

**Growth Mindset and Self-Regulated Learning as Essential Psychological
Competencies for Undergraduate Students: Changes in Task Difficulty Preference
and Academic Procrastination Across Latent Profiles**

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Abstract

The university period represents a transitional stage from adolescence to adulthood. Unlike the relatively passive learning environments of middle and high school, university students are situated in an autonomous academic context that requires them to independently plan, monitor, and implement their own learning. In this context, students are expected not only to achieve academic success but also to develop psychological competencies necessary for sustained personal growth and a fulfilling life. This demand has become even more pronounced in the era of artificial intelligence (AI), where rapidly evolving learning environments require students to proactively regulate their learning and continuously adapt to new challenges. Within such contexts, growth mindset and self-regulated learning emerge as essential psychological competencies that support students' capacity for learning, responsibility, and continuous development. These competencies are reflected in how students engage with academic challenges, including their willingness to take on difficult tasks and their ability to manage procrastination when facing demanding academic requirements.

This study identified latent profiles of self-regulated learning (SRL) and mindset among 311 university students and examined profile-based longitudinal changes in task difficulty preference and academic procrastination. Task difficulty preference and academic procrastination were measured at three time points at two-month intervals during the semester. A latent profile analysis (LPA) was conducted to classify subgroups based on the levels of self-regulated learning and growth mindset and to examine their relationships with relevant variables. To investigate

how task difficulty preference and academic procrastination change across the identified latent profiles, multiple group growth modeling (MGGM) was applied. A key advantage of MGGM is its ability to separately analyze the mean intercept and slope for task difficulty preference and academic procrastination within each profiles.

Using Latent Profile Analysis, four distinct profiles were identified: Low SRL–Fixed Mindset (C1; 12.9%), High SRL–Growth Mindset (C2; 17.0%), Average SRL–Average Mindset (C3; 59.2%), and Imbalanced SRL–Fixed Mindset (C4; 10.9%). The first group, consisting of 40 students (12.9%), was labeled the ‘Low SRL-Fixed Mindset (C1)’ group as it showed the lowest levels of self-regulated learning and growth mindset, while recording the second-highest level of fixed mindset. The second group, labeled ‘High SRL-Growth Mindset (C2)’, comprised 53 students (17.0%) and exhibited the highest levels of self-regulated learning and growth mindset with the lowest fixed mindset. The third group, ‘Average SRL-Growth Mindset (C3)’, represented the largest proportion with 184 students (59.2%); this group showed average SRL levels and a relatively high growth mindset. Finally, the fourth group, representing 34 students (10.9%), was named the ‘Imbalanced SRL-Fixed Mindset (C4)’ group. This group showed above-average SRL levels—with cognitive regulation being relatively higher than behavioral and motivational regulation—and the highest fixed mindset scores among all four groups. Significant differences were observed in behavioral regulation, growth mindset, and fixed mindset across all profiles. In contrast, cognitive regulation scores did not differ significantly between the ‘High SRL-Growth Mindset’ and ‘Imbalanced SRL-Fixed Mindset’ profiles, nor did motivational regulation scores show a significant difference between the ‘Average SRL-Growth’ and ‘Imbalanced SRL-Fixed Mindset’ profiles.

Based on the identified profiles, the initial levels of students’ task difficulty preference followed the order: High SRL–Growth Mindset, Average SRL–Average Mindset, Imbalanced SRL–Fixed Mindset, Low SRL–Fixed Mindset ($C2 > C3 > C4 > C1$). Task difficulty preference increased significantly over the semester for students in the Low SRL–Fixed Mindset (C1) and Average SRL–Average Mindset (C3) profiles, whereas no significant changes were observed in the remaining profiles. Meanwhile, the initial levels of students’ academic procrastination, from lowest to highest, followed the order: High SRL–Growth Mindset, Imbalanced SRL–Fixed Mindset, Average SRL–Average Mindset, and Low SRL–Fixed Mindset ($C2 < C4 < C3 < C1$). Over

the semester, students' academic procrastination significantly decreased in the Low SRL–Fixed Mindset (C1) and Average SRL–Average Mindset (C3) profiles, while no significant changes were found in the other profiles.

These findings indicate that a growth mindset is associated with stronger self-regulated learning, although above-average self-regulation can also be observed among certain individuals with fixed mindsets. Specifically, the results show that students with a growth mindset demonstrate a higher preference for challenging tasks, whereas students with higher levels of self-regulated learning are associated with lower levels of academic procrastination. It is noteworthy that the 'Average SRL-Growth Mindset' and 'Imbalanced SRL-Fixed Mindset' groups showed no significant difference in their initial levels of task difficulty preference, despite their diverging profiles in cognitive regulation, behavioral regulation, and both growth and fixed mindsets. This suggests that task difficulty preference is influenced by both mindset and self-regulated learning (SRL); moreover, it implies that proficient self-regulated learning can serve as a buffer, mitigating the adverse effects of a fixed mindset.

Yet, a high proportion of students showed below-average self-regulated learning and fixed mindsets, thereby highlighting the importance of growth mindset-based self-regulated learning interventions. By strengthening these competencies, such interventions can foster not only academic success but also overall student flourishing, thereby underscoring self-regulated learning and a growth mindset as essential positive psychological competencies for undergraduate students.

Keywords

Self-regulated learning, Growth mindset, Task difficulty preference, Academic procrastination, Latent profile analysis