

國家科學及技術委員會補助專題研究計畫報告

大學生課業延宕相關因子與自我疼惜 vs. 自我苛責之調節效應 探究

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本研究具有政策應用參考價值：否 是，建議提供機關
(勾選「是」者，請列舉建議可提供施政參考之業務主管機關)
本研究具影響公共利益之重大發現：否 是

中華民國 112 年 10 月 16 日

中文摘要：在不同國家中進行的調查，皆持續發現極高比例的大學生身陷課業延宕的困境，不僅阻礙這些學生們在學習上的進展與成就，同時也對其身心健康產生不利的後果。為了協助學生們順利達成課業目標，並且維持個人的整體福祉，實有必要探討大學生課業延宕傾向的相關因子。本研究旨在檢視包括外在因子，亦即「專制型教養風格」，與內在因子，即「自我苛責」與「課業壓力」在大學生課業延宕現象上之影響，同時亦探討「完美主義的努力」此一變項，在大學生「自我苛責」與「課業延宕」間關係中，是否扮演調節的角色。過去的相關研究雖然發現家長的教養風格與大學生的延宕傾向間之關聯性，然而教養風格與課業延宕之間形成關聯的歷程，仍未見較為細緻的探究，本研究因此採用廣義線性混合模型（generalized linear mixed model, GLMM）以檢驗研究者所提出之中介調節模型。研究者招募604位國內大學生，邀請其填答根據上述變項所編製之自陳量表。研究資料以中介效應分析之結果支持社會認知論的觀點，顯示大學生對專制型教養風格之知覺，與其延遲完成課業任務之傾向間，存在間接相關，且此二者間關係為學生之自我苛責與課業壓力所中介。再者，自我苛責亦經由課業壓力之中介，而與課業延宕間存在間接相關。而除了序列中介路徑的驗證外，研究結果亦顯示：完美主義的努力在自我苛責與課業延宕的關係間存在調節作用；具有自我苛責傾向之學生，若是其亦有較強的「完美主義的努力」傾向，則其與「完美主義的努力」水準較低的同儕相較，較不易出現課業延宕情形，完美主義的努力顯然有助於減輕自我苛責在課業延宕上的負面影響。根據上述研究發現，研究者亦於報告中，討論如何改善大學生課業延宕傾向之實務啟示。

中文關鍵詞：課業延宕、專制型教養、自我苛責、課業壓力、完美主義的努力

英文摘要：Surveys conducted in various countries have consistently revealed that a substantial proportion of college students struggle with procrastination. Academic procrastination not only impedes students' educational progress and accomplishments, but also contributes to adverse consequences for their mental and physical health. Exploring the factors related to college students' tendencies to procrastination is crucial for supporting students in achieving their academic goals and maintaining overall well-being. The present study aimed to examine the impacts of an external factor, specifically authoritarian parenting style, as well as internal factors including self-criticism and experienced academic stress on the phenomenon of academic procrastination among university students. Further, we attempted to investigate the moderating role of perfectionistic strivings in the relationship between self-criticism and academic procrastination. Although previous studies have established connections between parenting styles and procrastination in college students, the process by which parenting styles are connected to academic procrastination remains unclear. To

investigate the possible process, we tested the proposed mediation and moderation model by using the generalized linear mixed model (GLMM). Six hundred and four Taiwanese undergraduate students were recruited and completed a self-reported questionnaire assessing the variables described above. The results of the conditional process analysis lent support to the social cognitive view that students' perceptions of authoritarian parenting had an indirect relationship to their tendencies to delay academic tasks. This relationship was fully mediated by students' self-criticism and academic stress. Also, self-criticism had an indirect link to academic procrastination through academic stress. In addition to the sequential mediation pathways, the results of the current study confirmed the moderating role of perfectionistic strivings in the association between self-criticism and academic procrastination. Students who were self-critical and exhibited stronger tendencies to perfectionistic strivings were less likely to procrastinate compared to those with lower levels of perfectionistic strivings. Perfectionistic strivings in effect lessened the harmful impact of self-criticism on academic procrastination. Implications for reducing academic procrastination among university students are discussed.

英文關鍵詞： academic procrastination, authoritarian parenting, self-criticism, academic stress, perfectionistic strivings

Investigating Academic Procrastination Among Taiwanese University Students: A Mediation and Moderation Analysis

Academic procrastination, as defined by the intentional and irrational delay in completing academic tasks within the designated time frame (Schraw et al., 2007), is a wide spread issue observed among college students. Various surveys conducted in different countries have consistently demonstrated that a significant portion of college students struggle with procrastination (Ferrari et al., 2005; Geng et al., 2018; Mahasneh et al., 2016; Ö zer et al., 2009). Academic procrastination frequently manifests in educational settings when students choose to delay their academic work and submit papers or study for exams at the last moment (Batool, 2019). These actions involve willingly postponing essential tasks despite the awareness of potential negative outcomes (Steel, 2007). Thus, procrastination is described by Sirois and Pychyl (2013) as a failure in self-regulation characterized by a lack of motivation and the necessary resources for goal attainment. Students often engage in procrastination when they are confronted with unpleasant or challenging tasks. Facing such tasks can evoke negative emotions, leading individual to seek more enjoyable activities (Pychyl & Flett, 2012). This prioritization of immediate pleasure over the potential negative consequences of delaying aversive tasks is linked to a range of negative outcomes.

Academic procrastination has been found to hinder academic success by reducing the amount and quality of learning and increasing the likelihood of achieving lower grades (Howell & Watson, 2007). For college students, procrastination is associated with low self-efficacy, reduced self-regulation, fear of failure, and poor academic performance (Duru et al., 2014; Kim & Seo, 2015). Beyond the academic realm, chronic procrastination can have negative implications for students' overall well-being. It can lead to heightened stress and depression (Sirois, 2007; Sirois,

2014), which can have negative effects on mental health. Furthermore, procrastination can harm individuals' physical health and quality of life (Stead et al., 2010; Yang et al., 2020). The act of continuously delaying actions necessary to achieve goals can give rise to decreased productivity, reduced self-esteem, and dissatisfaction with oneself (Steel, 2007). Apparently, the repercussions of academic procrastination are far-reaching. It not only impedes students' educational progress and accomplishments, but also contributes to adverse consequences for their mental and physical health. Exploring the factors related to college students' tendencies to procrastination is crucial for supporting students in achieving their academic goals and maintaining overall well-being. The present study aimed to examine the impacts of an external factor, specifically authoritarian parenting style, as well as internal factors including self-criticism and experienced academic stress on the phenomenon of academic procrastination among university students. Further, we attempted to investigate the moderating role of perfectionistic strivings in the relationship between self-criticism and procrastination. It was hoped that the findings would provide valuable insights into effective strategies for reducing academic procrastination.

