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Balanced Test Reflections

ABSTRACT

Test reflections are a metacognitive tool intended to help improve student learning. Suggested forms of test reflections prompt students to focus on negative actions: what errors had you made, what was most challenging for you, and what will you change next time. If instead, test reflections included positive prompts, such as what was your best tool to prepare for this test, what did you do well when taking this test, and how can you carry good outcomes from this test to the next, it may empower students to improve the quality of their reflection and apply the results of that reflection to their courses. Inspired by employers using balanced feedback in the business workplace, I introduced balanced test reflections in an undergraduate business course. This article shares student perceptions of the use of test reflection prompts that include both positive and negative prompts. Most students in my courses showed preference for some positive focus in test reflecting. Student reflection on positive preparation and performance broadens the focus of test reflections to include what learners have already learned and rejects settled concepts that poor test results stem only from poor preparation and performance, instead recognizing that the capacity to learn should be addressed individually. Additionally, instructor feedback to each student focuses on solving individual learning needs or problems, making all students feel seen, heard, and helped. Based on my study, students prefer the ability to identify strengths in addition to the allowance to pinpoint weaknesses in test preparation and performance.

KEYWORDS

test reflections, post-test reflections, exam wrappers

INTRODUCTION

A tool for metacognitive skill enhancement in higher education, the test reflection or exam wrapper is used after an exam is administered and asks students to think about how the exam went (Hodges et al. 2020; Lovett 2013). Traditional test reflections can include questions about how students prepare to take the exam, what errors they made on the exam, and how students could change their exam preparation the next time they encounter an exam in the same course. However, the negative focus of the second question highlights the gaps in students' content knowledge, and the third question ties poor content knowledge to weak study strategies. In education, negative feedback focuses on a student's incorrect answers and where they need improvement while positive feedback focuses on correct answers, what a student has achieved, and a student's strengths (Finkelstein and Fishbach 2012). Although a focus on negative performance feedback is largely considered important to learning (Mercer and Gulseren 2024), a focus on negative feedback alone may be a source of discouragement, anxiety and/or concern; that anxiety and concern can contribute to a fixed mindset where students don't want to make any changes to their study habits or how they learn course material because they believe intelligence is predetermined (Dweck 2006). This fixed mindset or belief can come from prior knowledge of feeling judged by feedback, which distorts the feedback received (Dweck 200). In addition, some types of feedback are more inclined to produce learning than others,

(Dweck 2006) such as growth language, which tells students that they can improve with specific instruction on how to do so (Dweck 2006). For improved learning from exam results, I created a balanced test reflection using growth language and accompanied by instructor feedback with specific improvement instructions. These post exam reflection questions have a more positive focus, including what was helpful in a student's test preparation, what the student did well during their performance on the test, and what strategies the student could employ to continue to use these positive test preparation and test taking strategies on their next exam. In five semesters over two years, this study focuses on the perceptions of first- and second-year undergraduate students in four-year degree programs regarding this new type of test reflection and its emphasis on student strengths.

LITERATURE REVIEW

History of test reflections

My inquiry into student perception of the use of balanced test reflections began by reviewing the scholarly context (Felten 2013) of test reflections. Exam wrappers or test reflections were born out of the concept of metacognition, coined by John Flavell, in part as knowledge of how well an intellectual task is going (Flavell 1979). Flavell indicated that metacognition may help students to "comprehend and learn better" (Flavell 1979, 910). Further research into the use of metacognition in education shows that metacognition can help students "accurately judge how deeply they have learned something" and to know if they have "only a superficial understanding or the ability to widely apply their knowledge" (McGuire 2015, 16). Additional research demonstrates that the most common issue in student metacognition is exam overconfidence, where students don't perform as well on exams as they thought they would (Carpenter, Witherby, and Tauber 2020).

To help students better assess how they have learned something, test reflections can be employed, providing useful information about student limitations in study strategies and exam outcomes (Swanson, Adelola, and Dewsbury 2024). Test reflections are a type of metacognitive experience that encourages students to monitor and regulate their learning awareness and apply changes where necessary to similar tasks in the future (Swanson et al. 2024). Marsha Lovett at the Carnegie Mellon Eberly Center for Teaching Excellence developed test reflections in the early 2000s as a metacognitive practice when her instructor colleagues complained that more and more first year students were bright in class engagement but performed poorly on exams (Lovett 2013). Lovett researched the issue and discovered these first-year students were successful in high school without developing effective learning strategies—in other words they were not using metacognitive skills. Lovett described exam wrappers as "structured reflection activities that prompt students to practice key metacognitive skills after they get back their graded exams" (18). She argues that students reflecting on their study strategies used in test preparation helps them plan for necessary changes in their future test preparation. Other researchers suggest that exam wrappers give students a chance to see the gaps in their knowledge of course content and their chosen study strategies (Chin, Schroers, Gonzalez, Hauser, Lazala, and Yi 2024). Most exam wrappers follow Lovett's guide and generally ask three questions: how students prepared for an exam, what kinds of errors they made on the exam, and what they might do differently to prepare for the next exam.

