

# Educational Attainment Post-Pandemic: An Examination of Growth Mindset Language and Strategies in Graduate Students

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## Abstract

This paper examines growth mindset, an evidence-based strategy posited by Carol Dweck (2007), within the framework of a classroom at a private, faith-based university. In a post-pandemic time where many students and people have felt adverse effects on their ability to adapt, this research studies the impact of mindset language and strategies on a student's internal locus of control. The specific question the researchers posited was, does growth mindset language and strategies within a graduate-level class affect a student's internal locus of control?

Participants in this study were Master of Business Management students taking an online employee development course at Azusa Pacific University. The online course was modified to use growth mindset language and strategies. Changes in language focused on effort, starting with the syllabus and project instructions and continuing throughout the course. For example, language used in the weekly overviews focused on effort and explaining why effort was important.

Survey results indicated that the graduate students did not report an increase in their level of growth mindset or locus of control. This is hypothetically due to the high level of growth mindset and internal locus of control already felt by the participants. This moves the focus for graduate students from mindset to the environment they are learning in, including the level of psychological safety felt by the students in the classroom.

**Keywords:** mindset, psychological safety, student performance

## 1. Introduction

### 1.1 Growth Mindset

Growth mindset, originally put forth by Stanford professor Carol Dweck in her book *Mindset* (2007), has gained attention as an area of research in academic arenas as teachers attempt to design ecosystems for student achievement and excellence. The quest to improve student learning has produced growth mindset research and studies from elementary school to higher education. Thus, there is a considerable amount of evidence-based support for the growth mindset theory.

The construct of growth mindset suggests that there is a relationship between the internal locus of control felt by individuals and the ability to be effective in various pursuits. As noted by Dweck (2019), "Making a difference is a choice." Dweck does caution that growth mindset is not simply an attitude or a willingness to grow, but also includes sustained effort and strategic processes (2016). What is less clear is the relationship between intrinsic and extrinsic factors, and whether an educational setting can facilitate a more robust growth mindset in college students.

### 1.2 Growth Mindset Obstructions and Relationships

Some students engage in both classroom-based education and cocurricular experiences that may include a variety of activities and settings. In terms of the classroom, Hargreaves et al. (2021) suggest that students may possess the capacity for a growth mindset, but may be hampered by in-class rules and structure. Another study by Bai and Wang (2020) suggested that growth mindset may be a stronger indicator of learning in a Self-Regulated Learning (SRL) environment that also includes factors such as self-efficacy and intrinsic value. While both of these studies focused on elementary-age students, the presence of certain institutional barriers may also apply at higher levels of education.

Growth mindset is not necessarily about removing all obstacles, but there is value in examining the level of frustration that a learning opportunity challenge can facilitate.

Park et al. (2020) studied adolescents, and proposed that growth mindset is linked to grit in such a way that both elements may influence the expansion of the other. It should be noted that while definitions vary, grit can generally be categorized by resilience, perseverance, and stamina to overcome challenges (Duckworth, 2016). The construct of grit is not the focus of this study, but relates to the discussion in that life obstacles are often inevitable. Growth mindset, particularly when paired with grit, may play a key role in overcoming those barriers.

A similar study of eight-grade students found that self-discipline, which is linked to growth mindset and grit, may play a more significant role in academic performance than cognitive ability as measured by IQ tests (Duckworth and Seligman, 2005). While this does not suggest that ability is irrelevant, it does pair long-term academic performance with sustained effort and a willingness to engage in disciplined activities that overcome obstacles. In pragmatic terms, the study suggests that ability plays a key role in any process, but so does hard work and sustained dedication.

The relationship between growth mindset and grit was also explored by Warren and Hale (2020), who suggested that work habits of college students may have a significant impact on variances in grit. Because of the relationship between grit and growth mindset, this factor may impact what aspects of the college experience are addressed by educators and whether certain challenges are placed in strategic phases of the educational journey. This relates to the classic theory of Sanford (1967), who proposed that development during college is a combination of readiness, challenge, and support. This theory remains a popular framework for higher education, as many challenges are intentionally designed to test the ability and perseverance of students.

