

**Students' motivational self-regulation, procrastination, and sociodemographic
characteristics in a Honduran academic context**

Jean-Louis Berger^a, Cristian Calderón Manuel Baca^b, Brayam Eliezer Bustillos Rodriguez^b,
David Jan^a, Sara Da Silva^a

^a PLEMOS Lab, Faculty of Education, University of Fribourg, Fribourg, Switzerland

^b Universidad José Cecilio del Valle, Tegucigalpa, Honduras

Corresponding author

Jean-Louis Berger, jean-louis.berger@unifr.ch

[PLEMOS Lab](#)

University of Fribourg, Faculty of Education, Department of Education Sciences

Rue Faucigny 2

CH - 1700 Fribourg

jean-louis.berger@unifr.ch

Statements and declarations

Consent for publication

Not applicable

Declaration of conflicting interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding statement

The authors received no financial support for the research, authorship, and/or publication of this article.

Abstract

This study examined associations between motivational self-regulation (MSR) strategies, academic procrastination, and sociodemographic characteristics among university students at a private university in Honduras. Although research on self-regulated learning (SRL) acknowledges motivation and its regulation as central, research on MSR strategies has been geographically highly concentrated, leaving such strategies understudied in non-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) countries. Using a cross-sectional survey and structural equation modeling, we analyzed direct and indirect relationships among 10 MSR strategies (e.g., mastery-goal self-talk), procrastination, and sociodemographic characteristics (age, gender, socioeconomic status, educational level, and prior academic failures) in a sample of 581 students. The results suggested that higher MSR was associated with lower procrastination. Among the sociodemographic characteristics, age showed the strongest association: Older students reported less procrastination, with evidence of an indirect association via MSR. Gender showed a modest indirect association via MSR, whereas socioeconomic status and educational level showed no significant relationships. Prior academic failures were positively associated with procrastination, without evidence of mediation via MSR. These patterns support the relevance of MSR to procrastination and underscore the relevance of sociodemographic characteristics to both MSR and procrastination, suggesting that support for SRL may benefit from attending to students' developmental stage and academic history.

Keywords: Motivational self-regulation; Academic procrastination; Self-regulated learning; Sociodemographic characteristics; University students; Non-WEIRD contexts; Honduras

Introduction

Self-regulated learning (SRL) refers to the processes by which learners activate and sustain their cognitions, emotions, and behaviors to achieve personal goals (Zimmerman & Kitsantas, 2014). Research on SRL has provided valuable insights into how students initiate, manage, and adjust their learning processes to improve efficiency and achieve their goals (Pintrich, 2003; Sitzmann & Ely, 2011; Winne, 1995; Zimmerman, 2013). SRL is not viewed as a fixed or innate capacity but as a complex competence composed of knowledge, skills, attitudes, and strategies that can be developed, assessed, and intentionally fostered through education (Boekaerts, 1997; Cassidy, 2011; Wirth & Leutner, 2008). Various areas of learning, such as cognition, motivation, and behavior, can be self-regulated. Initially, research on SRL emphasized cognitive and metacognitive strategies before broadening its scope to include the regulation of motivation and emotion (Kim et al., 2020; Wolters, 2003a). Students frequently encounter challenges, such as low self-efficacy beliefs or low perceived task value, when engaging in academic assignments. These challenges can undermine motivation, which Schwinger et al. (2009) define as “the willingness to engage and sustain a high level of effort in completing the task” (p. 622). Consequently, students must identify ways to support or enhance their motivation. Motivational self-regulation (MSR) therefore represents a central component of SRL (Pintrich, 2000; Wolters, 2003). The goal of MSR is to increase effort and persistence, ultimately contributing to improved performance.

More specifically, MSR refers to strategies aimed at maintaining engagement when motivation wanes. Strategies are procedural knowledge directed toward a goal and are deliberate, intentional, conscious, and effortful (Alexander & Judy, 1988; Weinstein et al., 2000). They are contrasted with skills, which are defined as habits of performance characterized by a high degree of automaticity and lower awareness (Alexander et al., 1998).

MSR strategies play a key role when motivation declines, as they facilitate the restoration of engagement and perseverance (Sirois & Pychyl, 2013). Recent meta-analyses and literature reviews (Cosnefroy & Berger, 2024; Fong et al., 2024; Villar et al., 2024; Trautner et al., 2025) support the fundamental role of MSR in learning across contexts and age groups. Thus, MSR strategies are not limited to situational adjustments but form part of broader frameworks linking motivational beliefs, emotions, and goal orientation to more general self-regulatory strategies (Miele & Scholer, 2018).

Procrastination can be understood as a frequent form of self-regulation failure, reflecting deficits that are both metacognitive and motivational–emotional (Wolters, 2003b; Wolters et al., 2017). Defined as the chronic tendency to postpone important tasks despite awareness of the negative consequences, procrastination is associated with lower academic performance and heightened stress levels (Steel, 2007). Understanding this phenomenon requires examining how MSR mechanisms and self-regulatory strategies interact with temporal and emotional constraints that shape behavioral investment in educational tasks (Sirois & Pychyl, 2013). Prior research suggests that interventions targeting MSR strategies and, more generally, SRL can reduce procrastination, particularly when contextual support and available resources help learners adjust their beliefs, emotions, and behavior in response to academic demands (Malouff & Schutte, 2019; Van Eerde & Klingsieck, 2018).

Motivational self-regulation strategies

Several taxonomies categorize and describe MSR strategies in relation to the targeted motivational beliefs (Cosnefroy & Berger, 2024; Miele & Scholer, 2018; Wolters, 2003a). In other words, students make an effort to control specific motivational beliefs by using MSR strategies. Accordingly, some MSR strategies aim to enhance subjective task value (interest or utility enhancement), whereas others aim to enhance self-efficacy beliefs (proximal goal setting), regulate achievement goals (mastery- and performance-goal self-talk), or regulate the

learning environment (environmental control). Berger and Cosnefroy (Berger & Cosnefroy, 2026; Cosnefroy & Berger, 2024) suggested adding *Regulation of Negative Emotions* and *Seeking Support from Others* as two strategies that can regulate motivation but are absent from the most popular taxonomies. The main MSR strategies are described below.

Goal-oriented self-talk

Goal-oriented self-talk is an MSR strategy in which students use internal or subvocalized thoughts to find reasons to persevere with academic tasks. Unlike simple self-reinforcing statements, this form of self-talk activates achievement goals, which can be performance- or mastery-oriented. Performance-oriented goals focus on achieving high grades or outperforming others, while mastery-oriented goals focus on increasing knowledge or competence. Making these goals more salient while working on a task strengthens students' commitment and sustains their effort. This process also helps students delay gratification and resist distractions by reinforcing the purpose of completing the task (Brady & Kim, 2026; Wolters, 2003a).

Self-consequating

Students can regulate their motivation by setting up self-administered rewards or punishments based on their behavior. This involves giving themselves incentives for completing tasks or imposing negative consequences for failing to meet their goals. For instance, students might reward themselves with a break after finishing a chapter or cancel plans if they do not finish their work. These strategies maintain motivation by linking effort to meaningful outcomes (Brady & Kim, 2026; Wolters, 2003a).

Subjective task value enhancement

Interest and perceived utility are two key factors that predict student engagement and perseverance (Eccles & Wigfield, 1995). Students can deliberately evoke or enhance their subjective interest in or perceived utility of a task to motivate themselves to complete it. For

example, students can make a task more enjoyable by turning it into a game or by asking themselves how the task might help them achieve their personal learning goals.

Self-efficacy belief enhancement or efficacy management

Students can regulate their motivation by actively monitoring and assessing their expectations of success and their self-efficacy beliefs regarding academic tasks. They can also deliberately adjust these factors. Since these beliefs are shaped by multiple factors, students can use various strategies to influence their sense of capability. Among the major approaches are setting proximal goals and using efficacy-focused self-talk. Through proximal goal setting, students can regulate their motivation by providing themselves with positive reinforcement or imposing negative consequences (Wolters, 2003a).

Environmental control

This strategy aims to decrease off-task behavior by reducing distractions or the intensity of distractions. It consists of modifying one's environment to support motivation. For instance, students may move to a quiet corner to read or choose a secluded spot in the library to study. Alternatively, students can control their environment directly by asking classmates to be quiet or by turning off sources of distracting noise.