The literature on the effectiveness of test reflections is mixed. Some scholars have found that test reflections help increase students' metacognitive awareness (Achacoso 2004; LaCallie, LaCallie, and Maslowski 2019; Schuler and Chung 2019). Other studies have suggested that an increase in metacognitive ability exists only for students who complete test reflections in multiple courses (Soicher and Gurung 2017), as was also found by Lovett after employing her newfound exam wrappers (Lovett 2013). Test reflections can help students to adjust their study plan and approach (Gezer-

Templeton, Mayhew, Korte, and Schmidt 2017), but this may not benefit weaker students, even after they've reflected on their study strategies (Grandoit, Bergdoll, Rosales, and Tuberville 2020; Stanton, Neider, Gallegos, and Clark 2015) or students who have limited knowledge of metacognitive strategies (Sebasta and Speth 2017). One study found improvement in course grades that correlated to the more courses that used test reflections and offered points for completing test reflections (Hodges et al. 2020); another found test reflections helped students make study plans for future course tests (Gezer-Templeton et al. 2017), while others found no effect on test scores or final grades (Soicher et al. 2017) or mixed performance outcomes (Chew, Chen, Rieken, Turpin, and Sheppard 2016; LaCallie et al. 2019). Schendel (2020, 198-99) summarizes the literature best by saying:

> The small number of in-depth studies on the efficacy of exam wrappers, as well as the variation around how the studies were administered and the amount and types of data collected, makes it impossible to draw definitive conclusions. However, there is support for the proposition that drawing student attention beyond an exam grade to the development of metacognitive skills (namely, helping students realize that their own assessment of their skills and performance are [sic] likely misaligned) prompts changes in study and test taking strategies students may otherwise not pursue. Additionally, the research supports Lovett's proposition that such metacognitive skills are most effectively developed where students are new to the educational setting, and when they encounter these skills in more than one class.

An overview of balanced test reflections

Schendel (2020) concluded that despite the lack of conclusive determinations regarding the use of test reflections, the use of course activities like test reflections that help students gain metacognitive skills benefits students. Following this conclusion, I decided to use test reflections but wondered if there was a way to use them to benefit students further.

As an instructor of business, I follow business education publications and the Harvard Business Review Magazine's March–April issue in 2019 had an article which caught my attention. Marcus Buckingham and Ashley Goodall wrote "The Feedback Fallacy," an article based on their book *Nine Lies About Work: A Freethinking Leader's Guide to the Real World*. The article challenges conventional wisdom about feedback in the employment context which tends to focus on employee error and correcting what employees are doing wrong in order to improve work performance. Buckingham and Goodall use neuroscience literature to argue that pinpointing people's errors and weaknesses stops them from learning and growing. In other words, employees learn best when they focus on what they do well, not what they do poorly, especially when their strengths are not only recognized, but reinforced and refined (Buckingham et al. 2019a, 96–97; Buckingham et al. 2019b, 118–19). Buckingham and Goodall reference a neuroscience study where students who were given negative feedback on homework demonstrated brain activity that mimicked responding to a threat and invoked brain impairment, while students who received positive feedback about their goals demonstrated brain activity akin to relaxation and wellbeing, allowing for access to more regions of the brain (Buckingham et al. 2019b, citing Boyatzis 2011). Buckingham and Goodall suggest supervisors in the workplace should emphasize employee strengths and celebrate successful outcomes in order to encourage growth and performance. After reading Buckingham and Goodall's article and book, the similarity of conventional workplace feedback to the traditional test reflection questions struck me, and I wondered if students would improve in their learning if they, like Buckingham and Goodall suggested, were encouraged to recognize, reinforce, and refine their

strengths. Some studies report students find value in reflecting on what went well and what went wrong in completed coursework (Poe, Brooks, Korzaan, Hulshult, and Woods 2021). This idea also furthers the metacognitive learning idea that "Regular opportunities to reflect on one's success AND [emphasis mine] failures . . ." are significant to the forming of metacognitive knowledge (Schraw 1998, 118).

