Investigating a Growth Frame for Delivering Effective Failure Feedback

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Effective feedback is vital for individuals to optimize goal pursuit, providing direction for where and how to invest limited resources. In particular, failure feedback can be critical for successful goal pursuit (Carver & Scheier, 1998; Vancouver et al., 2010). However, despite considerable evidence that failure feedback is useful, and despite people indicating that they desire such feedback (Abi-Esber et al., 2022; Zenger & Folkman, 2014), research also suggests that it can be incredibly difficult to receive. This thesis extends research suggesting that an individual's mindset influences their response to failure (Dweck, 2006; Dweck & Master, 2008) to test a growth frame that can be incorporated into feedback messages to recontextualize failure as a valuable opportunity for growth. Three studies ($N = 466$) investigated whether participants experienced greater motivation, goal commitment, self-efficacy, and state growth mindset after receiving success and failure feedback with a growth frame versus without a frame (Studies 1 and 3) or with a general positive frame (Study 2). Overall, the results provide preliminary evidence that receiving feedback with a growth frame effectively reduces the emotional and motivational consequences of experiencing failure. By exploring the effectiveness of a growth frame for failure feedback, this research offers new insights into the foundations of effective failure feedback.

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INTRODUCTION

Every day, people in many contexts must navigate the challenge of providing effective feedback: teachers need to encourage their students to learn in the face of failure; coaches must strategize with their players to help them reach new heights; and managers need to guide their employees towards optimal performance. Feedback—information about how people are doing in relation to their goals—is a critical factor that facilitates progress and engagement in goal pursuit. Effective feedback can lead to many benefits for feedback recipients, including improved task performance (e.g., Aidman et al., 2015; Theobald & Bellhäuser, 2022), enhanced metacognitive skills (e.g., Butler et al., 2008; Callender et al., 2016), and increased motivation (e.g., Burgers et al., 2015; Hagger et al., 2015). However, providing effective feedback is not easy. In particular, providing effective failure feedback is especially challenging (Fong et al., 2016; Wisniewski et al., 2020).

Failure feedback—feedback that an individual is falling short of some performance goal or standard—is often provided in ways that do not support, and may even harm, the feedback recipient's motivation and goal commitment (Carlson & Fishbach, 2024; Eskreis-Winkler et al., 2024; Eskreis-Winkler & Fishbach, 2022; Mercer & Gulseren, 2024). Failure feedback can be extremely ego-threatening (Eskreis-Winkler & Fishbach, 2022), and although individuals clamor for receiving more of it (Abi-Esber et al., 2022; Cannon & Witherspoon, 2005; Zenger & Folkman, 2014), they often tune it out (Audia & Locke, 2003; Eskreis-Winkler & Fishbach, 2019; Grundmann et al., 2021) or avoid receiving it altogether (Larrick & Boles, 1995; Ratner & Herbst, 2005; Reb & Connolly, 2009). Thus, there is a need to develop ways to deliver negative feedback that engage and energize feedback recipients. I propose that the way failure is contextualized within the feedback message shapes how effectively the feedback recipient will

respond to the message. In the present research, I build on and extend prior work suggesting that an individual's mindset influences their response to failures (Dweck, 1999; Dweck & Master, 2008), to develop and test a growth frame that can be incorporated into feedback messages to position failure as a powerful opportunity for growth.

Success and Failure Feedback

Feedback can be defined as positive or negative information about a person's performance on a task or goal, including the knowledge, effort, and skills that determine this performance, which can be used as the basis for future improvements (Carver & Scheier, 1998; Gregory & Levy, 2015; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; van de Ridder et al., 2008). In cybernetic models of goal pursuit (e.g., Carver & Scheier, 1998), feedback serves as the input, which is then compared to a reference state to determine if there is a discrepancy between one's current goal state and their desired state. If a discrepancy is identified, an individual can use the feedback to alter their performance to move closer to their desired goal state, such as putting in more effort, changing their strategy, or devoting more time to reach this goal (Trope, 1986). Therefore, feedback serves an important purpose in maintaining efficacious goal pursuit. Frequently, this feedback is delivered by other individuals, creating an often-challenging interpersonal exchange (Dibble, 2018; Dibble & Levine, 2013; Dibble & Sharkey, 2017; Gaddis et al., 2004; Jeffries & Hornsey, 2012; Waung & Highhouse, 1997).

While feedback can have both positive and negative components, (e.g., you used strong evidence to support your claims and but showed poor spelling and grammar skills), feedback can also more generally indicate outcome levels of success or failure on a task. Success feedback is frequently associated with many positive outcomes, such as increasing the feedback recipient's intrinsic motivation (Hagger et al., 2015; Hashiguchi, 1984), self-efficacy (Kristensen et al.,

2023; van de Ridder et al., 2015), and feelings of competence (Faulconer et al., 2022; B. R. Gaines, 1988; Su & Zhang, 2022). In contrast, failure feedback typically evokes negative affect (Atkinson, 1957; Eskreis-Winkler & Fishbach, 2019, 2022; McGregor & Elliot, 2005), despite it being inevitable and necessary.

Failure feedback, when given and received effectively, can be critical for successful goal pursuit (Vancouver et al., 2010). When people know that they are falling short of a desired end-state, they are more likely to increase their effort, motivation, and commitment to improvement, often to a significantly greater degree than after receiving success feedback (Fishbach et al., 2010; Schmidt & DeShon, 2007). Additionally, research has consistently shown that failure feedback can be more effective at improving learning and future performance than success feedback (Audia & Locke, 2003; S. Kim et al., 2018). For example, participants in a study by Louro et al. (2007) working towards losing weight put in more effort to their weight loss goal and less effort to competing goals after experiencing failures as opposed to successes, and experienced greater future success as a result. Conceptually, failure (vs. success) feedback is considerably more beneficial in identifying discrepancies between one's current and desired performance towards a goal, and accordingly, can be used to inspire more drastic changes in one's performance to further successful goal pursuit (Carver & Scheier, 1998). However, despite considerable evidence that such failure feedback can be powerful, and despite people indicating that they desire such feedback (Abi-Esber et al., 2022; Zenger & Folkman, 2014), research also suggests that it can be incredibly difficult to receive.

In the modern success-oriented culture, the fear of failure often prevents people from pursing more difficult goals across all domains, such as the workplace or the classroom (Carlson & Fishbach, 2024; Dweck, 2006), and when people do fail, they commonly experience feelings

of shame and humiliation, coupled with the desire to reduce or cease their pursuit of the goal to prevent future failures (Atkinson, 1957; McGregor & Elliot, 2005; Reb & Connolly, 2009). This decrease in goal commitment can be detrimental to success: indeed, higher goal commitment leads to increased feedback seeking behaviors and learning from feedback, which in turn fosters greater performance and goal success (Renn, 2003). Despite wanting to improve their performance, people frequently disengage from their failures to preserve their self-efficacy and mood, and often underreport their failures to protect their reputations (Eskreis-Winkler & Fishbach, 2020; Grundmann et al., 2021). Thus, due to the ego-threatening nature of failure feedback, receivers will often tune out failure feedback messages and fail to learn from them (Audia & Locke, 2003; Eskreis-Winkler et al., 2024; Eskreis-Winkler & Fishbach, 2019, 2021, 2022; Keith et al., 2022).

However, this effect is mitigated when a person must learn from someone else's failure rather than their own failure. In a series of studies by Eskreis-Winkler & Fishbach (2019), participants were presented with pairs of novel symbols and asked to guess which had a specific meaning, after which they received outcome feedback which was randomly assigned to be either success or failure feedback for every trial. In the test phase, participants were presented with the same symbol pairs and a new definition—thus they could deduce from the original question and feedback which symbol would be the correct answer. Participants who received failure feedback after every trial scored lower on the test phase and reported significantly lower self-esteem than participants in the success feedback condition. In contrast, when participants were shown the choices made and feedback received by another person in the first part of the study rather than experiencing it themselves, there was not a significant difference between participants' learning and performance in either of the success or failure feedback conditions. This strongly supports

the notion that it is the emotional consequences of failure that inhibit people's ability to learn and grow from it (Eskreis-Winkler & Fishbach, 2019; Nelson et al., 2018).

While several strategies exist to improve the effectiveness of a feedback message's content to promote learning, these strategies cannot be fruitful if the feedback receiver fails to engage with the feedback message. This creates two distinct components to providing effective feedback: the message's content, comprised of the main ideas being communicated, such as the performance outcome (success or failure), what was done well versus what needs to be improved upon, and steps that can be taken to achieve future success; and the recipient's engagement, which allows them to look past their failure to absorb and learn from the feedback message in pursuit of future growth and success. Thus, the emotional and motivational consequences of failure need to be considered before a feedback message can effectively promote learning.

Pre-existing Feedback Strategies

Considerable research in the feedback literature has focused on developing and understanding strategies that increase the effectiveness of a feedback message's content. Accordingly, several specific strategies for enhancing the effectiveness of a feedback message's content have been defined and evaluated in the literature (see Table 1). These strategies seek to enhance the feedback recipient's ability to recognize what led to their success or failure and identify how they can learn and improve from the feedback. This is achieved by adding additional components to the primary outcome message being communicated.

Table 1

Pre-existing Feedback Strategies. Primary Example: You receive a grade of 60% on your essay.

Feedback Strategy	Example	References
Task-Focused (vs. Person-Focused): Participants' failures should be framed as being the result of a minor lack of knowledge, skills, or effort, which can be acquired or changed, rather than a lack of personal talent which cannot be changed.	I could tell that you didn't put too much time or effort into finding sources to support your arguments. (In contrast: writing essays doesn't seem to be a strength of yours since you're not good at backing up your ideas with sources.)	(Aguinis et al., 2012; R. Butler, 1987; Hong et al., 1999; Kamins & Dweck, 1999; Mueller & Dweck, 1998)
Balance of Positive and Negative Feedback: Regardless of the overall outcome, feedback should include both positive, motivating components and negative, constructive components.	You made a very compelling argument in your essay. However, your essay lacks credible sources to support the claims you made. You still did a good job though.	(Bottini & Gillis, 2020; Henley & DiGennaro Reed, 2015; Kivlighan et al., 2020; Prochazka et al., 2020; Slowiak & Lakowske, 2017)
Specific Feedback: With performance-improving feedback, specifically identify and provide examples of what was done wrong in order to re-enforce the goal state that the recipient is trying to meet.	You lost a lot of marks because your claims didn't have any references to support them, which detracted from the credibility of your paper.	(Boud, 2000; Engerer et al., 2019; Goodman & Wood, 2004; Kernan & Lord, 1989; Phye & Sanders, 1994)
Intended to Improve Performance: With specific feedback, specifically identify and provide examples of what could be done to improve performance and lead to success in the future.	On the next essay, your claims will be a lot more compelling if you back them up with credible sources that support your argument. Try to do more research before you start writing.	(Fong et al., 2018; Fong & Schallert, 2023; Hattie & Timperley, 2007; Muis et al., 2013; Phye & Sanders, 1994)
WISE Feedback: Set high standards for the recipient (that they haven't yet met), express confidence that they can meet these standards, and provide constructive rather than pure failure feedback.	I expect you to do better on your next essay, I know you have the potential to do so if you put in more effort. Make sure to back up your arguments with credible sources.	(Cohen et al., 1999; Stephens, 2021; Thayer et al., 2018; Walton & Wilson, 2018; Yeager et al., 2014)

Task-Focused Feedback

One common strategy for feedback provision is to use task-focused language as opposed to self-focused language. This notion stems from a robust finding in the developmental psychology literature that shows praising children's effort (e.g., you worked hard) rather than their abilities (e.g., you're so smart) increases their performance, learning, and achievement motivation (Mueller & Dweck, 1998). This same principle can be applied to feedback: Task-focused feedback can lead feedback receivers to believe that their effort will help them succeed as opposed to their natural ability, which can increase their goal-commitment and optimism after experiencing failure (Hattie & Timperley, 2007; Hong et al., 1999). Additionally, effort, performance, persistence, and interest are higher after receiving task-focused feedback as opposed to person-focused feedback (Butler, 1987; Kamins & Dweck, 1999). While using task-focused language increases a feedback message's effectiveness, it does not appear sufficient on its own to always reduce the negative emotional consequences of receiving failure feedback. For example, a recent study by Gok & Fyfe (2022), building on research by Eskreis-Winkler & Fishbach (2019), found that even when the feedback was provided via a task-focused message (i.e., The answer was incorrect) versus the original person-focused message (i.e., You got this question wrong), this did not lead to greater learning after failure.

A Balance of Positive and Negative Feedback

Another popular feedback strategy is to provide a balance of positive and negative feedback and therefore soften failure feedback (e.g., O'Malley & Gregory, 2011). This strategy is commonly known as the "feedback sandwich," where negative comments are sandwiched between two positive statements. Rigorous empirical work on the effectiveness of the feedback sandwich is relatively sparse, yet there is some evidence that this strategy often has the reverse of

its intended effect, since the positive elements can come across as insincere (Fong et al., 2019; Schwarz, 2013; Shute, 2008). In addition, feedback providers tend to pay more attention to the positive comments, which can lead to negative feedback being overlooked by the receiver and mistaken as purely positive feedback (Jensen & Baumgartner, 2021; Von Bergen et al., 2014). This strategy also conflicts with research showing that people overwhelmingly prefer to receive bad news first and good news second (e.g., Legg & Sweeny, 2014; Marshall & Kidd, 1981).