Seeking support from others

Seeking support from others is a motivational and emotional self-regulated strategy in which others provide support and acknowledge the value of the learning effort previously invested (Boekaerts, 1993; Karabenick & Newman, 2006). Emotional support may emerge in group learning contexts (Järvenoja et al., 2020) as well as during individual learning when task difficulty is perceived as high (Wolters, 1998).

Regulation of negative emotions

Negative emotions, such as frustration, anxiety, and boredom, can undermine students' effort and persistence (Camacho-Morles et al., 2021). Consequently, students often need to

monitor and regulate their emotions to achieve their learning goals (Berger & Cosnefroy, 2026; Ben-Eliyahu & Linnenbrink-Garcia, 2013). Emotion regulation is recognized as a relevant strategy in Wolters' (2003) taxonomy. Wolters (1998) observed that some students attempted to manage their emotions through emotion-focused self-talk (e.g., "Don't stress"). Physiological strategies, such as slowing one's breathing, can also help regulate emotional states (Corno, 2001).

Paucity of research in new contexts/countries

Fong et al.'s (2024) meta-analysis identified 55 empirical studies on MSR. The vast majority of these studies, relied on samples of students from European countries (mostly Germany), North America, and Asia (mostly China). Few studies from other parts of the world were identified (e.g., one sample from Iran, and one sample from Brazil). Geographic region is relevant to the conclusions of the meta-analysis, as correlations between MSR and achievement were found to be higher in samples of Asian students than in samples of European students, which might be explained by differences in motivational climates (Fong et al., 2024). The systematic review conducted by Trautner et al. (2025), based on 289 studies published in English and German, confirmed the general observation that most samples (57% in total) originated from the United States, Germany, and China. The synthesis revealed that "the vast majority of studies was cross-sectional, using self-report questionnaires, and conducted in western, industrialized countries with higher education learner samples" (p. 34). The authors concluded that many regions and cultures may be underrepresented in existing research on MSR and advocated for studies with more diverse samples. Villar et al.'s (2024) synthesis was based on 64 reports. Of these, 64% were conducted in Europe (mainly Germany and Spain), 16% in Asia, 16% in the United States, 2.6% in Latin America, and 1.4% in Australia. While MSR is an increasingly studied topic internationally, geographical concentration remains high. Culture has been suggested as a potential moderator of the effects of antecedents on MSR and of its

consequences, warranting further research (Villar et al., 2024). The high geographical concentration of research revealed across these three studies shows that current conclusions are based on a limited number of cultures, which restricts their generalizability.

Sociodemographic characteristics, SRL, MSR, and procrastination

Sociodemographic characteristics emerge as factors that may modulate the use of SRL strategies and, more specifically, MSR strategies. Age, gender, educational level, and socioeconomic status are among the major sociodemographic characteristics shaping learning opportunities, motivational beliefs, and knowledge of SRL strategies (Azevedo et al., 2023; Bussey, 2011; Bussey & Bandura, 1999). These characteristics should not be viewed merely as control variables; rather, they may function as determinants that condition access to material and social resources, pedagogical support, and evaluative environments, which could thereby influence the adoption and effectiveness of MSR and SRL strategies. Building on this perspective, it is essential to examine how each of these factors contributes to variability in SRL processes and outcomes. The following sections explore age, socioeconomic status, gender, and educational trajectories as key dimensions shaping learners' SRL and motivational profiles.

Age and educational level

Age and educational level are often examined as developmental dimensions that affect the complexity of SRL processes. According to developmental models, SRL becomes more refined with age due to cognitive maturation, development of executive functions, refinement of theory of mind, and accumulation of academic experience (Hoyle & Dent, 2018; Trautner & Pinquart, 2025; Wigfield et al., 2011; Zimmerman, 2000a). In higher education, older learners often demonstrate more systematic use of planning, time management, and MSR strategies, which are typically associated with more autonomous goals and higher intrinsic motivation (Richardson et al., 2012). This developmental progression becomes particularly salient during educational transitions. The shift from secondary to higher education significantly alters the

demands placed on students' SRL competencies and capacities. Studies indicate that university students employ more metacognitive and MSR strategies than their secondary-level counterparts and that educational level co-evolves with stronger self-efficacy beliefs and more robust forms of academic motivation (Cleary & Zimmerman, 2004; Nota et al., 2004; Richardson et al., 2012).

Socioeconomic status (SES)

SES represents another critical determinant of SRL development. SES refers to an individual's or group's position within a stratified social hierarchy and is conceptualized as a multidimensional construct reflecting differential access to economic, social, and cultural resources (American Psychological Association, n.d.). SES acts as a key factor in determining access to material and social resources that support the development of SRL and MSR strategies. Research shows that students from low-SES backgrounds tend to report lower levels of SRL, notably reduced use of metacognitive strategies, and that SES moderates the impact of MSR on performance outcomes and motivational trajectories (Azevedo et al., 2023; Dong, 2024). SES also predicts self-efficacy beliefs for SRL, defined as learners' judgments of their capability to effectively regulate their cognition, motivation, and behavior in pursuit of academic goals (Pajares, 1996; Zimmerman et al., 1992), as well as motivational beliefs, following a gradient from low to high SES (Raimondi et al., 2025). Studies further indicate that targeted interventions can reduce SES-related disparities by strengthening MSR among disadvantaged learners (Dong, 2024).

Gender

According to the systematic review of MSR by Trautner et al. (2025), to date, no clear assumptions have been established regarding gender differences in MSR. This applies to both theoretical models and research on SRL strategies. However, gender has been shown to shape both the selection and implementation of SRL strategies and the tendency to procrastinate, with

female students generally reporting more frequent use of metacognitive strategies, such as planning, goal setting, self-monitoring, and controlling the learning environment, as well as less reliance on surface strategies, such as rote memorization (Bidjerano, 2005; Niemivirta, 1997; Virtanen & Nevgi, 2010; Zimmerman & Martinez-Pons, 1990). These patterns are consistent with findings that female students tend to display more adaptive motivational beliefs, such as stronger endorsement of mastery goals and more autonomous forms of motivation, which support sustained engagement and effective self-regulation of learning (Meece et al., 2006; Oga-Baldwin et al., 2017). Furthermore, meta-analytic evidence related to procrastination, which is often conceptualized as a failure of MSR, suggests that male students are, on average, more likely than female students to engage in academic procrastination (Lu et al., 2022; Steel, 2007), a difference partly attributable to lower reported use of SRL strategies and more performance- or avoidance-oriented motivational profiles. However, other studies have not found significant gender differences in the self-regulation process (Truong & Wang, 2019) or in procrastination (Fentaw et al., 2022). Another theoretical explanation for gender differences in SRL emphasizes the central role of self-efficacy beliefs (Bussey, 2011). Indeed, research has shown that, at an equal level of achievement, female students tend to report lower self-efficacy beliefs than male students (Huang, 2013; McMichael et al., 2026; Pintrich & De Groot, 1990). Because such beliefs strongly influence SRL (Zimmerman, 2000b), this could result in lower levels of SRL among female students. Thus, this theoretical account would predict lower SRL among female students, which contrasts with empirical findings indicating that female students often report greater use of adaptive SRL strategies.

Achievement and prior academic failure

The empirical evidence regarding the association between MSR and achievement is mixed. For example, Fong et al. (2024) conducted a meta-analysis that found low to moderate positive correlations. In contrast, Trautner et al. (2025) conducted a systematic review that

found a lack of regular association between MSR and achievement: 74 positive associations, 68 nonsignificant associations, and 12 negative associations. Educational trajectories marked by grade repetition or academic failure introduce additional challenges for SRL development. Such experiences may influence self-efficacy beliefs for SRL and foster negative, stable, and internal attributions, thereby reducing students' initiative to self-regulate their learning, with implications for motivational beliefs and engagement (Bandura, 1997; Weiner, 1985). Recent research suggests that such experiences may contribute to a gradual decline in motivational beliefs, highlighting the importance of early interventions to support agency and engagement among students facing academic difficulties (Robinson et al., 2022). However, this aspect—which may have a significant impact—is rarely considered a contributing factor in analyses of SRL and MSR correlates.

Aims and research questions

Despite the abundance of studies on SRL, motivation, and procrastination, the literature remains fragmented. Research on SRL tends to focus primarily on cognitive and metacognitive dimensions, leaving MSR comparatively underexplored (Dent & Koenka, 2016; Panadero, 2017). Studies on MSR strategies highlight their importance for engagement and persistence, yet they often examine these strategies in isolation without systematically integrating them with other components of SRL (Schwinger et al., 2009; Wolters, 2003a). Similarly, research on procrastination identifies it as a self-regulation difficulty but rarely incorporates MSR strategies into explanatory models (Sirois & Pychyl, 2013; Steel, 2007; see Bäumle et al., 2018, and Grunschel et al., 2016, for exceptions). Finally, sociodemographic characteristics are generally treated as covariates, although they might play a more direct role in MSR.