Parenting in the Asian Context and Academic procrastination

Parenting refers to the influence parents have on the behavior and development of their children (Batool, 2019). Parenting styles serve as a psychological framework that reflects the typical strategies parents employ in raising their children. They are categorized based on the levels of demandingness and responsiveness exhibited by parents. These styles encompass a range of behaviors and establish an emotional climate through which parents interact with their children (Maccoby & Martin, 1983). According to Bandura's social cognitive perspective (1999), parenting plays a significant role in shaping children's development through modeling and reinforcement in their socialization process (Pomerantz & Thompson, 2008). During

parent-child interactions, children incorporate the values of their parents. These values contribute to children's self-perceptions and belief systems, ultimately impacting their behavioral patterns (Darling & Steinberg, 1993). From a social cognitive perspective, children who perceive their parents as more authoritarian are prone to internalize and integrate the high demands and critical attitudes into their own self-evaluations.

Children may therefore develop a cognitive expectancy of having limited control over their performance (Soysa & Weiss, 2014). Academic procrastination can emerge as a consequential outcome.

Asian parents are often associated with adopting an authoritarian parenting style. This style stems from certain cultural features prevalent in East Asian societies, such as collectivism and a strong emphasis on academic excellence (Batoool, 2020). In East Asian cultures like Taiwan, Japan, and Korea, individuals tend to have an interdependent self-construal. They prioritize maintaining group harmony, pleasing others, and conforming to societal norms (Heine, 2001; Markus & Kitayama, 1991; Oishi & Diener, 2001). Parents in East Asian cultures impose high standards of academic performance on their children. Also, children in these cultures feel a strong sense of obligation to their parents. The combination of these cultural characteristics may contribute to the development of self-criticism (Okagaki & Frensch, 1998; Park & Kim, 2006). Children who perceive high levels of parental control and a low tolerance for mistakes are likely to experience lower confidence in their learning abilities. They are inclined to self-doubt and fear of failure. These tendencies are positively associated with procrastination (Chen, 2022; Fletcher et al., 2012; Pylchyl et al., 2002). In East Asian cultural contexts, students who perceive their parents as authoritarian may experience elevated levels of self-criticism and academic stress, potentially resulting in academic procrastination. Using the social cognitive theory as the theoretical framework, the present study was intended to examine the relationship

between perceived authoritarian parenting and university students' academic procrastination in the Taiwanese context. Specifically, this study explored the mediating effects of self-criticism and academic stress in this relationship.

Self-criticism and Procrastination

Self-criticism is considered a maladaptive form of self-regulation driven by feelings of guilt and fear of reproach, which diminishes autonomous motivation (Shahar et al., 2003, 2006). From the self-determination theory perspective, this self-regulatory functioning closely aligns with Ryan's (1995) notion of "introjected regulation." The very concept involves controlled motivation based on contingent self-esteem and avoidance of guilt. Previous research (Sheldon & Elliot, 1998; Sheldon & Hauser-Marko, 2002) suggests that the goals adopted by self-critics are rarely connected to personal interest and meaningfulness. Self-criticism was found to be negatively related to goal progress (Shahar et al, 2003; 2006). Self-critics tend to be preoccupied with potential failure and critical evaluation. This preoccupation motivates them to set goals focused on avoiding failure and preserving approval rather than on personal interest and meaning. The heightened emphasis on protecting self-esteem may trigger a cycle of procrastination, thereby undermining effective goal pursuit (Blatt, 1995, 2004).

Procrastination is viewed as a self-defensive approach employed to conceal low self-esteem, functioning as both a protective mechanism and a strategy to defend one's ego (Steel, 2007). In academic settings, students who engage in self-criticism often experience anxiety about failure and negative evaluation when faced with tasks that could expose their abilities to others (Ryan & Deci, 2000). As a result, they may resort to academic procrastination as a means to avoid unfavorable judgments and potential emotions of incompetence (Closson & Boutilier, 2017). Further, Asian students often report stronger fear of failure in contrast to their non-Asian

counterparts. This fear significantly influences their motivation in achievement-related situations (Eaton & Dembo, 1997). Asian students may hence be more inclined to engage in procrastination to protect their desired image. Since procrastination often serves as a mechanism for students to avoid unpleasant tasks and seek immediate emotional relief (Sirois & Pychyl, 2013), negative emotions clearly play a critical role in the occurrence of procrastination (Steel, 2007; Wohl et al., 2010). The relationship between self-criticism and procrastination appears to be mediated by negative emotions. Self-criticism encompasses concern about negative judgment, self-doubt, and feelings of guilt and shame following failure (Abdollahi et al., 2018). These characteristics heighten the stress levels of self-critics in challenging situations, prompting them to choose postponement of academic tasks as a way to evade negative emotions. Procrastination, in this case, functions as a maladaptive emotional regulation strategy (Martinčková & Enright, 2020; Sirois & Pychyl, 2013).

Academic Stress and Procrastination

Recent surveys have indicated that a significant number of students contemplate leaving university due to poor mental and physical health, as well as academic stress (Egan et al., 2021). Several reports suggest that approximately half of students encounter substantial anxiety and stress, resulting in a high prevalence of stress-related mental health issues among university students (Bayram & Bilgel, 2008; Pinder-Amaker, 2012; Stallman, 2010). The way parents raise their children can influence the anxiety levels that children experience. Research has demonstrated a direct connection between authoritarian parenting and increased anxiety in children (Niditch & Varela, 2012). Regarding academic stress, when college students perceive that their parents are excessively involved in their academic pursuit, it has been found to be predictive of test anxiety (Shadach & Ganor-Miller, 2013). Conversely, there is an inverse relationship between parental warmth and achievement anxiety among

college students (Greenberger et al., 2008). Additionally, when college students perceive a lack of support and warmth from such significant others as parents, they are prone to experiencing negative emotions. Accordingly, these students may turn to unrelated activities that provide immediate gratification instead of concentrating on their responsibilities. Procrastination is more probable when there is a deficiency in social support. Negative emotions stemming from parental pressure can impair students' self-control and executive function. The failure of self-regulation is thought to increase the risk of academic procrastination among college students (Yang et al., 2020).

In summary, there is substantial evidence showing that parental pressure and self-criticism can impact how students experience academic stress and engage in procrastination. Gaining insights into these relationships is essential for enhancing students' well-being and their chances of academic success. Based on the above discussions, we proposed to test a mediation model of factors contributing to academic procrastination among Taiwanese university students. It was hypothesized that perceived authoritarian parenting was related to academic procrastination through the mediation of self-criticism and academic stress. The goal of this comprehensive mediation model was to provide a more thorough understanding of the link between authoritarian parenting and university students' tendencies to academic procrastination. It aimed to elucidate the underlying mechanisms that contribute to this connection. Previous research (Chen, 2022) indicated substantial conceptual similarities between attributes of authoritarian parenting and two of the dimensions that characterize perfectionism: parental expectations and parental criticism. In the present study, we utilized the scales of parental expectation and parental criticism (Frost et al., 1990) to assess perceived authoritarian parenting.

