Mastering Proximal Goals: The Interplay Between Self-Evaluation of Past Goal Experiences, Goal Self-Efficacy, and Timely Goal Attainment in Self-Regulated Learning

by

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We acknowledge and respect the Lək^{w}əŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Lək^{w}əŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

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Abstract

This study investigates the role of proximal goal self-efficacy as a mediator between self-evaluation processes early in the semester and timely goal attainment late in the semester within the framework of self-regulated learning and social cognitive theory. Using a path analysis design, the study examines how self-evaluation of past goal experiences (self-evaluation of goal attainment, accuracy of goal difficulty evaluation, and accuracy of time estimation evaluation early in a semester) predict current timely goal attainment (late in the semester), both directly and indirectly through goal self-efficacy. Data were collected from first-year undergraduate students enrolled in a learn-to-learn course. Results revealed that prior goal attainment predicted goal self-efficacy late in the semester, which in turn significantly influenced timely goal attainment late in the semester. Additionally, the accuracy of goal time estimation early in the semester directly predicted timely goal attainment late in the semester. However, none of the hypothesized mediation paths through goal self-efficacy were significant, suggesting that goal self-efficacy is not the sole mechanism through which goal evaluative accuracy impacts future goal attainment. Instead, other pathways— such as direct feedback effects on timely goal attainment late in the semester, task-specific strategies, goal challenges, or variations in goal types—may play a more significant role in influencing outcomes. This research addresses critical gaps in SRL literature by focusing on subjective evaluations and timely goal attainment in self-directed learning context, offering insights for educators to design interventions that enhance students' goal-setting and self-regulation skills.

Keywords: goal setting, goal attainment, self-regulated learning, social cognitive theory, self-efficacy, self-evaluations

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Introduction

Goal setting is an important mechanism in motivation and self-regulation (Panadero, 2017; Zimmerman, 2000). A goal is defined as a specific outcome or level of performance that individuals strive to achieve within a set timeframe (Locke, Shaw, Saari, & Latham, 1981). Goal-setting theory posits that clear, specific, and challenging goals enhance performance by directing attention, energizing effort, increasing persistence, and activating relevant knowledge and strategies (Locke & Latham, 2002; Locke et al., 2013). Within this framework, proximal goals, which are short-term, intermediate objectives, enable individuals to break down complex, long-term goals into manageable tasks, facilitating accurate evaluations of progress and goal-directed behavior (Seijts & Latham, 2001). Research has shown that setting proximal goals alongside distal goals positively correlates with improved performance (Seijts & Latham, 2001).

Proximal goals are particularly valuable in educational contexts, as they enhance motivation and academic performance by providing immediate benchmarks and timely feedback (Stock & Cervone, 1990; Zimmerman, 2012; Bandura & Schunk, 1981). According to Zimmerman (2012), goal setting significantly affects student motivation, influencing their choice, attention, effort, persistence, and emotional reactions in learning. Research has found that students who set proximal goals demonstrate increased self-efficacy and improved academic performance compared to those focused solely on distant goals (Bandura & Schunk, 1981). Moreover, proximal goals offer critical support in dynamic learning environments, allowing students to receive immediate feedback, manage errors effectively, and develop task mastery through ongoing adjustment and strategy refinement (Latham & Seijts, 1999; Schunk, 1990). Research found that students who set specific, short-term goals exhibit higher engagement, persistence, and academic achievement, as evidenced by improved test scores and GPA outcomes (Gaa, 1973; Morisano et al., 2010).

Despite the benefits, students often face challenges in setting effective proximal goals. University students, who typically engage in independent study with minimal instructor guidance, may struggle with delayed feedback, unclear priorities, and limited goal clarity, all of which complicate the goal-setting process (McCardle et al., 2017; Thibodeaux et al., 2017). Much of university learning comprises loosely defined, self-evaluated tasks, making it difficult for students to set clear, achievable proximal goals and effectively self-regulate their learning (Hadwin & Webster, 2013). This lack of frequent, external feedback often leaves students reliant on imprecise self-assessments, heightening the difficulty of breaking down long-term goals into actionable steps that support academic success (Kirby & Sharpe, 2001).

Problem Statement

While previous studies have explored the influence of various goal-related factors on overall academic metrics like test scores and GPA (e.g., Gaa, 1973; Morisano et al., 2010), a gap exists in understanding how these factors impact students' attainment of self-set proximal goals. Proximal goal setting has been shown to enhance motivation and academic performance (Seijts

& Latham, 2001; Stock & Cervone, 1990); however, most research focuses on assigned goals, as in workplace contexts (Yanagizawa, 2008), which do not reflect the self-directed nature of university study. In academic settings, students must independently decide what tasks to pursue, how to approach them within a given timeframe, often with limited external guidance (McCardle et al., 2017; Hadwin & Webster, 2013). One important factor influencing students' ability to attain self-set goals is their past goal-setting evaluations—how they assess the success, difficulty, and time required for their previous study goals. According to the cyclical nature of self-regulated learning (SRL), past learning experiences serve as self-generated feedback, shaping students' future self-efficacy beliefs and guiding their adjustments in goal setting and strategy use (Hadwin & Webster, 2013; Zimmerman, 1989, 1990). Specifically, self-efficacy plays a pivotal role in motivating persistence and effort in learning (Bandura, 1997). Despite this, limited research examines how students' evaluations of past goals influence their self-efficacy and future goal attainment. Understanding these relationships is critical for enhancing self-regulation in academic settings, where students rely on internal feedback to guide their learning. Given the importance of proximal goals in undergraduate studies, there is a need to explore the factors that influence students' ability to set and timely attain self-directed goals, providing insight into how they measure success in terms of personal academic objectives.

Literature Review

Goal Setting in SRL

Self-Regulated Learning (SRL) is recognized as a "core conceptual framework to understand the cognitive, motivational, and emotional aspects of learning" (Panadero, 2017, para. 1). Engaging in SRL enables students to take control of their own learning processes, reflecting a deliberate, strategic approach to study (Jansen et al., 2019). SRL emphasizes how students can effectively manage their own learning through proactive strategies, goal setting, and self-reflection, making them active participants in their education (Zimmerman, 2002; Panadero, 2017). Various processes of SRL, including setting goals, engaging in strategic planning, applying effective strategies, monitoring performance, and engaging in reflective practices, are especially significant for students who must independently balance their academic and personal responsibilities (Thibodeaux et al., 2017). In educational contexts, goal setting is central to SRL as it allows students to exercise active control over their learning processes by consistently setting, monitoring, and adjusting their goals during studying (Zimmerman, 2000). Within SRL framework, Sitzmann and Ely (2011) identified nine self-regulatory processes that significantly influence learning. Among these, goal level and self-efficacy emerged as strong predictors of learning, underscoring their unique contributions to the learning process. This self-regulated learning process aligns with goal-setting theory, which posits that setting goals and translating them into actions is a volitional process that enhances academic performance (Latham & Locke, 1991). In addition, empirical research found that proximal goals enhanced self-regulated learning during independent practice in instructional sessions, leading to the highest levels of study skills,

self-efficacy, and intrinsic interest (measured by the number of problems solved in a free-choice period) (Schunk, 1990).

Building on this foundational understanding of SRL, it is important to examine the specific components within this process. The key elements of SRL, identified in various models, are generally similar across different frameworks and typically include cognitive, metacognitive, and motivational aspects. Each of these components plays a critical role in shaping academic performance (Panadero, 2017). All SRL models acknowledged the importance of goal setting. For example, Zimmerman's SRL framework prioritizes goal setting in earlier stages of learning. He argued that learning, from a self-regulated perspective, is conceptualized as a dynamic, cyclical process that is both self-directed and goal-oriented (Zimmerman, 1990). According to Winne and Hadwin's model (1998, 2008), goals are crucial in SRL by providing context for interpreting tasks, directing planning and strategy selection, and setting standards for monitoring and evaluating performance. Furthermore, in Boekaerts's (1996) six-component model of SRL, Boekaerts pointed out that SRL is goal-directed, with students balancing between learning and emotion regulation. Boekaerts described the "cognitive self-regulatory strategies" component of SRL as a cognitive processes and behavior that are especially geared toward accomplishing self-set (or adopted) goals, and toward regulating one's activities to accomplish these goals (Boekaerts, 1996).

One foundational model within SRL research is Zimmerman's Three-Phase Model (2008), which conceptualizes SRL as a cyclical process consisting of three phases: forethought, performance, and self-reflection. In the forethought phase, students engage in activities such as strategic planning and goal setting, establishing a foundation for their learning activities. This preparatory work leads to the performance phase, where students actively engage with the learning material, monitor their progress, and adjust their strategies as necessary. The final phase, self-reflection, allows students to evaluate their performance, drawing lessons that inform future learning efforts. This continuous reflection and adaptation process is central to improving their ability to refine and optimize their learning strategies over time (Zimmerman, 2008).

Another SRL model by Winne and Hadwin (1998, 2008) describes SRL as unfolding across four recursively linked phases, providing a more granular view of the learning process. The initial phase involves task understanding, where learners interpret the academic task and its contextual elements. This understanding sets the stage for the goal setting and planning phase, where students establish objectives and determine their approach. The third phase, task enactment, involves learners executing their plans and employing a variety of strategies to engage with the material. The process concludes with adaptation, where students reflect on their performance and make necessary adjustments to their strategies and goals. This model is operationalized through the COPES framework—conditions, operations, products, evaluations, and standards. These elements play a vital role in shaping students' learning experiences and influencing their academic results (Hadwin & Webster, 2013). Winne and Hadwin's framework is particularly well-suited for my study because it offers a structured explanation of how students

monitor, evaluate, and adjust their goal-setting base on their learning experience over time (e.g., COPES architecture) (Winne & Hadwin, 1998; 2008). My research specifically examines how students assess their past learning experiences (past goal attainment, goal difficulty, and time estimation for completing goals) influence their future goal self-efficacy and timely goal attainment. These self-assessment and adaptive decision-making processes align directly with Winne and Hadwin's model, which highlights self-monitoring, feedback loops, and metacognitive adjustments as central components of SRL.

Proximal Goal Setting is Important for Time Management

Within the SRL framework, proximal goal setting also plays a critical role in effective time management. Time estimation, or the ability to predict the amount of time required to complete a specific activity or task, is an important component of SRL process (Burt & Kemp, 1994; Hadwin & Winne, 2012). In the SRL framework, effective time management goes beyond merely scheduling study sessions; it requires an integrated approach that considers students' perceptions of task demands, their strategic choices, and their ability to adapt based on ongoing learning experiences (Bahena-Olivares, 2022). Time management, therefore, serves as a diagnostic tool in SRL, where errors in time estimation and strategy selection can reveal deeper issues related to students' task understanding and self-regulation skills (Hadwin & Winne, 2012).

Research indicates that goal setting is instrumental in enhancing students' time estimation skills by providing structure and reference points that guide their planning processes (Bahena-Olivares, 2022; Zimmerman, 2008). Hadwin and Winne (2012) highlight that goal setting serves as a vital self-regulatory practice by helping students track their progress, identify discrepancies between their actual and expected performance, and adjust their strategies accordingly.

