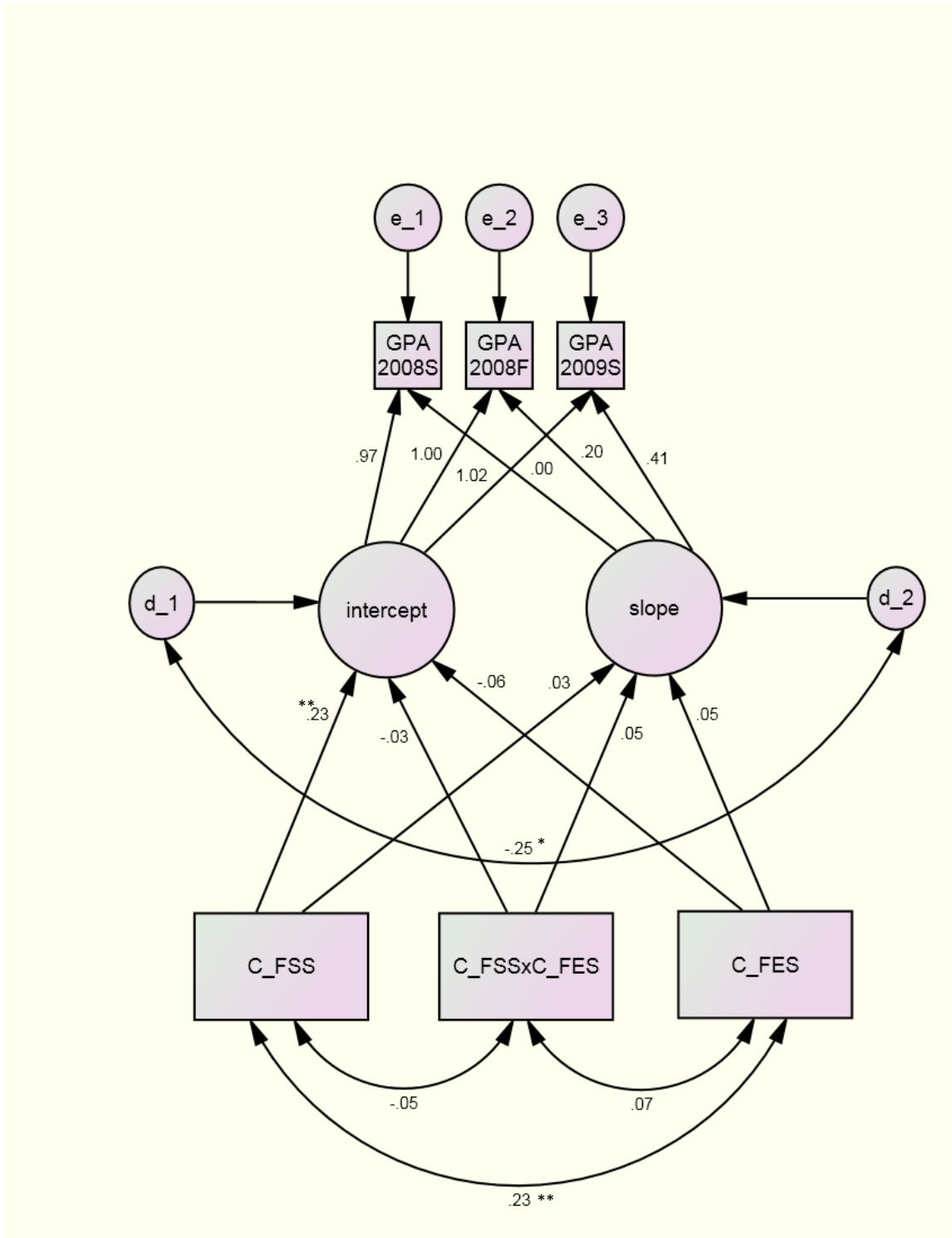


Figure 4. The growth cruve model with standardized regression coefficients.