The present study draws on sociocognitive models of self-regulated learning, theories of motivational self-regulation, and the literature on procrastination to examine the role of MSR strategies in students' academic functioning. Specifically, it investigates whether the use of

MSR strategies varies according to students' sociodemographic characteristics, how these strategies are associated with academic procrastination (i.e., to what extent they serve as protective or risk factors in relation to procrastination), and whether they help explain the relationship between sociodemographic characteristics and procrastination.

MSR is central to sustaining engagement when tasks are perceived as challenging or dull (Wolters, 2003a). However, little attention has been given to how students' sociodemographic characteristics, such as gender, age, and socioeconomic status, influence this process. The relationship between students' sociodemographic characteristics, MSR, and procrastination remains underdescribed (Lu et al., 2022; Trautner et al., 2025). Geographic region also matters for understanding motivation and MSR (Fong et al., 2024), yet the lack of studies in non-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) countries (Henrich et al., 2010) limits the generalizability of conclusions regarding MSR, its antecedents, and its outcomes across various cultural contexts. Thus, this study examined the relationship between self-reported MSR strategies and academic procrastination in a non-WEIRD country, Honduras. Specifically:

RQ1: What is the association between sociodemographic characteristics and MSR strategies?

RQ2: What is the relationship between MSR strategies and academic procrastination among university students?

RQ3: Do MSR strategies mediate the relationship between sociodemographic characteristics and procrastination?

Method

Participants and procedure

A total of 805 students from José Cecilio del Valle University (Honduras) were invited to participate in this study. They were contacted directly through the university's messaging

service. Data were collected using an online survey. Three data-cleaning steps were subsequently applied. First, 17 duplicate responses were removed because they contained identical phone numbers. Second, 100 respondents were excluded because they completed the survey in less than 5 minutes. This time limit was used as a critical threshold, as completion times below this mark were considered insufficient for providing reliable responses to the 56 items (11 sociodemographic and 45 Likert-scale items). Third, participants who provided identical responses to at least 75% of the 40 items on the *Motivational Regulation Strategies Inventory* were excluded ($n = 107$). For example, a participant who selected the same response option for 30 or more of the 40 items was excluded.

The final sample ($n = 581$) consisted of 67% women and 33% men,¹ with a mean age of 25.20 years ($SD = 5.91$). Data indicated that 94% of the students reported low or middle socioeconomic status, compared with 6% who reported high socioeconomic status. Regarding academic level, 70% were enrolled in a bachelor's program and 30% in a master's program. Students' academic results showed a mean score of 87.74 out of 100 for both the most recent academic term and overall academic performance, although the standard deviations differed ($SD = 7.24$ and $SD = 5.36$, respectively). Regarding academic background, 20% of students indicated that they had previously failed an academic program.

Instruments

The instrument consisted of three parts: questions assessing sociodemographic characteristics, items measuring MSR strategies, and items measuring procrastination.

Sociodemographic characteristics

In the sociodemographic section, participants were asked about gender, age (year of birth), educational level (undergraduate or postgraduate), prior academic failure ("Have you

¹ One participant selected the "other" gender option; this response was coded as missing data for the statistical analyses.

ever failed a course in a previous academic program?"; answered yes or no), academic performance (two items on a scale from 0 to 100: "What was your GPA for the last academic term?" and "What is your current overall GPA on your academic transcript?"), socioeconomic status ("What is your socioeconomic status?"; 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high), and phone number. The phone number was used to uniquely identify participants and provide them with the opportunity to enter a drawing for one of four \$40 gift cards as a token of appreciation for their participation.

Motivational self-regulation strategies

A Central American Spanish translation of the 40-item *Motivational Regulation Strategies Inventory* (MRSI; Berger & Cosnefroy, 2026), assessing 10 dimensions—namely Mastery Self-Talk, Performance-Approach Self-Talk, Performance-Avoidance Self-Talk, Enhancement of Utility Value, Enhancement of Situational Interest, Proximal Goal Setting, Self-Consequating, Environmental Control, Regulation of Negative Emotions, and Seeking Support from Others (see supplemental material for the full instrument)—was used to assess how students regulate their motivation when they find themselves in situations where completing an academic task seems difficult, boring, or less appealing than other activities. Each MSR strategy was assessed with three to five items. For the *Regulation of Negative Emotions* dimension, one item was added: "I'm changing the way I understand my schoolwork to get my motivation back." The Likert-type response options ranged across six levels, from "never or almost never" to "always or almost always." The translation was conducted by the first author and a bilingual native Spanish speaker. For each dimension, a composite score was calculated by averaging the corresponding items rather than using latent factor scores. This manifest-variable approach is a well-established method for promoting model parsimony and reducing potential convergence issues in complex multivariate models containing multiple dimensions (Rose et al., 2019). Reliability information is presented in Table 1.

Procrastination

Procrastination was measured using the Spanish version of the short form of *McClosky's Academic Procrastination Scale* (APS-S), adapted by Alegre Bravo et al. (2022). The Likert-type response options ranged from “strongly disagree” to “strongly agree.” The original scale consisted of five items, but one item was removed due to its low correlation with the other four items. This item was formulated in the absence of procrastination (“I get to work right away, even on tasks I find unpleasant”), whereas the other items were formulated to assess a tendency to procrastinate (e.g., “I put off starting things I don’t like to do”). Reliability analysis of the resulting four-item scale indicated satisfactory internal consistency (Cronbach’s $\alpha = .786$).

Data analysis procedure

To examine the relationships among MSR, procrastination, and sociodemographic characteristics, we adopted a quantitative approach based on mediation analyses (MacKinnon, 2008) implemented using structural equation modeling (Mulaik, 2009). The variables were treated as continuous (Robitzsch, 2020). Analyses were conducted using Mplus 8.3 with the maximum likelihood estimation and robust standard errors.

Results

Table 1 provides a description of the MRSI scores. Two models were tested to address the research questions. The first model examined sociodemographic characteristics as predictors of MSR strategies. The second model extended the first by adding procrastination to examine whether MSR strategies mediated the relationship between sociodemographic characteristics and procrastination.

Model 1: Relationships between motivational self-regulation strategies and sociodemographic characteristics

The first model, shown in Fig. 1, examined the relationships between sociodemographic characteristics and MSR strategies. All 10 MSR strategies were included in the model. The

model fit indices were adequate. Socioeconomic status was not significantly associated with any MSR strategy. No notable effects of prior academic failure or educational level on MSR strategies were observed. *Seeking Support from Others*, *Enhancement of Situational Interest*, and *Self-Consequating* were not significantly associated with any of the sociodemographic characteristics.

Age was positively associated with several MSR strategies: *Performance-Approach Self-Talk* ($\beta = .170, p < .001$), *Enhancement of Utility Value* ($\beta = .194, p < .001$), *Environmental Control* ($\beta = .083, p < .001$), and *Proximal Goal Setting* ($\beta = .073, p < .001$), indicating that older students reported greater use of these strategies than younger students. Conversely, age was negatively associated with *Performance-Avoidance Self-Talk* ($\beta = -.124, p < .01$). Gender was positively associated with several MSR strategies, notably *Environmental Control* ($\beta = .146, p < .001$), indicating that female students reported greater use of this strategy than male students. Gender was also associated with *Proximal Goal Setting* ($\beta = .073, p < .05$). The overall academic index was positively associated with *Proximal Goal Setting* ($\beta = .104, p < .001$).

Model 2: Structural relationships among sociodemographic characteristics, motivational self-regulation, and procrastination

The second model, shown in Fig. 2, was designed to examine the extent to which MSR strategies were associated with students' procrastination and whether MSR strategies mediated the relationship between sociodemographic characteristics and procrastination. Structural equation modeling incorporated the variables from the previous model, including the MSR mean scores and their covariances, along with the sociodemographic characteristics and the procrastination factor. The fit indices indicated good overall model fit: $\chi^2(44) = 70.498; p < .01$. The model fit indices met conventional thresholds (CFI = 0.991; TLI = 0.969), suggesting that the model adequately represented the observed data structure (Hu & Bentler, 1999). Residual-

based indices also supported good model fit: RMSEA = .032 indicated a close fit, and SRMR = .021 was well below the commonly recommended cut-off of .08 (Kline, 2016).