Perfectionistic Strivings and Procrastination

In addition to exploring the mediation model, the moderating role of perfectionistic strivings was investigated in the current study. Empirical findings suggest that perfectionistic strivings can be beneficial in learning situations (Bong et al., 2014). Perfectionistic strivings, known as a constructive aspect of perfectionism, entail setting ambitious goals and working diligently to attain them (Hewitt & Flett, 1991). Individuals with perfectionistic strivings are typically less preoccupied with mistakes and setbacks and also less prone to procrastinate. They tend to have effective time management skills and experience satisfaction in their accomplishments (Burnam et al., 2014). Research has found that possessing perfectionistic strivings, characterized by personal standards and organization, is linked to higher levels of academic engagement and decreased propensity for procrastination. College students higher in perfectionistic strivings show reduced procrastination when studying for exams and writing term papers (Burnam et al., 2014; Zhang et al., 2007). Students exhibiting perfectionistic strivings hold optimistic expectations for success and take pride in their accomplishments. These attributes drive them to embrace challenging situations rather than shy away from them. Their strong self-discipline and realistic goal-setting bolster their motivation, enabling them to surmount obstacles and achieve success even in the face of criticism (Burnam et al., 2014; Stoeber & Rennert, 2008).

These findings clearly demonstrate that perfectionistic strivings empower students to employ time management strategies to reach their goals even when confronted with criticism. We were thus interested in examining whether this form of perfectionism moderated the relationship of self-criticism to academic procrastination. Plenty of studies have established a direct link between perfectionistic strivings and procrastination. To the best of our knowledge, there is no existing research that has reported on the moderating effects of perfectionistic strivings in the connection between self-criticism and procrastination in academic tasks. Building upon the previously

discussed findings that highlight the inverse correlation between perfectionistic strivings and academic procrastinations, we attempted to investigate whether perfectionistic strivings could attenuate the impact of self-criticism on academic procrastination. The results from this investigation would provide valuable insights into developing interventions aimed at reducing academic procrastination in university students.

The Present Study

Using Bandura's social cognitive theory (1999) as the underlying framework, the primary purpose of the present study was to examine how perceived authoritarian parenting is related to academic procrastination among university students in Taiwan. This study was intended to determine whether the very relationship would be mediated by self-criticism and academic stress. Also, given that perfectionistic strivings are linked to greater self-discipline and academic engagement even in the face of criticism (Burnam et al., 2014; Stoeber & Rennert, 2008), it would be enlightening to examine whether perfectionistic strivings moderate the connection of self-criticism and procrastination. We used the generalized linear mixed model (GLMM) to test the proposed mediation and moderation model outlined earlier. The hypothesis posited positive associations between perceived authoritarian parenting and both self-criticism and academic stress. Furthermore, it was expected that self-criticism would be positively related to both academic stress and procrastination. Academic stress would also be positively associated with academic procrastination. Self-criticism and academic stress were presumed to mediate the relationship between perceived authoritarian parenting and academic procrastination. Academic stress was supposed to mediate the effects of self-criticism on procrastination. Additionally, we anticipated that perfectionistic strivings would weaken the effects of self-criticism on

academic procrastination. Figure 1 shows the hypothesized model of the relationships among the variables.

[Insert Figure 1 about here]

Methods

Participants

The current study includes 604 participants, with 330 (54.64%) female and 274 (45.36%) male students. Table 1 presents the demographic profile of the participants, revealing that 275 (45.53%) enrolled in private universities, while 329 (54.47%) enrolled in public universities. Among these students, 366 (60.59%) of the students majored in STEM subjects, while 238 (39.41%) majored in non-STEM subjects. Furthermore, 92.22% (557) of the participants were undergraduate students. All students were offered an NT\$ 100 gift card for completing the survey.

[Insert Table 1 about here]

Measures

Participants were instructed to respond to all items using a 6-point Likert scales, ranging from 1 (strongly disagree) to 6 (strongly agree). A Chinese language version of this self-report survey was used. All measures utilized in the present study were translated into Chinese and then back-translated into English. Information on each scale used in the present study is detailed below.

Academic procrastination. Students' tendencies to academic procrastination were assessed by the Academic Procrastination Questionnaire (2009). This questionnaire consists of two subscales. The scale of procrastination on assignments was intended to measure students' procrastination behaviors when writing assignments (e.g., "I usually wait until the last minute to start my assignments"; 6 items; $\alpha = .902$ and $\omega = .904$). The scale of procrastination on preparing for the

examination was developed to measure procrastination on preparation when the examination is approaching (e.g., “While preparing for the examination, I usually procrastinate on carrying out my study plan”; 6 items.; $\alpha = .910$ and $\omega = .914$). The composite measure shows excellent reliability, $\alpha = .948$, $\omega = .951$.

Authoritarian parenting. Students’ perceptions of authoritarian parenting were assessed by the two subscales of the Multidimensional Perfectionism Scale (MPS, Frost et al., 1990), “parental expectations” (PE) and “parental criticism” (PC). The scale of parental expectations consists of five items having to do with students’ perceptions that their parents have set standards they can hardly meet (e.g., “My parents set very high standards for me”; $\alpha = .887$ and $\omega = .889$). The scale of parental criticism consists of four items assessing students’ perceptions that any failure or mistake risks rejection by the parents and loss of love (e.g., “As a child, I was punished for doing things less than perfect”; $\alpha = .775$ and $\omega = .787$). The reliability measures for the composite measure are $\alpha = .898$ and $\omega = .900$.

Self-criticism. Students’ tendencies to be self-critical and dwell on mistakes were assessed by the subscale of Forms of Self-Criticizing Scale (Gilbert et al., 2004). The very scale is labeled “inadequate self.” It consists of nine items capturing a sense of feeling internally put-down and rendered inadequate by failures and setbacks (e.g., “I am easily disappointed with myself). This scale has good reliability, $\alpha = .904$ and $\omega = .905$.

Academic stress. Students’ perceived academic stress was measured by the scale adapted from the Perceived Stress Scale (Cohen et al., 1983). The scale items were reworded to fit the academic context and ask students about their feelings and thoughts regarding academic study during the past few months (e.g., “In the past few months, I have felt nervous and stressed because of academic difficulties”). There are

ten items in the scale. Four of them are reverse-scored. The scale exhibits acceptable reliability, $\alpha = .886$ and $\omega = .887$.