Specific Feedback

Providing specific commentary on what was done well versus poorly is a common strategy recommended in the feedback literature (e.g., Boud, 2000; Kernan & Lord, 1989). If the feedback recipient is unaware of what led them to success or failure, then simply knowing the outcome will not benefit them; however, by specifying what was done correctly and incorrectly, the feedback recipient can then apply this information to maintain or improve their future performance (Goodman & Wood, 2004). Accordingly, the use of specific feedback is often used in combination with feedback intended to improve the recipient's performance (Hattie & Timperley, 2007). Unfortunately, when applied to failure feedback, the use of specific examples can have a significantly negative impact on the feedback receiver's morale and self-efficacy (Eskreis-Winkler & Fishbach, 2022; McGregor & Elliot, 2005), and can cause them to focus on their past mistakes rather than applying this knowledge to work towards future success (Gnepp et al., 2020). While specific feedback can be an effective tool, it cannot be beneficial if the emotional consequences of a past failure prevents the feedback receiver from engaging with the feedback (Grundmann et al., 2021; Nelson et al., 2018).

Feedback Intended to Improve Performance

In conjunction with specific feedback, effective feedback messages should also be clearly intended to improve performance. By identifying and providing specific examples of what can be done to improve their performance, feedback receivers can then apply this actionable feedback to achieve future success (Fong et al., 2018; Muis et al., 2013; Phye & Sanders, 1994). However, congruent with the common English proverb, "You can lead a horse to water but you can't make it drink," suggestions on how to improve will not be sufficient to benefit performance if the feedback receiver is disengaged from the feedback message and their failure (Grundmann et al., 2021). The emotional consequences of failure must first be targeted before actionable feedback can benefit the receiver's learning and future performance.

Wise Feedback

Wise feedback was developed as an approach to providing critical feedback in educational contexts to students from under-represented groups (Cohen et al., 1999; Yeager et al., 2014). This approach to developing feedback grew out of the need for feedback providers to establish trust with feedback recipients, especially when feedback recipients might be concerned about the type of treatment they are receiving from feedback providers due to group membership (e.g., Black students receiving feedback from white teachers; Harber et al., 2010, 2012). This strategy targets both the content of the feedback message and the recipient's engagement with the message.

There are two primary components to wise feedback: the feedback provider sets high standards for the feedback recipient and expresses confidence in the recipient that they can meet these high standards (Cohen et al., 1999; Thayer et al., 2018). Together, these components are theorized to be effective at minimizing stereotype threat and increasing self-efficacy (Yeager et

al., 2014). When implemented in the classroom, wise feedback has been very successful in creating a sense of belonging and strengthening the trust between teachers and students, which in turn helps the students to thrive in their school environment (Houri et al., 2019; Thayer et al., 2018; Yeager et al., 2014). Critically, while wise feedback has been shown to increase the motivation of students from minoritized groups, it does not improve and can even reduce the motivation of non-minority students (Cohen et al., 1999; Yeager et al., 2014). Thus, while wise feedback is a promising feedback approach, there is still a need for a broader framework to improve the effectiveness of failure feedback.

A Growth Framework for Feedback

Research on lay theories of intelligence and mindsets proposed by Dweck (2006) posits that individuals vary in the extent to which they conceptualize the nature of individual attributes (e.g., such as intelligence, personality, morality, etc.). Individuals can hold a growth or incremental mindset, in which they believe that their aptitude is malleable, and that they can develop their skills through hard work (Dweck, 1999; Dweck & Master, 2008; Dweck & Yeager, 2021; Hong et al., 1999). In contrast, individuals can hold a fixed or entity mindset, in which individuals believe that their aptitude is constrained to a given level and that their skills are relatively innate (you have it or you don't; Dweck, 2006, 2016; Dweck & Master, 2008a; Kim & Park, 2021). Typically, having a growth mindset is thought of as more advantageous than a fixed mindset: People with a growth mindset are more likely to seek out challenging opportunities that provide the opportunity for learning (Burnette & Finkel, 2012; Rege et al., 2021), and set more mastery goals as opposed to performance goals, which increases achievement and goal success (Burnette et al., 2013; Costa & Faria, 2018; Sisk et al., 2018). However, context also plays a role in the instrumentality of each mindset: A growth mindset is more beneficial in contexts that

provide room and support for growth, whereas a fixed mindset is more productive in contexts where people cannot apply their skills to improve or keep working on a certain ability and must accept their limitations to thrive (Hecht et al, 2021).

Critically, research suggests that an individual's mindset also influences their perception of failure. People with a growth mindset are significantly more likely to accept personal responsibilities for their failures rather than blame the task and recognise that they can grow from their failures (Dweck, 1999; Dweck & Master, 2008). Furthermore, having a growth mindset significantly predicts a person's use of effective coping strategies after experiencing failure, such as planning steps to achieve future success, expressing their emotions, and seeking social support (Doron et al., 2009).

Additionally, a growth mindset can further support a more adaptive response to experiencing failure. With a fixed mindset, failure seems considerably more definitive: due to the belief their aptitude is constrained to a given level, individuals with a fixed mindset may focus on the cause of the failure and struggle to imagine how they can develop the necessary skills to move past a failure (Diener & Dweck, 1978; Dweck & Reppucci, 1973; Dweck & Yeager, 2019). In contrast, individuals with a growth mindset attribute their failures to their effort and direct their future efforts to learning and finding remedies for their failure in order to achieve success (Diener & Dweck, 1978; Dweck & Yeager, 2019). For example, Dweck & Reppucci (1973) presented children with an interspersed set of easy and unsolvable block problems, with each type presented by a different experimenter (i.e., one experimenter always presented the easy problems, and the other the unsolvable problems). Midway through the task, both experimenters began to present easy solvable problems. While children with a growth mindset quickly adapted and were able to solve the problems from both experimenters, children with a fixed mindset

continued to fail to solve the problems presented by the experimenter who had initially presented them with the unsolvable problems due to a learned helplessness.

Goal-setting behaviors also contribute to the relationship between mindsets and failure. Since people with a growth mindset set more mastery goals as opposed to performance goals, failures can feel less concrete and thus be considerably less emotionally taxing (Burnette et al., 2013; Costa & Faria, 2018; Sisk et al., 2018). For example, if one student set a performance goal to receive an A+ on a test while the other set a mastery goal to study the material to the best of their ability, the second student would perceive a reduced sense of failure after receiving a C+ on the test knowing they met their goal by working hard even if their grade is not the highest, whereas the first student would have simply failed to achieve their goal and would not experience the solace of knowing they still worked hard.

Despite the many benefits of having a growth mindset on a person's view of and response to failure, research shows that experiencing failure still has significant emotional and motivational consequences for the majority of people (Boaler, 2013; Burnette et al., 2013; Dweck, 2016; Eskreis-Winkler & Fishbach, 2022). To address this issue, I propose that contextualizing failure within the feedback message as an opportunity for growth rather than as a signal of fixed ability will transform how the receiver can engage with the feedback.

The Present Research

In the current studies, I extend research suggesting that an individual's mindset influences their response to failure (Dweck, 2006; Dweck & Master, 2008) to test a growth frame that can be incorporated into feedback messages to recontextualize failure as a valuable opportunity for growth. There are two vital components to the growth frame I propose: redefining failure as growth and taking a future focus. First, by normalizing failure and framing

it as an opportunity to grow (i.e., failure is typical, temporary, and useful), I predict that the feedback will be less ego-threatening to participants and thus allow them to engage more effectively with the feedback. Second, this works in conjunction with future-focused language, which encourages feedback receivers to think of failure as a tool to improve their chances of succeeding in the future and redefines their past mistakes as stepping-stones to success. Through these two mechanisms, I predict that the inclusion of a growth frame within a failure feedback message will increase the motivation, goal commitment, and self-efficacy of recipients relative to receiving a failure feedback message without these components. I also predict that it will do this, in part, by increasing recipients' state growth mindset.

A growth frame for failure feedback builds on and goes beyond pre-existing feedback strategies to create an effective feedback message. While past strategies often focus on improving the core content of a feedback message (e.g., specific vs. vague), a growth frame targets more directly some of the psychological barriers that affect the engagement of feedback recipients. This encourages the feedback recipient to focus their efforts on improving their performance and working to achieve success, rather than fixating on their past mistakes and failures, which can be the case after receiving specific feedback (Gnepp et al., 2020; McGregor & Elliot, 2005). A growth frame employs task-focused language (Gok & Fyfe, 2022; Kamins & Dweck, 1999; Mueller & Dweck, 1998). Further, unlike approaches that aim to add general positivity (e.g., a balance of positive and negative remarks), a growth frame utilizes positive language without requiring explicit praise that may sound insincere or obscure the failure message (Fong et al., 2019; Jensen & Baumgartner, 2021; Schwarz, 2013; Von Bergen et al., 2014). Rather than defining an explicit performance goal for the recipient as is often done with wise feedback (Cohen et al., 1999; Thayer et al., 2018), a growth frame is more open-ended,

letting feedback receivers set their own goals and standards, Additionally, as a frame that can be added to any feedback message, growth-framed feedback can be used concurrently with pre-existing feedback strategies since they serve unique purposes.

Across three studies, the present research investigates whether a growth frame can effectively reduce the motivational and emotional consequences commonly associated with experiencing failure (Eskreis-Winkler & Fishbach, 2019; Grundmann et al., 2021; McGregor & Elliot, 2005; Mercer & Gulseren, 2024; Nelson et al., 2018). In Studies 1 and 2, participants rated their motivational outcomes after imagining themselves receiving feedback with a growth frame compared to feedback without a frame (Study 1) or with a control "generic positivity" frame (Study 2) across eight hypothetical scenarios in a within-participants design. Study 3 examined the effectiveness of the frame using a consequential task, where participants believed the feedback reflected their performance using a between-participants design. I hypothesized that failure feedback with the growth frame would lead to higher motivation, goal commitment, and self-efficacy compared to feedback without the growth frame across all three studies.

STUDY 1

Study 1 investigated whether a growth frame would mitigate any of the emotional and motivational consequences typically experienced by participants after receiving failure feedback. After imagining themselves in a given scenario, participants received either success or failure feedback with or without a growth frame and completed measures of their motivation, goal commitment, self-efficacy, state growth mindset, and perceived feedback positivity. I examined the extent to which a growth frame mitigated the negative effects of receiving failure feedback based on participants' ratings of these measures.

Consistent with prior research (e.g., Eskreis-Winkler & Fishbach, 2019, 2021), I predicted a main effect of feedback valence, such that success (vs. failure) feedback would lead to significantly higher ratings across all variables. In addition, I predicted a valence x frame interaction, such that failure feedback with a growth frame would lead to significantly higher ratings across all variables compared to failure feedback with no frame. In contrast, I predicted that there would not be a significant difference in ratings for success feedback as a function of the presence or absence of the feedback frame since I expected that success feedback would elicit a positive response from participants regardless of the feedback frame. Finally, I hypothesized that participants' state mindset would mediate the effects of receiving failure feedback with a growth frame (vs. no frame) on participants' motivational outcomes.

Method

Participants and Design

Participants ($N = 95$ after exclusions) were recruited from Amazon Mechanical Turk (MTurk) through CloudResearch.com in exchange for $5.00 USD (37 females, 56 males; M_{age} = 39.48, SD_{age} = 11.49; 66% White, 18% Asian, 8% Black, 3% Hispanic, 2% Mixed Race). All

participants were from the United States and had an approval rating on MTurk of at least 95%. Five additional participants completed the study but were excluded from analyses based on an a priori exclusion criterion of answering less than 50% of the attention check questions correctly. A sensitivity analysis using G*Power (Faul et al., 2007) revealed that the minimum effect size that can be detected at 95% power with alpha .05 and this sample size is $\eta_p^2 = .02$, assuming a correlation between repeated measures of .50 and a non-sphericity correction of 1. Participants indicated their reactions to feedback in a 2 (feedback valence: success, failure) x 2 (frame: growth frame, no frame) fully within-participants design.

Procedure and Materials

Prior to beginning the study, participants were presented with a short passage and an open-ended question (see Appendix A). However, the passage explained that participants must type a key phrase instead of answering the open-ended question to move forward with the study. This was designed to encourage participants to read the scenarios carefully.

Participants were asked to read eight unique scenarios in which they imagined themselves receiving feedback on their pursuit of a goal while approximately half-way to the allotted deadline, such as working on an assignment for a course to learn another language or completing an important task at work (see Appendix B). Participants received a distinct feedback message after each scenario from the relevant superior in the scenario indicating either success or failure in pursuing the goal, and either including or excluding a growth frame. An example scenario and feedback messages are in Table 2. Following each scenario and feedback message, participants filled out several measures to indicate how the feedback impacted their attitude towards the goal, including their motivation, goal-commitment, self-efficacy, state growth mindset, and perceived feedback positivity.

Table 2

Example Scenario and Feedback Messages (Study 1)

Sample Goal Pursuit Scenario	
You have decided to make the effort to exercise on a regular basis. It has been a long time since you last worked out, so to help you get into a routine you have hired a personal trainer to develop an exercise plan. They have advised you to focus on cardio exercises for the next six months to help increase your overall stamina. After two months of trying to follow this plan, your trainer checks in with you again and comments on your efforts. Here is the feedback you receive from your trainer:	
Success Feedback with a Growth Frame	**Success Feedback with No Frame**
"It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well. *Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success*!"	"It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well."
Failure Feedback with a Growth Frame	**Failure Feedback with No Frame**
"It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations. *However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success*."	"It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations."

