"Feedback to the Future": Advancing Motivational and Emotional Perspectives in Feedback Research

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Abstract:
When a learner receives feedback, important motivational and emotional processes are triggered that control whether and how the learner re-engages in a learning activity and successfully adjusts in response to what the feedback suggests. We aim to highlight how motivation and emotion processes influence feedback effectiveness, and how our theoretical understanding of the feedback process depends on appreciating the affective precursors, concomitants, and consequences of feedback. To query the literature, interrogate theories of academic motivation and emotion, and identify central motivational and emotional factors associated with feedback, we use a five-question framework: What does the feedback mean to me? How do I feel about the feedback? Can I improve from the feedback? Do I want to improve from the feedback? Am I supported by others or by the context in dealing with feedback? A conceptual review of empirically grounded and theory-driven interpretations accompanies each question to inform practice and research.

Keywords: feedback, achievement motivation, emotions

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Feedback in learning situations is complicated. Motivation, with its intimate connection to emotions, is even more so. In this article, we explore the complex interconnections between these constructs, focusing on feedback in educational settings. We delve more deeply into a discerning observation (one that was left largely unelaborated) made by Wigfield and Koenka (2020) in a special issue on motivation theory, that feedback has played a critical role in prominent motivation theories. Our goal is to highlight how learners' motivation and emotion processes influence feedback effectiveness, and how understanding of the feedback process depends on appreciating the affective precursors, concomitants, and consequences of feedback. A difficulty we face in this task is integrating research on motivation and studies on feedback, two areas largely investigated independently. Therefore, one contribution of this paper comes from considering these two relatively siloed subfields, discussing their overlap when it has occurred, and suggesting new theoretical and empirical advances in the nexus of these areas.

Rather than systematically reviewing studies from these two fields on their own, we performed a *state-of-the-art review* that focused on conceptually reviewing studies at the intersection of motivation and feedback research (Grant & Booth, 2009). We start our review by addressing definitional issues surrounding the constructs of feedback and motivation. We then turn to five substantive questions that guided our review. Acting as a foundation, the first question, "What does the feedback mean?," includes our introduction of four theories of motivation and emotion we believe have generative potential to inform how to conceptualize the connection between feedback and motivation. The second question asks "How do I feel about

the feedback?" and examines the integral role of emotions when feedback is anticipated, received, and taken up. The remaining three questions (Can I improve from the feedback? Do I want to improve from the feedback? Am I supported by others or by the context in dealing with feedback?) emphasize the motivation factors relevant for maximizing the effectiveness of feedback, that is, how learners might improve from feedback. We end each question with research recommendations aimed at advancing understanding of feedback and motivation.

Definition and Delimitation Issues

The power of feedback to influence students' learning has been well-documented for decades (Hattie & Timperley, 2007). Since the beginning of the 20th century, feedback has been central to psychological theories, embodied as rewards and punishments that drive learning according to behaviorist perspectives. Although rarely termed feedback per se, positive outcomes to a behavior were said to eventuate in increases in such behavior and negative outcomes to decreases. With its emphasis on observable behavioral change and on the role of incentives and disincentives, it is not untenable to claim that behavior theory was as much a theory of motivation as of learning. This brings us to our task of defining motivation and feedback, but now from within modern-day framing.

Defining Motivation

Definitions of motivation often include such concerns as what moves a person to act, to engage in one activity over other possible activities, and to persist or return to the activity when interrupted. Schunk et al. (2014) conceptualized motivation as "the process whereby goal-directed activity is instigated and sustained" (p. 5). Pintrich (2003) described motivational theories as answering "questions about what gets individuals moving (energization) and toward what activities or tasks (direction)" (p. 669). When defining motivation, it is important to acknowledge how motivation is not a unitary construct, where a learner simply has a lot or little motivation. Instead, motivation is characterized as having dimensions of both quantity and quality, transversing distinctions of state and trait, occurring both consciously and subconsciously, and being diverse in nature as it includes but is not limited to goals, beliefs, values, and needs (Bong et al., 2022). Inextricably related to learner motivation is achievement emotions, or the affective responses arising from motivational perceptions of a learners' educational experiences and serving as antecedents to other motivational processes (Pekrun, 2006). Although several motivation frameworks exist, we focused on self-determination theory, situated expectancy-value theory, achievement goal orientation theory, and control-value theory.

Within educational psychology, these theories encompass the work of most motivation researchers and have been consistently featured in chapters on motivation in recent editions of the *Handbook of Educational Psychology* (Linnenbrink-Garcia & Patall, 2015; Miele et al., in press) and recent reviews (e.g., Wigfield et al., 2021). Furthermore, two well-cited *Contemporary Educational Psychology* special issues on theories of motivation in 2000 and 2020 included these theories as well, reflecting the historical and contemporary influences of these frameworks in the field. As for control-value theory, primarily described as a theory of emotions, it is frequently discussed as overlapping with motivation theories (Linnenbrink-Garcia et al., 2016) and invites a focus on affective processes involved in feedback. That being said, although other motivation/emotion constructs and theories could have been included (from social psychology, for example), we chose these frameworks as not only relevant for explaining feedback in educational contexts but also poised to benefit from the close look at their role in feedback situations.

Defining Feedback

Operational definitions of feedback have traditionally agreed that it is inherently a response to one's performance or understanding and involves procedures used to tell a learner if a response is right or wrong (Kulhavy, 1977). Henderlong and Lepper (2002) relied on the following definition by Kanouse et al. (1981, p. 98): "evaluations made by a person of another's products, performances, or attributes, where the evaluator presumes the validity of the standards on which the evaluation is based." Hattie and Timperley (2007) defined feedback as "information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" (p. 81). More recently, research on feedback has shifted from defining feedback as simply information being transmitted to providing a broader meaning of feedback that includes the agentic involvement of the feedback recipient and the processes involved in responding to such feedback (Winstone et al., 2017). We discuss the responsibility of the feedback recipient in later sections and turn next to specifying the types of feedback we focus on in this article, delimiting the territory we aim to address.

To describe the types of feedback we are envisioning, we relied on Panadero and Lipnevich's (2022) typology of feedback models. They identified four feedback dimensions that researchers have offered by way of definition: content, function, presentation, and source. We interrogate each dimension to highlight the kinds of feedback we addressed in this paper. Starting with feedback source, our interest is feedback provided by instructors (as opposed to peers, self, or other agents), because of the special issue's focus.