Students' SES and educational level were not significantly associated with either MSR strategies or procrastination. Five MSR strategies were significantly associated with procrastination: Negative associations were observed for *Mastery Self-Talk* ($\beta = -.245, p < .001$), *Environmental Control* ($\beta = -.137, p < .05$), and *Enhancement of Situational Interest* ($\beta = -.130, p < .05$), indicating that greater use of these strategies was associated with lower levels of procrastination. Conversely, positive associations were observed between procrastination and *Performance-Avoidance Self-Talk* ($\beta = .198, p < .001$) and *Self-Consequating* ($\beta = .116, p < .05$), indicating that greater use of these strategies was associated with higher levels of procrastination.

Procrastination was directly and negatively predicted by age ($\beta = -.165, p < .01$), indicating that older students reported lower levels of procrastination. Conversely, prior academic failure was directly and positively associated with procrastination ($\beta = .114, p < .01$), suggesting that students with a history of academic failure reported higher levels of procrastination. In addition to these direct effects of sociodemographic characteristics, several statistically significant indirect effects were observed, as summarized in Table 2.

Table 2 presents the direct and indirect (mediation) effects of each sociodemographic characteristic on procrastination (Cheong & MacKinnon, 2012). Age had the largest total effect on procrastination, with a total effect of $\beta = -.298 (p < .001)$, indicating that older students reported significantly lower levels of procrastination. Specifically, age showed both a significant direct effect on procrastination ($\beta = -.165; p < .001$) and two significant negative indirect effects through *Mastery Self-Talk* and *Performance-Avoidance Self-Talk*. Except for a small but significant indirect effect through *Mastery Self-Talk* ($\beta = -.026; p < .05$), gender had no significant direct, indirect, or total effect on procrastination. Prior academic failure showed

a direct effect ($\beta = .114$ $p < .01$), a significant total effect ($\beta = .154$; $p < .01$), and a significant indirect effect ($\beta = .039$; $p < .05$). This pattern indicates that the association between prior academic failure and procrastination was primarily direct, with only limited indirect association through MSR strategies.

Discussion

Based on the observation that few studies have investigated how MSR strategies relate to students' sociodemographic characteristics, despite various theoretical arguments supporting such relationships, the present study aimed to analyze direct and indirect relationships among 10 MSR strategies, procrastination, and sociodemographic characteristics in a sample of 581 students using a cross-sectional survey and structural equation modeling. In addition, this study aimed to extend the research to an underinvestigated context, namely Honduras.

Association between sociodemographic characteristics and MSR strategies

Two sociodemographic characteristics, namely gender and age, were found to be associated with multiple MSR strategies. Female students reported using MSR strategies more frequently than male students, more precisely *Mastery Self-Talk*, *Performance-Approach Self-Talk*, *Enhancement of Utility Value*, *Environmental Control*, and *Regulation of Negative Emotions*. All effect sizes were small. These results corroborate prior research on SRL, showing that female students tend to regulate their learning more actively (Bidjerano, 2005; Niemivirta, 1997; Virtanen & Nevgi, 2010; Zimmerman & Martinez-Pons, 1990). They are also consistent with studies indicating lower levels of procrastination among female students (Lu et al., 2022; Steel, 2007), a pattern that may partly reflect the greater use of MSR strategies. Furthermore, the findings reveal that gender differences do not affect all MSR strategies equally. For example, female students reported higher levels of environmental control, whereas no gender difference emerged for *Seeking Support from Others*. This pattern suggests that gender is associated with specific components of MSR rather than with a global tendency to self-regulate motivation.

Age was positively related to four of the 10 MSR strategies (*Performance-Approach Self-Talk*, *Enhancement of Utility Value*, *Environmental Control*, and *Proximal Goal Setting*) and negatively related to *Performance-Avoidance Self-Talk*. These results suggest a more adaptive MSR profile among older students, although the effect sizes remained small. Such findings are consistent with developmental perspectives on SRL, which assume that students progressively acquire more sophisticated self-regulatory competencies through experience, cognitive maturation, and exposure to academic demands (Hoyle & Dent, 2018; Zimmerman, 2000). Older students may have accumulated more opportunities to learn how to sustain motivation during periods of difficulty and may have developed stronger connections between present academic activities and long-term educational goals. Particularly noteworthy is the negative relationship between age and performance-avoidance self-talk. Given the generally negative consequences associated with avoidance-oriented goals, including anxiety, maladaptive coping, and procrastination, the reduced reliance on such self-talk among older students may reflect a more mature and adaptive motivational orientation.

Prior academic failure, educational level, and SES were not significantly associated with MSR strategies. This finding deserves attention because previous theoretical and empirical work has suggested that these characteristics could influence students' opportunities to develop self-regulatory competencies. The absence of a significant SES effect contrasts with studies indicating lower levels of SRL and lower motivational beliefs (e.g., lower self-efficacy beliefs) among students from disadvantaged backgrounds (Azevedo et al., 2023; Dong, 2024; Raimondi et al., 2025). One explanation is the relatively limited variability in SES within the present sample, where most participants were identified as belonging to low- or medium-SES groups. Moreover, the use of a single self-report indicator may not have captured the multidimensional nature of SES, which encompasses economic, social, and cultural resources.

Similarly, educational level was not significantly associated with MSR strategies. Although SRL theories frequently assume that students in more advanced educational programs should display stronger regulatory competencies, the distinction between undergraduate and postgraduate status may not adequately reflect the developmental mechanisms involved. Age and accumulated academic experience may represent more meaningful indicators of developmental progression than educational level considered independently.

Finally, prior academic failure was unrelated to MSR, despite theoretical arguments linking failure experiences to self-regulatory difficulties. This result suggests that previous academic setbacks may not substantially modify the strategies students report using to regulate motivation. Instead, failure may exert its influence through other mechanisms, such as reduced self-efficacy, more negative attributions, increased anxiety, or heightened avoidance tendencies. Together, these findings indicate that sociodemographic characteristics do not influence all dimensions of MSR equally and that their effects may often operate indirectly through more proximal psychological factors.

Enhancement of Situational Interest, Self-Consequating, and Seeking Support from Others were not significantly associated with any of the sociodemographic characteristics considered in the present study. This finding suggests that these strategies may depend more strongly on motivational beliefs, personality characteristics, learning contexts, or metamotivational knowledge than on demographic factors.

Relationship between MSR strategies and academic procrastination among university students

The results showed that the three MSR strategies were negatively predictive of procrastination, suggesting that higher levels of MSR are associated with a lower tendency to procrastinate. Although the effect sizes were small to moderate, these findings are consistent with previous research conducted in various contexts (Berger et al., submitted; Berger, 2021;

Berger & Cosnefroy, 2026; Grunschel et al., 2016) and extend these findings to a Honduran university context. Accordingly, the relevance of MSR does not appear to be limited to North American or European settings but may also characterize students' academic functioning in the present context.

Among the strategies examined, *Mastery Self-Talk* displayed the strongest negative association with procrastination. This finding is theoretically meaningful because *Mastery Self-Talk* emphasizes learning, competence development, and personal improvement rather than external evaluation. By directing attention toward growth and learning goals, students may become better able to maintain effort despite temporary difficulties, boredom, or uncertainty. Such a mechanism is consistent with SRL models emphasizing mastery goals as a foundation for persistence and adaptive engagement.

Environmental Control and *Enhancement of Situational Interest* also negatively predicted procrastination. These strategies appear particularly relevant because they directly address two common antecedents of procrastination: distracting environments and low task attractiveness. Students who actively structure their learning environments or make tasks more interesting may be better equipped to sustain engagement and initiate action despite motivational challenges.

In contrast, *Self-Consequating* and *Performance-Avoidance Self-Talk* were positively associated with procrastination. These findings suggest either that these strategies are comparatively ineffective in reducing procrastination or that they are used more frequently by students who already struggle with delaying their work. In particular, *Performance-Avoidance Self-Talk* involves focusing on avoiding failure, embarrassment, or negative evaluation. Such concerns may increase anxiety and avoidance tendencies, thereby reinforcing procrastination rather than reducing it. Similarly, *Self-Consequating* may sometimes reflect attempts to compensate for existing motivational difficulties instead of serving as an effective preventive

strategy. Taken together, the findings suggest that not all MSR strategies contribute equally to reducing procrastination and that considering a global MSR score may obscure important qualitative differences among strategies.