Note. Italics have been added to highlight the growth frame but were not present in the feedback given to participants.

Measures

Motivation. Motivation was measured using 3 items (α = .95) adapted from Lockwood et al. (2002), which asks participants about their motivation to continue working towards the task in the scenario (e.g., I would want to put more time into this task), on a Likert scale from 1 (not at all true) to 9 (very true). Full measures with items are available in Appendix C.

Goal Commitment. Goal commitment was measured using 3 items (α = .99) adapted from Klein et al. (2013). This scale asks participants how committed they are to the goal (e.g., How dedicated are you to this task?), on a Likert scale from 1 (not at all) to 9 (completely).

Self-Efficacy. Self-Efficacy was measured using 3 items (α = .92) adapted from Chen et al. (2001), which asks participants to how confident they feel in their ability to effectively complete the task (e.g., I believe I will be able to successfully overcome this task) on a Likert scale from 1 (not at all) to 9 (completely).

Mindset. Participants' state mindset was measured using 4 items (α = .94) adapted from the "Kind of Person" Implicit Theory Measure by Dweck (1999; e.g., The kind of person you are, is something very basic about you and it can't be changed very much) on a Likert scale from 1 (strongly disagree) to 6 (strongly agree).

Perceived Feedback Positivity. Participants' perception of the feedback was measured using one item on a Likert scale from 1 (extremely negative) to 9 (extremely positive), which asked: To what extent was the feedback positive or negative?

Feedback Attention Check. Participants were asked whether the feedback they received indicated that they were above (success feedback) or below (failure feedback) a performance standard. This question functioned as an attention check to ensure participants read the feedback

and interpreted the feedback signal accurately to classify their performance in the scenario as either success or failure. Participants who answered less than 50% of the binary attention check questions correctly were excluded from further analyses.

Results

Feedback Attention Check

95% of participants correctly indicated the direction of the feedback signal consistently more than half of the time: 75% of participants answered correctly for all eight scenarios, 16% for seven of the eight scenarios, and 4% for six of the scenarios.

Primary Analyses

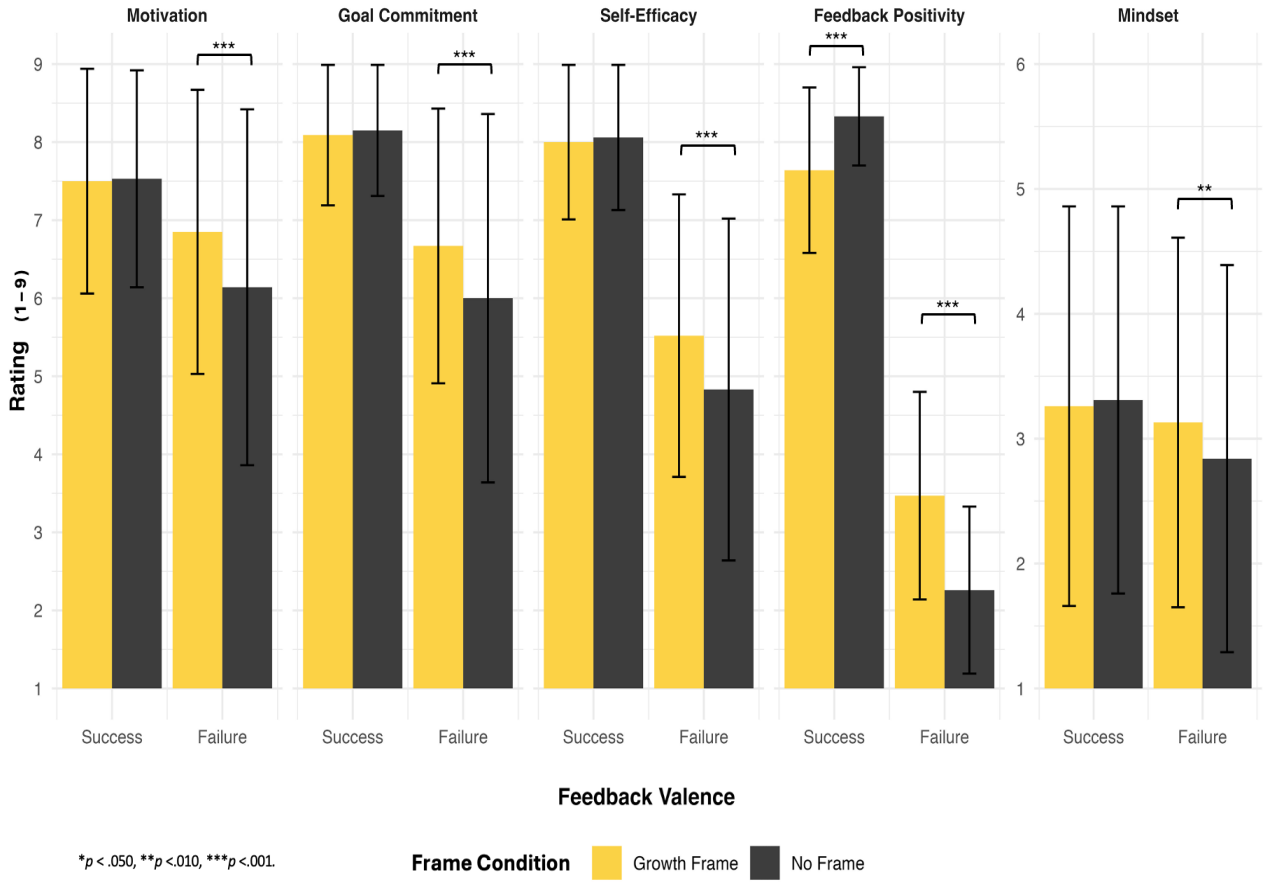
Figure 1 displays the means for each dependent measure by feedback valence and frame condition, and the correlations for outcome variables are reported in Table 3. I conducted a series of repeated measures analyses of variance (ANOVA) with feedback valence and frame as within-participant factors, and motivation, goal commitment, self-efficacy, state growth mindset, and perceived feedback positivity as outcomes. There was a significant main effect of feedback valence and frame for all the dependent variables, such that success (vs. failure) feedback and feedback with (vs. without) a growth frame resulted in higher ratings of motivation, goal commitment, self-efficacy, state growth mindset, and perceived feedback positivity. Results from the analyses are reported in Table 4.

Critically, these main effects were qualified by a significant feedback valence by frame interaction for all the dependent variables. Consistent with predictions, failure feedback with (vs. without) a growth frame resulted in higher ratings of motivation ($p < .001$), goal commitment ($p < .001$), self-efficacy ($p < .001$), state growth mindset ($p = .002$), and perceived feedback positivity ($p < .001$). In contrast, success feedback with (vs. without) a growth frame did not

significantly differ for motivation (p = .776), goal commitment (p = .432), self-efficacy (p = .509), or mindset (p = .167). Interestingly, success feedback without a frame was perceived as significantly more positive than success feedback with a growth frame (p < .001).

Figure 1

Means by Dependent Variable as a Function of Feedback Valence and Frame (Study 1)



Note. Variable means are plotted with error bars representing ± 1 *SD*.

Table 3

Descriptive Statistics and Correlations for Outcome Variables by Feedback Valence Collapsed Across Frame Condition (Study 1)

Variable	*M* (*SD*)	1.	2.	3.	4.	5.
Success Feedback						
1. Motivation	7.51 (1.31)	-	-	-	-	-
2. Goal Commitment	8.12 (1.02)	.77**	-	-	-	-
3. Self-Efficacy	8.03 (1.08)	.68**	.83**	-	-	-
4. Mindset	3.29 (1.57)	-.06	-.18	-.27**	-	-
5. Feedback Positivity	7.98 (0.75)	.55**	.65**	.65**	-.05	-
Failure Feedback						
1. Motivation	6.50 (1.90)	-	-	-	-	-
2. Goal Commitment	6.34 (1.88)	.91**	-	-	-	-
3. Self-Efficacy	5.18 (1.90)	.68**	.75**	-	-	-
4. Mindset	2.98 (1.45)	-.28**	-.30**	-.24**	-	-
5. Feedback Positivity	2.87 (1.05)	-.02	.04	.15	-.07	-

*$p < .050$, **$p < .001$

Table 4

Summary of Results from Repeated Measures ANOVAs by Dependent Variable (Study 1)

	$F(1,94)$	p	η_p^2
Motivation			
Main effect of Feedback	27.34	< .001	.23
Main effect of Frame	11.16	.001	.11
Interaction between Feedback X Frame	14.52	< .001	.13
Goal Commitment			
Main effect of Feedback	98.26	< .001	.51
Main effect of Frame	8.60	.004	.08
Interaction between Feedback X Frame	94.00	< .001	.13
Self-Efficacy			
Main effect of Feedback	204.34	< .001	.69
Main effect of Frame	18.55	< .001	.17
Interaction between Feedback X Frame	20.21	< .001	.18
Mindset			
Main effect of Feedback	12.89	< .001	.12
Main effect of Frame	5.00	.028	.05
Interaction between Feedback X Frame	12.06	< .001	.11
Perceived Feedback Positivity			
Main effect of Feedback	1139.48	< .001	.92
Main effect of Frame	9.65	.003	.09
Interaction between Feedback X Frame	187.76	< .001	.67

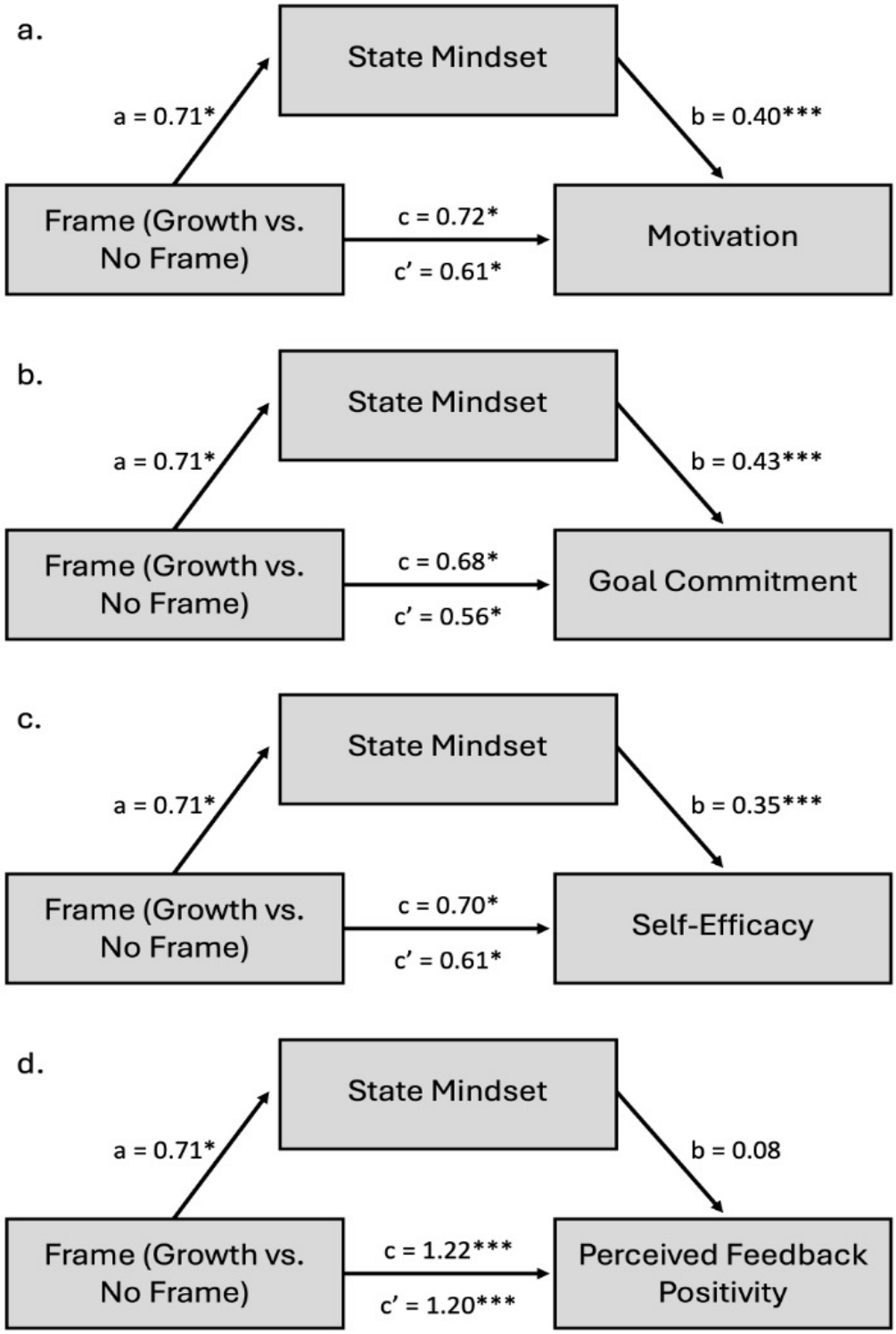
I used Process 4.0 (Hayes, 2013, 2022) with 5000 bootstrap estimates and 95% confidence intervals to test whether participants' state mindset mediated the effect of a growth frame (vs. no frame; see Figure 2) on their motivation (2a), goal commitment (2b), self-efficacy (2c), and perceived feedback positivity (2d) after receiving failure feedback. The relationship

between growth-framed feedback and participants' state mindset (path *a*) indicated that participants who received failure feedback with a growth frame (vs. without a frame) reported experiencing a higher state growth mindset: $b = 0.71$, $SE = 0.30$ $p = .019$. Additionally, participants' state mindset predicted their motivational outcomes (path *b*), such that participants with a higher state growth mindset reported experiencing greater motivation ($b = 0.40$, $SE = 0.10$, $p < .001$), goal commitment ($b = 0.43$, $SE = 0.10$, $p < .001$), and self-efficacy ($b = 0.35$, $SE = 0.09$, $p < .001$). Participants' state mindset did not predict their perception of the feedback's positivity, $b = 0.08$, $SE = 0.06$, $p = .161$.