Next, Panadero and Lipnevich (2022) described feedback as having three functions: learning/performance, motivation/affect, and self-regulated learning. It would seem that our focus should be the motivation/affect function, as opposed to, say, performance feedback. However, we assert that any feedback message is most often fulfilling multiple functions: for example, feedback intended for enhancement of (self-regulated) learning likely has motivational consequences. Further, in prior conceptions of feedback, motivational functions have often been reduced to a simple view of feedback valence, deeming praise (positive feedback) as motivating and criticism (negative feedback) as demotivating (Fong et al., 2019). A closer look at the literature reveals a more intricate interplay of motivational and affective processes with regards to valence. For instance, positive feedback may potentially undermine intrinsic motivation (Mueller & Dweck, 1998) or lead to embarrassment when praise is seen as undeserved (Fong, Williams et al., 2018). Furthermore, receiving negative feedback that simultaneously identifies shortcomings of a learner's performance and provides ways to improve the work, what is called *constructive feedback* or what some scholars have termed *feedforward* feedback (Hattie & Timperley, 2007), can ultimately be a motivating and emotionally pleasant experience. This type of feedback points to ways the learner needs to improve embedded in supportive language meant to sustain the learner's efforts (Fong et al., 2016). Therefore, feedback's motivational and affective functions can be complex, extending beyond a narrow understanding of feedback valence, and intimately connected to learning and self-regulated functions.

Turning to the remaining two dimensions, we recognize that feedback content and presentation can vary widely, encompassing feedback types such as formative and summative assessment, knowledge of performance, elaborated feedback, and modes of delivery. However, rather than focusing on just one feedback type, we considered how variations in feedback content and presentation intersect with the motivational and affective milieu influencing students in instructional contexts. Thus, we include in our purview studies that assess various forms of feedback content and presentation so as to tease apart how feedback differentially influences students' motivation and how students' motivation influences the interpretation of different forms of feedback. In a sense, our focus does not fit into a "box" in a feedback typology because studies on motivational and affective processes have transcended a single type of feedback.

Another aspect involved in defining feedback concerns how to operationalize feedback effectiveness. One obvious yet central aspect of feedback effectiveness is how a learner uptakes the feedback, what we see as occurring on a continuum. A learner could completely ignore the feedback, showing no uptake of its message, or a learner could be inspired to transform their conceptualization of the task, and various degrees of uptake in between. However, despite the high value placed on behavioral responses (e.g., revising work based on feedback) as a form of uptake and thereby signaling feedback effectiveness, there is more to feedback uptake than what might be observable to instructors. For example, feedback might affect one's understanding of self and/or the task and elicit greater levels of metacognitive awareness (Butler & Winne, 1995).

One could imagine students superficially addressing feedback comments without experiencing any meaningful change to their knowledge. Thus, we operationalized uptake in its ideal form as consisting of (meta)cognitive engagement that gives rise to enhanced understanding and productive behaviors that improve task performance. For the feedback to be realized fully, learners must be motivated to implement the feedback to enhance their current thinking and/or performance in advancement of their academic goals.

A final delimitation is our focus on the learner's experience of and perspective on feedback. Thus, although there can be much to be learned from studying the feedback giver's intentions and work in constructing feedback messages (Zhang et al., 2022 for a recent review), we are interested in the motivational and emotional experience of the learner. Whether an instructor intends a feedback message to be encouraging, the student must perceive it as being well-intentioned and useful for learning and improvement (Fong, Schallert et al., 2018). In contrast to other definitions solely focused on the feedback message, our conception centers on feedback processes as embedded in the relationship a feedback receiver perceives to exist with the giver; thus, feedback is a situated, relational, and holistic process. It is through these definitional lenses that we approach this review.

Using Five Questions to Explore Motivational Processes Related to Feedback

We now move to the heart of our article, explaining what happens motivationally and emotionally when feedback is encountered during an instructional situation. We use five substantive questions capturing the psychological experience of learners anticipating, receiving, and using feedback. In this organization, we were influenced by Pintrich's (2003) essay on motivation theories asking substantive questions from a student's perspective (e.g., what do students want). Most directly, our organizational questions come from considering what students may ask of themselves when receiving feedback. Based on our previous work with students we have interviewed and surveyed, asking them about their perceptions of the feedback process, we distill their experiences into the following questions: (a) What does the feedback mean to me? (b) How do I feel about the feedback? (c) Can I improve from the feedback? (d) Do I want to improve from the feedback? (e) Am I supported by others or by the context in dealing with feedback? Table 1 presents a summary of how key constructs from each motivation/emotion theory address the questions. These questions connect with the motivational and affective precursors and impact of feedback, but we take the first question to introduce four theoretical frameworks and to show how each informs an answer to this question.

1. What Does the Feedback Mean to Me?

When a student receives feedback on, say, an essay exam, there is much that needs to be deciphered as some feedback marks may be cryptic (why points have been deducted; what comments mean). Additionally, the overall meaning of this instructional event needs to be determined, ranging from whether the score is a good grade to such puzzlements as whether revising the work will be possible (Koenka et al., 2021). The answers to such questions touch on two circles of influence that impinge on how a person interprets a particular feedback situation. First, it is important to recognize that any one instance of receiving feedback is only the latest among hundreds, if not thousands, of feedback experiences in one's life history, augmented by memory of watching others receive feedback. Thus, a particular instance of feedback is interpreted cognitively and affectively through a feedback schema continuously being (re)constructed over time. And, because one's schemata are interconnected, it is easy to imagine situations where receiving negative feedback can be seen as a sign that one is worthy of attention from an admired instructor. Positive feedback does not always elicit pleasant emotions, as when one receives praise from someone who seems indiscriminate, inattentive, or patronizing. This is what undergraduates reported when asked to provide situations where they might have felt happy upon receiving negative feedback and sad upon receiving positive feedback (Fong, Williams et al., 2018). Additionally, what positive feedback may mean is that an instructor uses praise to mask a negative bias against particular students, as has been reported in interracial feedback situations between White instructors and Black students (see Harber, this issue).

A second circle of influence on the interpretation of feedback is the cultural milieu in which learners live. When a student brings home a report card, parents from different racial/ethnic backgrounds may have different reactions to grades that are essentially the same, reflecting differences in family expectations that are associated with the evaluation-fraught experience of schooling. Additionally, feedback can be interpreted differently by parents when compared with teachers, as when for example a writing teacher is focusing on meaning and organization and a parent is worried that grammatical errors are being overlooked. Thus, curriculum goals emanating from a school's culture become translated into feedback to students in ways that may not match parents' expectations. Such cultural mismatches are evidence that students' interpretation of feedback is never straightforward.

Having described these two important caveats, we now address what feedback means to a learner based on four frameworks. This first question, like our other questions, relates specifically to motivational constructs discussed in (a) self-determination theory, (b) situated expectancy-value theory (including social cognitive theory and attribution theory), and (c) goal orientation theory, as well as (d) the control-value theory of emotion. When introducing the central tenets of each theory, we highlight the role of feedback both from the vantage point of the theories' original formulation and within contemporary scholarship (see Table 1 for a summary).

Self-Determination Theory

Bound historically with a behavior theory perspective, self-determination theory had its starting point in resisting behaviorist claims about the role of incentives in learning. When in the 1960s such a view of learning was applied to humans in the form of behavior modification principles, reactions ran the gamut from enthusiastic acceptance ("how

much better to reward children for acceptable behavior rather than punish them for unacceptable behavior") to resistance ("why should children be bribed for doing what they should do anyway"). Most troublesome for social scientists (and observant parents) were the findings that positive feedback, specifically in the form of rewards, could damage intrinsic motivation.