[Figure 5]

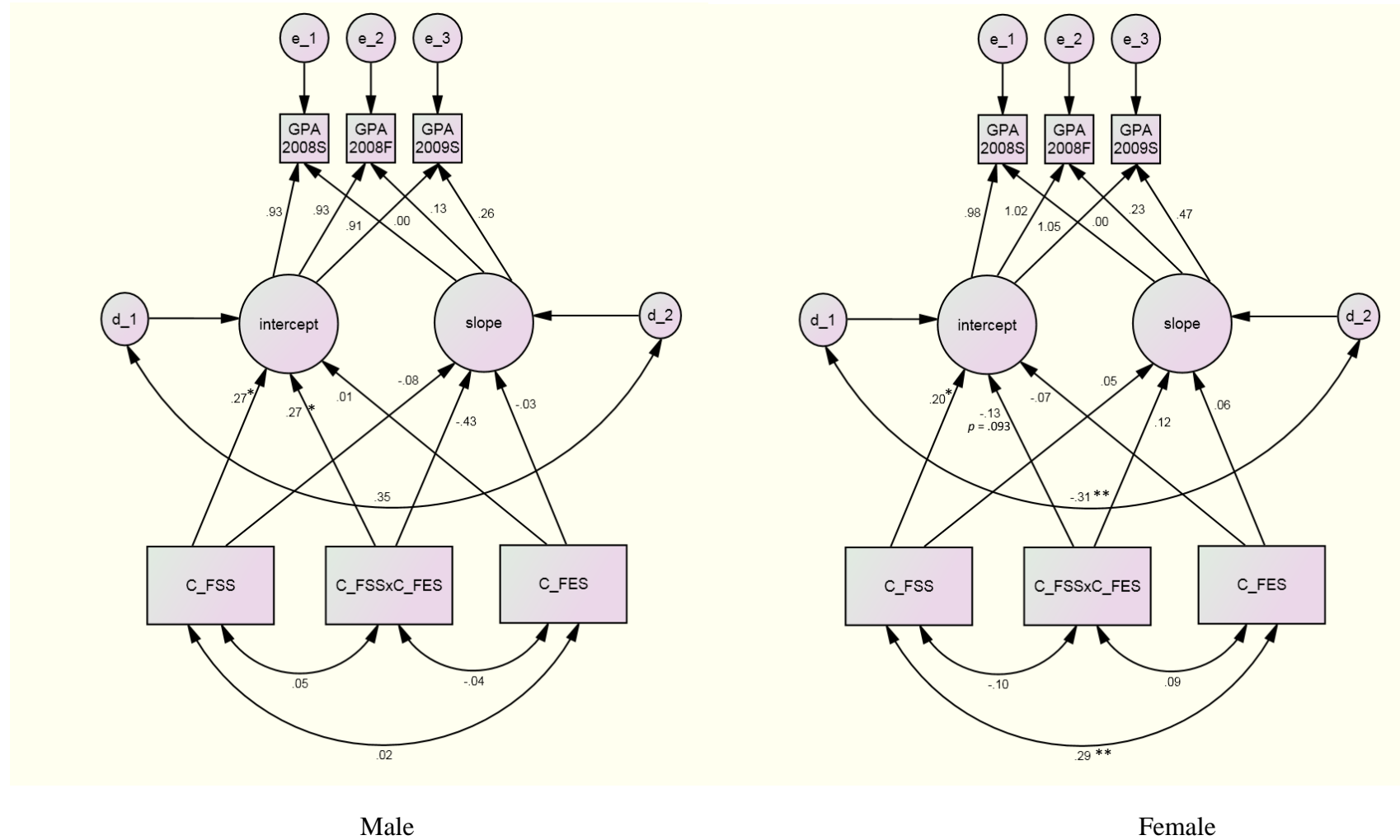


Figure 5. The unconstrained models for males and females with standardized regression coefficients.