Perfectionistic strivings. The construct was measured using two subscales, “personal standards” and “organization,” from the Multidimensional Perfectionism Scale (MPS) developed by Frost et al. (1990). The scale of personal standards assesses students’ tendencies to strive to achieve high personal standards of performance (e.g., “I set higher goals than most people”; 4 items; $\alpha = .801$ and $\omega = .804$). The organization subscale has to do with an emphasis on precision, order, and organization (e.g., “Organization is very important to me”; 5 items; $\alpha = .811$ and $\omega = .818$). The reliability coefficients of the composite scale are $\alpha = .871$ and $\omega = .875$.

Statistical Analysis

The conditional process analysis (Hayes & Rockwood, 2019, as known as mediation moderation analysis) was conducted to investigate the mediation effect of self-criticism ($a1 \times b1$), academic stress ($a2 \times b2$), and the serial mediation effect through the former variables ($a1 \times a3 \times b2$), between authoritarian parenting and academic procrastination. Mediation and moderation analysis can be considered as an expansion of a linear model. As a result, it can be implemented using any modeling framework, including structural equations modeling (SEM), especially path analysis, or the generalized linear mixed model (GLMM) framework.

In this study, the model was constructed within the framework of GLMM. We utilized the R package **brms** (Bürkner, 2017) to perform Bayesian Markov Chain Monte Carlo (MCMC) sampling for estimating the parameters in the model. Four Markov chains were run for 2000 iterations (with 1000 for warm-up) for the sampling process, with **cmdstanr** (Gabry & Češnovar, 2022) serving as the computing

backend. To make statistical inferences, we used the mean of the posterior distribution as the estimated value and checked for significance using a 95% credible interval (including 0 or not). For the prior setting, we proposed the non-informative distribution $N(0,10)$ for the intercepts of academic procrastination, stress and self-criticism, as well as for all the regression coefficients. In addition, the priors for the standard deviation of academic procrastination, stress and self-criticism were applied $Cauchy(0,1)$ as the non-informative distribution.

In traditional mediation analysis, researchers typically use the Sobel, bootstrapping, or Monte Carlo methods to test for indirect effects because the conventional MLE method cannot directly estimate the standard error of a product of two estimates. However, one of the benefits of Bayesian computing is that researchers can make statistical inferences directly from the posterior sampling distribution (Falk et al., 2023; Miočević et al., 2017; Yuan & MacKinnon, 2009). Thus, in the current research, we examined the mediation effect using the product of 4000 sampling points and their 95% credible interval. In the Bayesian framework, the model formula can be expressed in the following way.

$$\begin{aligned}
Procrastination_{[i]} &\sim N(\mu_{y[i]}, \sigma_{y[i]}) \\
Stress_{[i]} &\sim N(\mu_{m2[i]}, \sigma_{m2[i]}) \\
Criticism_{[i]} &\sim N(\mu_{m1[i]}, \sigma_{m1[i]}) \\
\mu_{y[i]} &= Intercept_{y[i]} + c' \cdot Parenting_{[i]} + b_1 \cdot Criticism_{[i]} \\
&\quad + b_2 \cdot Stress_{[i]} + w \cdot Strivings_{[i]} \\
&\quad + (b_1 w) \cdot Criticism_{[i]} \cdot Strivings_{[i]} \\
&\quad + \beta_1 \cdot Gender_{[i]} + \beta_2 \cdot Public_{[i]} + \beta_3 \cdot STEM_{[i]} \\
\mu_{m2[i]} &= Intercept_{m2[i]} + a_2 \cdot Parenting_{[i]} + a_3 \cdot Criticism_{[i]} \\
&\quad + \beta_4 \cdot Gender_{[i]} + \beta_5 \cdot Public_{[i]} + \beta_6 \cdot STEM_{[i]} \\
\mu_{m1[i]} &= Intercept_{m1[i]} + a_1 \cdot Parenting_{[i]} \\
&\quad + \beta_7 \cdot Gender_{[i]} + \beta_8 \cdot Public_{[i]} + \beta_9 \cdot STEM_{[i]} \\
\text{Priors:} \\
Intercept_{y[i]} &\sim N(0,10) \\
Intercept_{m2[i]} &\sim N(0,10) \\
Intercept_{m1[i]} &\sim N(0,10) \\
c', b_1, b_2, w, b_1 w, a_2, a_3, a_1 &\sim N(0,10) \\
\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9 &\sim N(0,10) \\
\sigma_{y[i]}, \sigma_{m2[i]}, \sigma_{m1[i]} &\sim Cauchy(0,1)
\end{aligned}$$

Results

The Direct and Indirect Effects in the Mediation Analysis

For the mediation analysis, we controlled for the background variables of gender, the school type and the field of major. Table 2 displays the descriptive statistics for the five main variables. Figure 2 and Table 3 show the results of conditional process analysis. This analysis involved three linear models aimed to explain academic procrastination ($R^2=0.193$, 95% CI=[0.146, 0.244]), academic stress ($R^2=0.288$, 95% CI=[0.237, 0.377]), and self-criticism ($R^2=0.154$, 95% CI=[0.106, 0.204]). Besides, the \hat{R} values of the estimates were around one, suggesting a nice convergence about the Bayesian computing.

[Insert Table 2 about here]

[Insert Table 3 about here]

Direct effects. We also calculated the direct effects in each regression model. As shown in Figure 2, the direct effects of authoritarian parenting on academic procrastination were not significant (Est.=-0.013, 95% CI [-0.091, 0.064]). This finding revealed that the relationship between authoritarian parenting and academic procrastination could be fully mediated by self-criticism and academic stress.

Indirect effects. The direct and indirect effects are summarized in Table 4 and Figure 2. As expected, authoritarian parenting was positively associated with both self-criticism (a1 Est.=0.349, 95% CI [0.278, 0.419]) and academic stress (a2 Est.=0.133, 95% CI [0.078, 0.189]). Self-criticism was also positively related to both academic stress (a3 Est.=0.358, 95% CI [0.298, 0.420]) and procrastination (b1 Est.=0.309, 95% CI [0.211, 0.405]). Academic stress was positively correlated with academic procrastination (b2 Est.=0.226, 95% CI [0.117, 0.341]). There were various indirect pathways through which authoritarian parenting influenced academic procrastination. Authoritarian parenting had an indirect impact on procrastination through self-criticism ($a1 \times b1 = 0.108$, 95% CI [0.069, 0.150]). Similarly, there was an indirect effect of authoritarian parenting on procrastination via academic stress ($a2 \times b2=0.030$, 95% CI [0.013, 0.052]). When considering both self-criticism and academic stress as mediating factors, the indirect effect of authoritarian parenting on procrastination ($a3 \times b2$) was 0.028, 95% CI [0.014, 0.046]. In addition, the proportions (to total effect) of the mediation effect for self-criticism, academic stress, and the serial mediation were 70.597%, 19.734%, and 18.513%, respectively. Clearly, self-criticism was the most important mediator in this model. Note that the sum of the proportion rates may exceed 100% due to the negative effect of the direct path (c').