Thus was born self-determination theory (Deci & Ryan, 1985), a broad framework emphasizing motivational propensities for learning and growth, with two main types of motivation delineated, intrinsic and extrinsic motivation. *Intrinsic motivation* is defined as the propensity to engage in a task out of interest or enjoyment for its own sake, whereas *extrinsic motivation* refers to task engagement motivated by external reasons, pressures, or rewards/punishment. A particularly noteworthy aspect of the theory is that intrinsic and extrinsic motivation are not portrayed as either-or motivational states but instead, extrinsic motivation is represented as a continuum (Ryan & Deci, 2000). Thus, one may be motivated by wanting to please important others (called *introjected regulation*) or one may be motivated to engage in a task because it fits with one's self-view (*identified regulation*), both different forms of extrinsic motivation. Along with intrinsic motivation, some forms of extrinsic motivation such as identified regulation are positively linked with higher grades and lower dropout rates (Howard et al., 2021). Closely related to self-determination theory is the self-concordance model (Sheldon & Elliot, 1999), which posits that the degree of alignment between individuals' goal systems and their enduring interests and values correlates with the kind of self-determined motivation they experience. When a situation allows pursuit of self-concordant goals, the learner is likely to experience identified and intrinsic motivation rather than external or introjected regulation.

Self-determined motivation relies on the striving to fulfill three basic human needs: *competence* (individuals' perceived effectiveness in successfully navigating their environments), *autonomy* (individuals' sense that they are the origin of their own actions), and *relatedness* (connections and engagement with others). Self-determination theory claims as its essential motivational mechanism an underlying reliance on how well a particular situation allows the learner to feel some degree of fulfillment of the three basic needs (Ryan & Deci, 2020). Social influences and experiences, such as receiving feedback, may satisfy or frustrate these psychological needs, thereby enhancing or diminishing self-determined motivation.

As it relates to our first substantive question, feedback processes can act to support or diminish self-determined motivation by way of whether it makes a learner feel competent, connected to the feedback giver, and in control of their own learning. Because one's understanding of their own competence is often influenced by evaluative information, feedback may alter one's self-determined motivation as it may increase or decrease a sense of competence (Fong et al., 2019). Early experiments supported this notion, demonstrating that negative feedback diminished participants' perceived competence and task persistence (Deci & Cascio, 1972). In contrast, positive feedback can enhance intrinsic motivation as it affirms one's sense of competence (Henderlong & Lepper, 2002). However, praise has its own complicated ramifications (Brummelman, 2020), and may potentially decrease intrinsic motivation by calling attention to an instructor's control over a learner's behavior, thereby shifting a learner from an internal to an external locus of causality (Ryan & Deci, 2000). Although less has been published on feedback and its connection to relatedness needs, Fong, Schallert et al. (2018) highlighted the importance of relationships characterized by mutual trust and respect between feedback giver and receiver in explaining how students respond to feedback, which we elaborate further in the fifth question. Thus, from a self-determination perspective, what feedback means to a student relates to whether progress is being signaled in accomplishing self-concordant goals and whether basic needs of competence, autonomy, and relatedness are being fulfilled or threatened.

Family of Theories Related to Situated Expectancy-Value Theory

A different perspective on what feedback means is highlighted from the family of theories related to what today represents the expectancy-value framework, a broad umbrella including social-cognitive theory, attributional processes, and self-efficacy. Tolman's work (1932) suggested that organisms learn from building expectancies, precipitating a shift away from mechanisms based on drives and habits, and instead introducing cognitive components to explain goal-directed behavior (Graham & Weiner, 1996). In this view, foundational to what became the social-cognitive movement, the learner's perceptions of the likelihood of success were key. Broadly, this perspective emphasized the learner's interpretation (cognitive component) of a social situation (social component) in whether the individual pursued an action or desisted from any further engagement. Responses to success/failure, often

induced by feedback, were thus not habitual reactions; rather, they resulted from cognitive interpretations of the situation. These interpretations involved a causal search for what had led to success or failure, a process that Weiner (1985; Perry & Hamm, 2015) formalized into attribution theory.

Within the expectancy-value family of theories, Bandura (1977) first offered, and prolifically researched, the construct of *self-efficacy*, defined as the belief in whether one is capable of performing a task and attaining success. In this view, motivation to perform a task depends on a person's belief that their actions will result in success. Self-efficacy increases or decreases depending on four sources: prior mastery experiences, vicarious observations of others, appraisal of one's physiological/emotional responses, and socially-provided persuasion, the latter of which commonly manifests itself as feedback (Usher & Pajares, 2008). As research on self-efficacy flowered, modern day conceptions of expectancy-value theory were developing (Eccles et al., 1983). Motivation, originally seen as simply resulting from the product of expectancies and task value beliefs, is now re-conceptualized as being shaped by perceptions of one's academic situation contextualized within a cultural milieu (*situated* expectancy-value theory, Eccles & Wigfield, 2020). Whereas the expectancy component can be equated to self-efficacy (Wigfield et al., 2020) and was the initial focus of work from this perspective, the value component has more recently received much attention, with a focus on whether a learner's sense of the importance of a task juxtaposed against perceptions of the relative cost of engaging in the task affects their motivation (Wigfield & Eccles, 2000).

As for the link between a modern-day expectancy-value framework and the feedback literature, we see three possibilities. First, from an attributional perspective, receiving feedback on their assignments is a common interaction through which students experience success and failure. Interpreting what the feedback means relies on whether students feel more or less responsible for and able to address the failures and successes suggested by the feedback. When receiving negative feedback, for instance, a student may attribute the failure to reasons within their control (ineffective strategy use) or beyond their control (unfair teacher, lack of ability, or noisy study environment). Tolli and Schmidt (2008) found that students who made internal attributions felt greater self-efficacy and regulated their goals more frequently upon receiving feedback compared to students who made external attributions. Causal attributions for success or failure contribute to what meaning students make of feedback.

Second, feedback can influence the development of a learner's self-efficacy or expectancy beliefs (Wigfield et al., 2020), as it answers the question of whether the learner is or is not competent. In Fong et al.'s (2019) meta-analysis, negative feedback led to a decrease in participants' self-efficacy by half a standard deviation when compared to neutral feedback or by nearly a full standard deviation when compared to positive feedback. As a prior achievement-related experience, receiving feedback (positive or negative) may influence a student's self-concept, and in turn, their belief in how well they might do on a subsequent task. Moreover, self-efficacy researchers have explicitly described feedback as social persuasion and as a potent source of self-efficacy, especially when a learner is not ready to make accurate self-appraisals (Usher & Pajares, 2008). Over time, students develop expectancies as they process feedback in the context of immediate success/failure experiences, prior achievement-related events, and associated affective memories. Interestingly, feedback, say on a math assignment, may not only influence math-specific expectancies and values but also shape how other domains like language arts are perceived. Möller and Köller (2001) found that learners engaged in such dimensional comparisons, so that negative feedback on a math task communicated "I am not a math person" and simultaneously increased students' self-concept in language arts, "I therefore must be a language arts person."