More specifically, Limeri et al. (2020) examined the relationship between growth mindset and quantifiable academic performance. The findings of this study suggest that performance and mindset can form a positive feedback loop, though it is reasonable to suggest that the reciprocal is also possible. In addition, change and development of the student mindset can continue to occur throughout the first year of higher education as students become accustomed to their new learning environment. This is related to a number of student development studies that link student success with the need to find permanence in the very early stages of the college experience.

In addition to classroom and co-curricular experiences, college students often work in order to offset educational costs. Baldwin (2019) discusses the value of a growth mindset in working with student employees. Mechanisms such as onboarding and feedback can be used to convey the learning outcomes that setbacks and challenges are opportunities for growth and development. This suggests that educational and professional environments may provide similar opportunities for growth mindset to evolve with new experiences.

A number of these studies reinforce broader ideas about growth mindset, and how it might be encouraged to develop over time. Dweck (2007) does suggest that growth mindset is a perspective that can be adopted. Given the formative cognitive development that can occur in higher education settings, this construct suggests that environments can be created to foster student decision-making practices that emphasize a growth mindset. This may take the form of academic tasks, but may also encompass the broader educational process of campus and support service navigation.

### *1.3 Growth Mindset Relevance in Higher Education*

Another application for higher education is that a growth mindset can be both a process and an eventual cognitive destination. The destination is not so much a fixed mindset, but a recurring set of behaviors that allow for future growth to continually occur. In a study of undergraduate STEM students, Hacisalihoglu et. al (2020) discusses the idea of moving students towards a growth mindset through course design that provides “a set of tools.” The implication is that success may be a combination of mindset and tangible mechanisms for overcoming obstacles and reaching goals. This is echoed by Bowman and Levto (2020), who also reference the use of “tools” for maximizing the effectiveness of teaching and presenting growth mindset.

While there is promising research pointing to the value of a growth mindset as a tool in education, there is still much research to be done and myriad factors to consider. Brez et al. (2020) tested the efficacy of a growth mindset intervention activity with a diverse population in a university setting. The study concluded that a growth mindset did not necessarily yield measurable results with certain populations. This is an expected result, as not all mechanisms should be expected to generate universal outcomes. A literature review of growth mindset studies involving engineering students (Campbell et al., 2021) proposed promising but similarly mixed conclusions based on population group. These results provide the framework for future studies.

For educators there is also the question of pedagogy, or appropriate programmatic methodologies for conveying a growth mindset. Research on process may help educators establish relationships between effectiveness and the variance

of different population groups. An example is a study by Torsney et al. (2021) which suggests that brief mindset refutation had a measurable impact on shifting college students from a fixed to a growth mindset. This study aligns with previously-mentioned research on grit, by acknowledging that growth mindset may be related to interventions that encourage student intent and strategic ability to overcome obstacles.

A comprehensive study conducted by Yeager et al. (2019) found that growth mindset can be taught in a short, online intervention, and that this methodology may be linked to measurable improvement in academic performance. This type of study suggests that a growth mindset can not only be fostered in students, but that educators may be able to achieve measurable outcomes with limited interventions and programming. For institutions with limited resources, this data may provide encouragement to propose and experiment with certain interventions that are brief, but possibly still effective.

As with any educational construct, there is a need for additional research. Educators must examine the impact of growth mindset on different ages, population groups, and environments. In addition, there are questions about methodology, depth of intervention, follow-up communication, and the relationship between intrinsic and extrinsic motivation.

## 2. Method

In a post-pandemic time where many individuals have felt adverse effects on their internal locus of control, this research studied the impact of mindset language and strategies on a student's internal locus of control. The specific question posited was, does growth mindset language and strategies within a graduate-level class affect a student's internal locus of control?

### 2.1 Participants

The participants of this study were graduate students in an online employee development course at Azusa Pacific University's School of Business and Management during the Spring 2021 semester. The course, Employee Development (HROD512), is a part of the Masters of Business Management (MBM) program curriculum. Students were contacted by the professor the week before the start of the course via a welcome email from the professor. The students were given information on the study and had the opportunity to opt into the study. If a student took no action, they were not part of the study.