The direct (path *c*') and total effects (path *c*) were significant between failure feedback with a growth frame (vs. without) and participants' motivation (direct: $b = 0.61$, $SE = 1.18$, $p = .040$; total: $b = 0.73$, $SE = 1.36$, $p = .016$), goal-commitment (direct: $b = 0.56$, $SE = 1.10$, $p = .048$; total: $b = 0.68$, $SE = 1.25$, $p = .036$), self-efficacy (direct: $b = 0.61$, $SE = 1.14$, $p = .044$; total: $b = 0.70$, $SE = 1.26$, $p = .024$), and perceived feedback positivity (direct: $b = 1.20$, $SE = 1.52$, $p < .001$; total: $b = 1.22$, $SE = 1.54$, $p < .001$). Thus, my hypothesis that failure feedback with a growth frame would benefit participants' motivational outcomes through an increased state growth mindset was supported. However, given that all variables were measured concurrently, the results should be interpreted with caution.

Figure 2

Mindset Mediating the effects of a Growth Frame on Participant Outcomes (Study 1)



Note. Unstandardized regression coefficients (*b*s) are plotted. *$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

Consistent with predictions, Study 1 revealed that participants reported higher motivation, goal-commitment, and self-efficacy after receiving failure feedback with a growth frame compared to no frame. Additionally, participants perceived the feedback as more positive and reported an increased state growth mindset from receiving failure feedback with a growth frame. These results support the empirical evidence indicating that a growth mindset ultimately fosters a positive approach to setbacks and failures (Dweck, 1999; Dweck & Master, 2008), and provide initial evidence for the effectiveness of a growth frame in promoting a more constructive response to experiencing failure. Also generally consistent with predictions, the inclusion of a growth frame had no impact on most reported outcomes after success feedback. However, success feedback with a growth frame was perceived to be less positive than success feedback with no frame. Thus, Study 1 suggests that the inclusion of a growth frame may not carry the same immediate benefits when delivering success feedback.

While Study 1 provides initial insights into the effectiveness of a growth frame when providing failure feedback, a limitation of the study is the direct comparison against feedback with no frame rather than a positive message of equal length. It is important to examine whether the addition of any positive comments following the feedback message would produce the same results, or if the growth elements of the frame are responsible for these effects. Study 2 therefore investigated the effectiveness of feedback with a growth frame compared to feedback with generic positive statements.

STUDY 2

Participants in Study 1 reported higher motivation, goal commitment, and self-efficacy after receiving failure feedback with a growth frame as opposed to without. However, prior research has shown that providing a balance of positive and negative task-specific feedback can diminish the emotional difficulty of experiencing failure (e.g., Kivlighan et al., 2020; Pisacreta et al., 2011). While a growth frame does not provide task-relevant positive feedback, its positive nature could be contributing to its effectiveness. Thus, Study 2 examined whether the specific growth elements or the positive nature of the growth frame led to the effects reported by participants in Study 1.

After reading and imagining themselves within eight hypothetical scenarios, participants received success or failure feedback with either a growth frame or generic positive statements, which provided generic positive comments unrelated to participants' task performance. I examined the extent to which feedback with a growth frame mitigated the negative effects of failure compared to feedback with the generic positive statements. I hypothesized that feedback including a growth frame would lead to more positive ratings compared to feedback with the positive statements. Specifically, I expected that failure feedback containing our growth frame would lead to higher ratings than failure feedback with the positive statements, while success feedback with either a growth frame or the positive statements would not significantly differ.

Method

Participants and Design

Undergraduate students ($N = 93$ after exclusions) were recruited online through the research participant pool at the University of Waterloo to participate in the study in exchange for course credit (75 females, 16 males, 4 unspecified; $M_{age} = 19.52$, $SD_{age} = 1.79$; 40% Asian, 20%

White, 13% Middle Eastern, 10% Black, 5% Mixed Race, 2% Hispanic). Seven additional participants completed the study but were excluded from analyses based on a prior exclusion criterion of answering less than 50% of the attention check questions correctly. A sensitivity analysis using G*Power (Faul et al., 2007) revealed that the minimum effect size that can be detected at 95% power with alpha .05 and this sample size is $\eta_p^2 = .02$, assuming a correlation between repeated measures of .50 and a non-sphericity correction of 1. Participants indicated their reactions to feedback in a 2 (feedback valence: success, failure) x 2 (frame: growth frame, generic positivity) fully within-participants design.

Procedure and Measures

Participants read the same eight scenarios from Study 1 in which they imagined themselves receiving feedback on their pursuit of a goal (see Appendix B). Participants received a different feedback message after each scenario indicating either success or failure in pursuing the goal, and either including a growth frame or the generic positive statements. Feedback examples are available in Table 5. Immediately after reading each scenario and feedback message, participants filled out the same measures from Study 1 to indicate how the feedback impacted their motivation, goal commitment, self-efficacy, and perception of the feedback's positivity (see Appendix C)[1].

Results

Feedback Attention Check

93% of participants correctly indicated whether the feedback they received denoted success or failure more than 50% of the time: 57% of participants answered correctly for all eight scenarios, 19% for seven of the eight scenarios, and 9% for four or five of the eight scenarios.

[1] Study 2 was run prior to Study 1, as it used a slightly different growth frame manipulation. As such, it did not include a measure of mindset.

Table 5

Example Scenario and Feedback Messages (Study 2)

Sample Goal Pursuit Scenario	
You have decided to make the effort to exercise on a regular basis. It has been a long time since you last worked out, so to help you get into a routine you have hired a personal trainer to develop an exercise plan. They have advised you to focus on cardio exercises for the next six months to help increase your overall stamina. After two months of trying to follow this plan, your trainer checks in with you again and comments on your efforts. Here is the feedback you receive from your trainer:	
Success Feedback with a Growth Frame	**Success Feedback with Generic Positivity**
"It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. *So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"*	"It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well. *Nice work, you've been working hard and you're doing a great job!*"
Failure Feedback with a Growth Frame	**Failure Feedback with Generic Positivity**
"It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. *So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around*."	"It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations. *I appreciate the positive attitude you've kept so far though."*

Note. Italics have been added to highlight the growth frame versus the generic positive statements but were not present in the feedback given to participants.

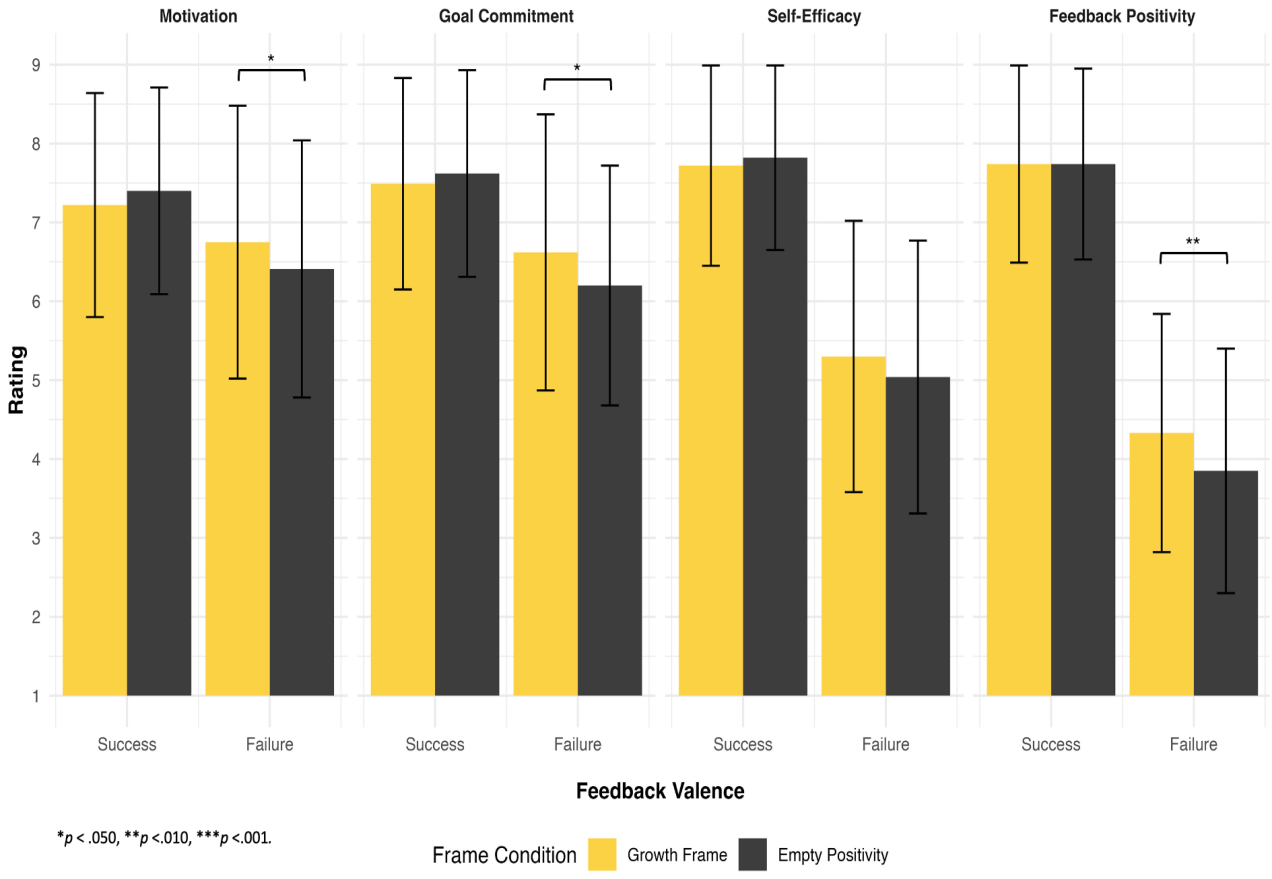
Primary Analyses

Figure 3 displays the means for each dependent measure by feedback valence and frame condition, and Table 6 reports the correlations for outcome variables. For each of the four dependent variables, I conducted a 2 (feedback valence: success, failure) x 2 (frame: growth

frame, generic positivity) repeated measures ANOVA. There was a significant main effect of feedback valence for all the dependent variables, such that success (vs. failure) feedback resulted in higher ratings of motivation, goal commitment, self-efficacy, and perceived feedback positivity. There was a significant main effect of frame for feedback positivity, such that participants perceived feedback with a growth frame as more positive than feedback with generic positivity. There was not a significant main effect of frame for motivation, goal commitment, or self-efficacy. Results from the analyses are reported in Table 7.

Figure 3

Means by Dependent Variable as a Function of Feedback Valence and Frame (Study 2)



Note. Variable means are plotted with error bars representing ± 1 *SD*.

Table 6

Descriptive Statistics and Correlations for Outcome Variables by Feedback Valence Collapsed Across Frame Condition (Study 2)

Variable	*M* (*SD*)	1.	2.	3.	4.
Success Feedback					
1. Motivation	7.51 (1.31)	-	-	-	-
2. Goal Commitment	8.12 (1.02)	.88**	-	-	-
3. Self-Efficacy	8.03 (1.08)	.79**	.86**	-	-
4. Feedback Positivity	7.98 (0.75)	.73**	.80**	.86**	-
Failure Feedback					
1. Motivation	6.50 (1.90)	-	-	-	-
2. Goal Commitment	6.34 (1.88)	.88**	-	-	-
3. Self-Efficacy	5.18 (1.90)	.49**	.49**	-	-
4. Feedback Positivity	2.87 (1.05)	.04	.11	.46**	-

*$p < .050$, **$p < .001$

Notably, the interaction between feedback valence and frame was significant for motivation, goal commitment, and perceived feedback positivity. Consistent with the hypotheses, failure feedback with a growth frame (vs. with generic positivity) resulted in higher ratings of motivation ($p = .050$), goal commitment ($p = .016$), and perceived feedback positivity ($p = .004$). In contrast, success feedback with a growth frame (vs. with generic positivity) did not significantly differ for motivation ($p = .199$), goal commitment ($p = .239$), or perceived feedback positivity ($p = .999$).