[Figure 6]

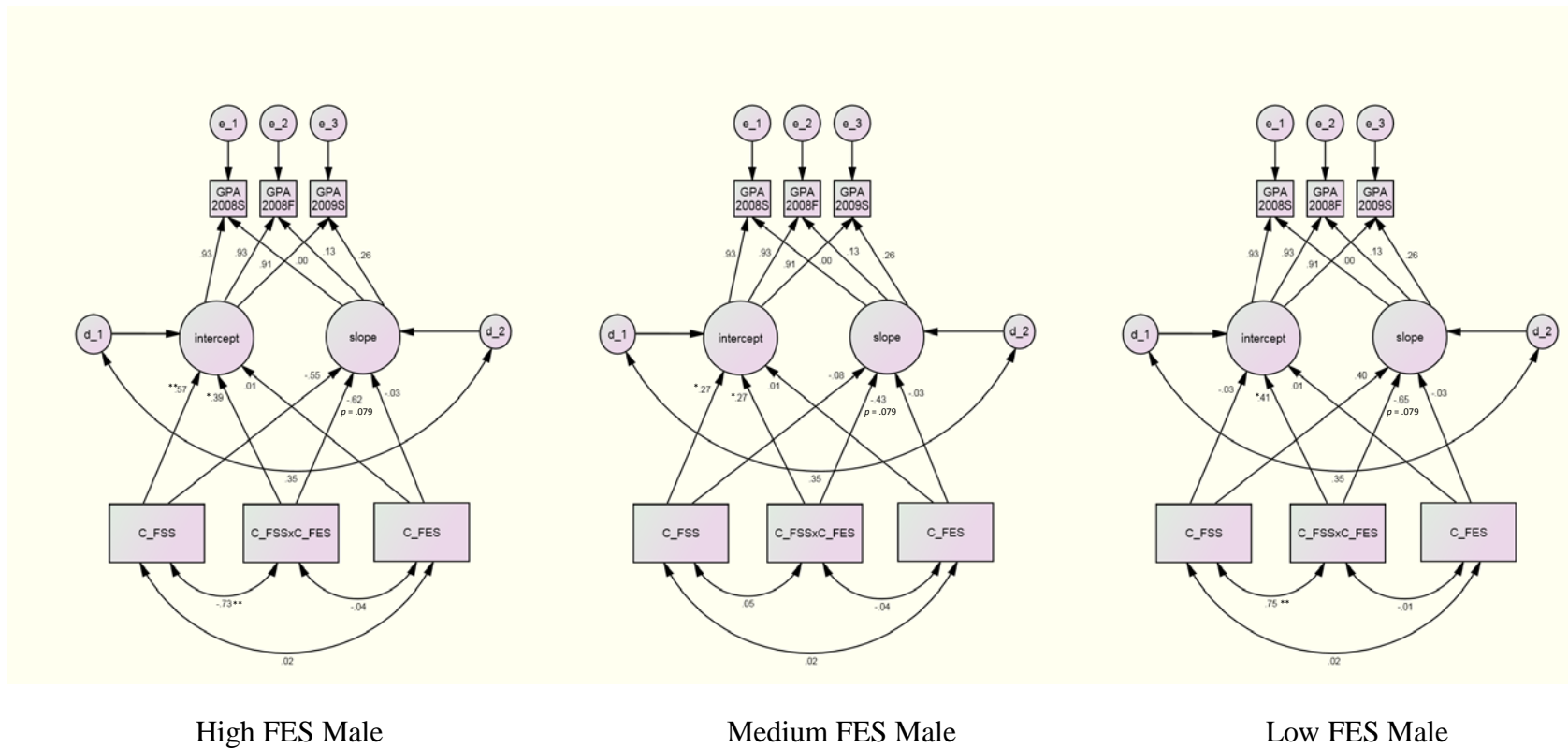


Figure 6. The models with standardized regression coefficients for males with high, medium, and low family economic support.