The students who opted to be part of the study completed the informed consent and the survey prior to the official start of the class. Participating students then completed the same survey during the final week of the course. The total number of participants in this study was 21.

### 2.2 Strategies and Language

The online course was modified to use growth mindset strategies and language. Changes were made to the syllabus, instructions for projects, and throughout the course. Language used in the weekly overviews focused on effort and explaining why effort was important. Sample welcome and weekly overviews are included below:

#### Welcome Message

*Welcome to class. I am glad you are here and I am excited to get started. In our course, you will walk through the employee development process. Each week you will use the discussion forum to help you work through the area of employee development you are studying for that week. Successful students use the discussion forums to gain insight into their projects through peer feedback and discussion. There are also scenario-based exercises in this course where you support the decisions you have made. You do this from the perspective of a learning and development leader. Previous students have found it helpful to think of themselves as learning and development leaders throughout the entire course. This way you have both a "big picture" view of employee development as well as a more granular view of employee development.*

*Each week you will find a topic under the weekly readings titled "Focus and Effort" this will help guide you through the weeks and define the most important aspects of the week. The goal is to help you focus your efforts. As adult learners, I know that this is not the only thing going on in your lives at the moment. The ability to focus our efforts is critical.*

*I am easy to get a hold of and will be active within the classroom 4 – 5 days a week.*

#### Focus and Effort

##### Week 1

*We are off and running in week 1. Goal setting is a critical aspect of employee development. In this course, we walk through the employee development process together. You will have opportunities to interact*

with each other in scenarios. Week 1 sets the tone for the course. This week you will be sharing your personal definition of employee development and you will create a SMART goal for your own development. Development and intelligence are both malleable. This really means that as we put in focused effort and deliberate practice we get better at what we do. Our intelligence level grows. The main difference between an expert and a novice is the number of networked connections the individual has created in their mind with the specific piece of content. Our goal is to create those networks and connections so we can use the content in creative and unique ways to solve problems. Focus your effort on the reflection of how you would like to develop professionally.

**Week 2** (This gives students specific direction on how to use their focus and energy for the week in the reading.)

*The focus this week is on consequences and causes. If people are not doing something the way that is needed or desired at work what is getting in the way? Most people don't wake up and think, how can I do my job incorrectly and jeopardize my job. Quite often there is something in the way or a reward system that rewards and punishes the wrong behaviors. As you read this week, take the time to pause and reflect during your reading. Ask yourself questions such as, "Where have I seen this at work?", "How do situations like this occur where I work, volunteer...?", "What can I do to make sure these situations do not occur"?*

### 2.3 Instrumentation

The survey, constructed utilizing the Locus of Control Scale from the Rosenberg Self Esteem scale (Rosenberg, 1965) and the Self-Efficacy Formative Questionnaire (Gaumer Erikson & Noonan, 2018), was administered before the start of the first class and after the last class session. The class was taught in an online, asynchronous modality during an 8-week term, Spring 2021. The principal researcher and HROD512 professor had experience teaching the class.

### 2.4 Statistical Analysis

Pre- and post-test scores were compared. For each scale, the researchers computed a summary score and used this measure for analysis. For the Locus of Control (LoC) scale, item 2 ("When I make plans, I am almost certain I can make them work") was reverse coded and the mean rating across all six items was calculated for Pre and Post intervention. Higher values represent greater internal locus of control. For the Growth Mindset scale, the mean average of responses across all 13 items at Pre- and Post-test were tabulated. Here, higher values indicate a higher degree of growth mindset.