This balanced approach also addresses the social psychology theory that due to a complexity of reasons, both positive and negative emotions can be motivators or detractors in thinking and learning, and it's important not to oversimplify the role of either in how we learn (Pintrich 2003). So, a balanced approach in test reflections is important to include both emotions, no matter how either affects a student. Even students recognize the need for balanced feedback in order to encourage them and build up their confidence, believing that only negative feedback may cause them to give up in the learning process (Ferguson 2011).

Feedback on balanced test reflections

An important component of employee learning by recognizing, reinforcing, and refining their strengths comes from supervisor or manager feedback in the workplace (Buckingham et al. 2019a; Buckingham et al. 2019b). Meanwhile, instructor feedback in the learning environment can help students to get to a desired learning goal (Hattie and Timperley 2007). Effective feedback in education is defined as ". . . a process in which learners make sense of information about their performance and use it to enhance the quality of their work or learning strategies." (Henderson, Phillips, Ryan, Boud, Dawson, Molloy, and Mahoney 2019, 1402). Instructors should think carefully about how the practice of instructor feedback may help or hinder student learning (Dweck 2006), because feedback, delayed until after a student has had a chance to self-reflect on their learning (Mathan and Koedinger 2005), about targeted student performance and progression can help students' current and future learning (McKendree 1990, 393–94).

Beginning instructor feedback with positive comments can help increase student motivation to act by encouraging their beliefs in their capabilities, or self-efficacy, (Ferguson 2011). Leading with negative feedback can lead to notably less student self-efficacy and an increase in negative feelings, such as anxiety and frustration (Kim and Lee 2019; Mercer et al. 2024, citing Lim, Dawson, Gasevic, Joksimović, Pardo, Fudge, and Gentii 2021; Shields 2015). Less self-efficacy and increased negative feelings can negatively affect a student's motivation to engage in the activities of learning (Mercer et al. 2024). A balance of positive and negative feedback in test reflection also fits the literature because it provides a balance in communicating feedback to students regarding the progress of their learning, as both positive and negative feedback can be beneficial to learning (Kluger and Denisi 1996); and it feels more authentic to students as they may find positive only comments spurious if they are not balanced with negative (Getzlaf, Perry, Toffner, and Lamarche 2009).

The effects of using either positive or negative feedback depend on what level feedback is aimed toward and how a student processes the feedback (Hattie et al. 2007,). Sometimes called constructive feedback (Getzlaf et al. 2009), positive followed by negative instructor comments are effective at helping students learn what they don't know and what study strategies might help in the future (Getzlaf et al. 2009). This self-critique and the ability to understand where they are in their learning is referred to as student metacognition (McGuire 2015). Student metacognition can be prompted by instructor feedback when that feedback provides more information about the performance of a task, and students engage with the feedback (Wood and Cross 2024). Thus, instructors provide feedback with both positive and negative comments, then note a student's hard work and strengths, and finally give clear instructions on how to improve (Hill, Berlin, Choate,

Cravens-Brown, McKendrick-Calder, and Smith 2021). In addition, as Wood et al. (2024) suggest, instructors can encourage student engagement with their feedback by having them submit their original work with the instructor feedback, providing corrected responses to their wrong work and a note explaining their initial misunderstanding and how they reached the correct understanding of what they got wrong. Each of these best practices may help promote student metacognition

Traditionally, the literature shows many ways in which instructors provide feedback to test reflections, such as through holistic results to an entire class (Poorman and Mastorovich 2016), after peer review first (Owen 2019), through automated feedback of recommended study habits based on student responses to multiple-choice reflection questions (Carpenter, Beall, and Hodges 2020), or through written, asynchronous instructor comments customized to individual students (Gerdes 2018).

In addition to feedback design, instructors can also choose to delve into the expansive list of conditions that help student feedback be more successful, such as barriers and challenges that instructors experience in providing student feedback, students' capacity to receive feedback, and classroom or institution culture around feedback (Henderson et al. 2019; Paris 2022). The instructor feedback step of balanced test reflections is important, not only to recognize, reinforce, and refine student test preparation and test taking strengths, but to foster trust between students and instructors. To create an environment of trust between instructor and student, instructors can ". . . pursue methods to increase their perceived ability, benevolence, and integrity to enhance student satisfaction" (Hiatt, Lowman, Maloni, Swaim, and Veliyath 2023, 7–8). "The most frequently mentioned dimension of benevolence focuses on flexibility and openness with assignments (including allowances for student emergencies), accommodating different student learning styles, tolerating different opinions, and providing feedback" (Hiatt et al. 2023, 7–8). Benevolence also focuses on encouragement of students which involves providing positive feedback on student learning and student goals (Hiatt et al. 2023). "Trusting virtues such as empathy, tact and a genuine willingness to listen are ways in which positive feedback messages can flourish, and more critical ones can be softened" (Carless 2012, 90).