In addition, Bahena-Olivares (2022) highlights the importance of goal clarity in goal setting process to support students' ability to estimate the time needed to complete their tasks. For instance, specifying the type of strategy required or identifying the cognitive demands associated with the goal enables students to anticipate the time commitment more accurately. By aligning goal-setting practices with these considerations, students are better positioned to manage their time effectively, which is crucial for achieving their goals within self-directed learning contexts (Bahena-Olivares, 2022).

Proximal Goal Setting Reflects Task Understanding

While proximal goals help students manage their time, they also reflect a student's level of task understanding, which is crucial for high-quality learning within SRL (Hadwin & Winne, 2012). Task understanding involves students gathering information from a variety of sources to construct an internal representation of the task requirements and objectives (Winne & Hadwin, 1998, 2008). Research emphasizes that accurate task understanding serves as a foundational skill, crucial for achieving high-quality learning outcomes (Hadwin & Winne, 2012). The goal-setting process is inherently linked to a student's task understanding because setting effective and realistic goals requires a comprehensive grasp of what the task entails and the criteria for success. Without a solid understanding of the task, students may set unrealistic or misaligned

goals, which can compromise their ability to succeed (Hadwin & Winne, 2012). Goals that students set reflect their perception of the task elements and how they believe these tasks should be approached, illustrating a close relationship between task interpretation and goal-setting practices (Hadwin, Järvelä, & Miller, 2018).

Types of Proximal Goals That are Useful for Managing Study in SRL

The types of proximal goals that students set play a crucial role in fostering effective SRL. Within the SRL framework, certain goal characteristics are identified as especially useful in helping students manage their studies independently. McCardle et al. (2017), consistent with Winne and Hadwin's SRL model (1998, 2008), identified four key properties of goals that can promote SRL: timeframe, action, standard, and content (TASC). By ensuring that goals encompass these TASC elements, learners are better positioned to regularly monitor their progress, have a clear understanding of what and how they intend to learn, and identify discrepancies between their current performance and desired outcomes. Such awareness allows students to make strategic adjustments in their approach, which is central to the iterative, adaptive nature of SRL (McCardle et al., 2017).

Zimmerman (2008) also outlines eight goal properties that enhance SRL. These properties suggest that effective goals should be specific, proximal, and structured in a hierarchical manner to facilitate the breakdown of complex tasks into manageable steps. Additionally, goals should be congruent with students' broader learning objectives, challenging but realistic, and self-set to foster intrinsic motivation. Zimmerman also emphasizes the importance of maintaining conscious awareness of goals, which supports better self-monitoring and adjustment throughout the learning process. For novel or unfamiliar tasks, Zimmerman recommends setting process-oriented goals that focus on learning and improvement, whereas product-oriented goals are more suitable for tasks with which students already have some mastery. This nuanced approach to goal setting helps students structure their study efforts, sustain motivation, and ultimately enhance their learning outcomes (Zimmerman, 2008).

The SMART criteria provide another framework for goal setting focusing on goals that goals are specific, measurable, achievable, relevant, and time-bound (Shahin & Mahbod, 2007; McCardle et al., 2017). By adhering to these criteria, students set clear, actionable goals that are achievable within a defined timeframe. Research shows that SMART goals help students remain focused, track their progress, and adjust as necessary, which aligns with the principles of SRL (Shahin & Mahbod, 2007; McCardle et al., 2017).

How Feedback and Calibration Influence Future Performance in SRL Framework

Background of Feedback, Evaluation and Calibration

While setting well-structured, proximal goals is important for effective self-regulation (Zimmerman, 2000), feedback and evaluative processes play a pivotal role in helping students

monitor their progress, calibrate their efforts, and refine their strategies to achieve these goals (Tolli & Schmidt, 2008; Ashford & Cummings, 1983; Winne & Hadwin, 2008). Feedback is generally defined as information regarding one's progress toward achieving a goal, providing a means to compare current performance against a target or standard (Tolli & Schmidt, 2008). In goal setting and SRL, feedback plays a vital role by informing students of how well they are progressing in relation to their goals (Ashford & Cummings, 1983). According to Winne and Hadwin's (1998, 2008) SRL model, feedback-based evaluations are crucial for sustaining task engagement and for effective monitoring. Their model emphasizes that feedback allows learners to make metacognitive judgments about their goal achievement, which are informed by standards that they set during the goal-setting phase (Butler & Winne, 1995; Winne & Hadwin, 1998; 2008). This reliance on feedback enables students to conduct self-evaluations that subsequently influence the development of new goals and strategies (Winne & Hadwin, 2008).

The cyclical nature of SRL reinforces the importance of past experiences, including self-evaluations of previous goal attainment, as these experiences serve as critical data for future goal-setting cycles (Hadwin & Webster, 2013). According to Winne and Hadwin's (1998, 2008) SRL model, self-evaluations contribute to shaping students' confidence in achieving future goals and informing their judgments, supporting a cycle of continuous improvement in learning efforts (Winne & Hadwin 2008; Hadwin & Webster, 2013).

A core feature of SRL is the "self-oriented feedback loop," where students constantly monitor and adapt their learning strategies, making both perceptual and behavioral changes to enhance their effectiveness (Zimmerman, 1989; Zimmerman, 1990). Within goal-setting theory, feedback has two primary functions. First, it encourages students to set new goals based on their prior performance, thus mediating the connection between feedback and future performance (Locke & Latham, 1990). Second, it interacts with goals to maximize performance; in other words, students perform best when feedback and goal setting are both present, illustrating the moderating effect of feedback on the relationship between goal setting and performance (Locke & Latham, 1990; Locke et al., 2013).

The role of feedback in influencing self-efficacy is further underscored by VandeWalle, Cron, and Slocum (2001)'s study, which found that positive feedback encourages college students to establish more challenging self-set goals, with self-efficacy mediating this relationship. This finding aligns with Locke and Latham's (1990) paper which argues that feedback impacts future goal setting by enhancing self-efficacy. When students receive positive feedback, their confidence in their abilities rises, prompting them to pursue higher goals in the future (Locke & Latham, 2013).

Feedback also influences what is known as goal-performance discrepancies (GPDs), which represent the gap between current performance and the set goals (Tolli & Schmidt, 2008). Tolli and Schmidt (2008)'s study found that feedback helps students identify these gaps by comparing their current performance with their intended targets. When students recognize GPDs,

they can modify their strategies and effort to close the gap, thus improving their performance. Research indicates that feedback not only aids in enhancing performance but also encourages learners to adjust their future goals. For instance, students who exceed their set goals are often inclined to set even higher goals subsequently, resulting in progressively better performance (Locke & Latham, 2013).

Types of Feedback

Bangert Drowns et al. (1991) distinguished two sources of feedback: one that students generate themselves by monitoring their engagement with learning tasks, and the other provided externally. Self-generated feedback plays a critical role in SRL, particularly in the context of independent studying. Butler and Winne (1995) emphasize that internal feedback is an inherent component of SRL, as learners continuously monitor their engagement with tasks, assess their progress, and make necessary adjustments to their strategies. Unlike external evaluations, which may lack personalization and immediate relevance, self-generated feedback allows learners to tailor their approach based on their unique knowledge, beliefs, and task interpretations. This personalized feedback fosters cognitive engagement and enables learners to dynamically adapt their learning behaviors in real time (Butler & Winne, 1995). Moreover, the ability to generate self-generated feedback enhances motivation and persistence by providing immediate insights into progress, which can sustain engagement and prevent discouragement, a challenge often associated with external feedback (Butler & Winne, 1995). Additionally, self-generated feedback supports better calibration of learning goals, helping students to develop a more accurate understanding of their performance and adjust their expectations and strategies accordingly (Butler & Winne, 1995). Given that self-regulated learners are responsible for managing their own learning processes over successive study sessions (Winne & Hadwin, 1998; 2008), the role of self-generated feedback becomes even more crucial in fostering autonomy and long-term academic success.

Despite the recognized importance of self-generated feedback in self-regulated learning, a significant research gap remains. Most studies on feedback in educational settings have predominantly focused on externally provided feedback from sources such as teachers or computer systems (e.g., Hadwin & Webster, 2013; Follmer et al., 2022). This type of feedback is typically delivered after learning activities have been completed or following an assessment of achievement, rather than during the learning process itself (Butler & Winne, 1995). Consequently, there is limited research that examines how students engage in self-evaluation of their goal attainment over successive study sessions without external input. This gap is particularly relevant in the context of independent studying, where students rely on their own judgments to regulate their learning strategies and progress. Investigating self-evaluative feedback processes can provide deeper insights into how students calibrate their learning, adjust their goals, and enhance their self-regulatory skills in the absence of external feedback.

Goal Difficulty Evaluation

The concept of goal difficulty is central to the process of setting and achieving academic objectives (Locke & Latham, 2019). According to Locke and Latham (2019), challenging and specific goals, as opposed to vague "do your best" goals, are more effective as they provide concrete targets that stimulate effort and engagement. Yanagizawa (2008) further supports this by demonstrating that goal difficulty, in conjunction with constructive feedback, correlates positively with goal attainment and enhances the learning process. There is also research suggesting the importance of setting goals that are specific and proximal/achievable to increase motivation and self-efficacy (McCardle et al., 2017; Latham& Locke, 2007; Schunk, 1990).

Despite the importance of goal difficulty in predicting goal attainment, a significant research gap exists. Although previous studies have explored how goal difficulty impacts performance (e.g., Yanagizawa, 2008), limited research examines how students' subjective evaluations of goal difficulty—distinct from assigned goal difficulty level—affect their achievement. Understanding the role of these subjective assessments in the SRL process may provide more comprehensive insights into how students perceive and manage their academic tasks, particularly those requiring independent studying.

Time Estimation Accuracy Evaluation

Another important evaluative process is time estimation accuracy, a form of calibration that allows students to assess whether they can complete tasks within the time frame they set for themselves (Follmer et al., 2022). Thibodeaux et al. (2017) found a positive correlation between students' time estimation ability and their actual and target GPA. Similarly, Bahena-Olivares (2022) found that students who accurately estimate the time needed for study sessions are more likely to achieve their academic goals than those who do not. Students who underestimate the time required are prone to rush work, miss deadlines, and engage insufficient preparation, all of which negatively impact academic performance. Conversely, students who overestimate the time needed may waste valuable resources, potentially hindering their goal attainment (Bahena-Olivares, 2022).

A study by Follmer et al. (2022) highlights the predictive value of time calibration in SRL and goal setting. They found that students' mid-course time calibration influenced their end-of-course calibration and performance, which in turn predicted their reported goal-setting skills, even after accounting for prior regulatory skills (Follmer et al., 2022). This study underscores the importance of accurate time estimation in the goal-setting process and its impact on overall academic performance.