Moderation Effects of Perfectionistic Strivings

To explore how perfectionistic strivings may moderate the association between self-criticism and academic procrastination, we initially assessed the interaction effect

between perfectionistic strivings and self-criticism. Table 3 reveals that the interaction between perfectionistic striving (w) and self-criticism (b_1) was significant (Est. = -0.109, 95% CI [-0.205, -0.017]). As Table 3 shows, self-criticism was positively linked to academic procrastination (Est. = 0.309, 95% CI = [0.211, 0.405]). Moreover, perfectionistic strivings were found to moderate the relationship between self-criticism and procrastination. As illustrated in Figure 3, students who exhibited self-criticism and possessed elevated levels of perfectionistic strivings tended to demonstrate a reduced propensity for academic procrastination compared to their counterparts with lower levels of perfectionistic strivings. In other words, perfectionistic strivings appeared to mitigate the detrimental impact of self-criticism on academic procrastination.

[Insert Table 4 about here]

[Insert Figure 2 about here]

[Insert Figure 3 about here]

Discussion

The present findings further our understanding of the interplay between external and internal factors in relation to academic procrastination among Taiwanese university students. The combination of the social cognitive aspect of the environmental context (i.e., the parenting style) and individual factors (i.e., self-criticism and academic stress) is infrequently studied concerning outcomes among undergraduate students (Fletcher et al. 2012). The sequential mediation and moderation model built in this study provides a more encompassing mechanism for explaining the connection between authoritarian parenting and academic procrastination via self-criticism and academic stress. Also, this comprehensive model reveals that students' perfectionistic strivings may attenuate the relationship of self-

criticism to academic procrastination. Although previous studies (Soysa & Weiss, 2014; Zakeri et al., 2013) have established connections between parenting styles and procrastination in college students, the process by which parenting styles are connected to procrastination remains unclear. Little research has examined the potentially intricate mediation or moderation in their associations. The results of this study not only validate the role of parenting in procrastination across different cultural contexts, but also distinctly illuminate strategies to alleviate academic procrastination among college students. Below, several important findings are discussed in more detail.

Effects of Authoritarian Parenting

The findings of the current study lend support to the social cognitive view (Bandura, 1999) that students' perceptions of authoritarian parenting have an indirect relationship to their tendencies to delay academic tasks. This relationship is fully mediated by students' self-criticism and academic stress. Parental expectations and criticism embedded in authoritarian parenting may increase the likelihood of children adopting comparable evaluative criteria for their own performance. The prevalent interdependent self-construal observed in East Asian contexts may result in children experiencing a pressure to meet the expectations set by their parents. When students find it difficult to achieve these unrealistic objectives, they often become excessively self-critical and experience heightened stress. The link between authoritarian parenting and experienced academic stress parallel the previous findings (Soysa & Weiss, 2014) that college students who can hardly perceive parental support and care appear to experience such negative emotions as stress and anxiety. The anxiety and fear of failing to satisfy their parents' demands may drive these students to engage in unrelated activities that offer immediate pleasure rather than focusing on their intended tasks. Consequently, academic procrastination is prone to emerge (Yang et

al., 2020).

Students possessing an interdependent self-construal typically exhibit an inclination to please their parents due to a feeling of duty. The desire serves as a powerful motivator for them, given their high regard for what parents deem significant (Bong et al., 2014). Nevertheless, the results of the current research reveal that this form of motivation can be a double-edged sword. On one side, the impetus stemming from parental expectations may inspire children to pursue excellence to gratify their parents. Conversely, when students perceive themselves as inadequate to fulfill these expectations, they may become self-critical and encounter stress, which could lead to the onset of academic procrastination.

Effects of Self-criticism

The current research validates the connection between students' perceptions of authoritarian parenting and their tendencies to self-criticism. Taiwanese university students are likely to internalize and integrate the strict standards and critical demands displayed by authoritarian parents into their own self-assessment. This process aligns with the insights of the social cognitive perspective. Investigating self-criticism is hence considered especially significant in understanding the academic involvement of Asian students. The stringent self-evaluation stemming from parental expectations and requirements has both immediate impacts and indirect influences on procrastination by way of academic stress. Previous findings (Powers et al., 2009) have shown that self-criticism is associated with controlled motivation. Students possessing elevated levels of self-criticism are motivated by their contingent self-esteem and the desire to avoid feelings of guilt. Since decreases in self-worth are distressing, the objective of preserving self-esteem often takes precedence over achieving the actual goal (Blatt, 1995, 2004). Put differently, this ineffective type of self-regulation (i.e., self-criticism) may direct students' attention to evading failure

and preserving their self-esteem, instead of actively and productively pursuing their goals. Academic procrastination thus functions as a self-defensive strategy that protects a delicate self-esteem originating from unfavorable self-evaluation (Steel, 2007). The association between self-criticism and academic procrastination clearly indicates that students who tend to be more critical of themselves are more inclined to procrastinate. When self-critical students utilize procrastination as a protective mechanism to avoid revealing their abilities to others, it undoubtedly hampers their capacity to freely pursue their aspirations.

Aside from its direct impact on academic procrastination, self-criticism also has an indirect link to procrastination through academic stress. This pathway implies that students who assess their academic performance critically may encounter feelings of stress, guilt, and shame (Abdollahi et al., 2018). In an attempt to alleviate these adverse feelings, they may be tempted to engage in unrelated activities that offer instant gratification, thereby postponing the current task and leading to increased procrastination. Drawing from the current findings, academic procrastination may function not only as a means of self-preservation to uphold self-esteem, but also as a strategy for emotional regulation aimed at relieving negative emotions arising from unfavorable self-evaluation. The integrated sequential mediation model analyzed in the present research evidently provides a comprehensive insight into the potential pathways through which self-criticism could contribute to academic procrastination.

The Moderating Role of Perfectionistic Strivings

In addition to the sequential mediation pathways identified in the present study, another important finding concerns the moderating role of perfectionistic strivings in the relationship between self-criticism and academic procrastination. Students who are self-critical and exhibit stronger tendencies to perfectionistic strivings are less likely to procrastinate compared to those with lower levels of perfectionistic strivings.