METHODOLOGY

One of the tenets of the scholarship of teaching and learning is that the improvement of student learning should direct our teaching (Hutchings, Huber, and Ciccone 2011). To reach the goal of improved student learning, the scholarship of teaching and learning asks instructors to reflect upon, question, and examine our instruction (Hutchings et al. 2011).

My analysis of how to improve student learning with test reflections focuses on students' perceptions of balanced test reflections. Student perceptions can be significant, as negative student perceptions can cause negative academic performance (Ferriera and Santoso 2008), and the fostering of positive student perceptions can improve learning and academic output (Lucas 2001). I thought about what might be (Hutchings 2000), where I wondered whether the practice of reflecting on one's successes and failures could be applied to test reflections and whether students would perceive this balance as positive.

I studied the use of balanced test reflections in my first- and second-year undergraduate business course in legal studies at Kennesaw State University, an American public four-year doctoral university in a suburban, densely populated area. This course is often a required part of many business colleges' core curriculum (AACSB 2023; Miller and Crain 2011), meaning many business majors must take it before starting their degree program. It is an introduction to learning about the law for most students. As the coordinator of this course, I teach three or four sections of it each semester, with enrollment between 120–160 students total.

In this course, students are assessed on several tests, and I provide an extra credit opportunity to complete a test reflection after some of these exams. As Felten (2013) suggests, I began by inquiring into the learning that comes from my students' test reflections, specifically, ". . . the cultivation of attitudes. . . that connect to learning" (122). The scholarly context grounding my inquiry is the breadth of literature on test reflections combined with evidence from the business world, metacognitive learning analysis, student perception research, and social psychology theory on balanced feedback.

As a methodology, I used an action research approach to identify a question, test out a new strategy, gather data on the new strategy's implementation, and analyze if it worked (Felten 2013; Ryan 2013). Action research is appropriate for higher education (Zuber-Skerrit 2018) and pointedly in the application of the scholarship of teaching and learning (Hubbell and Clarke 2010); it can support teachers and teaching as a mode to attain professional and personal development (Ryan 2013). I also chose action research because of its inherent flexibility, allowing me to reflect on each step as I progressed and adjust and adapt as needed (Harvey and Jones 2021). It also empowers teachers to effect change, giving me a method to demonstrate how and why I chose balanced test reflections in response to my students' learning needs (Boyer, Thomas, Neuman, Jernigan, Jones, Gollery, and Thompson 2019).

I engaged my students in inquiry into test reflections by seeking their perspectives, and I am now publicly communicating about my inquiry and results to invite critique and use of the same process (Felten 2013). I began using traditional test reflections in August of 2017. My traditional test reflections asked the standard questions about how students prepared for an exam, what kinds of errors they made on the exam, and what they might do differently to prepare for the next exam, as suggested by Lovett (2013); however with my students, I only saw a small percentage of participation in the traditional test reflections, even with an offer of minimal extra credit for completion. Following the Buckingham and Goodall literature mentioned above, I switched to balanced test reflections in August 2019, collected test reflection submissions, and sought student perceptions of those submissions. Students were permitted to opt out of having their comments included in this study, which did not affect the extra credit they received.

I manually analyzed my students' responses to a question about their perception of balanced test reflections using sentiment analysis to identify subjective information (Batrinca and Trealeven 2015) in this case student perceptions, as sentiment analysis can help ". . . determine students' interest . . . and identify areas that could be improved . . . " (Rani and Kumar 2017, 37) and aid in communication in the student-teacher relationship (Munezero and Montero 2013). Sentiment analysis is often about polarity of opinion, whether opinion is positive, negative, or neutral (Obeleagu, Abasu, and Adeshina 2019). I varied polarity detection in order to analyze student responses and identify comments, segments of comments, or words indicating student preference for a negative only focus on test reflections, positive only focus, or a balance of the two.