How MSR strategies mediate the relationship between sociodemographic characteristics and academic procrastination

The results revealed that MSR strategies significantly mediated the relationships between students' sociodemographic characteristics and procrastination. This finding supports previous research indicating that MSR strategies represent an important mechanism through which students maintain engagement and may reduce procrastination (Berger, 2021; Berger & Cosnefroy, 2026; Berger, in preparation; Grunschel et al., 2016).

Age emerged as the most influential sociodemographic characteristic. Older students not only reported lower levels of procrastination directly but also displayed more adaptive MSR profiles that were associated with further reductions in procrastination. In particular, the indirect effects of *Mastery Self-Talk* and *Performance-Avoidance Self-Talk* suggest that developmental differences in motivation may contribute to age-related differences in procrastination. These results are consistent with the view that SRL becomes progressively refined through academic experience (Dent & Koenka, 2016; Roebbers, 2017).

In contrast, gender played only a modest role in the model. Although female students reported slightly more adaptive MSR patterns, the corresponding indirect effects on procrastination were small. This finding suggests that gender differences in procrastination may be partially attributable to differences in MSR, but that other mechanisms are likely to contribute as well. While these results are consistent with earlier research on cognitive self-regulation (Niemi-virta, 1997; Zimmerman & Martinez-Pons, 1990), the MSR literature still lacks theoretically grounded explanations for gender differences (Trautner et al., 2025).

Prior academic failure emerged as a significant direct predictor of procrastination. This finding differs from the dominant literature, which often approaches failure through subjective perceptions, such as fear of failure. Whereas previous research has emphasized anticipated failure and failure-related anxiety (Steel, 2007; Duru et al., 2024), the present study instead used a retrospective self-report of prior academic failure. The results suggest that students who have experienced academic failure may remain vulnerable to procrastination, even when they report using MSR strategies at levels similar to those of their peers. Such a pattern may reflect persistent effects on self-confidence, attributional processes, or emotional responses to academic demands.

Research in Non-WEIRD contexts

Beyond the Honduran context, these findings are particularly relevant because they originate from a non-WEIRD country. As highlighted in the Introduction, research on MSR remains geographically concentrated in North America, Europe, and a limited number of Asian countries (Fong et al., 2024; Trautner et al., 2025; Villar et al., 2024). Consequently, many prevailing conclusions about motivation, self-regulation, and procrastination are based on a relatively restricted range of cultural and educational contexts.

The present findings contribute to addressing this gap by demonstrating that several relationships previously observed in predominantly WEIRD samples also emerge among Honduran university students. In particular, the negative associations between adaptive MSR strategies and procrastination, the importance of mastery-oriented regulation, and the developmental advantage observed among older students are consistent with established theoretical expectations. These similarities suggest that some key MSR mechanisms may extend across different educational contexts.

At the same time, the findings should not be interpreted as evidence that motivational processes are universally identical. Motivation develops within specific social, cultural, and

institutional environments, and the meanings attached to effort, achievement, and academic success may vary across contexts (Green et al., 2023). For example, in contexts where higher education is strongly associated with social mobility and economic advancement, students may attribute particularly high utility value to their studies. Such contextual influences may affect both the frequency and effectiveness of particular MSR strategies.

More broadly, extending educational psychology research to underrepresented regions serves two complementary objectives. First, it allows researchers to evaluate the generalizability of existing theories. Second, it makes it possible to identify contextual influences that remain largely invisible when evidence is derived from a small number of countries. The present study therefore contributes to broadening the empirical foundations of research on MSR and procrastination and highlights the value of future comparative studies across diverse cultural settings.

Study limitations and future research

The study's cross-sectional design limits causal inferences. The models tested were based on theoretically informed assumptions regarding the relationships among the variables, but longitudinal and experimental studies are necessary to establish directionality and causal relationships more convincingly. In addition, despite an adequate sample size, the data were collected within a single university, limiting the generalizability of the results. Future studies involving multiple institutions across WEIRD and non-WEIRD countries would allow stronger conclusions regarding the robustness and cross-cultural generalizability of the observed relationships.

Implications for research and practice

The findings support the relevance of MSR for understanding students' procrastination tendencies in a Honduran university context. Age emerged as the strongest explanatory factor, whereas gender played a relatively modest role. These results suggest the potential value of

age-sensitive interventions that support the development of adaptive MSR strategies, particularly among younger students. The findings also highlight the potential importance of targeted support for students with prior experiences of academic failure. More broadly, interventions designed to strengthen mastery-oriented self-talk, environmental control, and the enhancement of situational interest may represent promising avenues for reducing academic procrastination and fostering sustained engagement in higher education.

References

- Alegre Bravo, A. A., Benavente Dongo, D., & Guevara Rabanal, D. (2022). Adaptación lingüística y validación de la Escala de Procrastinación Académica – versión reducida (APS-S) [Linguistic adaptation and validation of the Academic Procrastination Scale – short version (APS-S)]. *Propósitos y Representaciones*, 10(3), Article e1708. <https://doi.org/10.20511/pyr2022.v10n3.1708>
- Alexander, P. A., Graham, S., & Harris, K. R. (1998). A perspective on strategy research: Progress and prospects. *Educational Psychology Review*, 10(2), 129–154. <https://doi.org/10.1023/A:1022185502996>
- Alexander, P. A., & Judy, J. E. (1988). The interaction of domain-specific and strategic knowledge in academic performance. *Review of Educational Research*, 58(4), 375–404. <https://doi.org/10.3102/00346543058004375>
- American Psychological Association. (n. d.). *Socioeconomic status*. <https://www.apa.org/topics/socioeconomic-status>
- Azevedo, R., Rosário, P., Magalhães, P., Núñez, J. C., Pereira, B., & Pereira, A. (2023). A tool-kit to help students from low socioeconomic status background: A school-based self-regulated learning intervention. *European Journal of Psychology of Education*, 38(2), 495–518. <https://doi.org/10.1007/s10212-022-00607-y>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Bäulke, L., Eckerlein, N., & Dresel, M. (2018). Interrelations between motivational regulation, procrastination and college dropout intentions. *Unterrichtswissenschaft*, 46(4), 461–479.
- Ben-Eliyahu, A., & Linnenbrink-Garcia, L. (2013). Extending self-regulated learning to include self-regulated emotion strategies. *Motivation and Emotion*, 37(3), 558–573. <https://doi.org/10.1007/s11031-012-9332-3>

- Berger J.-L. (2021). Motivation à apprendre, autorégulation motivationnelle et procrastination à l'adolescence *Revue française de pédagogie*, 210, 19-36. <https://doi.org/10.4000/rfp.10033>
- Berger, J.-L., & Cosnefroy, L. (2026). Development and validity evidence of the Motivational Regulation Strategies Inventory (MRSI). *Journal of Psychoeducational Assessment*. OnlineFirst. <https://doi.org/10.1177/07342829261447334>
- Berger, J.-L., Pfeiffer, J., Charrière, M., Buerki, M., & Shafii, R. (submitted). *Motivational self-regulation mediates the relationship between motivational beliefs and procrastination*.
- Bidjerano, T. (2005, October). *Gender differences in self-regulated learning* [Communication]. 36th Annual Meeting of the Northeastern Educational Research Association, Kerhonkson, NY, États-Unis.
- Boekaerts, M. (1993). Being concerned with well-being and with learning. *Educational Psychologist*, 28(2), 149–167. https://doi.org/10.1207/s15326985ep2802_4
- Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and Instruction*, 7(2), 161–186. [https://doi.org/10.1016/S0959-4752\(96\)00015-1](https://doi.org/10.1016/S0959-4752(96)00015-1)
- Brady, A. C., & Kim, Y. E. (2026). The importance of motivation regulation: Achieving success through academic delay of gratification. *New Directions for Teaching and Learning*, 1(185), 53–58. <https://doi.org/10.1002/tl.70010>
- Bussey, K. (2011). The influence of gender on students' self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 426–441). Routledge/Taylor & Francis Group.
- Bussey, K., & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychological Review*, 106(4), 676–713. <https://doi.org/10.1037/0033-295X.106.4.676>