Third, feedback and motivation can reciprocally influence each other by way of their connection, direct or indirect, to subjective task values. By *reciprocal* here, we mean that feedback influences the learner's motivation by increasing or decreasing the value of a task in the learner's eye, even as a learner's pre-existing valuing for a task influences their interpretation of the feedback. For instance, Gniewosz et al. (2015) found that receiving achievement feedback predicted changes in students' intrinsic values positively, and indirectly through expectancy beliefs, so that positive feedback was associated with increased valuing for the task. In answering the question of what feedback may mean, a student may now understand a task to be more (or less) interesting, useful, or important, all attributes pointing to task value.

Achievement Goal Orientation Theory

Like expectancy-value theory, achievement goal orientation theory originated in social-cognitive perspectives in the early 1970s and has become highly

generative as a motivational framework. Achievement goal orientation theory is focused on the learner's meaning-making system, a critical component of which is the person's purpose for engaging in an achievement situation (Urdan & Kaplan, 2020). Based on observations of children's responses to failure, Dweck's early work identified how learners' beliefs about the nature of ability were foundational to the kinds of achievement goals they adopted (Dweck & Leggett, 1988). Learners who viewed intelligence as malleable (incremental theory of intelligence) tended to endorse mastery (learning-focused) goals, whereas those who viewed ability as fixed (entity theory) tended to adopt performance (ego-focused) goals. These goals were differentially associated with attributions for success/failure, with consequences for either persistence or helplessness (Butler, 1987).

From this distinction between mastery and performance goals, a tripartite view was proposed, subdividing performance goals into performance-approach and performance-avoid goals (Elliot, 1999). Individuals holding performance-approach goals are focused on demonstrating competence, whereas those with performance-avoid goals are motivated by wanting to avoid seeming incompetent. In addition to students' personal goal orientations, the learning context could be characterized as reflecting mastery- or performance-oriented messages, in the form of classroom goal structures (Ames, 1992). Interestingly, students tended to adopt goals in line with the goal orientation they perceived in the classroom. Another theoretical development was the perspective that students often pursue multiple goals in the same learning situation (Pintrich, 2000). Thus, the current understanding is that a learner can be high in both performance-approach and mastery goal orientations at the same time, for example (Barron & Harackiewicz, 2001).

What feedback means from within this theory is again tied to the reciprocal relationship between achievement goal orientations and the feedback itself. First, receiving feedback can influence students' pursuit of their achievement goals because feedback conveys competence-related information. Students may revise their achievement goals upon receipt of feedback (e.g., shifting from a performance-approach to a performance-avoid goal when the feedback is negative). More recently, Elliot et al. (2011) posited that three evaluative referents are used to determine one's goals: task-based (absolute demands of the task as referent), self-based (intrapersonal trajectory as referent), and other-based (interpersonal comparisons as referent). It follows that feedback could be more motivating when the evaluative referent is aligned with one's goals: task-based ("you successfully completed it"), self-based ("you improved from last time"), and other-based ("you did well compared to others").

Second, the meaning of feedback is intimately related to the goals learners have for the task. For performance-oriented students, feedback is differentially interpreted depending on valence. Positive feedback will be welcomed by learners with performance-approach goals, signaling that they outdid others, and it will elicit relief for those with performance-avoid goals, abating worries of embarrassing failure. Negative feedback might be interpreted as more devastating for performance-oriented learners, leading to helplessness, an emotioned motivational consequence of the worst kind (Dweck & Leggett, 1988). In contrast, Fong et al. (2021) observed how mastery-focused students perceived any feedback as useful information about whether they are making progress, and therefore, as encouragement to re-invest effort in the task if improvement was needed. Thus, performance-oriented students view feedback as an evaluation of themselves, but those with mastery goal orientation interpret feedback as a tool for improvement (Kaur et al., 2018).

Control-Value Theory

Positioned as pertaining to learners' emotions experienced in achievement situations, Pekrun's (2006) control-value theory deserves greater recognition for its integration of motivational processes into its portrayal of emotional experiences associated with achievement. Similar to attribution theory, control-value theory emphasizes a learner's interpretation of an achievement-related event, placing particular emphasis on the effects of prior success/failure (Pekrun & Perry, 2015). A central premise is that control- and value-related appraisals of achievement events are precursors to emotions. Control appraisals refer to the learner's evaluation of having control over their actions, sense of agency, and probability of success. Value appraisals are similar to those described by expectancy-value theorists, represented in Pekrun's model as intrinsic and extrinsic values. Control and value appraisals result in different emotions including pride, relief, anxiety, hope, shame, boredom, among several others, each of which may influence motivation, self-regulated actions, and achievement.

As much as determining the meaning of feedback is a cognitive process, this process is fully embedded in complex social, motivational, and affective sub-processes. Pekrun's (2006) model is particularly relevant in terms of

its focus on appraisals, construing what the feedback means in the form of (a) control appraisals, "am I in charge of or responsible for success/failure", and (b) value appraisals, "do I care about this outcome" (Fong, Williams et al., 2018). These appraisals then give rise to emotions, which we turn to in answering the second question.

Advancing Understanding of the Meaning of Feedback From Theoretical Frameworks

The four frameworks all can contribute to elucidating what feedback can mean to a learner. Self-determination theory is well-positioned to illuminate how feedback is interpreted as supporting or thwarting a learner's psychological needs. Expectancy-value theory, especially in its latest guise as *situated*, may help explain how cultural milieu and socializers can shape learners' interpretations of feedback through their expectancy beliefs and task valuing. Achievement goal orientation theory describes how learners make meaning of feedback by way of the goal(s) they apply in particular learning situations. Control-value theory underscores the function of appraisals and emotions as mediators between feedback and motivation. Thus, each theory has potential for understanding what feedback means to a learner.

However, opportunities exist for enhancing the potential for these theories to conceptualize more fully the meaning of feedback from the learner's perspective. For instance, the connection to feedback with achievement goal orientation theory could be enhanced by exploring how learners with multiple goal orientations might respond to feedback. Based on student profiles from person-centered studies (Wormington & Linnenbrink-Garcia, 2017), it would be worth exploring, for example, what feedback means to students with high mastery and high performance-approach goals. It is not clear whether students who simultaneously endorse both goals may interpret feedback as indicative of (a) how much they have learned, (b) how much they outperform others, or (c) perhaps a combination of both. Because profiles characterized by multiple goal pursuit (high approach goals) are shown to be as prevalent and adaptive as high mastery profiles (Barron & Harackiewicz, 2001), comparing these groups' perceptions of feedback could identify the most adaptive goal orientation(s) for maximizing how feedback could be implemented. Although self-determination researchers might argue that feedback most directly influences learners' competence needs, less is understood about how feedback can frustrate or satisfy learners' need for autonomy or relatedness. Advances here might include disentangling how feedback may detract from learners' motivational agency, as it may thwart autonomy and promote reward-based or contingent forms of motivation (Rogat et al., 2014). Similarly, expectancy-value theory could expand how learners' cost perceptions influence their interpretation of feedback, as when they attend to some and ignore other feedback, representing a new interpretation of opportunity costs (Perez et al., 2019). Being ashamed, hopeless, or angry upon receiving criticism may increase students' perceptions of emotional or psychological cost, a distressing possibility when receiving critical comments. For control-value theory, we suggest that greater emphasis on sociocultural contexts, including but not limited to a learner's racial/ethnic background and gender identities, will provide insight into individual differences in emotioned responses to feedback.