However, research gaps remain. While time calibration has been extensively studied within SRL, most of the research has focused on objective comparisons between expectation and performance outcomes (e.g., Follmer et al., 2022). For example, in Follmer et al. (2022), students' time calibration was assessed by comparing their estimated and actual study time over five weeks. Time calibration was measured by researchers as the absolute difference between

students' predicted study time (before student complete the survey) and their actual recorded study time, which was tracked using an electronic survey software program. These studies, typically involving external evaluations of alignment between students' goal assessments and actual performance, have provided valuable insights into goal-setting accuracy. However, this approach has overlooked students' subjective evaluations of their own goal-setting processes time (i.e., student's self-evaluation of how well they completed the task compare to their expected outcome). Understanding how learners perceive and utilize their self-assessments to direct their learning efforts is essential for a more holistic view of the internal processes involved in SRL.

Furthermore, although many studies have examined the role of feedback and calibration in shaping future goal setting and general academic metrics such as GPA (e.g., Dignath & Veenman, 2021; Ashford & Cummings, 1983; Hadwin & Webster, 2013; Follmer et al., 2022), there is limited research on how these goal-related evaluations influence students' attainment of personally set proximal goals. Investigating this relationship could reveal how students' subjective evaluations of goal difficulty and time management impact their success in achieving self-set goals, an area that remains underexplored in SRL research.

The Role of Self-Efficacy in Social Cognitive Theory, SRL and Academic Performance

Self-Efficacy in Social Cognitive Theory

Perceived self-efficacy is defined by Bandura (1988) as the belief in one's capability to organize and execute the actions necessary to achieve desired performance levels. According to Bandura's Social Cognitive Theory (1986), behavior is regulated by three main components: goal setting, outcome expectancies, and self-efficacy. Self-efficacy is important, as it is based on a comprehensive self-assessment of personal factors that may influence performance (Bandura, 1986; Locke et al., 2013).

Central to Social Cognitive Theory is the concept of reciprocal determinism, which describes the bidirectional interaction between personal factors (cognition, emotions, and biological factors), behavior, and environmental influences. This triadic reciprocal model suggests that individuals' interpretation of their performance outcomes influences their self-efficacy and environment, which in turn shape future behaviors (Bandura, 1986; Pajares, 1996).

Self-Efficacy in SRL

In the context of SRL, self-efficacy is a key component that drives students' engagement in academic tasks (Usher & Pajares, 2008). According to Winne and Hadwin's SRL model (1998, 2008), self-evaluative processes—such as judgments of confidence (JOCs)—play a vital role in self-regulated learning. JOCs are assessments learners make regarding their ability to answer a question, complete a task, or, as in this study, achieve a self-set goal. These judgments provide learners with feedback on their perceived competence and guide informed adjustments in future strategies based on their perceived successes or challenges in prior tasks (Hadwin & Webster, 2013). Hadwin and Webster (2013) emphasize that JOCs act both as metacognitive products and

as outcomes of the learning process, informing and refining subsequent self-regulation cycles. This concept aligns closely with social cognitive theory, which suggests that individuals' evaluations of past performance shape their self-efficacy, which then influences their future performance (Bandura, 1986; Pajares, 1996).

The Role of Mastery Experiences and Performance Feedback in Developing Self-Efficacy

Bandura (1977) identifies four primary sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological states. Among these, mastery experiences are considered the most influential for building self-efficacy. Positive mastery experiences reinforce self-efficacy, as each success increases an individual's confidence in their abilities. Conversely, failures, particularly in preliminary stages of learning, can reduce self-efficacy (Bandura, 1977; Bandura, 1997). However, as self-efficacy strengthens with repeated successes, occasional setbacks become less impactful, sometimes even fostering greater persistence and resilience (Bandura, 1977).

The reciprocal relationship between goal setting and self-efficacy is further highlighted by findings that effective goal setting bolsters students' perceptions of progress, which in turn strengthens self-efficacy and encourages them to set more challenging goals (Zimmerman et al., 1992). Several studies have explored how performance feedback affects self-efficacy and goal adjustments over time, extending Zimmerman et al.'s (1992) findings on the reciprocal relationship between goal setting and self-efficacy (Tolli & Schmidt, 2008; Vancouver et al., 2001). For instance, Tolli and Schmidt (2008) demonstrated that manipulated feedback and causal attributions interact to influence self-efficacy in goal revision contexts. Similarly, Vancouver et al. (2001) found that past performance affects self-efficacy, with individuals who have a history of strong performance generally exhibiting higher self-efficacy.

In addition, Shea and Howell (2000) found the role of task feedback and experience in influencing self-corrections within self-efficacy and academic performance. They found that high-quality feedback was critical for effective self-corrections, as it allowed individuals to adjust their self-efficacy and subsequent performance in response to ongoing assessments of their progress. These findings reinforce the view that mastery experiences, bolstered by consistent and constructive feedback, serve as a foundation for self-efficacy, shaping students' beliefs in their capabilities and motivating them to pursue and attain more challenging goals.

However, despite extensive research on how feedback and mastery experiences influence self-efficacy (e.g., Bandura, 1977; Tolli & Schmidt, 2008; Vancouver et al., 2001), most studies treat feedback as a general mechanism without examining how specific types of feedback may differentially impact self-efficacy development. For instance, the effects of feedback related to accuracy of goal difficulty evaluation and accuracy of goal time estimation remain unexplored. Addressing this gap is important to better understand the nuanced ways in which various forms of feedback contribute to self-efficacy, particularly in academic contexts that require detailed self-regulation and goal-setting processes.

The Role of Self-Efficacy in Academic Performance

Perceived self-efficacy is regarded as a positive predictor of academic success (Latham & Locke, 2007; Augustiani et al., 2016). Zimmerman et al. (1992) argue that self-efficacy impacts not only students' goals but also their achievement of these goals. Agustiani et al (2016)'s study also found that student's self-efficacy is positively related to their academic achievement. A review paper by Klassen and Usher (2010), support and extend these papers by concluding that the relationship between self-efficacy and academic performance is typically explained through mechanisms whereby individuals with high self-efficacy set more challenging goals, exert greater effort, persist longer, and demonstrate resilience in the face of difficulties (Klassen & Usher, 2010).

However, some research presents a contrasting view on the effect of self-efficacy on performance. Vancouver et al. (2001) found a negative effect of self-efficacy on subsequent performance within individuals over time, proposing that higher self-efficacy might lead to complacency and a reduction in effort. Their findings suggest that while self-efficacy can facilitate the setting of more challenging goals, it does not always translate to improved performance, as overconfidence may reduce the motivation to exert the necessary effort. This nuance in the relationship between self-efficacy and performance indicates that although self-efficacy promotes goal adoption, its influence on actual performance outcomes may vary depending on context and individual differences in goal commitment and effort.

While these studies explore the relationship between self-efficacy and broad measures of performance (e.g., Latham & Locke, 2007; Augustiani et al., 2016), there is limited research examining the specific link between self-efficacy and goal attainment. Understanding how self-efficacy influences students' ability to achieve personally set goals could provide more nuanced insight into the mechanisms underlying academic success. This gap highlights the need for further investigation into the role of self-efficacy in shaping students' proximal goal attainment, particularly in self-directed learning environments.

Reciprocal Relationship Between Self-Efficacy and Academic Performance

Building on the interplay between self-efficacy and performance, Talsma et al. (2018) conducted a meta-analysis that confirmed a reciprocal relationship between self-efficacy and academic performance. Their findings indicated that academic performance had a more substantial influence on self-efficacy than the reverse, particularly among adult learners. This reciprocal relationship aligns with Bandura's (1977, 1997) concept of reciprocal determinism, where self-efficacy and performance form a feedback loop. Within this loop, success in academic tasks boosts self-efficacy, which in turn encourages persistence and goal-setting behaviors, thereby enhancing future performance (Klassen & Usher, 2010).

While existing literature has extensively examined the impact of mastery experiences on self-efficacy (Tolli & Schmidt, 2008; Vancouver et al., 2001; Shea & Howell, 2000) and the reciprocal effects of self-efficacy and academic performance (Talsma et al., 2018), there is

limited research about self-efficacy as a potential mediator between students' reflections on past learning experiences and their future goal performance. This gap underscores the need to explore how self-efficacy mediates the relationship between students' self-evaluative feedback on prior learning experiences and their ability to achieve future academic goals. Understanding this mediating role could provide a more comprehensive view of the internal processes that support effective goal setting and inform strategies to enhance students' self-evaluation skills.

Goal Setting Programs – Goal Setting Can Be Developed/Supported

Goal setting is integral to SRL and social-cognitive learning models of academic achievement, and research shows that it is a skill that can be actively developed and supported through structured programs (Morisano et al., 2012; Webster et al., 2010). These social-cognitive frameworks emphasize the positive feedback loops that form between self-efficacy and goal commitment (Bandura, 1977). When students achieve their goals, they experience an increase in self-efficacy, which in turn strengthens their commitment to future goals. This elevated self-efficacy mobilizes students to apply self-regulation skills, including the management of cognitive and motivational resources, thus fostering a cycle of continuous improvement in goal attainment and academic achievement (Schunk, 1990; Zimmerman et al., 1992).To initiate this feedback loop effectively, goal-setting programs should focus on "kick-starting" this self-reinforcing process by clarifying desired outcomes, emphasizing the value of the goals, and outlining specific paths to goal completion. This increases the perceived attainability of success and establishes benchmarks for evaluating goal progress (Wigfield & Eccles, 2000; Morisano et al., 2012).

One example of a goal-setting intervention is the program developed by Morisano (2010), adapted from Peterson and Mar (2004). This program, grounded in goal theory, demonstrated significant improvements in student performance by focusing on goal clarity, self-monitoring, and motivation. Each step of the program was designed to reinforce students' understanding of their goals, support their ability to self-monitor, and sustain their motivation throughout the process. By encouraging students to continuously assess their progress against defined targets, this program helped participants develop stronger self-regulatory skills, which are essential for both setting and achieving proximal goals. Self-monitoring, in particular, was a key component, as it allowed students to remain aligned with their goals and make necessary adjustments to their efforts (Morisano, 2010). This aligns with the broader SRL framework, where monitoring progress and adjusting strategies are central to goal achievement and learning improvement (Winne & Hadwin 1998; 2008).

In addition, a study by Webster, Helm, Hadwin, Gendron, and Miller (2010) explored the goal-setting behaviors of undergraduate students throughout a semester-long course on learning strategies. As part of a design-based study, students were tasked with setting goals for academic activities each week and reflecting on their progress. This regular goal-setting practice was shown to enhance the quality of the goals students set, boost their confidence in achieving those goals (goal efficacy), and increase self-reported goal attainment over time. The improvement

observed in these metrics indicated that students can be effectively taught to set proximal goals through consistent support and structured opportunities for reflection (Hadwin & Winne, 2012). The findings from these studies underscore the potential of structured goal-setting programs to foster SRL by enhancing students' abilities to set, monitor, and adjust proximal goals. In addition, this gradual improvement in goal-setting proficiency underscores the importance of giving students time to learn, practice, and internalize these self-regulatory behaviors. In our study, we sampled a week of goals early in the semester, when students were still developing their skills, and comparing it to a week late in the semester after they have had more experience with structured goal-setting practices can provide valuable insights into how students' progress in their goal setting skills.