Table 7

Summary of Results from Repeated Measures ANOVAs by Dependent Variable (Study 2)

	$F(1,92)$	p	η_p^2
Motivation			
Main effect of Feedback	22.13	< .001	.19
Main effect of Frame	0.84	.362	.01
Interaction between Feedback X Frame	4.46	.037	.05
Goal Commitment			
Main effect of Feedback	61.15	< .001	.40
Main effect of Frame	1.98	.163	.02
Interaction between Feedback X Frame	7.68	.007	.08
Self-Efficacy			
Main effect of Feedback	212.83	< .001	.70
Main effect of Frame	0.45	.502	.01
Interaction between Feedback X Frame	3.12	.081	.03
Perceived Feedback Positivity			
Main effect of Feedback	302.17	< .001	.77
Main effect of Frame	5.55	.021	.06
Interaction between Feedback X Frame	6.07	.016	.06

Discussion

Study 2 revealed that participants report higher motivation and goal-commitment after receiving failure feedback with a growth frame compared to generic positive statements. These results suggest that the effectiveness of a growth frame does not result solely from its positive nature, but rather from the growth elements that reframe failure as a learning experience to aid in future success rather than merely an obstacle. This provides further evidence supporting the effectiveness of a growth frame. Additionally, Study 2 revealed that failure feedback with a

growth frame is perceived as significantly more positive than failure feedback with the generic positive statements. This suggests that participants recognise the difference between authentic positivity meant to encourage future success and generic positivity used to conceal the failure. The results also showed that participants' self-efficacy did not significantly differ after receiving failure feedback with a growth frame compared to the generic positive statements. This might hint at the idea that any positive comment may suffice to buffer the negative effects of failure on self-efficacy, but more work will need to be done to replicate this effect.

While Study 2 provides further support for the usefulness of a growth frame for providing effective failure feedback, a limitation of Studies 1 and 2 is the hypothetical nature of the paradigm. Thus far, participants have self-reported their predicted reactions to receiving feedback after failure. However, emotional responses are difficult to accurately predict, and people tend to make considerably more mistakes when predicting their future emotions as opposed to more stable constructs, such as their beliefs or values (Kahneman & Snell, 1992; Kahneman & Tversky, 1990; Wirtz et al., 2003). It is crucial to examine whether the effectiveness of a growth frame extends beyond hypothetical situations to a real-life, consequential context. Thus, Study 3 investigated the effectiveness of feedback with a growth frame using a consequential task paradigm.

STUDY 3

Study 3 aimed to investigate the effectiveness of a growth frame using a consequential task, where participants believed the feedback they received was based on their own performance. The preregistration, which covered the number of participants, exclusions, design, and main analysis plan, is available on the Open Science Framework, https://osf.io/agbpj/ (Rubie & Scholer, 2024). Participants completed an anagrams task and then received failure feedback; they were randomly assigned to receive failure feedback with or without a growth frame. They then completed measures of their motivation, goal commitment, self-efficacy, state growth mindset, perceived feedback positivity, and perceived performance. Finally, participants completed an additional anagrams task where their persistence and performance were measured. I examined the extent to which a growth frame mitigated the negative effects of receiving failure feedback based on participants' ratings of these measures and their persistence on the second set of anagrams.

I predicted that feedback with a growth frame would lead to significantly higher ratings of motivation, goal commitment, self-efficacy, state growth mindset, and perceived feedback positivity, as well as greater persistence compared to feedback with no frame. Persistence was measured as a key behavioral outcome: previous research has shown that experiencing failure decreases persistence which ultimately hinders future success, whereas experiencing success increases persistence which in turn contributes to more success outcomes (Di Paula & Campbell, 2002; McFarlin, 1985; Sideridis & Kaplan, 2011). Since anagram tasks are commonly used as a robust measure of persistence (e.g., Eisenberger & Leonard, 1980; Gignac & Wong, 2020), I directly examined whether receiving feedback with (vs. without) a growth frame can contribute to positive behavioral outcomes for feedback receivers, specifically in their persistence on the

task. Finally, I predicted that performance would not differ between frame conditions; persistence is a more sensitive measure on this type of anagram task, and participants did not actually do poorly on the first anagrams set despite the failure feedback message they received.

Method

Participants and Design

Participants (N = 278 after exclusions) were recruited from Amazon Mechanical Turk (MTurk) through CloudResearch.com in exchange for $5.00 USD (145 females, 127 males, 2 non-binary people; M_{age} = 43.16, SD_{age} = 11.46; 69% White, 12% Black, 8% Asian, 5% Hispanic, 3% Mixed Race, 1% Indigenous). All participants were from the United States and had an approval rating on MTurk of at least 95%. A sensitivity analysis using G*Power (Faul et al., 2007) revealed that the minimum effect size that can be detected at 95% power with alpha .05 and this sample size is η_p^2 = .04. Participants indicated their reactions to feedback in a 2 condition (frame: growth frame, no frame) fully between-participants design.

Exclusions. Participants were excluded from the analyses based on three pre-registered exclusion criteria. First, participants were excluded for failing the manipulation check, which asked them to select their score indicated in the feedback message from three options. This aimed to make sure participants read the feedback they received as this is essential to the research. Additionally, any participants who clearly indicated that they suspected the feedback was false at the end of the study were excluded from analyses. Since Mturk participants may have previously participated in studies with deception and experience higher demand characteristics, we excluded participants who suspected the feedback was falsified, as this would prevent them from meaningfully engaging with the feedback message. Finally, participants who scored less than 4/26, or 15%, on the initial anagrams task were excluded. This aimed to make

sure participants who were included truly attempted and engaged with the task, such that the feedback they received was meaningful to their performance, and excluded participants who simply clicked through the task, which can occasionally arise from using Mturk. Since there were several easy anagrams in each set, receiving a score of at least 4/26, or 15%, was attainable for all participants with minimal effort; thus, participants were not excluded based on their prior skills or abilities.

67 additional participants completed the study but were excluded from analyses based these criteria: 16 participants failed the manipulation check, 28 participants believed the feedback to be false, and 34 participants had a score of less than 4/26 on the anagrams task.

Materials

Participants were told they would be completing an anagrams task where they must unscramble letters to create a word and would receive feedback halfway through the task about their performance thus far. Several of the words had multiple solutions, but participants were told that the correct answer would always be related to the themes of either foods or animals. However, some multi-solution anagrams did not have a correct answer related to the themes. This was done to reduce participants' ability to gauge their performance to make the failure feedback more believable. Participants were informed that a score in the 60th percentile or higher, meaning they scored better than 60% of other participants, was considered success, and that performance was measured based on a combination of factors, each weighted differently, including how many anagrams they solved, the difficulty of each anagram, their speed of responding, and whether their answer was related to one of the two themes. Participants had a maximum of 15 minutes to work on each set of anagrams. The anagram sets are presented in Appendix D, and the full feedback messages are shown in Table 8.

Procedure and Measures

After completing the first set of anagrams, participants randomly received a feedback message that they believed reflected their performance. Before moving on to the second set of anagrams, participants completed an additional manipulation check and the same measures of their motivation, goal-commitment, self-efficacy, and perceived feedback positivity from Studies 1 and 2 tailored to refer to the task, for example, "I am motivated to work on the next half of this task." A new measure of participants' state growth mindset was used to be more applicable to their task performance. Full measures with items are available in Appendix E.

Manipulation Check. Participants were asked to indicate percentile they scored in on the first half of the anagram task between three options: the 1st to 33rd percentile, the 34th to 66th percentile, or the 67th to 100th percentile. This question functioned as a manipulation check to ensure participants read the feedback they received. Participants who answered incorrectly were excluded from further analyses.

Perception of Performance. Participants' subjective perception of their performance relative to other participants was measured using one item on a Likert scale from 1 (complete failure) to 9 (complete success): In your own opinion, if you had to say, how would you evaluate your performance on the first half of the anagram task compared to other participants? This question ensured that participants had accurately classified their performance as failure across both feedback conditions.

Table 8

Feedback Messages (Study 3)

Failure Feedback with Growth Frame	Failure Feedback with No Frame
"So far, your performance falls into the 40th percentile. That means you've scored higher than 40% of other participants and lower than 60% of other participants at this point of the task. *An experience like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success*!"	"So far, your performance falls into the 40th percentile. That means you've scored higher than 40% of other participants and lower than 60% of other participants at this point of the task."

Note. Italics have been added to highlight the growth frame but were not present in the feedback given to participants.

Persistence. The amount of time participants spent working on the second set of anagrams was measured in seconds.

Performance. Participants' score on the second anagrams was calculated by summing the number of anagrams they correctly answered (maximum = 26).

Mindset. Participants' state mindset was measured using 4 items ($\alpha = .94$) adapted from the Goal Choice Scale by Dweck (1999; e.g., It's much more important for me to learn things from a task than it is to have the best performance) on a Likert scale from 1 (strongly disagree) to 6 (strongly agree).

Results

Manipulation Check and Perception of Performance

95% of participants correctly indicated from three options the range that included their score from the feedback message. Participants' perception of their performance relative to other participants did not significantly differ between frame conditions, $F(1, 277) = 212.83$, $p < .001$,

$\eta_p^2 < .01$. Notably, participants' perception of their performance was significantly below the scale midpoint after receiving feedback with a growth frame ($M = 4.29$, $SD = 1.59$, $t = -5.29$, $p < .001$) and without a frame ($M = 4.24$, $SD = 1.59$, $t = -5.45$, $p < .001$), indicating that participants accurately detected the failure signal from the feedback.

Primary Analyses

Figure 4 displays the means for the dependent measures by frame condition, and Table 9 includes the correlations among outcome variables. For each of the seven dependent variables, I conducted a one-way ANOVA with the frame condition as a between-participants factor. As hypothesized, participants indicated feeling greater motivation, $F(1, 277) = 25.42$, $p < .001$, $\eta_p^2 = .08$, goal commitment, $F(1, 277) = 20.69$, $p < .001$, $\eta_p^2 = .07$, and self-efficacy, $F(1, 277) = 7.33$, $p = .007$, $\eta_p^2 = .03$, after receiving failure feedback with a growth frame as opposed to without the frame. However, participants' state growth mindset did not significantly differ between frame conditions, $F(1, 277) = 0.80$, $p = .371$, $\eta_p^2 < .01$.

Participants persisted significantly longer on the second set of anagrams ($M_{difference} = 64$ seconds) after receiving feedback with a growth frame as opposed to no frame, $F(1, 277) = 6.50$, $p = .011$, $\eta_p^2 = .03$. This effect remained significant after applying a Log10 transformation to the data, $F(1, 277) = 9.70$, $p = .002$, $\eta_p^2 = .03$. Additionally, as predicted, participants' performance on set two did not significantly differ between feedback with and without a growth frame, $F(1, 277) = 0.31$, $p = .581$, $\eta_p^2 < .01$. Finally, participants perceived the feedback to be more positive when it included a growth frame, $F(1, 277) = 212.83$, $p < .001$, $\eta_p^2 = .04$.

Figure 4

Means by Dependent Variable as a Function of Frame Condition (Study 3)

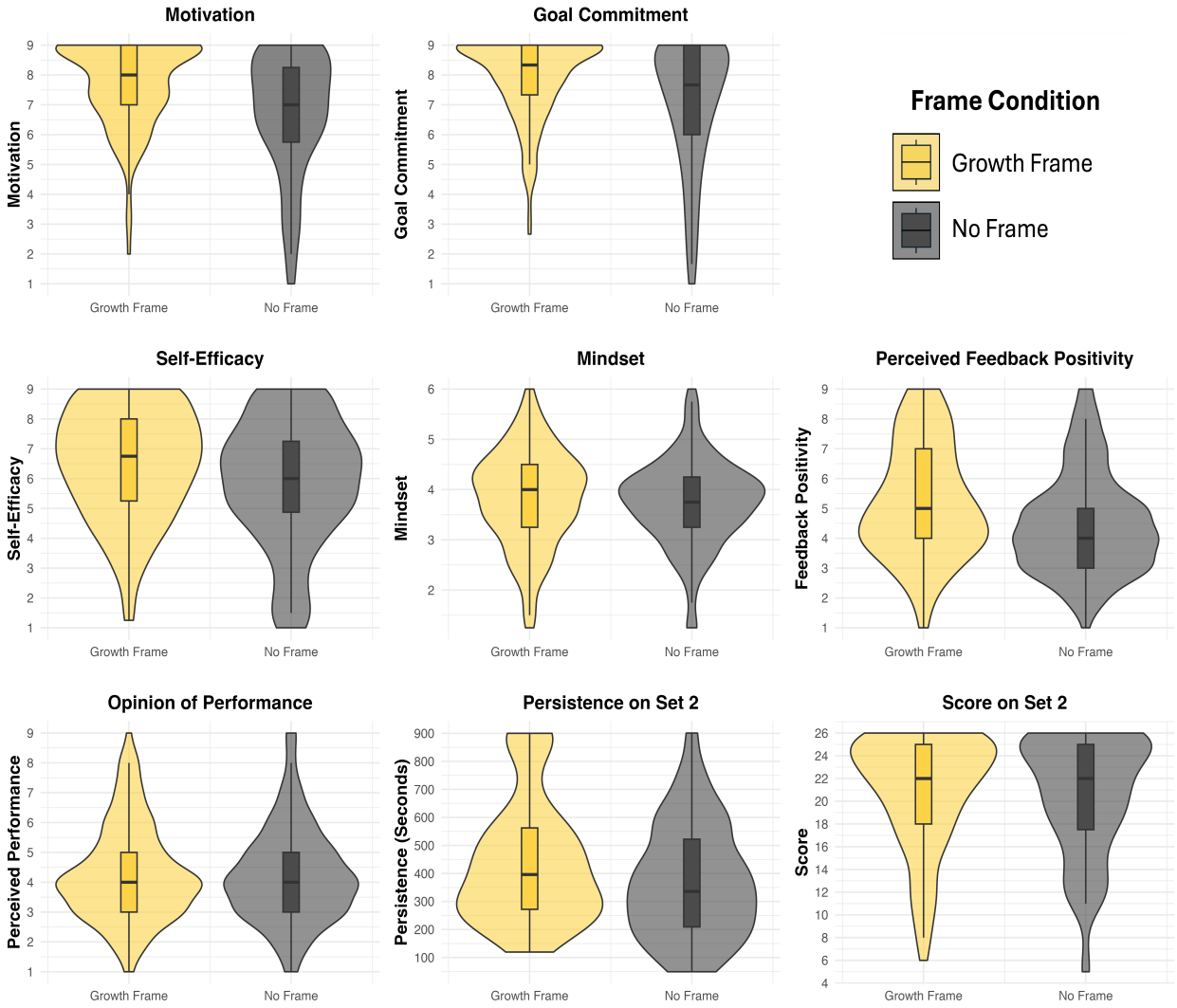


Table 9

Descriptive Statistics and Correlations for Outcome Variables (Study 3)