2. How Do I Feel About the Feedback?

Among other possible emotional responses, students may feel angry when receiving critical comments, joyful after being praised, or hopeless upon receiving many suggestions for revision. Although, as Table 1 demonstrates, all four theories can be applied to answering this question, the most relevant framework for this question is control-value theory. For example, Pekrun et al. (2014) examined achievement emotions high school students reported after being informed they would receive one of three types of feedback: self-referential feedback ("your performance will be evaluated relative to your individual level of progress"), normative feedback ("your performance will be evaluated in relation to the performance of other students," p. 118), or no feedback. Students anticipating self-referential feedback experienced higher levels of hope and pride and lower anger, whereas anxiety, hopelessness, shame, and relief were elicited from anticipating normative feedback. Furthermore, students' goal orientations partially mediated the feedback-emotion relation. Anticipating normative feedback seemed to actuate students' performance goal orientations, which led to either pleasant emotions for students adopting performance-approach goals or unpleasant emotions for those with performance-avoid goals. By contrast, students who were told they would receive self-referential feedback were more likely to report mastery goals for their performance, which had a significant mediated connection to relief.

In addition to students reporting feelings about feedback, whether anticipatory or retrospective, they can experience different emotions depending on feedback

valence. For example, Fong et al. (2016) asked undergraduates to imagine three scenarios of receiving positive, negative, and constructive feedback on a writing assignment. Depending on the type of feedback students contemplated, a different pattern of emotions emerged, both in terms of the factor analytic structure of students' ratings of discrete emotions and in terms of the magnitude of each emotional factor. Predictably, negative feedback was rated as likely to evoke higher levels of unpleasant emotions whereas positive feedback was likely to engender higher levels of pleasant emotions. Interestingly, constructive feedback elicited a distinct factor of hope that aligned well with students' definitions of constructive feedback as including a pathway to improve, thereby generating optimistic feelings. Furthermore, the way students felt about constructive feedback depended on how they conceptualized it; perceiving more disparaging remarks within constructive feedback statements was associated with lower pleased satisfaction.

Although emotional responses occur almost immediately upon receiving feedback, students' appraisals about their control and value perceptions toward the learning environment are essential antecedents (Pekrun, 2006). Thus, aligned with attribution theory, students' interpretation of feedback shapes their emotional responses. To uncover a full range of appraisals students might make when receiving feedback, Fong, Schallert et al. (2018) explored students' reasons for feeling different discrete emotions when imagining receipt of either positive, negative, or constructive feedback. Aligned with control-value theory, many reasons tapped aspects of control and value appraisals. For control appraisals, interpreting feedback as providing pathways to improvement (direction for how one can exercise control) was associated with such emotions as enjoyment and pride. In contrast, hopelessness and shame resulted from appraising the feedback as signaling low efficacy (indication of low control), particularly when learners felt they were incapable of implementing the challenging number of changes suggested by the feedback. For value appraisals, students reported how they became bored with positive feedback if they cared little about the task or angry if the feedback made excessive suggestions, thereby eliciting some degree of work-avoidance.

With a similar interest in shame responses, Turner and Schallert (2001) examined psychopharmacology undergraduates' experiences after receiving feedback on a first exam. Interestingly, students endorsed higher shame when they had reported lower self-efficacy and more explicit goals. Of the students who had reported high levels of shame, one group was able to improve markedly on the second exam (resilient) and one group again received disappointing scores on the second exam (nonresilient). The resilient group comprised those students who had reported on the first day that their course grade was important for their future goals. Findings suggested that shame, despite being an unpleasant emotion, can reinvigorate goal commitment and trigger motivated action (Lipnevich et al., 2021).

Shame can also occur with negative feedback when learners experience internal pressure to please important others or avoid disappointing them (or *introjected regulation*; Ryan & Deci, 2000). When Turner and Schallert's (2001) students were interviewed, several shared that they hoped the instructor would write them a recommendation letter for graduate school applications (Turner et al., 2002). With these intentions in mind, negative feedback was interpreted as disappointing their instructor and reflecting badly on themselves.

Advancing Understanding of Affective Components in the Feedback Process

The first avenue to advance research in this area is to extend beyond examining discrete emotions alone (e.g., shame) to use circumplex approaches of emotions, or multidimensional models placing emotions in quadrants formed by temporal (activity, retrospective, prospective), valence (pleasant, unpleasant), and activation level dimensions (activating, deactivating), for example (Linnenbrink-Garcia et al., 2016). Measuring affect dimensions as opposed to discrete emotions may allow for a more efficient and flexible way to study the broad panoply of emotional responses to feedback. Second, multiple modes of measurement may generate new insights into what learners feel about feedback; for instance, experience sampling methodologies could capture moment-by-moment shifts in emotions before, during, and after receiving feedback, further distinguishing state- from trait-level emotions. Third, as the feedback process is affectively dynamic, the work on emotion regulation (Harley et al., 2019) may offer testable suggestions for importing regulatory strategies (e.g., reappraisal strategies) into stages of the feedback process. Learners could reappraise or reframe negative feedback, for example, as not indicative of a personal, unchangeable deficiency but as having the potential to enhance long-term understanding.

3. Can I Improve From the Feedback?

When a learner receives feedback, a likely question is whether this feedback indicates a possibility to improve performance, something that depends on the learner's perceived control and what the content of the feedback entails. Possible answers to the question seem most related to motivation theories of expectancy-value and goal orientation (as Table 1 highlights, connections are possible from all four theories). In light of the attributions learners may make about feedback they receive, subsequent improvement hinges on how much control they sense in the learning-evaluation sequence. Learners consider whether exerting effort will help them do better or whether the chance for improvement is low, having been thwarted by external circumstances outside of their control. Here, self-efficacy comes into play, as feedback may be interpreted differently depending on one's level of self-efficacy. In contrast to learners with lower self-efficacy, those with higher self-efficacy spend more time reflecting on the feedback they receive (Winstone et al., 2017). Self-efficacious students are interested in increasing their metacognitive awareness of what needs improvement, the next steps required, and the skills necessary to produce requested changes (Duijnhouwer et al., 2012). Therefore, high self-efficacy may equate to greater confidence that one expects to improve from any feedback received. A similar pattern emerges when comparing reactions to feedback from experts and novices. Finkelstein and Fishbach (2012) found that novices in a French course preferred instructors who praised what they did well, whereas advanced learners showed greater interest in instructors who emphasized how they could improve.