Research Gaps

In summary, while goal setting and SRL have been widely studied, several critical research gaps remain. First, most existing studies have focused on externally provided feedback, such as teacher or computer-generated feedback, rather than students' self-evaluations of their self-set goal attainment over successive study sessions. This gap is particularly relevant in the context of independent studying, where learners must rely on their own assessments to regulate their learning strategies effectively. Second, although goal difficulty evaluation and time estimation accuracy are essential components of SRL, there is limited research examining how students' subjective assessments of these factors influence their goal attainment. Additionally, while feedback and calibration processes have been linked to general academic outcomes like GPA, there is little research on how these evaluations influence personally set proximal goals. Research also tends to treat feedback as a general mechanism, without distinguishing how different types of feedback uniquely shape self-efficacy. Furthermore, while self-efficacy has been identified as a crucial predictor of academic performance, research has primarily focused on its relationship with broad academic outcomes rather than its role in achieving self-set proximal goals within specific time constraints. Finally, while the impact of mastery experiences on self-efficacy is well established, there is limited research on whether goal self-efficacy mediates the relationship between past goal-setting experiences and future goal attainment. Addressing these gaps is essential for developing a more comprehensive understanding of how students regulate their learning in the absence of external feedback and how goal self-efficacy influences the attainment of personal goals.

Purpose Statement

This study focuses on first-year undergraduate students engaging in self-directed study sessions at a Western Canadian university. The purpose of this study is to examine the mediating role of goal self-efficacy in the relationship between self-evaluation of past goal experiences and future timely goal attainment. Specifically, it investigates how students' self-evaluation of past goal experiences (evaluations of goal attainment, accuracy of goal difficulty evaluation, and accuracy of time estimation) during a week of studying early in the academic semester predict

their timely goal attainment (attain the goal within 1-2 hours) late in the academic semester after which students were taught about goal setting, self-regulation, and time management and given weekly opportunities to set goals and reflect on them, with goal self-efficacy late in the semester as a partial mediator. By exploring this mediation model, the study seeks to enhance our understanding of the mechanisms through which self-evaluation of past goal experiences impact goal-related outcomes and to provide insights for interventions aimed at improving goal achievement processes. Rooted in SRL and social cognitive theory, this study explores proximal goals as essential for self-directed learning at university, allowing students to monitor and adjust their strategies independently of external feedback. By focusing on the day-to-day demands of self-directed learning, this study seeks to illuminate how internal feedback mechanisms—through self-evaluation and self-efficacy—support students in setting and achieving their academic goals within timeframe.

Research Design

Key Terms and Definitions for Constructs

Goal self-efficacy in this study refers to students' confidence in their ability to attain their self-set study goals. It is computed as the weekly average of goal self-efficacy ratings reported across multiple study sessions during a week late in the semester. Past goal experiences include students' self-evaluations of previous goal setting early in the semester and include three variables: goal attainment, accuracy of goal difficulty evaluation, and accuracy of goal time estimation. Timely goal attainment refers to the proportion of study goals students successfully achieve within 1–2 hours, averaging over a week of studying late in the semester. Figure 1 presents a time sequence of these variables.

Predictors

Self-evaluation of past goal experience early in the semester serve as the primary predictor variable. This includes (1) ***self-evaluation of goal attainment*****,** which measures the proportion of self-set study goals successfully attained within a given week early in the semester, (2) ***goal difficulty evaluation accuracy***, which assesses the extent to which students' initial difficulty ratings align with their perceived difficulty after attempting the goals within a given week early in the semester, and (3) ***goal time estimation accuracy***, which captures how well students' estimated study duration corresponds to the actual time spent on their goals within a given week early in the semester.

Mediator

Goal self-efficacy late in the semester serves as the mediating variable. It reflects students' belief in their ability to attain their study goals after engaging in structured goal setting, self-monitoring, and self-evaluation processes late in the semester. Goal self-efficacy late in the

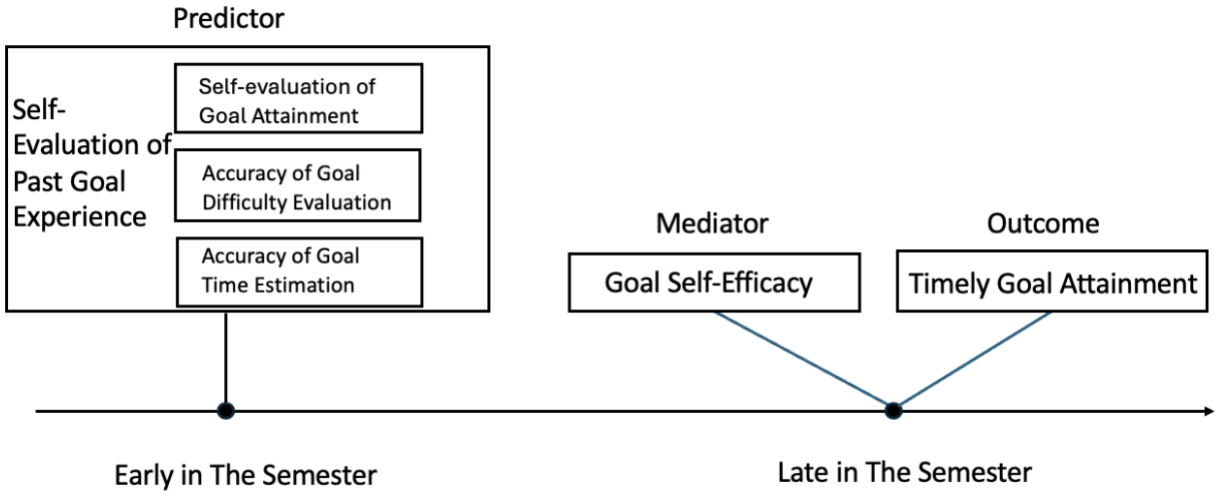
semester is hypothesized to mediate the relationship between past goal experiences and timely goal attainment, influencing students' ability to refine and adapt their self-regulatory learning strategies.

Outcome

Timely goal attainment late in the semester is the outcome variable. It represents the proportion of study goals that students successfully achieve within 1–2 hours, averaged over a week of studying late in the semester. This construct reflects both goal attainment and time management, capturing how well students regulate their study behaviors within timeframe.

Figure 1

A Conceptual Model Illustrating the Time Sequence of Self-Evaluation of Past Goal Experience, Goal Self-Efficacy, and Timely Goal Attainment



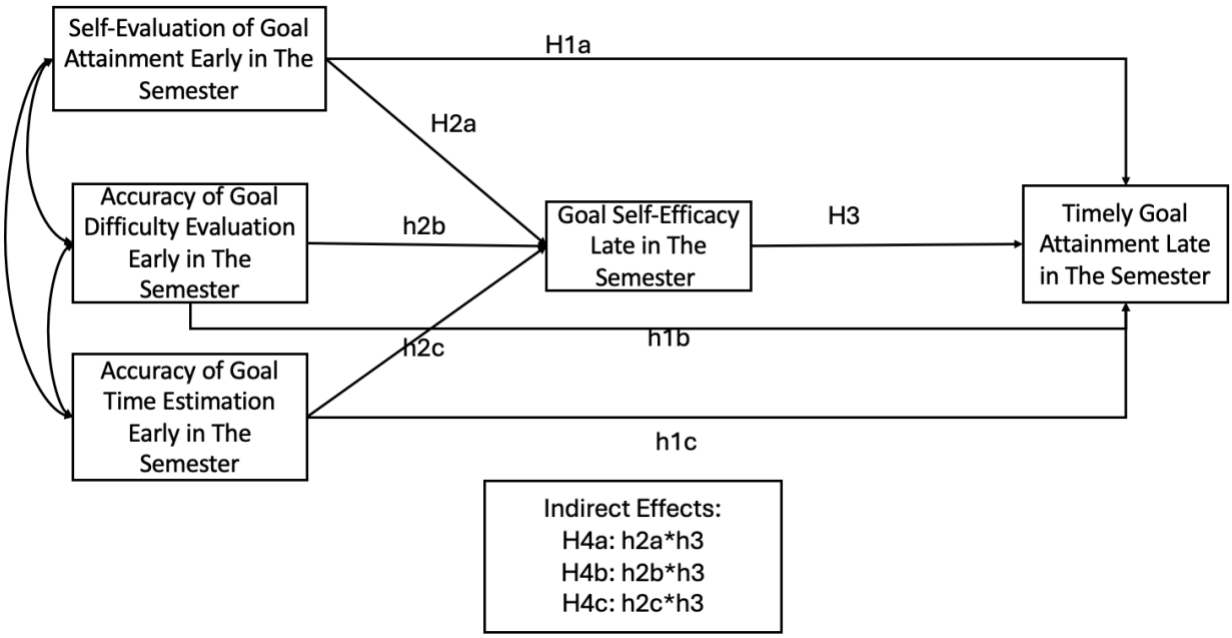
Research Design - Path Model

This study employs a path analysis design to investigate the mediation effect of goal self-efficacy on the relationship between self-evaluation of past goal experience and future goal attainment, within the theoretical framework of SRL and social cognitive theory (see Figure 2). Path analysis enables the simultaneous evaluation of the strength and significance of the paths between the variables (Klem, 1994). In my model, the path analysis examines how past self-evaluation of goal experiences (goal attainment, accuracy of goal difficulty evaluation, accuracy of goal time estimation) early in an academic semester directly and indirectly influence their timely goal attainment late in the academic semester. The central focus of the study is to test whether self-efficacy late in the semester partially mediates the relationship between these self-

evaluation of goal experiences early in the semester and timely goal attainment late in the semester.

Figure 2

Path Model Illustrating the Direct and Indirect Effects of Self-Evaluation of Past Goal Experiences (Self-Evaluation of Goal Attainment, Accuracy of Goal Difficulty Evaluation, and Accuracy of Time Estimation) Early in The Semester on Timely Goal Attainment Late in The Semester, Mediated by Goal Self-Efficacy Late in The Semester.



Research Questions

Research Question 1: Are self-evaluations of past goal experiences (self-evaluation of goal attainment, accuracy expectations about goal difficulty, and accuracy in estimating time needed to attain goals) related to timely goal attainment late in the semester?

Hypothesis 1a: Students' self-evaluation of goal attainment early in the semester is positively related to the probability of timely goal attainment late in the semester.

Hypothesis 1b: Students' accuracy of goal difficulty evaluation early in the semester is positively related to the probability of timely goal attainment late in the semester.

Hypothesis 1c: Students' accuracy of time estimation early in the semester is positively related to the probability of timely goal attainment late in the semester.

Research Question 2: Are self-evaluations of past goal experiences (self-evaluation of goal attainment, accuracy expectations about goal difficulty, and accuracy in estimating time needed to attain goals) related to their goal self-efficacy late in the semester?