Variable	*M* (*SD*)	1.	2.	3.	4.	5.	6.	7.	8.
1. Motivation	7.22 (1.81)	-	-	-	-	-	-	-	-
2. Goal Commitment	7.46 (1.82)	.88**	-	-	-	-	-	-	-
3. Self-Efficacy	6.19 (1.99)	.63**	.60**	-	-	-	-	-	-
4. Mindset	3.79 (0.95)	.21**	.21**	.17*	-	-	-	-	-
5. Feedback Positivity	4.87 (1.83)	.29*	.23*	.33**	.11	-	-	-	-
6. Perceived Performance	4.27 (1.59)	.09	.04	.32**	.09	.30**	-	-	-
7. Set 2 Persistence	407.76 (211.59)	.06	.12*	.08	.13*	-.13*	.03	-	-
8. Set 2 Performance	20.58 (5.03)	.16*	.16*	.04	.14*	.16**	-.07	.10	-

*$p < .050$, **$p < .001$

Discussion

The results of Study 3 provide additional evidence that a growth frame is effective in a consequential context in which participants believe that the feedback they received reflects their performance. Thus, Study 3 both replicates and extends the findings of Studies 1 and 2 by providing evidence that participants experienced higher motivation, goal-commitment, and self-efficacy after receiving failure feedback with a growth frame (vs. without a frame). Additionally, participants perceived the feedback as more positive when it includes a growth frame, while still perceiving their performance as failure in both frame conditions. Critically, participants who received failure feedback with a growth frame persisted for an average of a minute longer on the second anagrams set than participants who received feedback with no frame. This behavioral outcome directly supports the effectiveness of a growth frame in promoting a constructive, future-focused approach to experiencing failure.

Contrary to Study 1, there was not a significant difference in participants' state growth mindset from receiving feedback with versus without a growth frame. One potential explanation for this finding is the use of a new mindset scale in this study, which may have lacked the sensitivity to accurately measure participants' state mindset. While using the new measure, which compared learning versus performance goals, seemed more relevant to the task, this change may have prevented participants' state mindset from being accurately measured. The items directly asked participants to choose between learning and performance goals (e.g., If I had to choose between having the best performance and being challenged by a task, I would choose…), which may have led to a central tendency bias. This notion is supported by the data, as an exploratory analysis found that participants' average state mindset did not significantly differ from the scale midpoint in either the growth frame feedback condition ($M = 3.84$, $SD = 0.95$, $t = 1.76$, $p = .081$), nor the feedback with no frame condition ($M = 3.74$, $SD = 0.85$, $t = 0.58$, $p = .562$). Thus, replicating the study with the initial "Kind of Person" Implicit Theory Measure by Dweck (1999) would be a useful next step before drawing any overarching conclusions about the role of this proposed mechanism in understanding the effects.

Overall, Study 3 extends the current work in a significant way by showing that a growth frame is effective at reducing the emotional and motivational consequences associated with receiving failure feedback. The results from Study 3 also have implications for the mindset literature, as they provide initial support for the idea that using growth-framed feedback could potentially help people to develop a more effective approach to failure over time.

GENERAL DISCUSSION

The current work provides an initial examination of whether implementing a growth frame within a failure feedback message can increase its effectiveness and enable the feedback recipient to learn from their failures. The present studies reveal new insights regarding the effectiveness of a growth frame in reducing the emotional and motivational consequences of receiving failure feedback. Three studies provide preliminary evidence that people report higher motivation, goal-commitment, self-efficacy, and perceived feedback positivity after receiving failure feedback with a growth frame versus without a frame (Studies 1 and 3) or with generic positive statements (Study 2). Additionally, people persist longer on a related task after receiving failure feedback with a growth frame versus without a frame (Study 3). These results were observed in both within-participant hypothetical paradigms (Studies 1 and 2) and a between-participant consequential task paradigm (Study 3). Taken together, these studies demonstrate that the inclusion of a growth frame within a failure feedback message has the potential to reduce the motivational consequences of experiencing failure and enable the recipient to engage with the feedback in order to learn and grow from their failures.

Theoretical Implications

By demonstrating an increase in participants' reported motivation, goal commitment, and self-efficacy after receiving failure feedback with a growth frame, the current work advances our understanding of factors that may contribute to effective failure feedback and enable the feedback recipient to engage with the message. Prior research on failure feedback has found that people often find failure to be embarrassing and ego-threatening (Audia & Locke, 2003; Eskreis-Winkler & Fishbach, 2020; McGregor & Elliot, 2005), and these emotional consequences often cause the feedback recipient to tune out failure feedback messages, and thus fail to learn from

them (e.g., Audia & Locke, 2003; Eskreis-Winkler & Fishbach, 2019, 2022). While several strategies for providing effective failure feedback exist in the literature (Hattie & Timperley, 2007; Henley & DiGennaro Reed, 2015; Mueller & Dweck, 1998), this body of work has largely focused on improving the content of the feedback message rather than recipients' engagement with the message, which is a significant distinction.

As an example, specific feedback intended to improve performance would require content in the feedback message to inform the recipient of which aspects of their performance led them to failure, and what needs to be changed to achieve future success. However, the recipient may be too overwhelmed by their failure, whether from embarrassment, sadness, or denial, to engage with the feedback message and truly listen to the helpful information provided in the feedback message failures (Eskreis-Winkler & Fishbach, 2019, 2022; McGregor & Elliot, 2005; Reb & Connolly, 2009). Thus, while the feedback message's content may be high quality, the recipient cannot absorb and learn from the message if they are unable to overcome their emotional response to failure and engage with the feedback. This leaves a significant gap in the literature on how to enable feedback recipients to overcome their negative emotional reactions and truly engage with a failure feedback message. By focusing on the development of a growth frame to reduce the motivational and emotional consequences of experiencing failure, the current research aimed to fill this gap.

Furthermore, the present work has important implications for the study of strategies to provide effective feedback more broadly. The framework for growth-framed feedback does not work in competition with other feedback strategies, but rather in conjunction with these strategies to create the most effective feedback message possible. By increasing the recipient's willingness to engage with failure feedback, a growth frame can not only serve as a tool for

providing effective feedback on its own but may also increase the effectiveness of other pre-existing feedback strategies. A growth frame can be combined with content-improving strategies, such as specific feedback intended to improve performance, to further provide the feedback recipient with instruction on how to improve and guide them towards future success. Thus, by increasing the feedback recipient's ability to engage with the feedback message through the inclusion of a growth frame, the full potential of content-focused strategies can be unlocked.

The current work also adds to the growing mindset literature by demonstrating an additional operationalization of growth mindset work beyond the classic classroom-based interventions. Although many interventions exist to cultivate a growth mindset in individuals, these interventions have shown varying success rates, both in their implementation and replication (Balan & Sjöwall, 2023; Blackwell et al., 2007; Brez et al., 2020; Moreau, 2022; Yeager et al., 2016). For example, a meta-analysis of 273 effect sizes from growth mindset interventions by Sisk et al. (2018) found moderate average effect sizes qualified by a high degree of heterogeneity: indeed, half of the effect sizes were not significantly different from zero, and multiple moderating variables have been proposed. These results also highlight the difficulty of promoting a general trait growth mindset in individuals, as opposed to a contextual state growth mindset (Ratchford et al., 2021).

In response to this, recent research has shown that the effectiveness of growth mindset interventions are strongly dependent on the classroom context: the feedback and failure attitudes expressed by teachers have a significant impact on students' receptiveness to growth mindset interventions, as the classroom context created by the teacher can either enhance or diminish the ideas communicated by the interventions in the long term (Combette et al., 2023; Hecht et al., 2021, 2023; Seals, 2018). By creating an environment that promotes learning and growth instead

of a focus on performance indicators such as grades, the beliefs instilled in students from short-term mindset interventions are afforded by the context, which in turn allows for these interventions to effectively guide students towards developing growth mindsets in the long-term (Hecht et al., 2023). Combining those insights with the current work implies that providing teachers with a growth framework for providing failure feedback may help to create a learning-oriented classroom context, which in turn can promote an environment conducive to growth mindsets and enhance the effectiveness of growth-mindset interventions.

While it is challenging to cultivate a trait growth mindset in individuals, simply evoking a state growth mindset through failure feedback with a growth frame may be enough to recontextualize failure as a learning opportunity and encourage recipients to grow from their failures. Additionally, a growing body of research suggests that parents' attitudes towards failure have the strongest impact on their children's mindsets and responses to experiencing failure (Ching et al., 2023; Haimovitz & Dweck, 2016a, 2016b; Tao et al., 2022). For example, across four studies, Haimovitz & Dweck (2016a) measured the mindsets of children and their parents, as well as the parents' views of failure and their responses to scenarios in which their child failed at a task. While the parents' mindsets did not predict their responses to the scenarios or their child's mindset, their views of failure significantly predicted their responses to their child's failures and their child's mindset. Additionally, children were significantly more accurate in discerning their parents' views of failure than their mindsets. Thus, encouraging a healthy attitude towards failure in adults by providing feedback with a growth frame could potentially have downstream effects by influencing parents to model a constructive attitude towards failure to their children.

Limitations and Future Directions

A Growth Mindset and Pre-existing Feedback Strategies

While the present research offers interesting insights into the effectiveness of a growth frame for failure feedback, it is currently unknown how effective this framework is compared to pre-existing feedback strategies. Given the exploratory nature of this work, the present research aimed to establish the overall effects of a growth frame, rather than systematically compare its effectiveness against other feedback strategies. Although a growth frame targets the feedback recipient's willingness to engage with the feedback message rather than the content of the feedback message, this contrast could still provide further support for the effectiveness of growth-framed feedback by demonstrating comparable results to pre-existing empirically supported strategies for providing effective failure feedback.

Additionally, while a growth framework is hypothesized to work synergistically with and enhance the effects of pre-existing feedback strategies, this has not yet been examined. Future research should investigate the capacity of a growth frame to work concurrently with additional feedback strategies and enhance the feedback recipient's willingness to engage with these components of the feedback message. This could be examined by comparing feedback recipients' motivation outcomes after receiving specific feedback intended to improve performance with a growth frame versus without a frame. Thus, comparing the effectiveness of a growth frame against and in combination with other feedback strategies are fruitful areas for future research.

Methodological Limitations

As a preliminary investigation into the efficacy of a growth framework for providing more effective failure feedback, the present work had important methodological limitations that

should be addressed in future research. As the current work stands, the evidence for participants' state growth mindset working as a mechanism to promote a more effective response to failure is mixed across Studies 1 and 3. Currently, it is unclear whether the use of a new scale to measure participants' state mindset in Study 3 led to this mixed evidence, or if the mechanism only operates in a hypothetical context and not in a consequential task paradigm. In Study 1, state mindset was measured using four items ($\alpha = .94$) adapted from the "Kind of Person" Implicit Theory Measure by Dweck (1999; e.g., The kind of person you are, is something very basic about you and it can't be changed very much). However, Study 3 employed the four-item Goal Choice Scale by Dweck (1999; e.g., It's much more important for me to learn things from a task than it is to have the best performance) due to its task-specific nature and behavior-oriented measurement of participants' likelihood to pursue performance versus mastery goals. While this shift was initially thought to provide a more direct outcome-specific measure of participants' state mindset, this measure may have confounded mindset with participants' preference for specific types of goals and thus lacked the sensitivity to accurately measure their state mindset.

Due to this limitation, future research should further examine whether participants' state mindset functions as a key mechanism in promoting a more effective response to growth-framed failure feedback. For instance, an important next step could be to replicate Study 3 with both the initial "Kind of Person" Implicit Theory Measure (Dweck, 1999) and the Goal Choice Scale (Dweck, 1999) to examine whether the null results were due to measurement error or if the mechanism does not function as expected.

In addition, other methodological paradigms could be adopted to further explore causality (e.g., Spencer et al. 2005). We know from previous work that possessing a trait growth mindset or directly manipulating a state growth versus fixed mindset tends to lead to greater engagement

after failure (Doron et al., 2009; Dweck & Master, 2008; Dweck & Reppucci, 1973). However, the relationship between a manipulated state growth mindset and increased engagement after experiencing failure could be investigated more systematically, particularly in the context of interpersonal feedback.

An additional limitation of the work is the controlled context used to evaluate the effectiveness of a growth frame. The current studies employed hypothetical scenarios and a relatively low stakes anagrams task paradigm. An important next step would be to examine the effectiveness of a growth frame for failure feedback using additional performance contexts and tasks, including those that go beyond a laboratory setting and better capture a more authentic feedback context. For example, a controlled experiment examining students' responses to their professor's feedback on their assignments with or without a growth frame would allow for a deeper understanding of the effectiveness of growth-framed feedback as it would be delivered in the real world. Further, introducing an interpersonal context by having a confederate deliver the feedback in-person would allow for a deeper investigation of the effectiveness of a growth frame for failure feedback in a more realistic context, as feedback tends to be more effective when delivered face-to-face rather than in text in an organizational setting (e.g., Chae et al., 2020).