Whether students think they are capable of executing suggestions for improvement may depend on whether they believe in an incremental theory of ability (and therefore adopt mastery goals). If learners think their ability is malleable, then improvement is always a possibility; however, for those with an entity view, improvement would seem unlikely. In a study by Cutumisu and Lou (2020), learners were asked to design digital posters, then chose to receive either confirmatory (i.e., positive) or critical (i.e., negative) feedback, and finally had the opportunity to revise their posters. Choosing critical feedback increased the likelihood of learners engaging in revision and thus receiving a higher final score. Interestingly, this mediated relationship was stronger for students with a higher incremental view of intelligence, suggesting that mastery-oriented response patterns involve seeking feedback and improving one's work through revision.

A second way to address this question is to investigate which feedback features encourage learners to improve performance on a task. Feedback can be delivered in several meaningful ways, one of those being effectance-relevant feedback or "information that signifies to a person that he or she is competent at the target activity or information that lets the person know how to become more competent" (Ryan et al., 1983, p. 737). Feedback elaborating why a misstep occurred and suggesting directions for how to improve has been shown to enhance task engagement and persistence (Narciss, 2004). Providing a specific pathway for students to improve their work has consistently been identified as effective feedback (Shute, 2008). Examining peer feedback from high school students, Wu and Schunn (2021) coded nearly 2,500 comments containing implementable directions for a revised writing assignment. If the feedback contained guidance for how to improve the paper, students indicated they were more likely to use the comments while revising.

Another feature of what feedback tells a learner about their ability to improve depends upon whether the feedback includes praise. There are mixed findings about praise and its effect on learners' uptake of feedback. Praise can bolster learners' self-efficacy by serving as positive social persuasion, thereby increasing their self-efficacy and encouraging them to revisit their work (e.g., Dahling & Ruppel, 2016). Additionally, statements of praise before and after a corrective feedback statement ("compliment sandwich") not only improved learners' subsequent task performance but also increased time spent preparing for a post-feedback task, suggesting that the inclusion of praise may invite learners to reflect on how to improve their approach to the task (Prochazka et al., 2020). However, compliment sandwiches are not universally effective, as the praise provided in the "bread" can be viewed as inauthentic or as obfuscating the substantive suggestions (the "filling") presented in the feedback (Fong, Schallert et al., 2018). Moreover, such "sugar-coated" feedback (as participants referred to it) may be unhelpful for subsequent improvement because it signals that the task has been completed, thereby discouraging further task engagement (Fong, Williams et al., 2018). A compliment sandwich may lead students to overestimate their performance and demotivate any attempt to revise their work. Fong et al. (2021) reported that students high in self-efficacy rated feedback statements as less constructive when praise was included, suggesting that an unintended effect of praise is to reduce investment in fixing any identified problem. Highlighting the complexity of praise, Patchan et al. (2016),

after coding over 7,500 feedback comments on writing assignments, found that praise did not consistently predict whether students implemented changes in a revision.

Advancing Understanding of Learners' Sense of Their Ability to Improve From Feedback

To further the field's understanding of learners' self-evaluation of their ability to implement feedback, one suggestion builds from work on general academic self-efficacy (Winstone et al., 2017). The suggestion is that self-efficacy could be specific to learners' feedback recipience and uptake (because self-efficacy is theorized to be domain- or task-specific). In the field of assessment, some scholars have reflected this idea in their work on *feedback literacy*, which refers to the understanding and capacity to make sense of feedback and use it to enhance learning (Carless & Boud, 2018). New insights could be generated by infusing feedback literacy with a motivational flavor, such as exploring the sources of feedback-centered self-efficacy (Winstone et al., 2021).

Similarly, although sources of self-efficacy are usually described as antecedents to self-efficacy for academic learning more broadly ("doing well in school") or in a specific subject (e.g., math), we propose that such sources could be specific to feedback situations: (a) experiences of prior successes/failures when trying to uptake feedback; (b) vicarious experiences of seeing others improve from feedback; (c) verbal persuasions about how well the task may improve from implementing feedback; (d) emotional and physiological reactions when engaging with feedback. Usher and Pajares (2008) argued that "the predictive value of sources depend[s] on the domain in which the constructs are assessed" (p. 781), explaining how mastery experiences might be more potent for predicting self-efficacy in one task than another. As some students might be less confident in uptaking feedback but more efficacious in studying, for example, this new direction could distinguish between precursors to self-efficacy for such learning activities as test-taking, comprehension, and self-regulation and self-efficacy for using feedback and actualizing improvement.

4. Do I Want to Improve From the Feedback?

It is one thing to decide that one could improve from feedback; it is a related but different thing actually to want to act on the feedback and invest effort in improving one's performance. Clearly, wanting to improve realistically depends upon, and is influenced by, judgments that one can improve, which aligns with the expectancy X value interaction. Beyond a student's capability, motivational qualities of the learner, situation, and feedback need attention.

As one of the most relevant theories for addressing this question, achievement goal theory offers valuable insights into whether improving from feedback is deemed worthwhile. A hallmark of a mastery goal orientation is being able to see the benefits of exerting effort and implementing strategies while learning (Kamins & Dweck, 1999). Because of their pursuit of learning-focused aims, students adopting mastery goals are likely to seek out and welcome feedback (VandeWalle & Cummings, 1997). Asking undergraduates to rate various features of feedback statements, Fong et al. (2021) observed how students high in mastery goal orientation rated feedback comments as more constructive when they contained specific directions for improvement relative to students low on mastery goal orientation. Contrastingly, because performance goals are associated with ego-protective concerns, learners with performance-approach goals may want to improve their work but more for social validation reasons than for learning-focused reasons, whereas learners with performance-avoid goals may view constructive feedback as a sign of failure and quit altogether. Sansone (1986) described a similar process when students received negative feedback, they reported that performing well was no longer important in order to protect their self-worth. This can lead to a strategic disinvestment from the pursuit of developing competence. Moreover, the type of feedback, whether it is person- or process-focused, affects students' motivation differentially. Thus, praise highlighting a person's trait-like attributes such as their ability may make the person vulnerable to feelings of helplessness should failure ensue (Mueller & Dweck, 1998). Conversely, process-focused feedback emphasizing students' improvement efforts works to enhance mastery-based motivation.

A self-determination perspective may answer this fourth question by identifying whether feedback supports the learner in autonomously choosing to improve the work. When students sense that their actions flow from a self-concordant origin, they may be more internally driven to invest in the improvement process, whereas students feeling controlled by external pressures may not be as personally involved. This dynamic is amplified by the way feedback is delivered, whether using autonomy-supportive or controlling language (Carpentier & Mageau, 2013). Literature on autonomy-supportive practices, or the nurturing of an individual's inner motivational resources (Reeve & Jang, 2006), recommends feedback that offers encouragement and suggestions for how to make progress

as well as acknowledgement of difficulties students may face. Another component is the provision of rationales, as feedback that includes explanations for why improvement is needed can motivate learners to take up feedback and implement revisions on a task (Wu & Schunn, 2021). In contrast, feedback with controlling language consists of directives of what students should do and may cause learners to feel they have little choice when deciding to improve. Unsurprisingly, Fong et al. (2019) found that negative feedback, when couched in invitational language, motivated higher levels of interest and task persistence.