The presence of perfectionistic strivings effectively lessened the harmful effects of self-criticism on academic procrastination. The strong expectations set by parents in East Asian culture are found to be connected to children establishing high standard of excellence. While the aspirations for reaching perfectionistic standards and the tendency to self-criticism may both have roots in authoritarian parenting, these two forms of self-regulation could elicit different reactions when confronted with identical challenges and setbacks (Bong et al., 2014). In contrast to the confirmed positive correlation between self-criticism and avoidant behaviors such as academic procrastination, perfectionistic strivings may boost students' commitment to academic endeavors. Nonetheless, previous findings simply show that strivings for excellence and being organized are positively linked to engagement and inversely correlated with procrastination (Abdollahi et al., 2018; Chen et al., 2022; Closson & Boutilier, 2017). What distinguishes this study is its capacity to identify the moderating effects of perfectionistic strivings.

As previously mentioned, self-criticism that may originate from authoritarian parenting can serve as a source of motivation for students to turn to procrastination. The very practice functions as a way to protect their self-worth and alleviate negative emotions when confronted with academic difficulties. Individuals who exhibit self-criticism and harbor perfectionistic ambitions, however, may experience hope for success and derive joy from accomplishing their goals. These qualities propel them to willingly place themselves in demanding situations and employ effective time management strategies to attain their objectives, rather than evading responsibilities (Abdollahi et al., 2018). Their aspirations for achievement may empower them to overcome the fear of failure associated with self-criticism and prompt them to make greater effort in order to meet their own high standards. Consequently, these students exhibit a reduced likelihood of procrastinating on their present tasks. A potential

insight derived from these results is that parents can encourage their children to establish ambitious yet achievable personal standards and support their efforts to meet these standards without reproaching them for any setbacks along the way.

When students are inspired to pursue excellence and are less preoccupied with the fear of making mistakes or encountering failures, they appear to show a diminished tendency to postpone the completion of tasks. This study carries implications for addressing procrastination among university students. Given the role of parenting styles in students' timely completion of academic tasks even at higher education level, educators and counsellors should collaborate with parents of college student procrastinators to examine the parenting approaches they are employing. Moreover, parents can be educated about how embracing compassionate and autonomy-supportive parenting styles can lead to various beneficial outcomes for their children (Batool, 2019). These advantages encompass reduced levels of self-criticism, academic stress, and procrastination.

Limitations and Future Research

Although the results of the present study provide insights into practices, there are two limitations that need to be addressed in the future research. First, the present study solely investigated the mediating relationship between authoritarian parenting and academic procrastination through self-criticism and academic stress. Future research could explore the impacts of alternative parenting styles (e.g., autonomy-supportive parenting) and mediators (e.g., autonomous motivation) on procrastination. Examining these outcomes would enable us to draw comparisons regarding the influences of various parenting styles and mediators. Second, the current research measures the variables of interest simultaneously. For a more precise examination of the mediating processes, it is essential to evaluate the presumed antecedents and consequents with an appropriate temporal gap between them. Also, employing a

cross-lagged panel design in the future would allow the researchers to discern the direction of mediations effects with greater accuracy.

Conclusion

In conclusion, the results of this study suggest that our hypotheses are confirmed. Authoritarian parenting, as an external factor, is indirectly related to Taiwanese university students' tendencies to engage in academic procrastination. The relationship is fully mediated by students' self-criticism and academic stress. Specifically, authoritarian parenting is positively associated with both self-criticism and academic stress. Self-criticism is both directly and indirectly linked to academic procrastination. Academic stress mediates the effects of self-criticism on academic procrastination. Moreover, perfectionistic strivings moderate the relationship between self-criticism and academic procrastination. Self-critical students with higher levels of perfectionistic strivings procrastinate less than those who show lower perfectionistic strivings. Perfectionistic strivings appear to reduce the detrimental effects of self-criticism on academic procrastination.

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Table 1.
The population, proportion (%), and homogeneity tests of the participants

| Variable | N | % | Testing |
|-------------------|----------|----------|----------------------|
| Gender | | | $\chi^2(1)=5.19,$ |
| Female (=0) | 330 | 54.64 | $p=.02$ |
| Male (=1) | 274 | 45.36 | |
| School | | | $\chi^2(1)=4.83,$ |
| Private (=0) | 275 | 45.53 | $p=.03$ |
| Public (=1) | 329 | 54.47 | |
| Field | | | $\chi^2(1)=27.126,$ |
| STEM (=0) | 366 | 60.59 | $p<.001$ |
| Non-STEM (=1) | 238 | 39.41 | |
| Student of | | | $\chi^2(1)= 430.63,$ |
| undergraduate | 557 | 92.22 | $p<.001$ |
| graduate | 47 | 7.78 | |
| Total | 604 | 100 | |

Table 2.
Descriptive statistics and correlations for study variables

| | (1) | (2) | (3) | (4) | (5) |
|----------------------------|-----------|----------|----------|----------|-------|
| (1) Procrastination | 1.000 | | | | |
| (2) Parenting | 0.127*** | 1.000 | | | |
| (3) Self-criticism | 0.326** | 0.358*** | 1.000 | | |
| (4) Stress | 0.314*** | 0.324*** | 0.489*** | 1.000 | |
| (5) Strivings | -0.155*** | 0.086** | 0.155*** | -0.103** | 1.000 |
| Mean | 3.764 | 3.190 | 3.813 | 3.511 | 4.307 |
| SD | 1.035 | 1.051 | 0.968 | 0.805 | 0.749 |

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3.
Mediation analysis results in Bayesian framework.

| Variable | Est. | SE | Q2.5 | Q97.5 | R-hat | ESS_Bulk | ESS_Tail |
|--|--------|-------|--------|--------|-------|----------|----------|
| Response: Procrastination | | | | | | | |
| (Intercept) | 2.985 | 0.226 | 2.546 | 3.425 | 1.000 | 5050 | 3501 |
| Parenting (c') | -0.013 | 0.040 | -0.091 | 0.064 | 1.000 | 5557 | 3153 |
| Criticism (b1) | 0.309 | 0.050 | 0.211 | 0.405 | 1.000 | 4573 | 2940 |
| Stress (b2) | 0.226 | 0.057 | 0.117 | 0.341 | 1.000 | 4811 | 3684 |
| Strivings (w) | -0.284 | 0.054 | -0.386 | -0.175 | 1.002 | 5125 | 3044 |
| (b1*w) | -0.109 | 0.048 | -0.205 | -0.017 | 1.002 | 5686 | 3006 |
| R^2 | 0.193 | 0.025 | 0.146 | 0.244 | | | |
| Response: Stress | | | | | | | |
| (Intercept) | 2.935 | 0.114 | 2.709 | 3.160 | 1.000 | 4694 | 2801 |
| Parenting (a2) | 0.133 | 0.028 | 0.078 | 0.189 | 1.001 | 4800 | 3079 |
| Criticism (a3) | 0.358 | 0.032 | 0.298 | 0.420 | 1.001 | 5072 | 2983 |
| R^2 | 0.288 | 0.026 | 0.237 | 0.337 | | | |
| Response: Self-criticism | | | | | | | |
| (Intercept) | -1.039 | 0.146 | -1.327 | -0.755 | 1.001 | 5094 | 2847 |
| Parenting (a1) | 0.349 | 0.036 | 0.278 | 0.419 | 1.001 | 5889 | 2711 |
| R^2 | 0.154 | 0.025 | 0.106 | 0.204 | | | |
| Family specific parameters (sigma): | | | | | | | |
| Procrastination | 0.939 | 0.027 | 0.889 | 0.993 | 1.001 | 6887 | 2957 |
| Stress | 0.684 | 0.020 | 0.647 | 0.725 | 1.001 | 6912 | 2989 |
| Criticism | 0.896 | 0.026 | 0.847 | 0.947 | 1.001 | 6304 | 2812 |