Additionally, in a real-world context, it is equally likely that a person would need to complete a new, related task rather than repeat the same task following failure. For example, a student who receives a failing grade on an essay may then need to prepare for the course's final exam rather than write an additional essay. While Studies 1 through 3 provided evidence that participants experience higher motivation and goal commitment to continue with the same task and persist longer after receiving failure feedback with a growth frame, it is important to examine whether these positive effects are transferrable to a new, related task in the same

context. Thus, an important future direction would be to examine participants' motivational and emotional outcomes after receiving failure feedback with or without a growth frame when they must pivot to perform a new task that will help them advance towards the same goal. For example, participants could complete and receive feedback on an anagrams task first, and then have their persistence and performance measured on a new task, such as the Unusual Uses Test (Guilford, 1967), with their combined performance determining their overall rank.

The Paradox of Success Feedback

While I hypothesized that there would not be a significant difference in all ratings for success feedback as a function of the presence or absence of the feedback frame, since I expected that success feedback would elicit a positive response from participants regardless of the feedback frame, Study 1 yielded a surprising result: Success feedback with no frame was perceived to be more positive than success feedback with a growth frame. This raises an interesting question: are people more resistant to messages encouraging growth and learning after succeeding? Receiving praise after success tends to reinforce the positive emotions that accompany such an outcome and sates the human desire to have others acknowledge our successes, leading to deeper performance-related satisfaction (Delin & Baumeister, 1994; L. M. Gaines et al., 2005). In contrast, the developing concept of feedback fatigue suggests that receiving too much constructive feedback can be mentally draining and harmful rather than beneficial (Barrett et al., 2018; Lipkin, 2022). Perhaps feedback recipients would prefer to simply have their successes acknowledged without an additional growth message encouraging them to learn from their experiences and strive for more.

However, success is a continuum rather than a binary outcome. Although a person might see a success outcome as signifying that effort is no longer needed, there will always be skills,

abilities, and aspects of performance that a person could improve upon to maintain or achieve a higher degree of success. While success feedback alone can feel more positive and uplifting, success feedback with a growth frame may still be more effective feedback, even if people would prefer not to hear it. In support of this notion, Studies 1 and 2 found that success feedback with a growth frame did not result in lower motivation, goal commitment or self-efficacy than feedback without a frame or with generic positivity: only the feedback's perceived positivity was significantly lowered by the inclusion of a growth frame. To address this paradox, future research should explore how the implementation of a growth frame in a success feedback message impacts the receiver's emotional response to their success, their satisfaction in their performance, and their persistence and performance on a follow-up task. By doing so, people's emotional and behavioral responses to success can be disentangled to determine the most effective way to frame success feedback, depending on the desired outcome.

CONCLUSION

Receiving effective feedback is critical to facilitating meaningful progress and engagement in goal pursuit. While both success and failure feedback can be powerful tools, failure feedback is especially beneficial for subsequent goal pursuit (Vancouver et al., 2010). When people are informed that they are failing to make fruitful progress in pursuit of their goals, they are more likely to increase their motivation, effort, and commitment to improvement (Fishbach et al., 2010; S. Kim et al., 2018; Schmidt & DeShon, 2007). However, failure feedback is often delivered in an ineffective manner that prevents the recipient from engaging with or learning from the feedback message due to the ego-threatening nature of failure (Eskreis-Winkler & Fishbach, 2019, 2022; Fong & Schallert, 2023).

The present research provides initial evidence that implementing a growth frame for failure feedback can recontextualize failure as an opportunity for growth and encourage the recipient to engage with the feedback message. Specifically, three studies provided preliminary evidence that people experience higher motivation, goal commitment, and self-efficacy, and persist longer on a related task after receiving failure feedback with a growth frame (versus no frame or generic positivity). In addition to providing deeper insight into the foundations of effective failure feedback and advancing the operationalization of Dweck's (1999) mindset framework, this research will have a multi-disciplinary impact. Feedback occurs in many contexts, such as the classroom, the athletic field, and the workplace, and this research is an initial step towards developing interventions to allow for the provision of effective failure feedback in all environments. Thus, this research can contribute to positive real-world outcomes for feedback receivers.

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APPENDICES

Appendix A

Attention Check

Materials used as an attention check in Studies 1, 2, and 3. This was presented at the beginning of each study after the consent form, and prior to any further instructions or information about the study.

Recent research on decision making shows that choices are affected by context. Differences in how people feel, their previous knowledge and experience, and their environment can affect choices. To help us understand how people make decisions, we are interested in information about you. Specifically, we are interested in whether you actually take the time to read the instructions; if not, some results may not tell us very much about decision making in the real world. To show that you have read the instructions, please ignore the question below about how you are feeling and instead type in "I know how to type" without quotation marks. You must answer this question correctly in order to participate in this study.

Please briefly describe how you are feeling right now:
[open text box]

Appendix B

Hypothetical Scenarios and Feedback Messages

All scenarios and feedback messages used in Studies 1 and 2. Scenarios were presented in randomized order and the feedback message was randomly assigned to each scenario for every participant, such that each participant saw all four possible feedback frames twice but corresponding to different scenarios.

Instructions

For the first part of the study, we would like you to read through 8 short scenarios while imagining yourself pursuing the goal in each one of them. Really try to immerse yourself in each scenario.

For each scenario, you will be asked to imagine yourself receiving feedback about your progress/work so far and will be asked a series of questions about this feedback.

Here is the scenario in which you are pursuing a goal:

Special Task at Work

You are working at an organization and as part of your job you are assigned to work on a special task. As a relatively new hire to the organization, you have been given this task as a chance to make a good impression on your manager for important projects in the future. The time allocated for this task is about two months. After working for one month on the task, your manager calls you into their office and remarks on your current progress.

Here is the feedback you receive from your manager:

Study 1 – Growth Frame vs. No Frame

Success Growth Frame. "It looks like you're about three-quarters of the way through the project you've been working on, and half-way through your time. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"

Success No Frame. "It looks like you're about three-quarters of the way through the project you've been working on, and half-way through your time. So far, you are doing really well. Great job!"

Failure Growth Frame. "It looks like you're about one-quarter of the way through the project you've been working on, and half-way through your time. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "It looks like you're about one-quarter of the way through the project you've been working on, and half-way through your time. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity
Success Growth Frame. "It looks like you're about three-quarters of the way through the project you've been working on, and half-way through your time. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!
Success Generic Positivity. "It looks like you're about three-quarters of the way through the project you've been working on, and half-way through your time. So far, you are doing really well. Great job, you've been working hard!"
Failure Growth Frame. "It looks like you're about one-quarter of the way through the project you've been working on, and half-way through your time. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."
Failure Generic Positivity. "It looks like you're about one-quarter of the way through the project you've been working on, and half-way through your time. So far, your efforts fall below expectations. You did a great job on that last project you did before this one though!"

<u>Task for Client's Order</u>

You are currently working at one of your preferred organizations. A client has recently placed an important order with the organization, and you have been assisting your supervisor with a critical task to help complete it. The order must be sent to the client in a week's time. After three days of working on this task, your supervisor turns to you and comments on your work.

Here is the feedback you receive from your supervisor:

Study 1 – Growth Frame vs. No Frame
Success Growth Frame. "It looks like you've finished about 75% of the task I assigned you to help complete the order, and you still have half of the week left to keep working on it. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"

Success No Frame. "It looks like you've finished about 75% of the task I assigned you to help complete the order, and you still have half of the week left to keep working on it. So far, you are doing really well."
Failure Growth Frame. "It looks like you've finished about 25% of the task I assigned you to help complete the order, and you only have half of the week left to keep working on it. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "It looks like you've finished about 25% of the task I assigned you to help complete the order, and you only have half of the week left to keep working on it. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity
Success Growth Frame. "It looks like you've finished about 75% of the task I assigned you to help complete the order, and you still have half of the week left to keep working on it. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"
Success Generic Positivity. "It looks like you've finished about 75% of the task I assigned you to help complete the order, and you still have half of the week left to keep working on it. So far, you are doing really well. Great job, you've been working hard!"
Failure Growth Frame. "It looks like you've finished about 25% of the task I assigned you to help complete the order, and you only have half of the week left to keep working on it. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."
Failure Generic Positivity. "It looks like you've finished about 25% of the task I assigned you to help complete the order, and you only have half of the week left to keep working on it. So far, your efforts fall below expectations. You did a great job on that last order you did before this one though!"

Wage Increase at Part-Time Job

You have recently taken up an extra part-time job. Your manager informs you that the part-time job pays on an hourly base rate and it is possible to obtain a wage increase from excellent performance during your six-month probation period. You decide to work toward this raise for your own personal reasons. Three months into working on the job, your manager pulls you aside and remarks on your performance.

Here is the feedback you receive from your manager:

Study 1 – Growth Frame vs. No Frame

Success Growth Frame. "Over the past three months you've consistently turned in high-quality work, met all of your deadlines, and been a real team player. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"

Success No Frame. "Over the past three months you've consistently turned in high-quality work, met all of your deadlines, and been a real team player. So far, you are doing really well."

Failure Growth Frame. "Over the past three months, you've consistently turned in average-quality work, missed quite a few of your deadlines, and haven't been much of a team player. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."

Failure No Frame. "Over the past three months, you've consistently turned in average-quality work, missed quite a few of your deadlines, and haven't been much of a team player. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity

Success Growth Frame. "Over the past three months you've consistently turned in high-quality work, met all of your deadlines, and been a real team player. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"

Success Generic Positivity. "Over the past three months you've consistently turned in high-quality work, met all of your deadlines, and been a real team player. So far, you are doing really well. Great job, you've been working hard!"

Failure Growth Frame. "Over the past three months, you've consistently turned in average-quality work, missed quite a few of your deadlines, and haven't been much of a team player. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."

Failure Generic Positivity. "Over the past three months, you've consistently turned in average-quality work, missed quite a few of your deadlines, and haven't been much of a team player. So far, your efforts fall below expectations. You did a great job on that last project you did though!"

Assignment for Language Class

You are taking a class to learn a new language and are working on an important end-of-term assignment that is being graded by your instructor's teaching assistant. For this assignment, you are required to submit it in portions throughout the term so the teaching assistant can make suggestions toward the final version. The deadline to submit the final version is in four months.

After two months of working on the assignment, your teaching assistant takes you aside to talk about your work.

Here is the feedback you receive from your teaching assistant:

Study 1 – Growth Frame vs. No Frame
Success Growth Frame. "You've been consistently turning in high quality work for your end-of-term assignment, and it's clear that you've been applying material that you've learned from the course readings to your work. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"
Success No Frame. "You've been consistently turning in high quality work for your end-of-term assignment, and it's clear that you've been applying material that you've learned from the course readings to your work. So far, you are doing really well."
Failure Growth Frame. "The work that you've been turning in so far hasn't followed the assignment guidelines you were provided with, and you haven't been applying the material from the course readings to your work. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "The work that you've been turning in so far hasn't followed the assignment guidelines you were provided with, and you haven't been applying the material from the course readings to your work. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity
Success Growth Frame. "You've been consistently turning in high quality work for your end-of-term assignment, and it's clear that you've been applying material that you've learned from the course readings to your work. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"
Success Generic Positivity. "You've been consistently turning in high quality work for your end-of-term assignment, and it's clear that you've been applying material that you've learned from the course readings to your work. So far, you are doing really well. Great job, you've been working hard!"
Failure Growth Frame. "The work that you've been turning in so far hasn't followed the assignment guidelines you were provided with, and you haven't been applying the material from the course readings to your work. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."
Failure Generic Positivity. "The work that you've been turning in so far hasn't followed the assignment guidelines you were provided with, and you haven't been applying the material from the course readings to your work. So far, your efforts fall below expectations. You did a great job on that last assignment you did before this one though!"

Practical Exam for a Promotion

You have an upcoming practical exam that will get you a promotion at work if you pass it and have been corresponding with your boss while preparing for it. Your boss is receptive to questions and clarifications from their employees, especially if they take the time to complete practice exam questions. The exam is set to be written in two weeks. After answering your inquiries for about a week, your boss writes you an additional message regarding your readiness for the exam.

Here is the feedback you receive from your boss:

Study 1 – Growth Frame vs. No Frame
Success Growth Frame. "The questions you've been asking me indicate that you have a solid understanding of the exam material and have been engaging in higher-level thinking about the content we've covered. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"
Success No Frame. "The questions you've been asking me indicate that you have a solid understanding of the exam material and have been engaging in higher-level thinking about the content we've covered. So far, you are doing really well."
Failure Growth Frame. "The questions you've been asking me indicate that you don't have a good grasp of the exam material and haven't gone beyond thinking about the basic concepts we've covered. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "The questions you've been asking me indicate that you don't have a good grasp of the exam material and haven't gone beyond thinking about the basic concepts we've covered. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity
Success Growth Frame. "The questions you've been asking me indicate that you have a solid understanding of the course material and have been engaging in higher-level thinking about the content we've covered in class. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"
Success Generic Positivity. "The questions you've been asking me indicate that you have a solid understanding of the course material and have been engaging in higher-level thinking about the content we've covered in class. So far, you are doing really well. Great job, you've been working hard!"