Drawn from expectancy-value theory, connections can be made with how students may value the task and the effect such valuing may have on how they respond to feedback and work to improve their performance. Students who find a task personally relevant may welcome a request to improve their task performance as an opportunity to sustain their interest and engagement. However, even constructive feedback could derail students from what they found enjoyable or important about the task if the feedback causes them to focus on less-valued aspects of the activity. When learners value a task for its utility to accomplish important goals, improvement feedback may be interpreted either as relevant and important for achieving these goals or as needlessly focused on unimportant aspects of the task (Harks et al., 2014). These valuation processes are mediated by emotions, so that feedback, after being interpreted via control and value appraisals, induces emotions that potentiate achievement-related outcomes (Pekrun & Perry, 2015). For instance, pleasant activating emotions, such as pride, are likely to increase motivation to implement the feedback's suggestions. By contrast, deactivating emotions like hopelessness can undermine motivation to improve because either the task or outcome is devalued. The complex emotion of relief may signal that immediate action may not be needed but also strengthen learners' commitment to re-engage in the activity at a later point and improve their performance.

Advancing Understanding of Learners' Value for Improving From Feedback

Thus, each of our frameworks offers characteristically different answers to the question (see Table 1): if learners want to improve their performance upon receiving feedback depends on whether (a) the learner holds a mastery goal orientation; (b) the learner's sense of autonomy is supported; and (c) the learner values the task and the feedback itself. Although these distinctions offer a rich motivational perspective on the question, more needs to be understood about the conditions that would move learners to use the feedback process to fulfill their own goals. Advances in this area might emerge from harnessing contemporary research on motivational interventions. Situating motivation within the feedback process, value-based interventions (Hulleman & Harackiewicz, 2021; Rosenzweig et al., 2022) could be adapted to apply specifically to feedback situations by communicating that feedback may be useful, personally important, interesting, and worth the cost it incurs. Affirming learners' perceived value for improvement may mitigate the sense of threat emanating from critical feedback. Noting that the relationship between cost and feedback has been understudied, Joughin et al. (2021) described the detrimental effects of opportunity costs when a learner "may be too busy with other work to afford the time required to seek, receive[,] and act on feedback" (p. 85). We encourage further inquiry into how learners' decisions to act upon feedback is affected by the sense of cost, of the time, effort, lost opportunities to engage in other activities, and emotional turmoil.

Also, because mastery goals can be induced within learners, it would be interesting to see how manipulating self-based mastery goals might maximize learners' value for feedback to promote learning growth (Elliot et al., 2011). Before providing feedback, teaching students that adopting mastery goals is beneficial for their learning (Dompnier et al., 2015) may result in more receptive responses to such feedback. Similarly, interventions aimed at increasing students' autonomy in engaging with their learning may be productively applied to encourage learners to use feedback as a guide to improvement (Reeve & Cheon, 2021). Thus, focusing on changing a learner's view of feedback may clarify the motivational mechanisms underlying why learners may or may not uptake feedback.

5. Am I Supported by Others or by the Context in Dealing With Feedback?

Our final and perhaps most important consideration is the sociocultural context that influences how learners seek, receive, and uptake feedback. As represented in all four frameworks (see Table 1), characteristics of instructors, their relationships with students, and the instructional context all come into play. For example, context is identified as a precursor to emotions in control-value theory (Pekrun, 2006). Similarly, because expectancy-value theory emphasizes the role of important others as influencing a learner's self-efficacy and value judgments, feedback interactions, by their very nature, become a form of social

persuasion situated in cultural messages. Interestingly, learners' interpretation of feedback can differ by culture in terms of the weight placed on who is providing the feedback (e.g., teacher, family, peers; Ahn et al., 2016).

More substantively related to addressing the fifth question, early work on goal orientation theory pointed to the contextual influence of classroom goal structures on students' motivation (Ames, 1992). Such structures embody messages to students about the goals relevant to the instructional context and are important aspects of classroom climate (Patrick et al., 2011), shaping how feedback is delivered and perceived. A key aspect of classroom goal structures is the evaluation dimension (E of Ames' TARGET system, 1992), which describes assessment systems geared either toward learning or competition goals. For mastery goal structures, feedback can take the form of self-referential evaluations that track whether students are improving in relation to their prior performance (self-based goals) as well as encouragement that supports their intellectual development (Vispoel & Austin, 1993). Whereas classrooms with mastery goal structures would likely have private ways of presenting feedback, those with performance goal structures might publicly display grades, thereby prompting social comparisons. Teachers in performance-oriented classrooms focus on summative feedback, but instructors perceived to hold mastery goals are more likely to communicate formative feedback that nurtures students' meaningful re-engagement with and improvement of their work (Iaconelli & Anderman, 2021).

From self-determination theory, the extent to which a learner's need for relatedness is satisfied, dependent as it is upon the relationship between feedback giver and receiver, may influence the way feedback is experienced. When learners perceive a high level of relatedness, even critical feedback may be perceived as more charitable (Kumashiro & Sedikides, 2005). Fong et al.'s (2019) meta-analysis indicated that negative feedback had a more detrimental effect on intrinsic motivation when feedback was delivered through a disembodied modality (i.e., a computer) compared with feedback provided by a human agent (i.e., an experimenter; Golke et al., 2015). This finding suggests that another person's presence may soften the blow of criticism. Beyond the human presence of a feedback provider, instructors' delivery of feedback can also promote involvement (e.g., showing care, friendly communication) that supports both autonomy and relatedness needs (Reeve & Cheon, 2021).

Underscoring the importance of this final question, Fong, Schallert et al. (2018) analyzed undergraduates' focus group data and proposed that feedback uptake depends on the relational dynamics between the instructor and student. Students must not only respect their instructor for their credibility and expertise but also sense that the relationship with their instructor is marked by trust and positive intentions. As students described it, the process of receiving, interpreting, and acting upon feedback was sensitive to how much learners felt supported by their instructor, as embodied in the feedback message. This relational dynamic is more salient in contexts where trust might be tenuous, such as when criticism is given by a White teacher to an African-American student (Yeager et al., 2014). Studies have shown that White instructors, when evaluating work of the same quality from White students and students of color, tend to provide students of color with more praise and less criticism, a phenomenon dubbed the *positive feedback bias* (Harber, this issue). Harber hypothesized that White teachers may have racial anxiety, or the fear of being seen as racist, and thereby engage in outgroup favoritism to reduce the threat of appearing prejudiced. Therefore, being viewed through the lens of a negative stereotype and the possibility of prejudice, students of color may develop mistrust toward instructors and debate whether critical feedback is fueled by racial bias or a desire to help. Addressing this issue, Yeager and colleagues studied a strategy called *wise feedback*, consisting of critical feedback coupled with messaging that emphasized the instructor's high standards and belief in the student's capacity to meet these standards. In the wise feedback condition ("I'm giving you these comments because I have very high expectations, and I know that you can reach them," p. 6), students were more engaged, made more revisions, and performed better; this effect was more pronounced for African-American students with higher levels of school mistrust. Wise feedback was theorized to create a "positive attributional space" (p. 3) for students to appraise feedback as resulting from the instructor's high standards rather than racial bias.