- Camacho-Morles, J., Slemp, G. R., Pekrun, R., Loderer, K., Hou, H., & Oades, L. G. (2021). Activity achievement emotions and academic performance: A meta-analysis. *Educational Psychology Review*, 33(3), 1051–1095. <https://doi.org/10.1007/s10648-020-09585-3>
- Cassidy, S. (2011). Self-regulated learning in higher education: Identifying key component processes. *Studies in Higher Education*, 36(8), 989–1000. <https://doi.org/10.1080/03075079.2010.503269>
- Cheong, J., & MacKinnon, D. P. (2012). Mediation/indirect effects in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 417–435). Guilford Press.
- Cleary, T. J., & Zimmerman, B. J. (2004). Self-regulation empowerment program: A school-based program to enhance self-regulated and self-motivated cycles of student learning. *Psychology in the Schools*, 41(5), 537–550. <https://doi.org/10.1002/pits.10177>
- Corno, L. (2001). Volitional aspects of self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed., pp. 191–225). Lawrence Erlbaum.
- Cosnefroy, L. & Berger, J.-L. (2024). Autoréguler sa motivation : état des lieux d’un champ de recherche en développement. *Revue française de pédagogie*, 225, 115-160. <https://doi.org/10.4000/1453f>
- Dent, A. L., & Koenka, A. C. (2016). The relation between self-regulated learning and academic achievement across childhood and adolescence: A meta-analysis. *Educational Psychology Review*, 28(3), 425–474. <https://doi.org/10.1007/s10648-015-9320-8>
- Dong, L. (2024). Examining the relationship between socioeconomic status, self-regulated learning strategies, and writing proficiency in English as a second language learning

- context. *Journal of Educational Psychology*, 116(5), 686–702.
<https://doi.org/10.1037/edu0000834>
- Duru, E., Balkis, M., & Duru, S. (2024). Fear of failure and academic satisfaction: The mediating role of emotion regulation difficulties and procrastination. *European Journal of Psychology of Education*, 39(3), 2901–2914. <https://doi.org/10.1007/s10212-024-00868-9>
- Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Personality and Social Psychology Bulletin*, 21(3), 215–225. <https://doi.org/10.1177/0146167295213003>
- Fentaw, Y., Moges, B. T., & Ismail, S. M. (2022). Academic procrastination behavior among public university students. *Education Research International*, 1(1), Article 1277866. <https://doi.org/10.1155/2022/1277866>
- Fong, C. J., Altan, S., Gonzales, C., Kirmizi, M., Adelugba, S. F., & Kim, Y. (2024). Stay motivated and carry on: A meta-analytic investigation of motivational regulation strategies and academic achievement, motivation, and self-regulation correlates. *Journal of Educational Psychology*, 116(6), 997–1018. <https://doi.org/10.1037/edu0000886>
- Green, B. P., Gray, D. L., Hope, E. C., & Matthews, J. S. (2023). Can we really say that motivational processes are universal across cultures and contexts? In M. Bong, J. Reeve, & S. Kim (Eds.), *Motivation science: Controversies and insights* (pp. 88–93). Oxford University Press. <https://doi.org/10.1093/oso/9780197662359.003.0015>
- Grunschel, C., Schwinger, M., Steinmayr, R., & Fries, S. (2016). Effects of using motivational regulation strategies on students' academic procrastination, academic performance, and well-being. *Learning and Individual Differences*, 49, 162–170. <https://doi.org/10.1016/j.lindif.2016.06.008>

- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *The Behavioral and Brain Sciences*, 33(2–3), 61–135. <https://doi.org/10.1017/S0140525X0999152X>
- Hoyle, R. H., & Dent, A. L. (2018). Developmental trajectories of skills and abilities relevant for self-regulation of learning and performance. In D. H. Schunk & J. A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (2nd ed., pp. 49–63). Routledge.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Huang, C. (2013). Gender differences in academic self-efficacy: A meta-analysis. *European Journal of Psychology of Education*, 28(1), 1–35. <https://doi.org/10.1007/s10212-011-0097-y>
- Järvenoja, H., Malmberg, J., Törmänen, T., Mänty, K., Haataja, E., Ahola, S., & Järvelä, S. (2020). A collaborative learning design for promoting and analyzing adaptive motivation and emotion regulation in the science classroom. *Frontiers in Education*, 5, Article 111. <https://doi.org/10.3389/feduc.2020.00111>
- Karabenick, S. A., & Newman, R. S. (Eds.). (2006). *Help seeking in academic settings: Goals, groups, and contexts*. Lawrence Erlbaum.
- Kim, Y., Brady, A. C., & Wolters, C. A. (2020). College students' regulation of cognition, motivation, behavior, and context: Distinct or overlapping processes? *Learning and Individual Differences*, 80, Article 101872. <https://doi.org/10.1016/j.lindif.2020.101872>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

- Lu, D., He, Y., & Tan, Y. (2022). Gender, socioeconomic status, cultural differences, education, family size and procrastination: A sociodemographic meta-analysis. *Frontiers in Psychology*, 12, Article 719425. <https://doi.org/10.3389/fpsyg.2021.719425>
- MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Lawrence Erlbaum.
- Malouff, J. M., & Schutte, N. S. (2019). The efficacy of interventions aimed at reducing procrastination: A meta-analysis of randomized controlled trials. *Journal of Counseling & Development*, 97(2), 117–127. <https://doi.org/10.1002/jcad.12243>
- McMichael, S. L., West, S. G., & Kwan, V. S. Y. (2026). The enduring gender gap in STEM : A meta-analysis of gender differences in self-efficacy in STEM fields. *Behavioral Sciences*, 16(1), Article 141. <https://doi.org/10.3390/bs16010141>
- Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology*, 57(1), 487–503. <https://doi.org/10.1146/annurev.psych.56.091103.070258>
- Miele, D. B., & Scholer, A. A. (2018). The role of metamotivational monitoring in motivation regulation. *Educational Psychologist*, 53(1), 1–21. <https://doi.org/10.1080/00461520.2017.1371601>
- Mulaik, S. A. (2009). *Linear causal modeling with structural equations*. Chapman & Hall/CRC.
- Niemivirta, M. (1997, March). *Gender differences in motivational-cognitive patterns of self-regulated learning* [Communication]. Annual Meeting of the American Educational Research Association, Chicago, IL, United-States.
- Nota, L., Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: A longitudinal study. *International Journal of Educational Research*, 41(3), 198–215. <https://doi.org/10.1016/j.ijer.2005.07.001>
- Oga-Baldwin, W. L. Q., Nakata, Y., Parker, P., & Ryan, R. M. (2017). Motivating young language learners: A longitudinal model of self-determined motivation in elementary

- school foreign language classes. *Contemporary Educational Psychology*, 49, 140–150.
<https://doi.org/10.1016/j.cedpsych.2017.01.010>
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543–578. <https://doi.org/10.3102/00346543066004543>
- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, 8, Article 422.
<https://doi.org/10.3389/fpsyg.2017.00422>
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50043-3>
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–686.
<https://doi.org/10.1037/0022-0663.95.4.667>
- Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33–40.
<https://doi.org/10.1037/0022-0663.82.1.33>
- Raimondi, G., Manganelli, S., Cavicchiolo, E., Zacchilli, M., Palombi, T., Chirico, A., Lucidi, F., & Alivernini, F. (2025). Exploring academic self-efficacy for self-regulated learning: The role of socioeconomic status, immigrant background, and biological sex. *Psychology in the Schools*, 62(6), 1862–1871. <https://doi.org/10.1002/pits.23439>
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353–387. <https://doi.org/10.1037/a0026838>
- Robinson, K. A., Lee, S. Y., Friedman, S., Christiaans, E., McKeague, M., Pavelka, L., & Sirjoosingh, P. (2022). “You know what, I can do this” : Heterogeneous joint trajectories

- of expectancy for success and attainment value in chemistry. *Contemporary Educational Psychology*, 69, Article 102055. <https://doi.org/10.1016/j.cedpsych.2022.102055>
- Robitzsch, A. (2020). Why ordinal variables can (almost) always be treated as continuous variables: Clarifying assumptions of robust continuous and ordinal factor analysis estimation methods. *Frontiers in Education*, 5, Article 589965. <https://doi.org/10.3389/feduc.2020.589965>
- Roebers, C. M. (2017). Executive function and metacognition: Towards a unifying framework of cognitive self-regulation. *Developmental Review*, 45, 31–51. <https://doi.org/10.1016/j.dr.2017.04.001>
- Rose, N., Wagner, W., Mayer, A., & Nagengast, B. (2019). Model-based manifest and latent composite scores in structural equation models. *Collabra: Psychology*, 5(1), Article 9. <https://doi.org/10.1525/collabra.143>
- Schwinger, M., Steinmayr, R., & Spinath, B. (2009). How do motivational regulation strategies affect achievement: Mediated by effort management and moderated by intelligence. *Learning and Individual Differences*, 19(4), 621–627. <https://doi.org/10.1016/j.lindif.2009.08.006>
- Sirois, F., & Pychyl, T. (2013). Procrastination and the priority of short-term mood regulation: Consequences for future self. *Social and Personality Psychology Compass*, 7(2), 115–127. <https://doi.org/10.1111/spc3.12011>
- Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin*, 137(3), 421–442. <https://doi.org/10.1037/a0022777>

- Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, 133(1), 65–94.
<https://doi.org/10.1037/0033-2909.133.1.65>
- Trautner, M., Grunschel, C., & Schwinger, M. (2025). Motivating motivation regulation research: An evidence and gap map approach. *Educational Psychology Review*, 37(2), Article 44. <https://doi.org/10.1007/s10648-025-10019-1>
- Trautner, M., & Pinquart, M. (2025). Development of motivational self-regulation in childhood: An integrative review. *Frontiers in Psychology*, 16, Article 1533625.
<https://doi.org/10.3389/fpsyg.2025.1533625>
- Truong, T. N., & Wang, C. (2019). Understanding Vietnamese college students' self-efficacy beliefs in learning English as a foreign language. *System*, 84, 123–132.
<https://doi.org/10.1016/j.system.2019.06.007>
- van Eerde, W., & Klingsieck, K. B. (2018). Overcoming procrastination? A meta-analysis of intervention studies. *Educational Research Review*, 25, 73–85.
<https://doi.org/10.1016/j.edurev.2018.09.002>
- Villar, E., Mayo, M. E., Martínez-López, Z., & Tinajero, C. (2024). What are the principal and most effective strategies for motivational self-regulation? A systematic review and meta-analyses. *Learning and Individual Differences*, 113, Article 102480.
<https://doi.org/10.1016/j.lindif.2024.102480>
- Virtanen, P., & Nevgi, A. (2010). Disciplinary and gender differences among higher education students in self-regulated learning strategies. *Educational Psychology*, 30(3), 323–347.
<https://doi.org/10.1080/01443411003606391>
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548–573. <https://doi.org/10.1037/0033-295X.92.4.548>

- Weinstein, C. E., Husman, J., & Dierking, D. R. (2000). Self-regulation interventions with a focus on learning strategies. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 727–747). Academic Press.
- Wigfield, A., Klauda, S. L., & Cambria, J. (2011). Influences on the development of academic self-regulatory processes. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 33–48). Routledge.
- Winne, P. H. (1995). Inherent details in self-regulated learning. *Educational Psychologist*, 30(4), 173–187. https://doi.org/10.1207/s15326985ep3004_2
- Wirth, J., & Leutner, D. (2008). Self-regulated learning as a competence: Implications of theoretical models for assessment methods. *Zeitschrift für Psychologie/Journal of Psychology*, 216(2), 102–110. <https://doi.org/10.1027/0044-3409.216.2.102>
- Wolters, C. A. (1998). Self-regulated learning and college students' regulation of motivation. *Journal of Educational Psychology*, 90(2), 224–235. <https://doi.org/10.1037/0022-0663.90.2.224>
- Wolters, C. A. (2003a). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist*, 38(4), 189–205. https://doi.org/10.1207/S15326985EP3804_1
- Wolters, C. A. (2003b). Understanding procrastination from a self-regulated learning perspective. *Journal of Educational Psychology*, 95(1), 179–187. <https://doi.org/10.1037/0022-0663.95.1.179>
- Wolters, C. A., Won, S., & Hussain, M. (2017). Examining the relations of time management and procrastination within a model of self-regulated learning. *Metacognition and Learning*, 12(3), 381–399. <https://doi.org/10.1007/s11409-017-9174-1>

- Zimmerman, B. J. (2000a). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50031-7>
- Zimmerman, B. J. (2000b). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91. <https://doi.org/10.1006/ceps.1999.1016>
- Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychologist*, 48(3), 135–147. <https://doi.org/10.1080/00461520.2013.794676>
- Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3), 663–676. <https://doi.org/10.3102/00028312029003663>
- Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary Educational Psychology*, 39(2), 145–155. <https://doi.org/10.1016/j.cedpsych.2014.03.004>
- Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology*, 82(1), 51–59. <https://doi.org/10.1037/0022-0663.82.1.51>

Table 1

Description of the MRSI scores.

MSR strategy	# items	M	SD	Cronbach's α	Sample item
Mastery Self-Talk (MST)	4	4.590	1.000	0.615	I try to see difficulties as opportunities to progress (MST4)
Performance-Approach Self-Talk (PAPST)	4	4.968	0.943	0.715	I think about the good results I will get if I keep working (PAPST3)
Performance-Avoidance Self-Talk (PAVST)	4	3.979	1.392	0.808	I tell myself that I wouldn't want to be the one who didn't understand (PAVST1)
Enhancement of Utility Value (EUV)	3	4.896	1.057	0.763	I tell myself that what I must learn will be useful to me later (EUV2)
Enhancement of Situational Interest (ESI)	4	3.648	1.145	0.716	I think of a way to make work more fun to do (ESI1)
Proximal Goal Setting (PGS)	4	4.330	1.058	0.708	I retrace the steps from the desired result (PGS2)
Self-Consequating (SC)	4	4.189	1.221	0.736	I think of an enjoyable activity I can do when I've finished (SC4)
Environmental Control (EC)	4	4.340	1.115	0.681	I arrange the place where I go to work to limit distractions (EC2)
Regulation of Negative Emotions (RNE)	4	4.009	1.114	0.621	I take a break to calm down and motivate myself (RNE1)
Seeking Support from Others(SSO)	5	3.244	1.296	0.825	I organize myself to work with other students (SSO3)

Table 2

Indirect predictive effects.

Indirect predictive effects	β	ES	95% IC B. inf.	95% IC B. sup.
<i>Student age</i>				
Age → Procrastination	-.165 **	.048	-.259	-.071
Age → MST→ Procrastination	-.063 **	.021	-.103	-.023
Age → PAPST→ Procrastination	-.02	.013	-.045	.006
Age → PAVST→ Procrastination	-.024 *	.011	-.044	-.003
Age → EUV→ Procrastination	.017	.013	-.010	.043
Age → EC→ Procrastination	-.019	.011	-.041	.002
Age → ESI→ Procrastination	-.015	.009	-.033	.003
Age → PGS→ Procrastination	-.005	.008	-.021	.011
Age → RNE→ Procrastination	.008	.006	-.005	.020
Age → SC→ Procrastination	-.011	.007	-.026	.003
Age → SSO→ Procrastination	-.001	.002	-.005	.004
Total indirect	-.133 ***	.023	-.178	-.089
Total effect	-.298 ***	.046	-.387	-.208
<i>Student gender</i>				
Student gender → Procrastination	-.028	.044	-.114	.058
Student gender → MST→ Procrastination	-.026 *	.011	-.048	-.003
Student gender → PAPST→ Procrastination	-.013	.010	-.032	.006
Student gender → PAVST→ Procrastination	.010	.008	-.006	.027
Student gender → EUV→ Procrastination	.008	.007	-.006	.023
Student gender → EC→ Procrastination	-.023	.012	-.047	.001
Student gender → ESI→ Procrastination	-.001	.006	-.012	.010
Student gender → PGS→ Procrastination	-.001	.002	-.006	.004
Student gender → RNE→ Procrastination	.010	.008	-.006	.026
Student gender → SC→ Procrastination	.002	.005	-.007	.011
Student gender → SSO→ Procrastination	.000	.002	-.004	.003
Total indirect	-.034	.018	-.069	.002
Total effect	-.062	.045	-.150	.027
<i>Past school failures</i>				
Prior academic failures → Procrastination	.114 **	.041	.033	.195
Prior academic failures → MST→ Procrastination	.019	.012	-.005	.042
Prior academic failures → PAPST→ Procrastination	.008	.007	-.006	.021
Prior academic failures → PAVST→ Procrastination	.002	.008	-.014	.018
Prior academic failures → EUV→ Procrastination	-.007	.006	-.019	.006
Prior academic failures → EC→ Procrastination	.005	.006	-.007	.018
Prior academic failures → ESI→ Procrastination	.006	.006	-.006	.018
Prior academic failures → PGS→ Procrastination	.002	.004	-.006	.010
Prior academic failures → RNE→ Procrastination	-.001	.004	-.009	.007
Prior academic failures → SC→ Procrastination	.004	.005	-.006	.015
Prior academic failures → SSO→ Procrastination	.000	.001	-.001	.002
Total indirect	.039 *	.016	.007	.072
Total effect	.154 **	.044	.067	.241

Note: EC = Environmental Control; ESI = Enhancement of Situational Interest; EUV = Enhancement of Utility Value; MST = Mastery Self-Talk; PAPST = Performance-Approach Self-Talk; PAVST = Performance-Avoidance Self-Talk; PGS = Proximal Goal Setting; RNE = Regulation of Negative Emotions; SC = Self-Consequating; SSO = Seeking Support from Others.