This process began with reading through a student response once, forming an initial categorization, and looking for words that indicated preference toward one polarity, the other, or a neutral preference. Then I re-read the same response again to ensure that the polarity categorization fits within the context of the whole response. For example, if I saw the phrase "I do not like" in a student response, I initially categorized it as a negative opinion, but if the whole response said, "I do not like test reflections that force me to only focus on what went wrong on my test," this is an opinion which prefers positive reflection, even though it includes the phrase "I do not like."

Throughout the process, I consistently reflected on and attempted to mitigate any personal biases, such as confirmation bias, implicit bias, or influence of my personal values, that may have affected my analysis. This study received Institutional Review Board exemption, but I still gave

students a study consent form to read and keep, which explained that their anonymous perceptions on balanced test reflections may be used in academic publication. I maintained anonymity by first cutting and pasting student responses, as they came in from their submitted document into a master document without inclusion of name, course section, or semester. I separated each submission response by a line. My analysis of the master document began one full semester later, giving me time to forget which student submitted which response.

I collected balanced test reflections from my students in two 15-week semesters and one eight-week semester of the 2019–2020 academic year, as well as in two 15-week semesters of the 2021–2022 academic year. The balanced test reflection prompt (Appendix) asked for student responses to five questions in a short writing of 200 to 350 words. Between the five collection semesters, 556 students submitted a balanced test reflection, and 156 of those respondents answered the question in the prompt regarding their preferences about balanced test reflections.

With the feedback literature mentioned above in mind, I included individual feedback to all my student responses about their balanced test reflections based on growth language, which included constructive criticism (Dweck 2006). I simplified the process for my students by focusing on a few helpful feedback conditions, including providing timely feedback, providing personalized feedback to each individual student, starting with positive feedback to highlight student strengths and then encouraging improvement or growth, and monitoring at-risk or weaker students closely. I used the convenience of my course learning management system to provide customized, individual test reflection feedback in a written or recorded audio format. My learning management system allowed for private feedback to be entered for each student assignment submission, which appeared next to the grade for that assignment in the grades section of the system. Each student received feedback that encouraged their strengths and suggested improvement strategies if the student asked for them. This feedback was given after students have reflected on their exam results on their own, giving them a chance to fix their own errors first. Here is a sample of instructor feedback to balanced test reflections that includes recognizing strengths and providing constructive criticism for growth:

> I agree with you, student, that learning discipline is more difficult than most students believe, but it seems that you have a good study and test preparation plan in place. I would suggest one addition—watch your test taking time. I noticed on your Test 3 that you took only half of the allotted test time to complete your submission. Perhaps slowing down would allow you to double check your work or read questions more carefully to help you correct and avoid small mistakes. Let me know if that works for you and if you have any questions about Test 3.

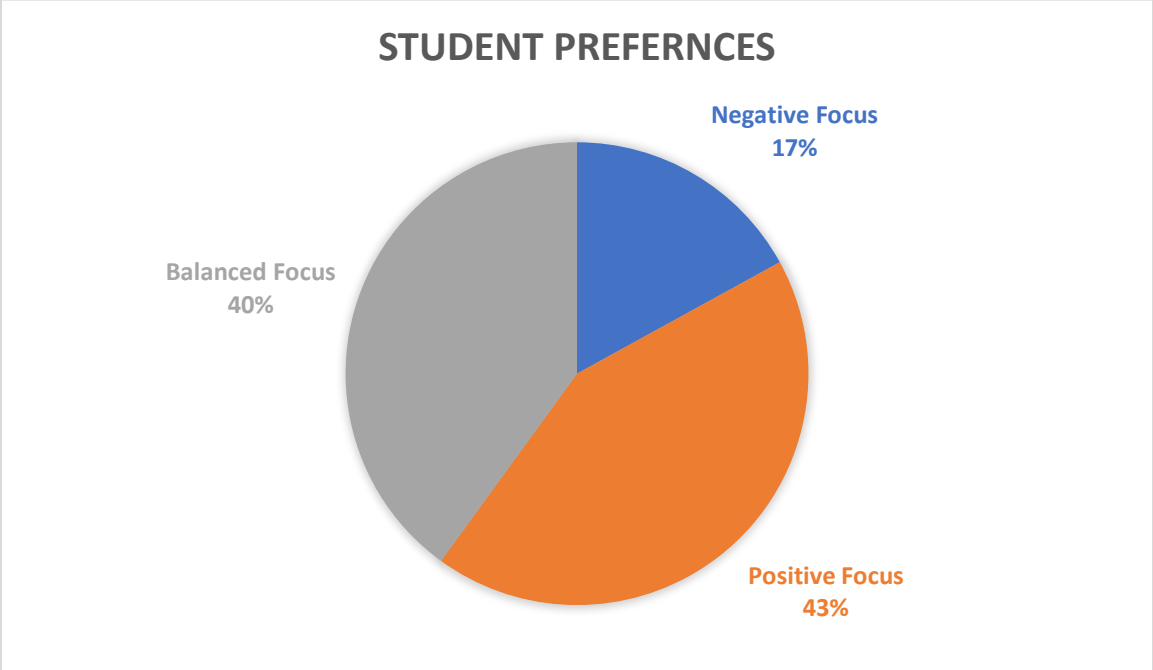
My student respondents were all first- and second-year undergraduate students in four-year degree programs at a large, suburban, doctoral university. Although I did not collect the demographics of my student respondents, the demographics of my university at the time of response collection were: 50% female and 50% male; 40% first generation; geographically from all 50 United States and 126 countries outside of the United States; and 45% white, 26% black or African American, 14% Hispanic or Latinx, 6% Asian, 5% two or more races, less than 1% American Indian or Alaska Native, and less than 1% Native Hawaiian or Pacific Islander.