This study utilized a two-pronged approach to examine whether there were any reliable changes in LoC and Growth Mindset following the intervention relative to pre-intervention. First, the researchers calculated a paired sample t-test comparing Pre- vs Post- scores for each measure. Here, we report the p values, taking an alpha threshold of .05 as evidence for statistical significance. The researchers report Cohen's d to indicate the size of the difference between the two time points, with d values of 0.2 interpreted as small, 0.5 as medium and 0.8 as large. However, given the well-known limitations of null-hypothesis significance testing, we also computed the Bayes factor's (BFs) for each outcome measure (Jeffreys, 1961) using default priors as implemented in the Bayes Factor package (version 0.9.12-4.2 (Morey, Rouder, Jamil, & Morey, 2015) in R (2020)). This additional approach was utilized because it has several advantages (see Masson, 2011 for a more comprehensive overview) relative to traditional null-hypothesis significance testing (NHST).

The first advantage is that BFs allow one to determine whether the evidence obtained favored the alternative hypothesis (that there is a difference between Pre and Post scores) (with a  $BF > 1$ ), the null hypothesis ( $BF < 1$ ) or neither ( $BF$  equal or close to 1). This is particularly important for understanding the data when p values are greater than the significance threshold (Dienes, 2014). The second advantage is that BFs are useful when results need to be directly comparable with future work. Because the obtained value represents a ratio of the probability of the null and alternative hypotheses, it is not biased by sample size in the same way that NHST approaches are (Jarosz & Wiley, 2014).

To interpret the strength of the BFs, the research group considered a BF range from 1-3 as barely consequential evidence and a BF greater than 10 as "strong evidence" (Kass & Raftery, 1995).

## 3. Results

This study found no statistically significant differences between Pre ( $M = 1.63$ ,  $SE = 0.051$ ) and Post ( $M = 1.6$ ,  $SE = 0.046$ ) LoC measures in our paired samples t-test ( $t(19) = 1.71$ ,  $p = .104$ ,  $d = .382$ ). The Bayes factor (BF) of 0.79 to 1 in favor of the null hypothesis indicates that there is no evidence in support of the claim that gathered intervention resulted in a change in LoC.

The Growth mindset scale responses at Pre-test were similarly high at Pre ( $M = 4.49$ ,  $SE = 0.128$ ) and Post ( $M = 4.52$ ,  $SE = .112$ ), indicating that participants were already at the ceiling on this measure. Here too, we found no statistically significant difference between the two time points ( $t(19) = 1.0$ ,  $p = 0.33$ ,  $d = .224$ ). The BF score of 0.36 to 1 in favor of the null supported the idea that there is little evidence for this claim that the intervention resulted in any change in growth mindset. However, caution is stressed in interpreting this result. With the scores already close to the ceiling at Pre-intervention, there is no scope to capture any further improvement, should that have been elicited by the intervention.