Note.[Q2.5, Q97.5]= 95% HDI

The *Normal* distribution is used as the response distribution.

Table 4.

The direct, indirect, and total effects on academic procrastination in mediation analysis.

| Effect | Mean | Median | Q2.5 | Q97.5 | Prop.(%) |
|------------------------------|-------------|---------------|-------------|--------------|-----------------|
| Direct (c') | -0.013 | -0.013 | -0.091 | 0.064 | |
| Indirect 1 (a1*b1) | 0.108 | 0.107 | 0.069 | 0.150 | 70.597 |
| Indirect 2 (a2*b2) | 0.030 | 0.029 | 0.013 | 0.052 | 19.734 |
| Indirect 3 (a1*a3*b2) | 0.028 | 0.028 | 0.014 | 0.046 | 18.513 |
| Total effect (c) | 0.152 | 0.152 | 0.076 | 0.229 | |

Note. The mean and median are referred to the posterior mean and mediation.

Prop. (%) = Proportion mediated (%)

Figure 1.

The hypothesized model of the relationships among the variables of interest

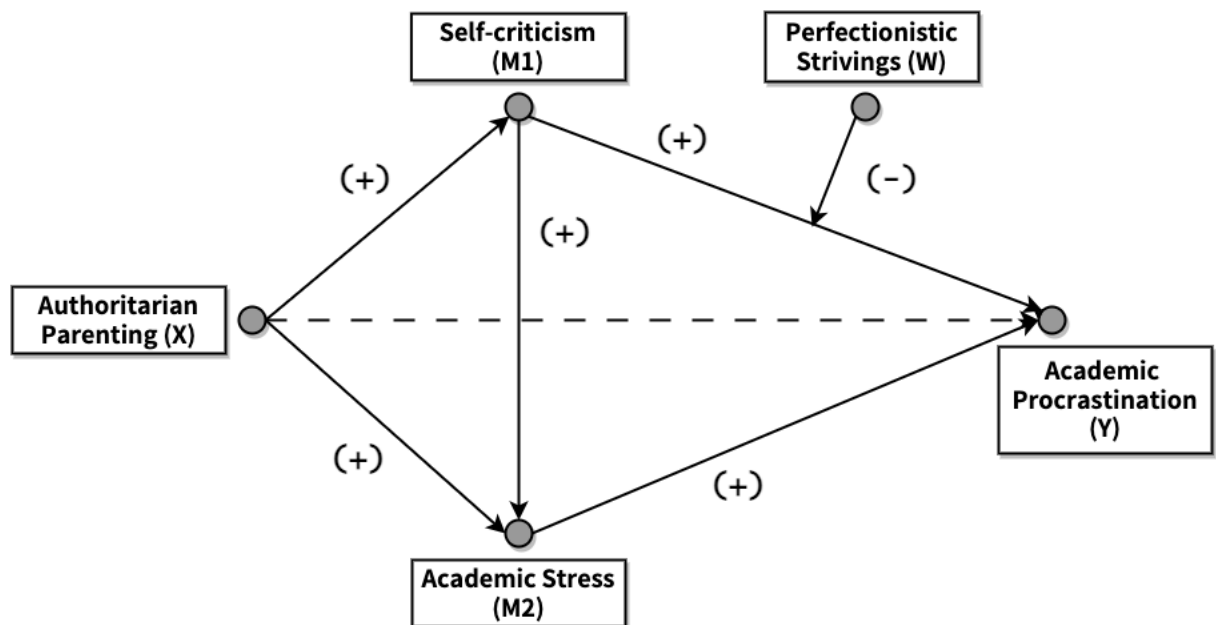


Figure 2.

Diagram for the results of mediation analysis.