FINDINGS AND DISCUSSION

As shown in Figure 1, of the 156 students answering the balanced test reflections prompt question about their preference for test reflections, 17% preferred to discuss what they did wrong on

a test (the negative). Most students preferred to discuss what they did right on a test (43% positive) or preferred a balanced discussion of what both they did right and wrong (40% balanced). I acknowledge that my findings came from one course, taught by one instructor in multiple sections at one institution, but my hope is that this study is replicable by readers.

Figure 1. Prompt question #5 students' preferences



Students' preferences in test reflections, sampling 156 students, notably finding that most prefer at least some focus on the positive, or what they did well to prepare for or perform on a test. Figure created by Dutcher in 2023.

Testing in higher education involves making errors, and "to learn from errors or failures, learners need to process information and regulate behavior on several levels (cognitive, metacognitive, motivational, emotional, affective, behavioral, and social" (Narciss and Alemdag 2024, 201). What degree of processing or regulation is utilized and at which levels may be unique to each individual student (Narciss et al. 2024), however, below I discuss what appeared to be true for the students in this study, or some possible reasons for why they may have preferred a negative, positive, or balanced focus for test reflections.

Student comments preferring to focus only on the negative in test reflecting could echo Carpenter, Beall et al.'s (2020) finding that the most common issue in student metacognition is exam overconfidence, where students don't perform as well on exams as they thought they would or that students entered an exam not knowing how to study for the exam's content in the first place, similar to Swanson et al.'s (2024) findings that test reflections can help students better assess how they have learned something by demonstrating individualized information about their limitations in study strategies and exam outcomes (3). In addition, as Fordyce (2024) explains, students who prefer a negative focus may be adaptive reactors in learning, actively looking for modifications to improve the effectiveness of their learning no matter whether they have succeeded or failed at a learning activity, instead of defensive reactors in learning who withdraw and avoid learning opportunities when they fail (24). Examples from student respondents include:

> I personally do not like to focus on what I did well because I know what I did well on. I like to look at what I did poorly in order to [sic] correct it and prevent it from happening in the future. I have done test reflections that focus on what I did poorly [sic] and I find that it helps because it often times [sic] helps me understand why I missed the questions I did. (August–December semester, 2019)

> I am a problem solver, so I prefer to reflect on my deficiencies and find solutions to them. I have performed higher than the class average on all the tests, but my grades are much lower than my typical grades, so I am anxious to fix the areas I am lacking in and [sic] improve my overall grade. (June–July semester, 2020)

> I feel that it is more motivating to focus on what you did poorly because that is how you improve. If you were to only focus on what you did right, there would be minimal [sic] increase in production compared to figuring out what you can improve upon. (August–December semester, 2021)

Examples of student preferences for focusing on only the positive in test reflecting seem to echo Boyatzis's findings where students who were given negative feedback on homework demonstrated brain activity that mimicked responding to a threat and invoking brain impairment, while students who received positive feedback about their goals demonstrated brain activity akin to relaxation and wellbeing, allowing for open access to more regions of the brain (Buckingham et al. 2019b, citing Boyatzis 2011). Perhaps students who prefer positive focus also prefer to have feelings of relaxation and wellbeing when thinking about their learning. As Boud, Walker, and Keogh (1985) said, "Positive feelings and emotions can greatly enhance the learning process; they can keep the learner on the task and can provide a stimulus for new learning" (11). These students' comments also may support Ferguson's (2011) findings where students believed that all negative feedback may cause them to give up in the learning process. (57). Collected samples include:

> I do prefer to focus on what I did well instead of what I did badly as it helps me when trying to remember what I did well on previous tests. In [another] class we were told to write down what we thought we did poorly so that we could avoid doing it again in the future. It is definitely less [sic] motivating to stare at what you did poorly instead of focusing on what you truly think you did well on while taking an exam. (January–May semester, 2020)

> I do prefer focusing on what I've done well, it helps me to focus on what to continue to do well next time. Focusing on how I failed doesn't seem to encourage me as much. The other exams that do that, while helpful, do make me feel like they are forcing me to focus on the negative and it definitely is [sic] not motivating or encouraging. Just reflecting in a positive manner helps me to get better, my exams have gone from 80% to 88% to 96%. Reflecting positively helps me to capitalize on what I do well and continue to do that well rather than beating myself up for where I am lacking. (August–December semester, 2021)

> Reflecting upon my preparation for this test, I found it easier to focus on what I did well. I cannot recall when I had to focus on what I did wrong. I do not think it is a very effective

> question. To ask, "well, what did you do wrong?" For most people, it boils down to the same few variables: procrastination, motivation, time management, and relevance (in regards to [sic] career objectives). Most people know, subconsciously or not, that procrastinating does not usually lead to the best results. But saying that changes nothing. It is more valuable to focus on things that you did well. However small those achievements may be. (January–May semester, 2022)

Examples of student preferences for focusing on balanced test reflecting seem to follow the social psychology theory of balance in learning; this theory states that due to a complexity of reasons, both positive and negative emotions can be motivators or detractors in thinking and learning, and it's important not to oversimplify the role of either one in how we learn (Pintrich 2003, 679). They also echo Pan, Sana, Samani, Cooke, and Kim's (2020) finding that undergraduates have an "ambivalent approach" to learning from errors where many factors, including the benefit of learning from errors and the detrimental feelings associated with having errors, can be part of a student's learning approach (1116). In addition, students who prefer a focus on balance in test reflections may feel like the students in Poe et al.'s (2021) study who found value in reflecting on BOTH (emphasis mine) what was going well and what wasn't going well in the course work and setting goals to continue what was going well and improve what wasn't. Students who prefer balance may also have more of a growth mindset, as Dweck (2006) says those with a growth mindset tend to be more focused on learning and believe that they can develop themselves if they know the truth about their abilities, whether positive or negative, and they can usually identify both their own strengths and weaknesses. Sample student comments include:

> I think being able to analyze your performance and finding [sic] what you did wrong is more beneficial because then you know what you need to change to do better. If you are constantly just looking at yourself through the lens of "what did I do well" I feel like you might be more apt to miss critical flaws in your strategy and you will keep on making the same mistakes. I think a mix of the two methods would be optimal. Start off with what you did well, to encourage yourself, then transition to what did I do [sic] wrong and what do I need to change. That way you keep what works and you toss what did not. (January–May semester, 2020)

> I think it is better to focus on what you did well AND what you did poorly. While it is good to continue and improve good testing habits, it is also good to observe bad testing habits and try to fix those habits. I don't think it's very motivational to focus on what you did poorly, but by focusing on what you did well in addition, you can motivate yourself by seeing what you are already good at, and what you need to work on. (January–May semester, 2022)

> When I think about the test reflections so far, I think it's a good idea to look back at what you did well, and what you didn't do so well on. It's important to have the [sic] conversation with yourself, instead of taking the test and then pretending it didn't happen. Each student should be able to be honest with themselves and allow them to come up with a game plan. This game plan should also include a contingency plan, in the event they are in a position where they might have to really change up [sic] a

> strategy if they are at risk of failing the class. Like most situations in life, you always want to plan for the good [sic] and bad. (January–May semester, 2022)

Student comments preferring a balanced approach to test reflections also reiterate the importance of balance in instructor feedback to students. Since the research suggests both positive and negative feedback can be beneficial to learning (Kluger et al. 1996), and since the effects of using either positive or negative feedback depend on what level feedback is aimed toward and how a student processes the feedback (Hattie et al. 2007), a balanced approach to instructor feedback is ideal. In addition, the order in which an instructor shares both positive and negative feedback is important to students and should start with positive comments in order to encourage and motivate (Ferguson 2011), instead of starting with negative comments, which can increase negative feelings and reduce motivation to engage in the activities of learning (Mercer et al. 2024). Hill et al.'s (2021) suggestion offers an ideal to strive for: balance positive and negative comments in instructor feedback, noting a student's hard work and strengths and giving clear instruction on how to improve.