Hypothesis 2a: Students' self-evaluation goal attainment early in the semester is positively related to their goal self-efficacy late in the semester.

Hypothesis 2b: Students' accuracy of goal difficulty evaluation early in the semester is positively related to their goal self-efficacy late in the semester.

Hypothesis 2c: Students' accuracy of time estimation early in the semester is positively related to their goal self-efficacy late in the semester.

Research Question 3: Does students' goal self-efficacy late in the semester related to the probability of timely goal attainment late in the semester?

Hypothesis 3: Students' goal self-efficacy is positively related to the probability of timely goal attainment late in the semester.

Research Question 4: To what extent does goal self-efficacy about one's goals mediate the relationship between self-evaluations of past goal experiences and timely goal attainment late in the semester?

Hypothesis 4a: The relationship between students' self-evaluation of goal attainment early in the semester and the probability of timely goal attainment late in the semester is partially mediated by goal self-efficacy late in the semester.

Hypothesis 4b: The relationship between students' accuracy of goal difficulty evaluation early in the semester and the probability of timely goal attainment late in the semester is partially mediated by goal self-efficacy late in the semester.

Hypothesis 4c: The relationship between students' accuracy of time estimation early in the semester and the probability of timely goal attainment late in the semester is partially mediated by goal self-efficacy late in the semester.

Methods

Participants

Participants were undergraduate students enrolled in a psychology based learn-to-learn (L2L) course during the Spring 2022 semester at a Western Canadian university from different faculties (*N=239*, M age = 20.12, 43% female, 57% male). Of the initial participants, 221 students participated at the first study session early in the semester, and 212 late in the semester. Overall, 202 students completed all required questions on the scales at both sessions and were included in the final analysis. All students provided informed consent in the study.

Instructional Context

The L2L course is a semester-long, credited course offered to undergraduate students at a Western Canadian university. The course teaches the psychology of learning and motivation and uses SRL as a framework to guide students to develop knowledge and skills to regulate multiple areas of their learning. Course objectives include equipping students with an understanding of SRL theories and research that focus on factors contributing to student success, such as metacognitive, cognitive, motivational, behavioral, and socio-emotional aspects. Throughout the course, students practiced self-regulated learning through proactive goal setting and planning. They were encouraged to diagnose academic difficulties and identify proactive solutions. Additionally, the course aims to help students choose and use evidence-based strategies that are best aligned with their academic work, goals, and skills.

Students attended a lecture and an applied lab each week. In addition to the instruction of content related to SRL, the learning-to-learn course is designed to promote metacognitive awareness and engagement in SRL cycles by completing weekly or daily study diary activities (McCardle & Hadwin, 2015). Importantly, all assignments/activities required students to apply topics and concepts to another academic course. For example, all goal setting and monitoring activities focused on coursework for at least one other academic course taken concurrently.

Procedures

Participants engaged in a structured daily diary activity in Week 4 and Week 9 using an online tool designed to guide them through planning, studying, and reflecting on their study sessions. This diary activity contained both drop-down menu selections and open-text fields to capture students' goal setting, self-evaluations, and study behaviors. In Week 4 (early in the semester), students were prompted to set five study goals, one for each day of the upcoming week. These goals were intended to be completed within a single study session of 1–2 hours, with students scheduling one goal per day over five consecutive days. When setting their goals, students rated both the perceived difficulty of each goal (*"How difficult is this goal for you?"*) and their confidence in achieving it (*"How confident are you that you will attain this goal?"*). Throughout the week, students completed daily check-ins where they reported the goal they worked on, the number of hours spent, and whether the goal was more, less, or as difficult as expected (*"This goal was... than I expected."*). These daily reflections captured students' ongoing self-evaluations of their goal-related expectations.

Between Week 4 and Week 9, students received instruction on self-regulated learning (SRL) theories and practices, including goal setting, self-monitoring, and time management strategies. In week 9, the same daily diary activity was repeated. For consistency in terminology throughout the study, Week 4 is referred to as "early in the semester," and Week 9 as "late in the semester."

Measurement

A selection of three items from the daily diary were used to measure student's self-evaluation of past goal experiences including self-evaluations of: (a) goal attainment, (b) accuracy of goal difficulty and (c) accuracy of time estimation early in the semester. Goal self-efficacy (1 item), and timely goal attainment (2 items) were also measured for each goal in the daily diary. Rather than focusing on each individual goal, the study aims to examine the overall patterns in students' goal setting skill across the week. Specifically, the measures assessed students' self-evaluation of past goal experiences by averaging responses across the five goals they set during one week early in the semester. Similarly, their self-efficacy and timely goal attainment were averaged across the five goals they set during one week late in the semester. This aggregated approach provides a comprehensive view of students' self-regulatory processes and their ability to set, evaluate, and attain self-directed study goals within a structured timeframe.

Self-evaluation of Goal attainment. After each of five study sessions over the week 4 and week 9, students completed a self-statement about their goal attainment (for the purpose of this study, only goal attainment from week 4 was used as a predictor in the study). Goal attainment was reported after each study goal by responding to 'I [did not attain—part*ially attain—fully attain']* within 2 hours). Students chose one of three options (1 = *Did not attain*, 2 = *Partially attained*, 3 = *Fully attained*). For the purposes of this study, goal attainment was computed as a score for each week (Week 4 and Week 9), based on the frequency of fully attained goals across the five goals they set. Specifically, a goal attainment score was derived by calculating the proportion of study goals that students reported as "fully attained" (coded as 1) within the given week. In contrast, study goals that were partially attained or not attained were grouped together and coded as 0, as these goals did not meet the full completion criterion. For the purposes of this study, partially attained goals were treated as not attained because using a binary scale simplifies the analysis, making it easier to interpret the key outcome—whether or not a student fully attained their goal. Additionally, the primary interest of the study is in determining whether the goal was fully achieved within the specified timeframe, rather than assessing partial progress. This approach allows for a more precise measurement of successful goal attainment by emphasizing complete success rather than partial progress.

Unlike traditional research, which focuses on attainment of assigned goals, this study emphasized success in meeting self-set goals. This approach provides insights into students' personal goal-setting processes and their capacity to regulate learning in response to their own goal attainment self-evaluations.

Accuracy of goal difficulty evaluation. Goal difficulty evaluation was assessed after each of the five study sessions during Week 4 (early in the semester) and Week 9 (late in the semester). For the purpose of this study, only goal difficulty evaluation from week 4 was used as

a predictor in the study. After completing a study session, students reported their perceived goal difficulty by responding to the prompt: “This goal was [ ] than I expected.” Students selected from the following responses: “much easier than expected”, “a little easier than expected”, “the same level of difficulty”, “a little more difficult than expected”, “much more difficult than expected”.

For the purposes of this study, goal difficulty evaluation was categorized into three levels. A score of 3 (accurate) was assigned when students reported that the goal was the same level of difficulty as expected. A score of 2 (somewhat inaccurate) was assigned when students indicated that the goal was a little easier or a little more difficult than expected. A score of 1 (very inaccurate) was assigned when students reported that the goal was a lot easier or much more difficult than expected. Accuracy of goal difficulty evaluation was computed as a score for each week (Week 4 and Week 9) based on the average rating scores (after recoding) across the five study goals set during that week. Higher scores indicate greater accuracy in goal difficulty evaluation, whereas lower scores reflect greater discrepancies between students' expectations and actual experiences.

Accuracy of time estimation evaluation. The time students spent on each of their goals was assessed after each of the five study sessions during Week 4 (early in the semester) and Week 9 (late in the semester). For the purpose of this study, only accuracy of time estimation from week 4 was used as a predictor in the study. After their study session, students completed a self-statement about the time they spent on each of their goals (i.e., I worked towards my goal for *[zero hours— less than 1 hour—1-2 hours—2-3 hours—more than 3 hours])*.

For the purposes of this study, responses were categorized into three levels. A score of 3 (accurate) was assigned when students reported spending 1–2 hours on their goal, as this matched the intended study session duration. A score of 2 (somewhat inaccurate) was assigned when students reported spending less than 1 hour or 3–4 hours, indicating a moderate deviation from their initial estimate. A score of 1 (very inaccurate) was assigned when students reported spending zero hours or more than 4 hours, reflecting a significant discrepancy between their estimated and actual study time. Accuracy of time estimation was computed as a score for each week (Week 4 and Week 9) based on the average of students' ratings (after recoding) across the five study goals set during that week. Higher scores indicate greater accuracy in time estimation, whereas lower scores reflect greater discrepancies between students' expected and actual time spent on study goals.

Goal self-efficacy. Students completed the following self-statement about their confidence of attaining each of their goals before each of the five study sessions during Week 4 (early in the semester) and Week 9 (late in the semester) (i.e., ‘How confident are you that you will attain each goal this week?’). For the purpose of this study, only goal self-efficacy from

week 9 was used as a predictor in the study**.** Confidence choice was scored on a 5-point numerical scale ranging from (1) *not at all certain* to (5) *extremely certain.*

Timely goal attainment. Timely goal attainment was assessed late in the semester using a computed variable that combined students' self-reported goal attainment late in the semester and the time they spent on each of their goals late in the semester. This measure was designed to capture both whether students fully attained their goal and whether they did so within an expected timeframe. As we mentioned earlier, after each study session, students provided separate self-reports for goal attainment by indicating whether they fully attained, partially attained, or did not attain their study goal. Additionally, they reported the amount of time spent working towards their goal by selecting from the following options: 0 hours, less than 1 hour, 1–2 hours, 2–3 hours, or more than 3 hours.

For the purposes of this study, timely goal attainment was computed as a binary variable for each study session. A student was classified as having "fully attained within the timeframe" (coded as 1) if they (a) reported "fully attained" on the goal attainment measure and (b) indicated spending "1–2 hours" on the time estimation scale. Any other combination—such as reporting partial or no attainment or spending a different amount of time—was categorized as "did not attain within the timeframe" (coded as 0). A timely goal attainment score was then computed for Week 9 (late in the semester) based on the proportion of study sessions in which students met both criteria. This measure extends beyond general goal attainment by integrating a time management component, reflecting students' ability to complete self-set goals efficiently within a structured timeframe.

Analytic Strategy

In the initial phase of data analysis, an average score for time estimation accuracy evaluation, goal difficulty evaluation and goal self-efficacy—were computed for each student across the five goals set early and late in the semester. These averaged scores then served as the data points for further analysis. This approach focuses on between-person differences rather than within and between goal variabilities, aligning with our research objective of understanding how students' self-evaluation of past goal experience influences future self-efficacy and timely goal attainment across multiple goals, focusing on the overall impact of goal evaluation rather than fluctuations in specific goals.

To understand the distribution and characteristics of key study variables, descriptive statistics were computed to assess patterns in students' self-evaluation of past goal experiences, goal self-efficacy, and timely goal attainment over time. This initial analysis helps to evaluate the normality of the data, identify potential trends, and determine whether transformations or additional data cleaning procedures are necessary before further analysis.