### Boxplots for (A) Locus of Control and (B) Growth Mindset

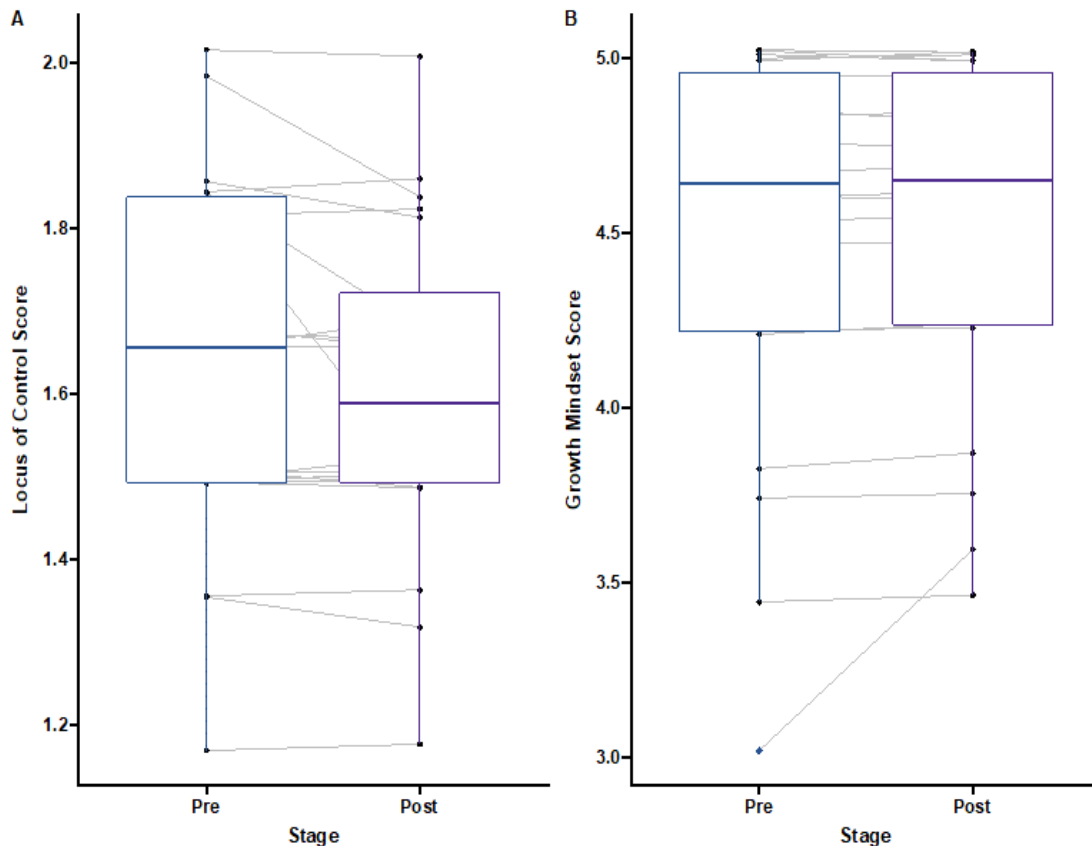


Figure 1. Boxplots showing interquartile ranges for (A) Locus of Control and (B) Growth mindset, pre and post intervention. Each dot corresponds to a single observation and the gray lines connect participants ( $n = 20$ ) across the two time points for each scale

## 4. Discussion

The lack of change in the area of growth mindset by the student population is most likely caused by the population sample we tested. It is plausible that graduate students already possess a high growth mindset. Therefore, prior experience or development did not allow for an increase in their perception of abilities and growth mindset. Results also suggested the students had a strong internal locus of control. This conclusion moves the discussion towards a question of what makes a high performing classroom, whether they are online or in-person. For graduate students who already have a high growth mindset and internal locus of control we posit that creating an environment of psychological safety is the next logical step to create or maintain a high performing classroom environment. Student performance is the underlying need, and the classroom result may be a direct reflection of the environment of psychological safety felt by the class.

It is also possible that portions of this population had already participated in enhanced connectedness and intrinsic motivation as the School of Business and Management had previously studied and encouraged faculty to implement

the S3 Model (Hanshaw, Helm-Stevens, & Lopez, 2019). The S3 Model is centered on a three-pronged strategy: student-centered learning, student connection, and student motivation. The goal of their research was to “explore ways in which to promote and increase the level of academic success in online learning environments, knowing instructors must be adaptable in their delivery styles depending on the setting (p. 1).”

### 5. Limitations

A limitation of this study is the population sample. Data was gathered from a single class in a private, faith-based university. Since the study was conducted with graduate students, there exists the possibility that individuals pursuing advanced degrees may have already reached a level of intrinsic motivation. Or, the amount of growth for graduate students may be lower than other levels. As Dweck (2015) noted “In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment.”

Additional limitations include the duration of the study and the class modality. This study was conducted in an online class that was eight weeks in length, which may limit how much impact can occur.

### 6. Future Research Recommendations

This study is not intended to be an exhaustive survey of this subject area. There are myriad opportunities for future research, particularly as this subject area is better understood in various fields. In the educational sector, research has been conducted with various age groups, but there are opportunities to further study subsets of student populations, including different cultures, school structures, and demographics. Applications can include classroom work, but there are also many co-curricular environments that might be assessed. There are also opportunities to study a wide distribution of vocational fields in order to assess whether growth mindset is an effective conduit for training, organizational culture, and career development. Because a growth mindset is a combination of thought processes and strategy, there are also research opportunities in a number of social science fields, including cognitive therapy. In order to lend clarity to future study, there may be value in establishing more common variables and descriptors in order to focus the constructs of growth mindset and grit into measurable terminology.