[Figure 7]

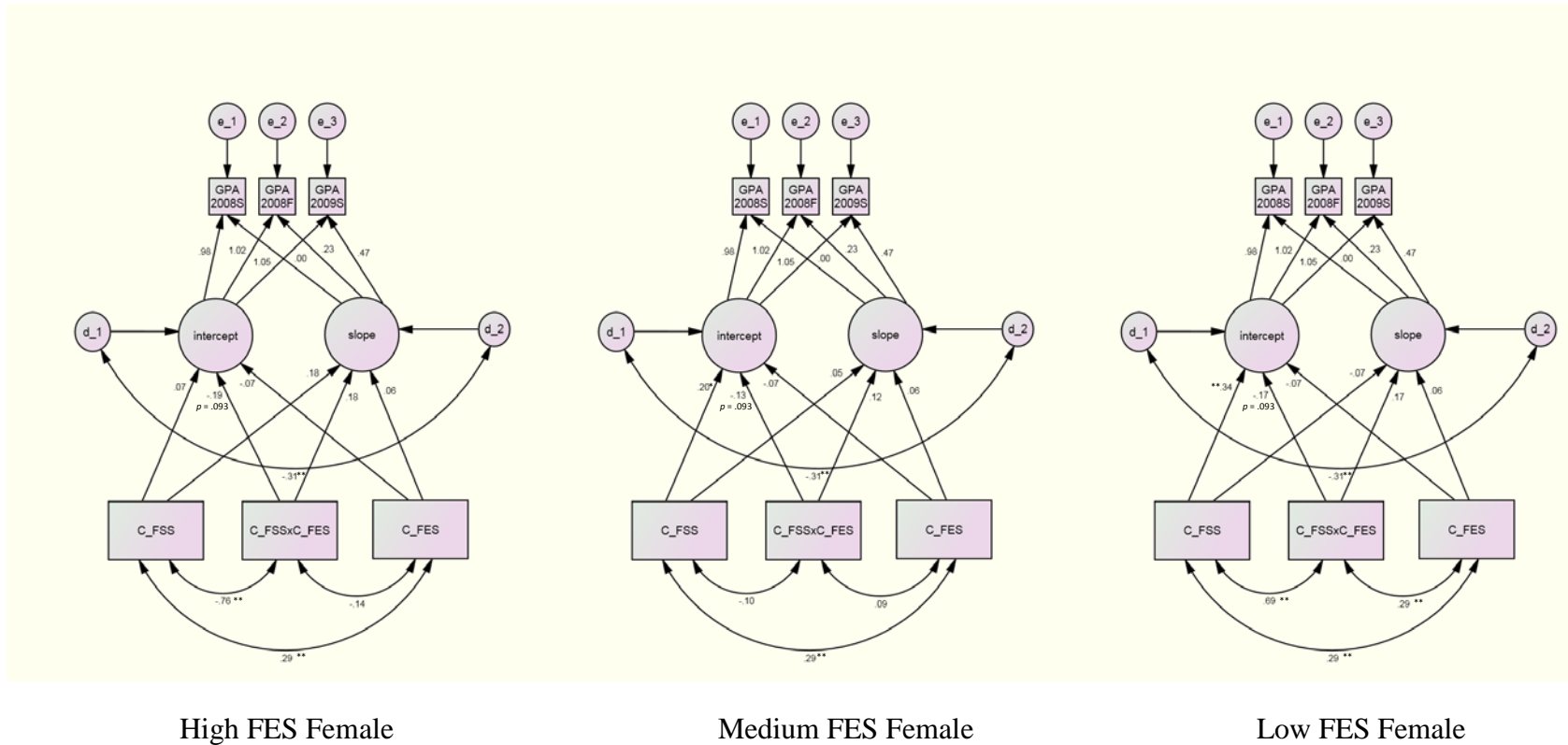


Figure 7. The models with standardized regression coefficients for females with high, medium, and low family economic support