Descriptive statistics were calculated for goal self-efficacy, accuracy of goal time estimation, and accuracy of goal difficulty evaluation, including means, standard deviations, skewness, and kurtosis to assess the distribution of these variables within individuals across the five goals they set. For self-evaluation of goal attainment, frequencies were analyzed to examine the proportion of attained versus non-attained goals within individuals at both early and late points in the semester. This step ensures a clear understanding of the data distribution before conducting further analyses.

To test the hypothesized relationships between the independent variables (early semester evaluation of goal attainment, accuracy of goal difficulty evaluation, and accuracy of time estimation), the mediator (goal self-efficacy late in the semester), and the dependent variable (timely goal attainment late in the semester), path analysis was conducted using Mplus (Version 8.8, Muthén & Muthén, 1998-2017).

Data Screening and Testing Assumptions

Prior to conducting the path analysis, univariate normality for each variable was assessed by examining skewness, kurtosis, and visual inspection of distribution graphs (e.g., histograms). These diagnostics help determine the appropriateness of using Maximum Likelihood (ML) estimation. If the data meets normality assumptions, ML estimation is employed, as it provides robust and efficient parameter estimates under normality. If the data is found to significantly deviate from normality, an alternative estimator more suitable for non-normal data may be considered. The proposed path analysis model is a saturated model, meaning all possible direct and indirect paths between the variables are included. This approach is justified because the hypothesized relationships suggest comprehensive interconnections among all variables, aligning with theoretical frameworks of social cognitive theory and SRL theory (Bandura, 1986; Winne & Hadwin, 1998, 2008). Including all paths in the model ensures that no potential relationships are omitted, allowing for a thorough examination of both direct effects and mediated relationships. Since the proposed path analysis model is a saturated model, traditional model fit indices (e.g., CFI, RMSEA) are not applicable (Byrne, 2016). Instead, parameter estimates and their associated statistical significance levels were the focus for evaluating the hypothesized relationships. Indirect effects were calculated to examine potential mediation by self-efficacy at Time 2.

Results

Descriptive Statistics

Frequency distributions for each variable are presented in Appendix A, providing an overview of their range and central tendencies. These distributions align well with normal distribution curves. Among them, timely goal attainment at time 2 exhibits a slightly positively

skewed distribution (+.45), but this deviation is unlikely to significantly affect model estimation due to the multivariate normality confirmed across the dataset.

Means, standard deviations (SD), skewness, and kurtosis for each variable of interest were shown in Table 1. The results indicate that most variables are relatively symmetric and do not indicate severe non-normality and fall within acceptable ranges for skewness and kurtosis (skewness and kurtosis: ±1) (Tabachnick & Fidell, 2013). The Henze-Zirkler test for multivariate normality conducted in R confirmed that the data met the assumptions of multivariate normality (p=.098). These results justify the use of maximum likelihood (ML) estimation for the path analysis, which is robust under conditions of multivariate normality.

Table 1

Descriptive Statistics for Self-Evaluation of Goal Attainment, Accuracy of Goal Time Estimation, Accuracy of Goal Difficulty Evaluation, Goal Self-Efficacy and Timely Goal Attainment

	Means	***SD***	**Skewness**	**Kurtosis**	**1**	**2**	**3**	**4**	**5**
1.Self-Evaluation of Goal attainment	.604	.249	-.221	-.524	1				
2.Accuracy of goal time estimation	2.352	.389	-.525	-.027	.049	1			
3.Accuracy of goal difficulty evaluation	2.268	.335	-.099	-.111	.028	.386***	1		
4.Self-efficacy	3.964	.646	-.333	-.012	.137*	.011	.030	1	
5.Timely goal attainment	.357	.290	.452	-.785	.161	.278**	.199	.303***	1

Note: *SD*=standard deviation; *** significant at the 0.001 level; ** significant at the 0.01 level; * significant at the 0.05 level

The relationships between the study variables were analyzed using Pearson correlation coefficients calculated in Mplus, as presented in Table 1. Self-evaluation of goal attainment early in the semester was positively correlated with goal self-efficacy late in the semester ($r = .137$, $p = .048$), indicating that higher self-evaluation of goal attainment early in the semester is associated with greater goal self-efficacy late in the semester. Additionally, accuracy of goal time estimation early in the semester demonstrated a significant positive correlation with timely goal attainment late in the semester ($r = .278$, $p = .001$), highlighting the association between accurate time estimation and timely goal attainment. A strong positive correlation was also observed between accuracy of goal time estimation early in the semester and accuracy of goal difficulty evaluation early in the semester ($r = .386$, $p < .001$), suggesting an association between accuracy in time estimation and goal difficulty evaluation. Finally, goal self-efficacy late in the semester exhibited a positive correlation with timely goal attainment late in the semester ($r = .303$, $p < .001$), emphasizing the potential role of goal self-efficacy in facilitating timely goal attainment.

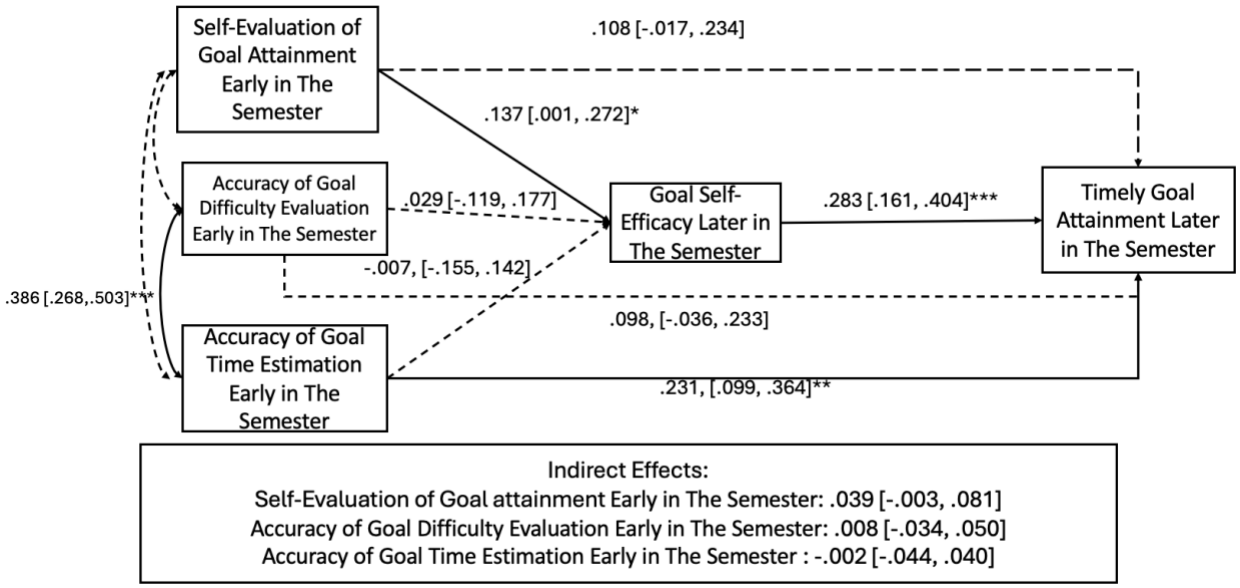
A paired-samples t-test was conducted to examine changes in students' self-evaluation of goal-related experiences from the early to the late semester study sessions. As shown in Appendix B, the results indicate a significant increase in students' self-evaluation of goal attainment, and a modest but statistically significant improvement in the accuracy of goal difficulty evaluation. No significant change was observed in the accuracy of time estimation.

Path analysis

Path analysis was conducted to examine the predictive relationships depicted in Figure 3. Self-Evaluation of goal attainment early in the semester, accuracy of goal time estimation early in the semester, accuracy of goal difficulty evaluation early in the semester, goal self-efficacy late in the semester and timely goal attainment late in the semester.

Figure 3

Path Analysis Model of Self-Evaluation of Goal Attainment, Accuracy of Goal Time Estimation, Accuracy of Goal Difficulty Evaluation Early in The Semester, Goal Self-Efficacy and Timely Goal Attainment Late in The Semester



*Note. Solid lines represent significant paths and dashed lines represent non-significant paths; *** significant at the 0.001 level; ** significant at the 0.01 level; * significant at the 0.05 level.*

RQ 1: Does self-evaluation of past goal experience (self-evaluation of goal attainment, accuracy of goal difficulty evaluation, and accuracy of goal time estimation) related to timely goal attainment late in the semester?

Self-evaluation of goal attainment early in the semester was not associated with timely goal attainment late in the semester (β = .108, SE = .064, p = .089, CI [-.017, .234]). Although the estimate suggested a weak positive effect, the lack of statistical significance indicates that past goal attainment did not predict timely goal achievement within the studied timeframe.

Similarly, accuracy of goal difficulty evaluation early in the semester did not significantly predict timely goal attainment late in the semester (β = .098, SE = .069, p = .151, CI [-.036, .233]). This finding suggests that students' ability to accurately evaluate the difficulty of their goals did not enhance their likelihood of completing future goals within set deadlines.

In contrast, accuracy of time estimation early in the semester emerged as a significant predictor of timely goal attainment late in the semester (β = .›231, SE = .067, p = .001, CI [.099, .364]). This result underscores the critical role of accuracy of time estimation in facilitating successful and timely goal attainment. Students who could better estimate the time required for their tasks were more likely to meet their future goals within the given timeframe.

RQ 2: Does self-evaluation of past goal experience (self-evaluation of goal attainment, accuracy of goal difficulty evaluation, and accuracy of time estimation) related to their goal self-efficacy late in the semester?

According to the path analysis results (Figure 3), self-evaluation of goal attainment early in the semester is positively associated with goal self-efficacy late in the semester (β = .137, SE = .069, p = .048, CI [.001, .272]). In contrast, early semester accuracy of goal difficulty

evaluation and accuracy of time estimation were not associated with goal self-efficacy in the late semester (see Figure 3). Findings suggest that accurate self-assessments of goal difficulty or time requirements do not directly enhance students' goal self-efficacy for future goals.

RQ 3: Does students' goal self-efficacy late in the semester related to the probability of timely goal attainment late in the semester?

Self-efficacy late in the semester was found to be positively associated with timely goal attainment late in the semester (β = .283, SE = .062, p < .001, CI [.161, .404]).

RQ 4: To what extent does self-efficacy about one's goals mediate the influence of self-evaluation of past goal experiences on timely goal attainment late in the semester.

Mediation analyses were conducted to assess whether goal self-efficacy mediated the relationships between the independent variables (self-evaluation of goal attainment early in the semester, accuracy of goal time estimation early in the semester, accuracy of goal difficulty evaluation early in the semester) and dependent variable (timely goal attainment late in the semester). None of the mediation hypotheses were supported (see Figure 3).

Goal self-efficacy late in the semester did not mediate the relationship between any early semester predictors—self-evaluation of goal attainment, accuracy of goal difficulty evaluation, and accuracy of goal time estimation—and outcome in the late semester—timely goal (see Figure 3). None of the indirect effects were statistically significant (indirect effects are reported in Figure 3), indicating that goal self-efficacy did not serve as a mediating mechanism in these relationships. These findings indicate that goal self-efficacy does not mediate the relationships between these predictors and timely goal attainment.