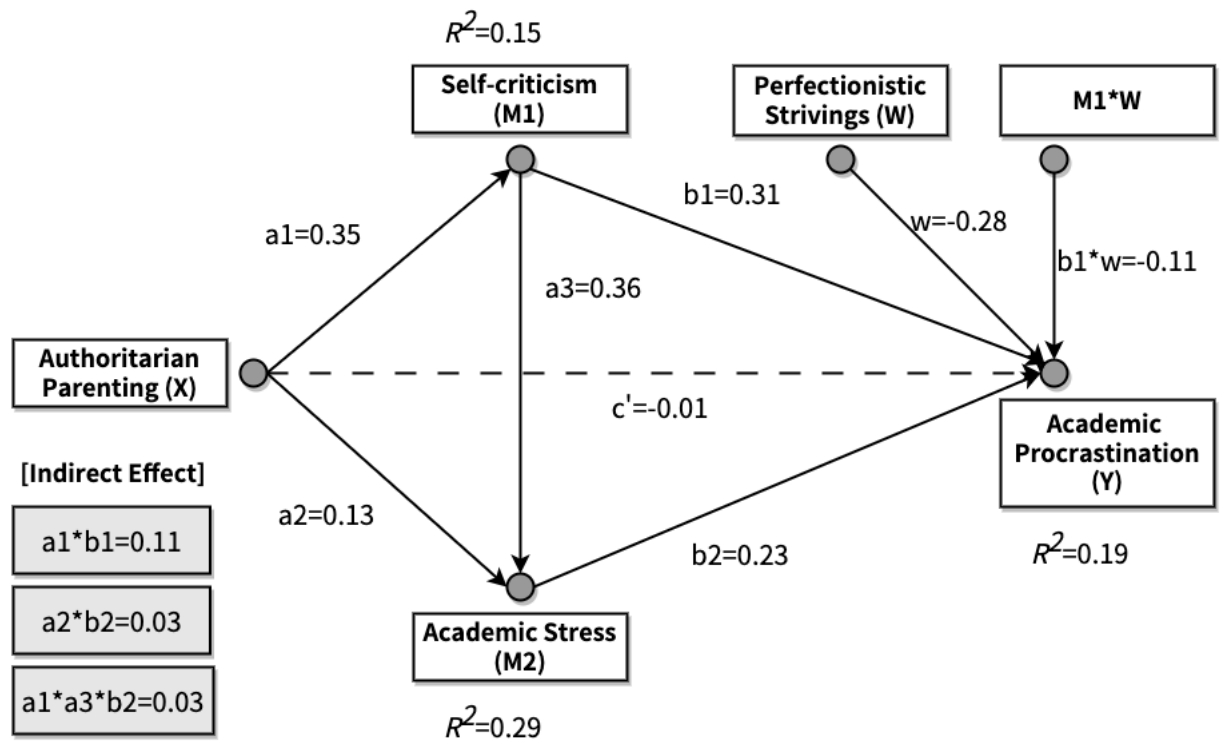
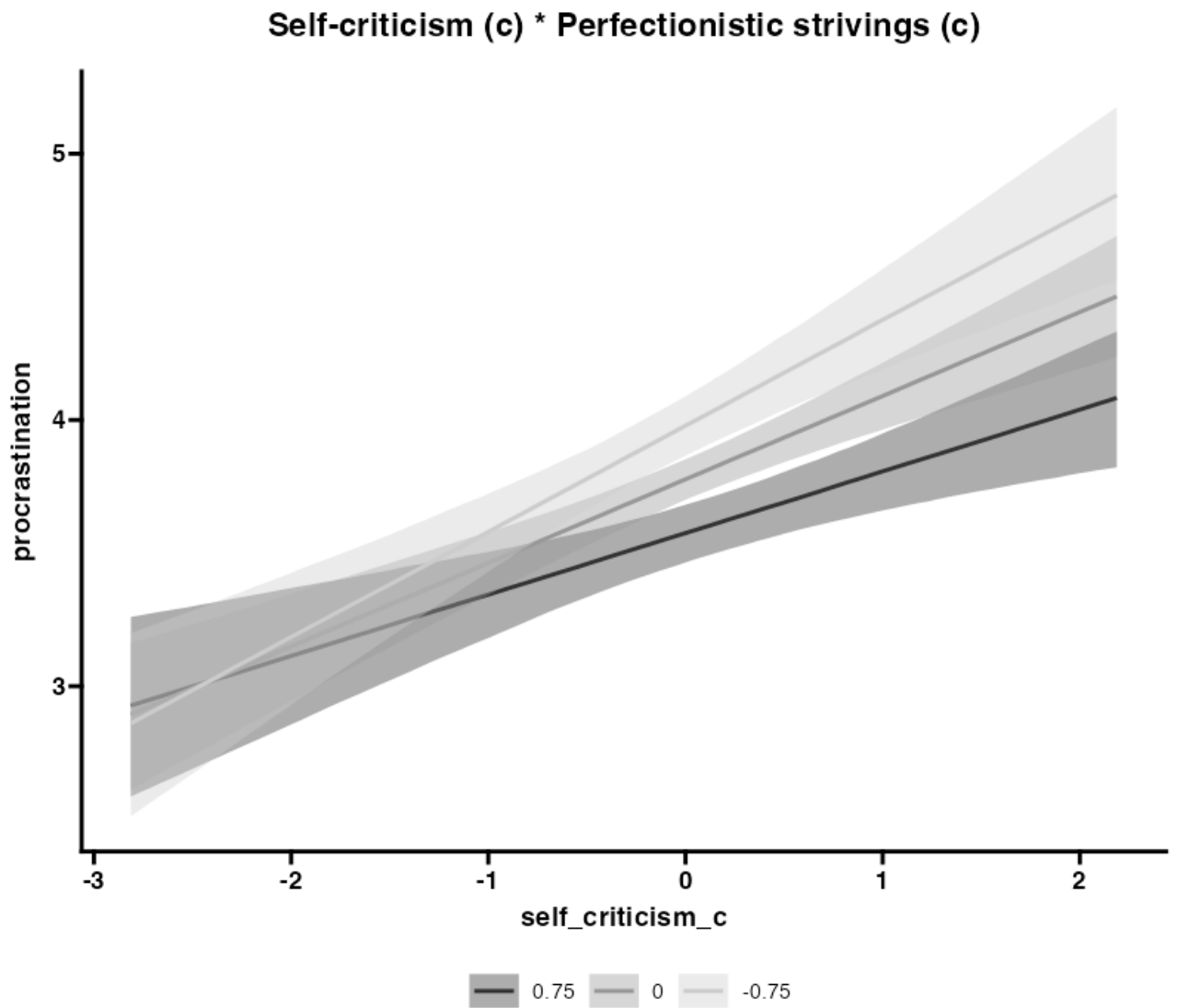


Figure 3.

The conditional effect of self-criticism (centralized) and perfectionistic strivings (centralized) on procrastination



111年度專題研究計畫成果彙整表

| | | | | | |
|--|-------|-----------------------------|----|---|-----------------------|
| 計畫主持人：施淑慎 | | 計畫編號：111-2410-H-004-082-SSS | | | |
| 計畫名稱：大學生課業延宕相關因子與自我疼惜 vs. 自我苛責之調節效應探究 | | | | | |
| 成果項目 | | 量化 | 單位 | 質化 (說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等) | |
| 國內 | 學術性論文 | 期刊論文 | 0 | 篇 | |
| | | 研討會論文 | 0 | | |
| | | 專書 | 0 | 本 | |
| | | 專書論文 | 0 | 章 | |
| | | 技術報告 | 1 | 篇 | 國科會專題研究計畫成果報告 |
| | | 其他 | 0 | 篇 | |
| 國外 | 學術性論文 | 期刊論文 | 0 | 篇 | |
| | | 研討會論文 | 0 | | |
| | | 專書 | 0 | 本 | |
| | | 專書論文 | 0 | 章 | |
| | | 技術報告 | 0 | 篇 | |
| | | 其他 | 0 | 篇 | |
| 參與計畫人力 | 本國籍 | 大專生 | 0 | 人次 | |
| | | 碩士生 | 1 | | 碩士生兼任助理協助問卷編製與調查、經費核銷 |
| | | 博士生 | 1 | | 博士生兼任助理協助問卷調查、資料收集與分析 |
| | | 博士級研究人員 | 0 | | |
| | | 專任人員 | 0 | | |
| | 非本國籍 | 大專生 | 0 | | |
| | | 碩士生 | 0 | | |
| | | 博士生 | 0 | | |
| | | 博士級研究人員 | 0 | | |
| | | 專任人員 | 0 | | |
| 其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。) | | | | | |