LIMITATIONS AND FURTHER RESEARCH

Undergraduate students enrolled in one first and second year, introductory, undergraduate course at a single university over two academic years contributed all perception responses. The COVID-19 pandemic interrupted the collection of responses and may have slowed response rates as many students returning to higher education after the pandemic seemed to cut out participation in all but the most essential assignments and activities. In addition, student responses may not be representative of the general populations of students across all disciplines. The responses span five semesters making it possible that one or more students repeated the course in which the author collected reflection responses, and these repeat students may have submitted a response each time they took the course, giving the author more than one response for those students; however, students would only be able to submit one response per semester. Student respondents may have experienced response bias where those who completed test reflections have different preferences than students who did not complete them.

In assessing the polarity of each student response, I consistently reflected on and mitigated any personal biases that may have affected my analysis, but the study would have benefited from either a second rater who could cross check and validate polarity assessment of student responses or anonymization of student responses to help avoid author biases, if any existed. The study would also benefit from external validation of the findings.

I have several suggestions for further research on balanced test reflections. First, a study could expand upon the use of balanced test reflections in other courses and in other disciplines. Second, a study could use balanced test reflections in graduate courses across multiple disciplines. Third, a study could incorporate balanced test reflections with more of the optimal conditions for the use of test reflections/exam wrappers outside of feedback design, such as barriers and challenges that instructors experience in providing student feedback, students' capacity to receive feedback, and classroom or institution culture around feedback (Henderson 2019, 1405–13; Paris 2022, 8–10). Fourth, responses regarding the use of balanced test reflections could be collected from a larger sample size and from multiple courses and universities of differing size and type to make the results more generalizable. Following existing literature regarding weaker students and the use of test reflections over multiple courses, further research could include the impact of test reflections on students with limited knowledge of metacognition, and demographic data collection in order to determine test reflection perceptions of students who are at-risk learners, students who are first-

generation college students, who are non-native speakers, and who use test reflections of any type in multiple courses.

CONCLUSIONS AND RECOMMENDATIONS

Test reflections can serve as a valuable tool to develop and improve a student's metacognitive skills in higher education. However, existing test reflections often steer students toward the negative aspects of their test preparation and test taking strategies, prompting them to focus on their mistakes, challenges, and areas for improvement. Instead, I found success for my students by using balanced test reflection prompts. While my findings are derived from a single course taught by one instructor across multiple sections at one institution, I am hopeful that readers will be able to replicate them in other courses and at other institutions. So, I recommend that instructors incorporate balanced test reflection prompts, like mine in the Appendix, that highlight the positive aspects of test preparation and performance first and then allow for reflection on the negative aspects of test preparation and test-taking experiences. For instance, students could reflect on their best strategies for test preparation, their successful approaches during the test, and how they can leverage positive outcomes for future assessments and finally, review what can be changed for the better, if they choose to do so. Balanced test reflections may empower students to engage in metacognitive reflection and apply insights from their reflections to their coursework. Additionally, I recommend that instructors should 1) pay special attention to at-risk and other weak students in their course to ensure that they know how to apply their reflective realizations, 2) start feedback with positive encouragement of a student's strengths and then follow with clear and specific directions for how the student can improve before the next exam, and 3) provide personalized feedback to address each student's unique learning needs, ensuring that all students feel acknowledged and supported.

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DISCLOSURE

The researcher used Microsoft CoPilot to create the image symbolizing this article and to edit approximately 25% of the article text.

ETHICS

Kennesaw State University institutional review board deemed this research exempt.

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APPENDIX

Balanced Test Reflection Prompt

Please answer the following questions:

1. What did you do WELL to prepare for this test?

2. What did you do WELL in your performance during the taking of this test?

3. For the next test, how could you expand what you did WELL to prepare for this test or what could you do to build upon what you already do WELL on [this course's] tests? Is there anything that worked for you in preparing WELL for tests in your past that you could apply to [this course]?

4. For the next test, how could you expand what you did WELL in your performance during the taking of this test, or what could you do to build upon what you already do WELL on [this course's] tests? Is there anything that worked for you in performing WELL on tests in your past that you could apply to [this course]?

5. Do you prefer focusing on what you did WELL in preparation and performance of a test? Why or why not? Have you done test reflections before that had you focus on what you did poorly to prepare? Do you feel it is more motivating than focusing on what you did poorly?