Because our set of graduate students may already have a strong growth mindset we suggest that building the growth mindset may not be the focus of future study. Rather the focus of study could move to psychological safety in the classroom, whether it is in the online or physical classroom. According to Ungvarsky (2019), psychological safety is a concept in the workplace, schools and organizations that requires people to feel safe and free from ridicule in order to perform at optimal levels. Clark (2020) defines psychological safety as “rewarded vulnerability” and states that a hallmark of psychological safety is the presence of a positive intellectual and creative friction.

Psychological safety has been found to be a key aspect of creating high performing teams. In 1965, Edward Schein and Warren Bennis coined the term Psychological Safety. The term and power of psychological safety has been recently brought into light due to the Project Aristotle case study conducted by Google (Kim, 2020), which found that a key attribute of a high performing team is psychological safety.

For graduate students we posit that the level of psychological safety within the classroom directly affects the level of student performance within the course. The graduate students come to class with a high growth mindset and internal locus of control. In order for them to excel in the classroom a level of psychological safety must be present. Hanshaw (2022) stated that the level of psychological safety has a direct effect on the amount of interactions students have within an online course discussion forum and also affects the level of creativity students show in assignments.

The next evolution in this research is to design an instrument that measures the level of psychological safety specifically in an online classroom. The instrument will connect with the stages outlined by Clark (2020), be behavior-based, and determine the level of psychological safety created by the instructor in the classroom. The level of psychological safety directly affects the performance level of teams and that level is created by the leader of the team. In the case of the classroom, the instructor is the leader and shapes the environment and the level of psychological safety.

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## **Appendix A**

Sample welcome and weekly overviews used in each week with the purpose of guiding the learner to focus on the effort required each week rather than outcomes.

### **Welcome**

Welcome to class. I am glad you are here and I am excited to get started. In our course, you will walk through the employee development process. Each week you will use the discussion forum to help you work through the area of employee development you are studying for that week. Successful students use the discussion forums to gain insight into their projects through peer feedback and discussion. There are also scenario-based exercises in this course where you support the decisions you have made. You do this from the perspective of a learning and development leader. Previous students have found it helpful to think of themselves as a learning and development leaders throughout the entire course. This way you have both a “big picture” view of employee development as well as a more granular view of employee development.

Each week you will find a topic under the weekly readings titled “Focus and Effort” this will help guide you through the weeks and define the most important aspects of the week. The goal is to help you focus your efforts. As adult learners, I know that this is not the only thing going on in your lives at the moment. The ability to focus our efforts is critical.

I am easy to get a hold of and will be active within the classroom 4 – 5 days a week.

### **Focus and Effort**

#### **Week 1**

We are off and running in week 1. Goal setting is a critical aspect of employee development. In this course, we walk through the employee development process together. You will have opportunities to interact with each other in scenarios. Week 1 sets the tone for the course. This week you will be sharing your personal definition of employee development and you will create a SMART goal for your own development. Development and intelligence are both malleable. This really means that as we put in focused effort and deliberate practice we get better at what we do. Our intelligence level grows. The main difference between an expert and a novice is the number of networked connections the individual has created in their mind with the specific piece of content. Our goal is to create those networks and connections so we can use the content in creative and unique ways to solve problems. Focus your effort on the reflection of how you would like to develop professionally.

Week 2 (This gives students specific direction on how to use their focus and energy for the week in the reading.)

The focus this week is on consequences and causes. If people are not doing something the way that is needed or desired at work what is getting in the way? Most people don't wake up and think, how can I do my job incorrectly and jeopardize my job. Quite often there is something in the way or a reward system that rewards and punishes the wrong behaviors. As you read this week take the time to pause and reflect during your reading. Ask yourself questions such as, “Where have I seen this at work”, “How do situations like this occur where I work, volunteer...”, “What can I do to make sure these situations do not occur”.

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