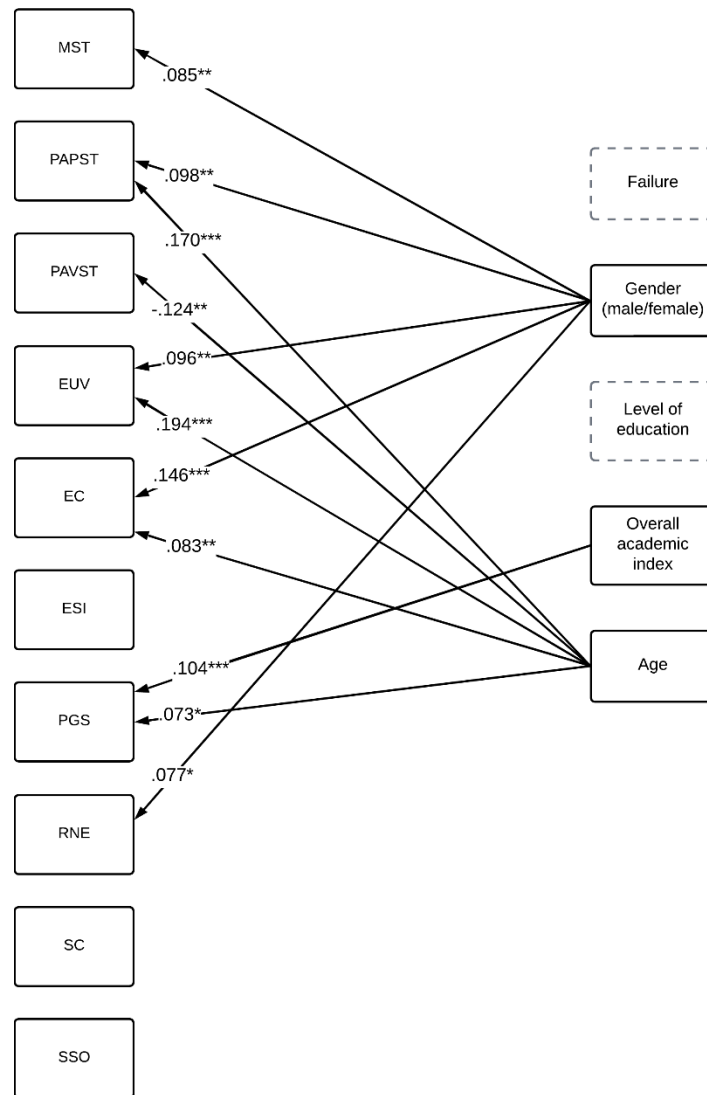


Fig. 1. Links between sociodemographic characteristics and motivational self-regulation strategies.

Note: $\chi^2_{(17)} = 40.333$; $p < .01$; CFI = .989; TLI = .951; RMSEA = .049; SRMR = .030. EC = Environmental Control; ESI = Enhancement of Situational Interest; EUV = Enhancement of Utility Value; MST = Mastery Self-Talk; PAPST = Performance-Approach Self-Talk; PAVST = Performance-Avoidance Self-Talk; PGS = Proximal Goal Setting; RNE = Regulation of Negative Emotions; SC = Self-Consequating; SSO = Seeking Support from Others.

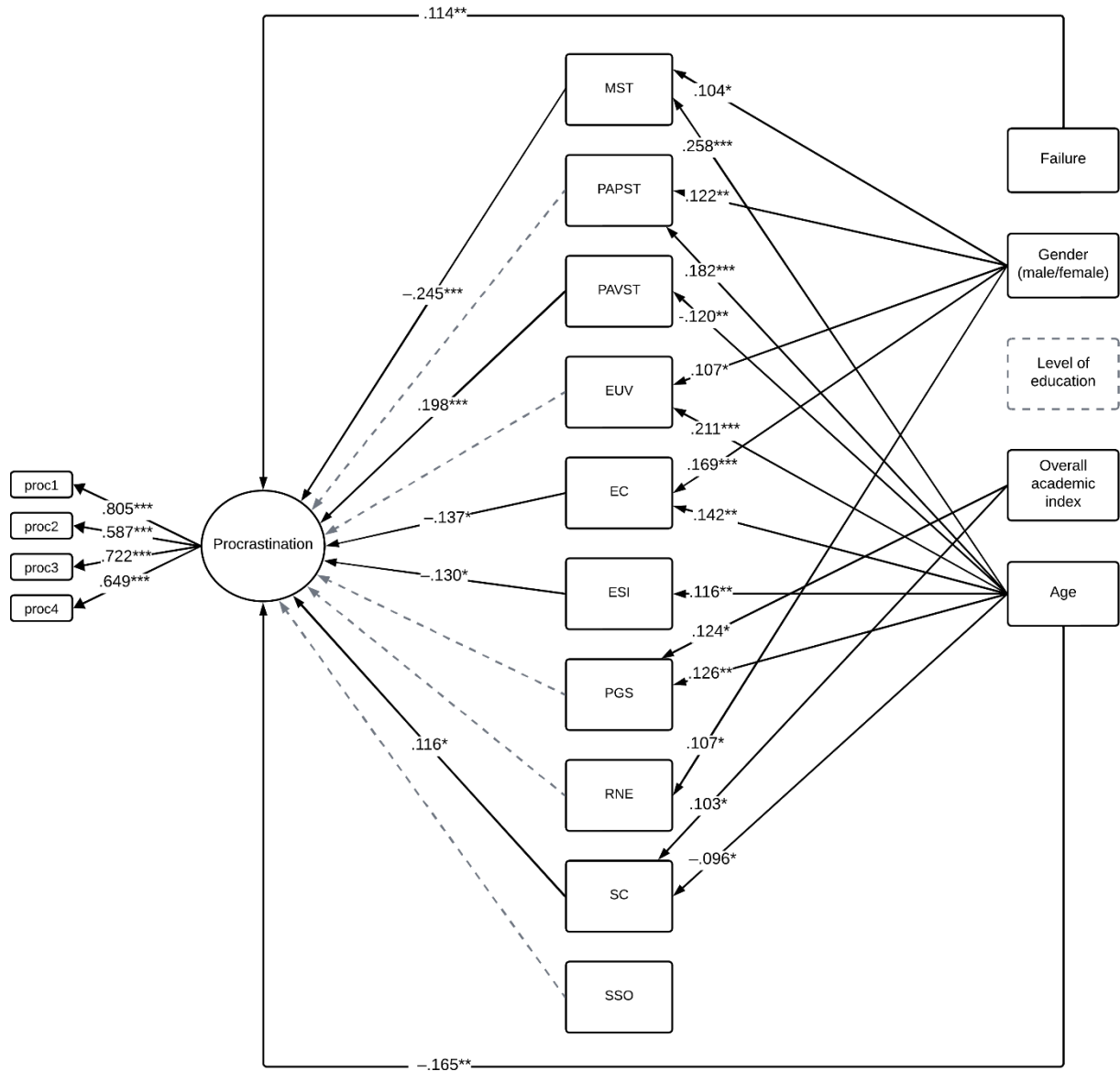


Fig. 2. Links between sociodemographic characteristics, motivational self-regulation strategies, and procrastination.

Note: $\chi^2_{(44)} = 70.498$; $p < .01$; CFI = .991; TLI = .969; RMSEA = .032; SRMR = .021. EC = Environmental Control; ESI = Enhancement of Situational Interest; EUV = Enhancement of Utility Value; MST = Mastery Self-Talk; PAPST = Performance-Approach Self-Talk; PAVST = Performance-Avoidance Self-Talk; PGS = Proximal Goal Setting; RNE = Regulation of Negative Emotions; SC = Self-Consequating; SSO = Seeking Support from Others.