Discussion

This study aimed to address the gap in SRL and goal attainment research by investigating how students' self-evaluations of their personally set goals early in the semester related to their future goal self-efficacy and timely goal attainment. The findings of this study provide insight into the interplay between prior self-evaluation of goals, future goal self-efficacy, and future timely goal attainment within the framework of SRL and social cognitive theory. Specifically, the results support the SRL theory that students' self-evaluations of past goal experiences and goal self-efficacy interact and influence their ability to attain future goals within set timeframes. These findings hold important implications for both theoretical advancement and practical applications in the field of educational psychology and SRL research.

Findings Consistent with Theory and Research

Prior self-evaluation of goal attainment is positively associated with later goal self-efficacy

The positive and significant relationship between self-evaluation of goal attainment early in the semester and goal self-efficacy late in the semester aligns with Bandura's (1977, 1997) social cognitive theory that mastery experiences are a primary source of self-efficacy, as

successfully achieving goals reinforces confidence in future tasks. This finding also supports empirical research, such as Zimmerman et al. (1992), who found that effective goal setting enhances perceptions of progress, thereby strengthening self-efficacy and encouraging more challenging goal setting. Similarly, studies by Tolli and Schmidt (2008) and Vancouver et al. (2001) demonstrate that past performance and feedback influence self-efficacy, with higher self-efficacy stemming from previous successes. For students, this means that achieving initial goals builds confidence to approach future goals. For educators, the findings reaffirm the importance of designing learning environments that promote academic success in early stages. Strategies such as breaking tasks into smaller, manageable goals, providing clear guidance, and celebrating incremental successes align with these insights and can support students in building a solid foundation for self-efficacy and academic persistence.

Goal self-efficacy is positively associated with later timely goal attainment

Similarly, the robust relationship observed between goal self-efficacy at late in the semester and timely goal attainment late in the semester aligns with prior research goal-setting theory which emphasizing the critical role of self-efficacy as a predictor of academic success (e.g., Latham & Locke, 2007). Previous studies have consistently demonstrated that self-efficacy is positively related to individuals' motivation, persistence, and resilience, enabling them to overcome challenges and achieve academic goals (Klassen & Usher, 2010; Augustiani et al., 2016). While these studies primarily focus on the link between self-efficacy and broader academic performance outcomes such as GPA, the findings of this study extend the literature by specifically examining goal self-efficacy's role in student's personally set goal attainment within timeframe. This study addresses a critical gap in the literature by providing evidence on how goal self-efficacy supports the attainment of personally set, proximal goals—a key aspect of self-regulated learning that is often overlooked in favor of general performance metrics. Additionally, these findings not only confirm the importance of self-efficacy but also suggest that targeted interventions, such as reflective activities and mastery-oriented feedback, are essential tools for educators to enhance students' ability to achieve their goals within set timeframes.

Accuracy of goal time estimation is positively associated with future timely goal attainment

The study also found a significant relationship between accuracy of goal time estimation early in the semester and timely goal attainment late in the semester. This finding underscores the importance of precise time management in achieving goals within designated timeframes. While previous research, such as Bahena-Olivares (2022)'s study, demonstrated that time estimation accuracy predicts goal completion within a single study session, this study extends those findings by showing that time estimation accuracy in a study session early in the semester predicts goal attainment in a study session late in the semester. By doing so, it highlights the broader relevance of accurate time estimation in predicting not only short-term but also a future goal attainment. Students who accurately estimate the time required for tasks may be better equipped to plan and allocate their efforts effectively, ensuring the completion of goals in a timely manner. For educators, these results highlight the value of teaching time-management strategies and

incorporating exercises that encourage students to develop more accurate time estimation skills. By fostering these competencies, educators can enhance students' ability to meet deadlines and navigate academic demands successfully.

Unexpected Findings and Possible Explanations

Goal self-efficacy is not associated with some early self-evaluation of goal setting

Contrary to expectations, which were based on the broader understanding that mastery experience and feedback influences self-efficacy (Bandura, 1977; Zimmerman et al., 1992), the results revealed no association between accuracy of goal difficulty evaluation early in the semester or accuracy of goal time estimation early in the semester and goal self-efficacy late in the semester. While the accuracy of these evaluations was conceptualized in this study as specific forms of feedback, prior research has predominantly examined feedback in general terms, without delving into the unique contributions of different feedback types to self-efficacy development (Tolli & Schmidt, 2008; Shea & Howell, 2000). The specific forms of feedback examined in our study—goal difficulty evaluation accuracy and time estimation accuracy—don't meaningfully influence self-efficacy, possibly because such granular feedback lacks the motivational component typically found in broader mastery experiences or qualitative feedback. Another possible explanation lies in the way evaluation accuracy was measured. Averaging scores across five goals may have obscured goal-specific nuances, as certain goals may have had a stronger impact on self-efficacy than others. Self-efficacy might be more sensitive to feedback tied to specific goals rather than generalized across multiple goals. Additionally, the process of averaging likely overlooked individual variations in how students interpreted feedback of each goal. These findings suggest that future research should explore goal-specific feedback and its impact on self-efficacy to capture the dynamic nature of this relationship. In addition, it highlights the multifaceted nature of self-efficacy formation, where other factors—such as commitment of goals—might be more influential. Future research could investigate these alternative pathways, including whether specific feedback types interact with individual differences in motivation and learning strategies, to provide a more nuanced understanding of how self-efficacy evolves.

Goal self-efficacy does not mediate the relationship between past self-evaluation of goal experiences and timely goal attainment in the future

This study hypothesized that goal self-efficacy late in the semester would mediate the relationship between past goal experiences (goal attainment, accuracy of goal difficulty evaluation, and accuracy of time estimation) early in the semester and timely goal attainment late in the semester (H4a, H4b, H4c). However, the findings did not support this mediation pathway. Prior research found self-efficacy's key role in learning and performance, as well as how mastery experiences and feedback shape self-efficacy, which in turn influences future performance (Bandura, 1986, 1997; Zimmerman et al., 1992; Tolli & Schmidt, 2008; Shea & Howell, 2000). Although self-evaluation of goal attainment early in the semester was associated with self-

efficacy late in the semester, and goal self-efficacy late in the semester was associated with timely goal attainment late in the semester, the indirect effects through goal self-efficacy were not found. This suggests that goal self-efficacy may not fully capture the mechanisms through which evaluative accuracy influences goal attainment. Instead, direct effects—such as the observed relationship between time estimation accuracy and timely goal attainment—may be more prominent. Contextual factors, such as external deadlines or task importance, might further reduce self-efficacy's mediating role in this academic setting. Future research should explore alternative mediators (e.g., goal challenges, goal types) and consider how feedback can be designed to more effectively strengthen self-efficacy in academic and other contexts.

Significance and Implications

This study advances the understanding of SRL and goal setting by integrating two critical frameworks: SRL theory and social cognitive theory. While both frameworks have been extensively studied independently (Zimmerman, 2002, 2008; Winne & Hadwin, 1998, 2008; Panadero, 2017), this research bridges the gap by examining their interplay to understand how self-evaluation of past goals influence goal self-efficacy and subsequent performance. Specifically, this study sheds light on how mastery experiences, such as prior goal attainment, directly enhance self-efficacy and contribute to future goal achievement within time-bound constraints. By doing so, it not only confirms existing theories but also extends their application to personalized, time-sensitive academic settings. In addition, this study brings together SRL theory with time-management theory (Koch and Kleinmann 2002), which is important for advancing our SRL theory to be more explicit about the time component and its role in self-regulation. By incorporating the variable of timely goal attainment, this study offers an unique contribution to the SRL literature by linking goal achievement with time constraints—an aspect often underemphasized in prior research. This variable captures the critical time-bound nature of academic goals, providing a more nuanced understanding of the factors driving success in educational settings. For university students, who frequently face time-limited study tasks, understanding how they can effectively achieve their goals within these constraints is particularly important.

This study also addresses several critical gaps in the literature on SRL and goal setting. Unlike previous research that relies on objective comparisons between set goals and performance (e.g., Follmer et al., 2022), this study emphasizes students' subjective evaluations of their own goal-setting processes. By doing so, it provides valuable insights into how learners perceive and use their self-assessments to guide their learning efforts, offering a more holistic view of the internal processes involved in goal-setting and self-regulation. Furthermore, while previous studies have primarily examined how goal-related factors impact overall academic performance metrics such as GPA (Dignath & Veenman, 2021; Jansen et al., 2019; Wolters et al., 2023), this study uniquely investigates the direct influence of these factors on students' attainment of personally set goals. By doing so, it provides insight of the personalized aspects of goal setting. Moreover, although the reciprocal relationship between self-efficacy and academic performance

has been examined (e.g., Talsma et al., 2018), the mediating role of self-efficacy in the relationship between past performance and future goal attainment has not been sufficiently explored. This study addresses this gap by investigating if self-efficacy mediates the influence of prior goal attainment and evaluation on subsequent academic performance, thereby enhancing our understanding of the mechanisms underlying successful goal setting. Understanding this mediation is critical because self-efficacy may serve as a key mechanism through which students translate past goal experiences into future success. Beyond filling a research gap, this insight has practical implications for education—if self-efficacy strengthens the impact of past learning, then interventions that foster confidence, such as structured reflection or mastery-oriented feedback, could help students better regulate their learning and achieve goals more effectively. Additionally, this study extends the literature by addressing a gap regarding the types of feedback in self-efficacy development. While prior research has examined feedback as a general mechanism (Shea and Howell, 2000; Tolli & Schmidt, 2008; Vancouver et al., 2001), this study uniquely investigates specific types of feedback— previous goal attainment, the accuracy of goal difficulty evaluation and time estimation—and their influence on self-efficacy. By exploring these nuanced forms of feedback, this research provides deeper insights into the ways in which previous goal attainment and evaluative accuracy contributes to self-efficacy development within the context of self-regulated learning and goal attainment.

Additionally, self-report data, often criticized for its limitations, serves as a vital tool in this study. Despite potential biases, self-report methods provide unique insights into students' intrapsychic aspects like evaluation, motivations, and self-efficacy, which are crucial for understanding SRL processes (Fryer & Dinsmore, 2020). In addition, self-report surveys provide unique explanatory insights by capturing patterns and variations in strategy use that other methods may not reveal (Fryer & Dinsmore, 2020; Halem et al., 2020). For instance, Halem et al. (2020) demonstrated that combining self-report data with trace data from students' online activities provides a comprehensive analysis, revealing unique variances in academic performance not captured by behavioral data alone but captured by self-report data. These insights are important for developing tailored educational strategies that improve student’s goal setting skills and goal attainment, aligning with modern educational directives that emphasize personalized learning approaches (Deed et al., 2014; Roegiers et al., 2020), thereby fostering more effective learning environments.