Failure Growth Frame. "The questions you've been asking me indicate that you don't have a good grasp of the course material and haven't gone beyond thinking about the basic concepts we've covered in class. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."
Failure Generic Positivity. "The questions you've been asking me indicate that you don't have a good grasp of the course material and haven't gone beyond thinking about the basic concepts we've covered in class. So far, your efforts fall below expectations. You did a great job on that last exam you did before this one though!"

Starting a New Exercise Plan

You have decided to make the effort to exercise on a regular basis. It has been a long time since you last worked out, so to help you get into a routine you have hired a personal trainer to develop an exercise plan. They have advised you to focus on cardio exercises for the next six months to help increase your overall stamina. After two months of trying to follow this plan, your trainer checks in with you again and comments on your efforts.

Here is the feedback you receive from your trainer:

Study 1 – Growth Frame vs. No Frame
Success Growth Frame. "It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"
Success No Frame. "It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well."
Failure Growth Frame. "It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity
Success Growth Frame. "It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing

really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"
Success Generic Positivity. "It's clear you've been following the exercise plan I set for you, and I can tell that your stamina has greatly improved since the first time we met. So far, you are doing really well. Great job, you've been working hard!"
Failure Growth Frame. "It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."
Failure Generic Positivity. "It's clear that you haven't been following the exercise plan I set for you, and I can tell that your stamina hasn't improved since the first time we met. So far, your efforts fall below expectations. You did a great job on that last circuit you did before this one though!"

Eating a Healthier Diet

You have decided to pursue a goal that involves eating a healthier diet. To help with accountability, you have shared your plans with a nutritionist who will help track your meals and snacks for approximately four months. Two months into working on this goal, they discuss your current progress at your request.

Here is the feedback you receive from your nutritionist:

Study 1 – Growth Frame vs. No Frame
Success Growth Frame. "I noticed you haven't gotten fast food for the past two months and have increased your fruit and vegetable intake. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"
Success No Frame. "I noticed you haven't gotten fast food for the past two months and have increased your fruit and vegetable intake. So far, you are doing really well."
Failure Growth Frame. "I noticed you've still been ordering in fast food several times a week and haven't increased your fruit and vegetable intake. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."
Failure No Frame. "I noticed you've still been ordering in fast food several times a week and haven't increased your fruit and vegetable intake. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity

Success Growth Frame. "I noticed you haven't gotten fast food for the past two months and have increased your fruit and vegetable intake. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"

Success Generic Positivity. "I noticed you haven't gotten fast food for the past two months and have increased your fruit and vegetable intake. So far, you are doing really well. Great job, you've been working hard!"

Failure Growth Frame. "I noticed you've still been ordering in fast food several times a week and haven't increased your fruit and vegetable intake. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."

Failure Generic Positivity. "I noticed you've still been ordering in fast food several times a week and haven't increased your fruit and vegetable intake. So far, your efforts fall below expectations. You did a great job on that last diet you did before this one though!"

Learning a Musical Instrument

You are learning a new musical instrument and have accepted a request from your private instructor to perform in a recital with other students. The recital date is set to be in three months. To ensure that the performance goes well, your instructor has been overseeing the rehearsals along with your individual lessons. Two months into learning your new instrument, your instructor critiques the playing of the recital pieces during your lessons.

Here is the feedback you receive from your instructor:

Study 1 – Growth Frame vs. No Frame

Success Growth Frame. "Your skill level has greatly progressed since you began learning this instrument, and your performance is already at the level I would expect for the recital. So far, you are doing really well. Although you're succeeding, feedback like this can still provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!"

Success Growth Frame. "Your skill level has greatly progressed since you began learning this instrument, and your performance is already at the level I would expect for the recital. So far, you are doing really well."

Failure Growth Frame. "Your skill level has not progressed much since you began learning this instrument, and your performance is quite below the level I would expect for the recital. So far, your efforts fall below expectations. However, feedback like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success."

Failure No Frame. "Your skill level has not progressed much since you began learning this instrument, and your performance is quite below the level I would expect for the recital. So far, your efforts fall below expectations."

Study 2 – Growth Frame vs. Generic Positivity

Success Growth Frame. "Your skill level has greatly progressed since you began learning this instrument, and your performance is already at the level I would expect for the recital. So far, you are doing really well. The work you've put in so far has paid off, and you are on track for success if you continue the way you have been. Great job!"

Success Generic Positivity. "Your skill level has greatly progressed since you began learning this instrument, and your performance is already at the level I would expect for the recital. So far, you are doing really well. Great job, you've been working hard!"

Failure Growth Frame. "Your skill level has not progressed much since you began learning this instrument, and your performance is quite below the level I would expect for the recital. So far, your efforts fall below expectations. However, failure is success if we learn and grow from it. You can still turn this around."

Failure Generic Positivity. "Your skill level has not progressed much since you began learning this instrument, and your performance is quite below the level I would expect for the recital. So far, your efforts fall below expectations. You did a great job on that last performance you did before this one though!"

Appendix C

Full Measures used in Studies 1 and 2

All scales and items were presented in randomized order.

Motivation
Please rate each statement on a scale of 1 (not at all true) to 9 (very true).
After receiving this feedback...

1. ...I would want to put more time into this task.
2. ...I would want to put extra effort into this task.
3. ...I would plan to focus more on this task.

Goal Commitment
Please answer each question on a scale of 1 (not at all) to 9 (completely).
After receiving this feedback...

1. ...How committed are you to this task?
2. ...To what extent do you care about this task?
3. ...How dedicated are you to this task?

Self-Efficacy
Please rate each statement on a scale of 1 (not at all) to 9 (completely).
After receiving this feedback...

1. ...I believe I will be able to successfully overcome this task.
2. ...I am confident that I can perform effectively on this task.
3. ...I believe that compared to other people, I can do this task very well.
4. ...I am confident that even when things are tough, I can perform quite well on this task.

Perceived Feedback Positivity
Please answer on a scale of 1 (extremely negative) to 9 (extremely positive).

1. To what extent was the feedback positive or negative?

Feedback Attention Check
Which best characterizes the feedback giver's perception of your performance so far?

a. Your performance is below the expected performance standard
b. Your performance is above the expected performance standard

Mindset[2]

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements from 1 (strongly disagree) to 6 (strongly agree).

After receiving this feedback, I feel that...

1. The kind of person you are, is something very basic about you and it can't be changed very much.
2. You can do things differently, but the important parts of who you are can't really be changed.
3. As much as I hate to admit it, you can't teach an old dog new tricks. You can't really change your deepest attributes.
4. You are a certain kind of person, and there is not much that can be done to really change that.

[2] Mindset was measured in Study 1 but was not measured in Study 2. All mindset items were reverse scored so that a higher score reflected a growth mindset, and a lower score reflected a fixed mindset.

Appendix D

Anagrams Task

Instructions

In this study, you will be doing a task where you unscramble letters to make words. This is referred to as an anagram task. All of the anagrams will be related to the theme of either foods or animals and will range in difficulty. Some of the anagrams will have multiple solutions, but only one correct solution that is related to the theme. You must use all of the letters given to you to create the correct word.

Halfway through the task, you'll receive feedback on how your performance compares to other participants at that point of the task. A score in the 60th percentile or higher, meaning you scored better than 60% of other participants, is considered success. Performance is measured based on a combination of factors, each weighted differently, including how many anagrams you solve, the difficulty of each anagram, your speed of responding, and whether your answer is related to one of the two themes. For example, you may solve the same number of anagrams as 20% of other participants, but your speed of solving them will determine whether you are ranked higher or lower than them.

Then, you will be asked a series of questions about your experience completing the first half of the task. After, you will complete the second half of the task and receive feedback on your final performance. You will have a maximum of 15 minutes to complete each half of the task, for a total of 30 minutes. You do not have to answer every anagram correctly to move on.

First Set of Anagrams[3]

Please complete the following anagrams as quickly as you can! Type the correct word into the text box and click next when you are ready to move on. Remember – correct answers will be related to the theme of either foods or animals.

Anagram	Answer(s)
K N K U S	Skunk
K R E U T Y	Turkey
E G A B L	Bagel
T R E G I	Tiger
A N C D Y	Candy
R A B E Z	Zebra

[3] Anagrams were presented in a randomized order. Some anagrams have multiple solutions but only one which is related to one of the themes, which is always the first word in the list. Some anagrams, denoted with a star, do not have a solution related to the themes of either foods or animals.

R B D I S	Birds
W I O N E R B	Brownie
L C P I E N A	Pelican
M O O S U H M R	Mushroom
M E A W L R N O E T	Watermelon
P A A A R U S S G	Asparagus
M I B N H M R U G D I	Hummingbird
S R B U A E T C H T	Bruschetta
P L U D G N M I	Dumpling
T T U R O	Trout, Tutor
T K A S E	Steak, Skate, Stake, Takes
T A E B S	Beast, Beats, Abets, Baste
M L S U P	Plums, Slump, Lumps
S P E N T E R S	Serpents, Pertness, Presents
R A D M E *	Dream, Armed
N G R A D E E *	Angered, Enraged
D E R A P I *	Diaper, Paired, Repaid
Y T N E D S I *	Destiny, Density
L M S A N E E S *	Nameless, Salesman
T P A N R E I *	Repaint, Pertain, Painter

Wait Message

Please wait a moment while your performance on the first half of the task is ranked. The arrow will appear once your results are available.

TIP: Remember, your ranking is determined based on the number of anagrams you got correct, whether or not your answers matched the themes of foods or animals, your speed of answering, and how these metrics compare with other participants who have completed the task. If you think you solved most of the anagrams, try working faster on the second half. If you worked quickly, try slowing down and putting extra time into anagrams you couldn't solve.

Feedback

Failure Growth Frame. So far, your performance falls into the 40th percentile. That means you've scored higher than 40% of other participants and lower than 60% of other participants at this point of the task. An experience like this can provide an opportunity for growth. If it's not challenging, then you're not learning. Take what you've learned from this experience to keep working towards success!

Failure No Frame. So far, your performance falls into the 40th percentile. That means you've scored higher than 40% of other participants and lower than 60% of other participants at this point of the task.

Second Set of Anagrams

Please complete the following anagrams as quickly as you can! Type the correct word into the text box and click next when you are ready to move on. Remember – correct answers will be related to the theme of either foods or animals.

Anagram	Answer(s)
N A D P A	Panda
O R N A O C	Racoon
O S G E O	Goose
H L A E W	Whale
O R H N I	Rhino
C B O B A T	Bobcat
R O B C A	Cobra
G E L A E	Eagle
N G U I P N E	Penguin
N O G R D A	Dragon
B L O T S E R	Lobster
T S A T O	Toast
Y T U R G O	Yogurt
L O D O N S E	Noodles
L E P A G N G T	Eggplant
Y N E H O	Honey
P H I S C	Chips
C O N C T U O	Coconut
R G U R B E	Burger
P R O P C N O	Popcorn
E O F C F E	Coffee
R A T O S R C	Carrots
A K N G R O O A	Kangaroo
C H A L O C O T E	Chocolate
R B D E A	Bread, Beard
R H S E O	Horse, Shore

Appendix E

Full Measures used in Study 3

All scales and items were presented in randomized order.

Motivation

Please rate each statement on a scale of 1 (not at all true) to 9 (very true).

1. I want to put more time into the next half of this task.
2. I want to put extra effort into the next half of this task.
3. I plan to focus more on the next half of this task.
4. I am motivated to work on the next half of this task.

Goal Commitment

Please answer each question on a scale of 1 (not at all) to 9 (completely).

1. How committed are you to the next half of this task?
2. To what extent do you care about performing well on the next half of this task?
3. How dedicated are you to the next half of this task?

Self-Efficacy

Please rate each statement on a scale of 1 (not at all) to 9 (completely).

1. I believe I will be able to successfully overcome the next half of this task.
2. I am confident that I can perform effectively on the next half of this task.
3. I believe that compared to other people, I can do the next half of this task very well.
4. I am confident that even when things are tough, I can perform quite well on the next half of this task.

Mindset[4]

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements from 1 (strongly disagree) to 6 (strongly agree).

1. If I knew I wasn't going to do well at a task, I probably wouldn't do it, even if I might learn a lot from it.
2. Although I hate to admit it, I sometimes would rather do well on a task than learn a lot from it.
3. It's much more important for me to learn things from a task than it is to have the best performance.
4. If I had to choose between having the best performance and being challenged by a task, I would choose...[5]

[4] Items 1 and 2 were reverse scored so that a higher score reflected a growth mindset.

[5] From 1 (Always the Best Performance) to 6 (Always Being Challenged)

Perceived Feedback Positivity

Please answer on a scale of 1 (extremely negative) to 9 (extremely positive).

1. To what extent was the feedback you received positive or negative?

Perception of Performance

Please answer on a scale of 1 (complete failure) to 9 (complete success).

1. In your own opinion, if you had to say, how would you evaluate your performance on the first half of the anagram task compared to other participants?

Manipulation Check

What percentile did you in score on the first half of the anagram task?

a. 1st to 33rd Percentile
b. 34th to 66th Percentile
c. 67th to 100th Percentile

End of Study Funnel Debriefing

Please answer the following questions about your experience of participating in this study. Your responses will not affect your remuneration and will be kept strictly confidential.

1. What do you think this study is about? [Open Text Box]
2. Did any part of the study seem strange to you, or were you wondering about anything?
    a. No
    b. Yes (Please Specify) [Open Text Box]
3. Some people are skeptical of research studies in general. Were you suspicious about any aspects of this study?
    a. No
    b. Yes (Please Specify) [Open Text Box]