For educational practice, the findings underscore the importance of creating learning environments that support the cyclical process of self-regulation and mastery experience. Educators can develop interventions that not only focus on goal setting but also provide ongoing feedback and opportunities for mastery experiences. Such interventions might include structured reflection activities, where students assess their goal attainment and receive feedback that helps them refine their future goals and strategies. By fostering environments that encourage the calibration of task difficulty and time estimation, educators can help students become more

accurate in their self-assessments, leading to more effective self-regulated learning and goal setting.

Limitations

This study exclusively involved first-year undergraduate students enrolled in a L2L course at a Western Canadian university, which may not reflect the broader university student population. These students opted into a course designed to enhance self-regulated learning skills, suggesting that they may not represent the typical student. Therefore, the findings should be interpreted with caution, acknowledging the potential for a self-selection bias.

Another limitation is the temporal scope of this study was limited to two measurement points during a single academic term, which does not allow for the assessment of long-term impacts of SRL interventions on students' learning and goal attainment. The transient effects observed may not sustain over longer periods, which is a crucial consideration for educational interventions aimed at lasting change. Future research could address this limitation by employing a longitudinal design to investigate how these factors influence future goal attainment, providing a more comprehensive understanding of goal-setting behaviors.

In addition, although self-report data is important for capturing students' subjective experiences and self-assessments in goal setting, it has inherent limitations. Self-report measures can be prone to inaccuracy, as students may not take the surveys seriously or may be influenced by biases such as social desirability, which could lead to over- or under-reporting of their engagement with goal-setting processes. However, since self-report data offers unique value by providing insight into students' internal evaluations and perceptions—perspectives that are difficult to access through objective measures alone. To mitigate this limitation in future studies, a mixed-methods approach incorporating behavioral metrics alongside self-report could provide a more comprehensive picture of how students' perceived and actual goal-setting behaviors align.

Also, while this study focuses on how students' previous assessments influence their subsequent performance, this study does not explore the extent to which students' learning experiences improve over time. This gap highlights the need for future research to examine the trajectory of students' learning and how their evolving experiences can further inform goal attainment and self-regulated learning. Understanding this dynamic could provide deeper insights into the effectiveness of self-assessment and goal-setting strategies in academic contexts.

Furthermore, the measurement of goal attainment, goal difficulty evaluation, and time estimation was averaged across multiple goals. This approach may overlook individual differences in how students' approach and achieve each specific goal, as well as the progression of their goal-setting behaviors over time. Future studies should consider analyzing each goal

individually to capture these nuances, providing a more detailed understanding of how students' evaluations and achievements evolve with each goal.

Additionally, while this study provides valuable insights into students' self-evaluations of goal attainment, an important area for future research lies in examining the quality and nature of the goals students set, rather than focusing solely on their evaluations. The characteristics of goals—such as their specificity, difficulty, and alignment with personal values—can influence students' perceptions of their progress and self-efficacy (Locke & Lathem, 2019). Investigating how students formulate their goals, the strategies they use to achieve them, and the contextual factors influencing goal setting could yield deeper insights into the interplay between goal quality and self-evaluations. This approach would offer a more holistic perspective on how students regulate their learning and refine their strategies over time.

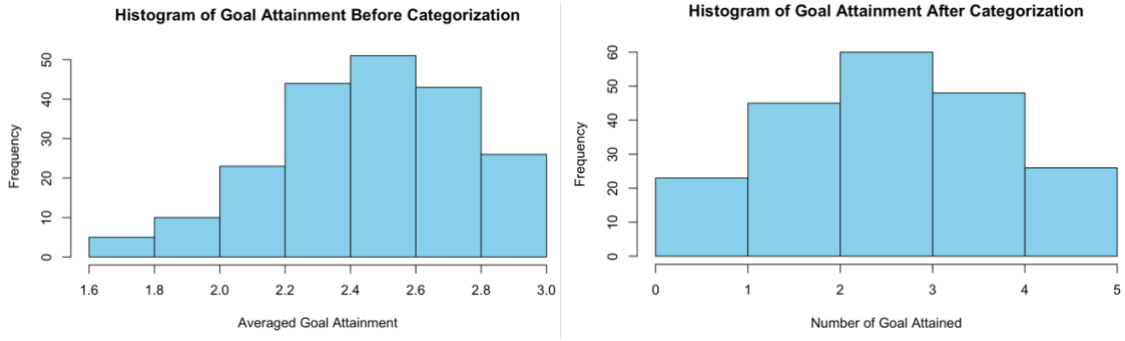
Finally, as a saturated model (i.e., all possible paths are included), it did not allow for the examination of model fit indices, which constrains the ability to assess how well the model aligns with observed data. This presents a significant limitation, as model fit indices (e.g., RMSEA, CFI, TLI) provide critical information about how well a proposed model represents the observed data. Without these indices, it is difficult to determine whether the relationships among the study variables align with broader theoretical expectations or if alternative model structures might provide a better representation of the data. Future research should consider developing over-identified models to test their fit and validate the relationships among these variables. So it can constrain certain paths to allow for model fit assessment, thereby enabling a more robust evaluation of the validity of these relationships and ensuring that findings are not an artifact of model specification.

Conclusion

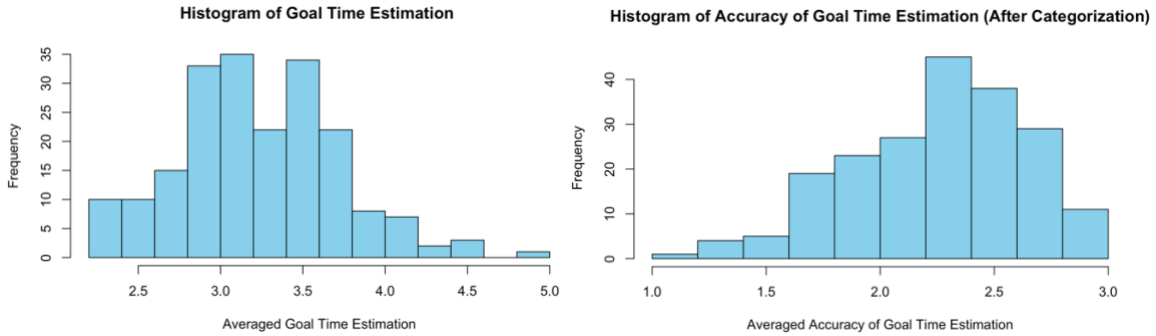
In summary, this study advances the understanding of SRL and goal setting by analyzing the relationships between self-evaluation of past goal experience (self-evaluation of goal attainment, accuracy of time estimation and accuracy of goal difficulty evaluation), future goal self-efficacy, and future timely goal attainment. The findings highlight the significant positive effects of past goal attainment on future goal self-efficacy and the influence of goal self-efficacy on timely goal attainment. Moreover, the results reveal a significant direct relationship between accurate time estimation and timely goal attainment, further emphasizing the importance of temporal awareness in goal-setting processes. At the same time, the study highlights the limited role of evaluative accuracy in directly influencing self-efficacy, suggesting that other factors may be more critical for building students' confidence. Together, these findings provide valuable insights into the mechanisms underlying successful goal-setting and self-regulated learning, with important implications for both research and educational practice.

Appendix A

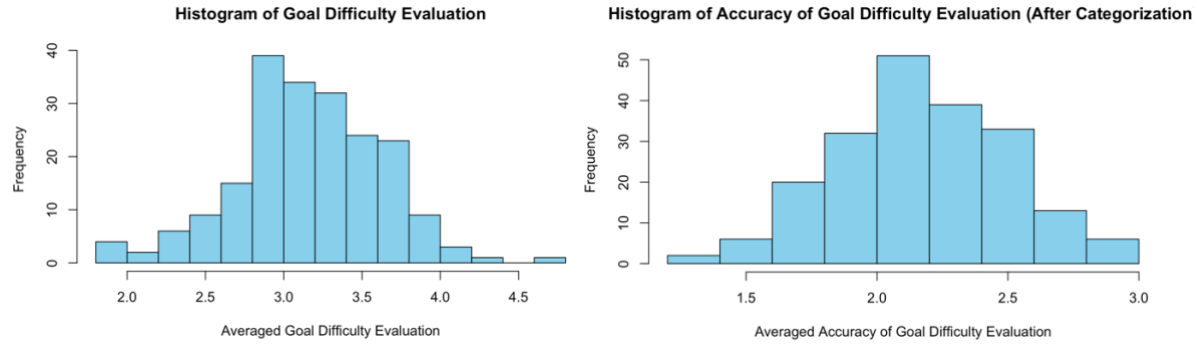
Averaged Goal Attainment (Across Five Goals) Early in The Semester Before Categorization (Left) and Number of Goal Attained Ealy in The Semester After Categorization (Right)



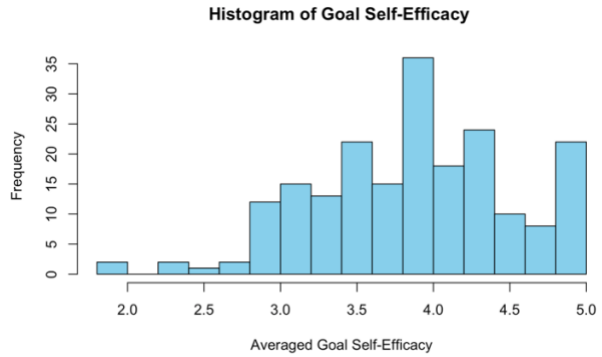
Average Goal Time Estimation Early in The Semester (Left) and Averaged Accuracy of Goal Time Estimation (After Categorization) Early in The Semester (Right)



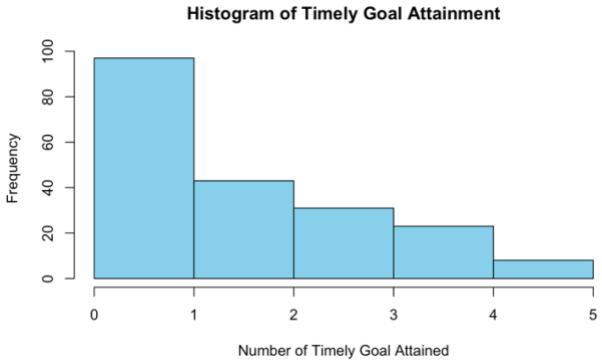
Average Goal Difficulty Evaluation Early in The Semester and Averaged Accuracy of Goal Difficulty Evaluation (After Categorization) Early in The Semester



Average Goal Self-Efficacy Late in The Semester



Timely Goal Attainment Late in The Semester



Appendix B

Paired-Sample t-Test for Goal Attainment, Accuracy of Time Estimation and Accuracy of Goal Difficulty Evaluation

	Variable	Early Semester Mean (SD)	Late Semester Mean (SD)	t (201)	p-value	Significant?
1	Goal Attainment	.60 (.25)	.73 (.24)	-5.58	< .001	Yes
2	Accuracy of Time Estimation	2.35 (.39)	2.33 (.45)	0.80	.42	No
3	Accuracy of Goal Difficulty Evaluation	2.27 (.34)	2.34 (.34)	-2.65	.009	Yes

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