Advances in Understanding Social and Contextual Support in the Feedback Process

Given how sensitive learners can be to the contextual and relational dynamics of the feedback process, one concern we have pertains to the work on automated, computer-mediated feedback. Despite the promise these advances hold for efficiently providing feedback to large numbers of students (Narciss, 2004; Wang & Lehman, 2021), we worry that they may alter the delicate nature of the social context, thereby reducing feedback effectiveness.

Wilson and Csik (2016) found that the addition of automated feedback to teacher-provided feedback resulted in the same level of students' self-reported writing motivation and writing quality of their revisions compared to receiving teacher-provided feedback alone, thereby casting some doubt on the value of automated writing evaluations. Automated feedback is ostensibly coming from the instructor, but learners may not sense the same social support from such feedback when compared to more personalized and genuine statements. In a review of automated feedback systems, Deeva et al. (2021) were critical of how automated feedback seemed teacher-focused and recommended that educators seize opportunities to increase personalization. One interesting suggestion to make automated feedback more student-centered was to give students the chance to customize the kinds of feedback features to their needs, goals, and preferences (e.g., when feedback would be available).

In addition, advancing research in this area will require tuning into the social dynamics involved in students' perceptions of credibility, trust, and relatedness, especially when accounting for racialized, culturalized, and gendered feedback experiences (Fong, Schallert et al., 2018; Harber, this issue). Systematically testing relational aspects of the feedback process may inform how to deliver motivationally-supportive feedback at scale.

Concluding Thoughts on the Five-Question Framework

Before ending with implications, we return to how we chose these questions as reflecting the likely "inner dialogue" through which learners negotiate whether or not feedback should be taken up. Clearly, choosing to implement feedback is a motivated act during which learners decide whether enacting the feedback's suggestions is possible (based on one's perceived competence and autonomy) and valuable (based on one's interests, values, and goals). These considerations are well-aligned with *metamotivational monitoring*, defined as learners' self-assessment of the quantity and quality of their motivation to pursue a task goal (Miele & Scholer, 2018). When learners adopt the goal of using feedback they have received on a task, they are aware of the motivation they possess for improving their performance with such feedback. If learners need motivation to engage in the feedback process, they can also use *metamotivational control*, or the selection and execution of regulation strategies that initiate, sustain, or bolster their motivation (Wolters, 2003). For example, learners might break down the feedback they receive on an essay into smaller comments, so they can feel more efficacious about implementing feedback. Or, learners can pair their revision with a reward structure, so that each time a feedback comment is addressed, they allow themselves to engage in a more enjoyable activity.

Not only do these five questions have the potential to generate metamotivational knowledge for students but they may help researchers find ways to integrate the motivational frameworks we used. Under each question, we discussed theories that address learners' perceptions, emotions, competence-related beliefs, values, and social/contextual support associated with feedback processes. Although the goal for our five-question framework was not to propose a novel theoretical integration of motivation theories, it is possible that our consideration of the motivational experience of feedback may suggest new ways these perspectives can complement one another.

As a final concern about the framework, we are aware that our answers to the five questions remained at a micro-level view of the motivational and emotional processes involved in the feedback process, taking in turn, the theoretical perspectives of what makes instructional feedback motivating, what motivational characteristics ready a learner to receive and respond to feedback productively, and what sociocultural processes inform the feedback dynamics among instructor, learner, and context. Our five-question framework may give the impression that answers to each question make isolated connections between motivation and feedback; rather, we see them as acting synergistically with tremendous potential to promote learners' uptake of feedback. In an essay discussing the role of context in moderating the effectiveness of mindset and belongingness interventions, Walton and Yeager (2020) proposed that some contexts nurture in learners an adaptive perspective (acting as "soil") so that change may occur in a person's psychology (with an intervention acting as the "seed"). Extending their metaphor, we may view the social support perceived by a feedback receiver as the "soil" providing or denying opportunities for uptake, and the learner's motivation as the "fertilizer" to encourage (or deter) uptake of feedback, with feedback standing in for the "seed" of the process. In other words, learners' motivation to improve based on feedback they receive may be facilitated by feedback delivered in motivationally supportive ways and situated in trusting and authentic relationship(s). However, not all seeds are germinative, not

all soil is fertile, nor all fertilizers effective; viable seeds are not always planted in fertile soil. How would motivationally supportive feedback convince a learner with little value or low self-efficacy for improvement to uptake the feedback? How would a mastery-oriented student respond to feedback with little to no direction for improvement? How would both of these scenarios play out with and without a secure relationship between learner and instructor? These complexities have made it difficult for researchers to examine these facets simultaneously, but approaching feedback in this holistic and contextualized way may help resolve the ongoing puzzle of what makes feedback effective.

Directions for Future Research

We have already addressed suggestions for empirical and theoretical developments and offered theory-driven connections between motivation and feedback (see Table 1) that also serve as testable notions that could use further validation and exploration. Here we present some suggestions that cross the five questions and four frameworks. First, when a study involves asking participants to respond to feedback in real, remembered, or imagined situations, methods such as think-aloud protocols or cognitive interviewing can be used to explore students' perceptions of feedback. Such data could uncover nuanced ways students interpret feedback and begin to reveal motivational mechanisms undergirding learners' feedback responses. Second, future studies may benefit from combining learners' motivational perceptions with their emotional responses to the anticipation, receipt, and uptake of feedback. As studies tend to focus on either motivational or emotional components, integrating the two, as control-value theory does, could be generative.

Third, we recommend researchers move past the oversimplified positive-negative valence dichotomy and explore more learning-focused feedback with elaborated and constructive comments (Fong et al., 2019). Because more scholarship is needed on the motivational interplay of how learners improve from feedback, we encourage researchers to include both behavioral and self-report indicators of learners' feedback uptake. Fourth, future studies may do well to incorporate the situatedness of feedback interactions, even though studying the complex world of learners receiving feedback in actual instructional settings will necessarily prove difficult. The beauty of such studies is that it would allow the full force of influences to come into play, including teachers' reactions to students' performance impinging on the kind of feedback they provide and students' interpretation of such feedback cognitively, motivationally, and emotionally. Classroom-based studies with ecologically valid designs will empower consideration of how sociocultural contexts motivate learners to uptake feedback.

Fifth, we encourage feedback researchers to incorporate advances in motivation research to enrich understanding of constructs such as feedback literacy. For instance, although one of feedback literacy's tenets is that learners must manage their emotions when receiving feedback, the specific ways learners regulate their emotions and the process by which these strategies influence their motivation to implement the feedback is not well understood. Other feedback models (Fong, Schallert et al., 2018; Panadero & Lipnevich, 2022; Winstone et al., 2017) assert that learner motivation is central to feedback uptake, yet their treatment of motivation factors does not adequately capture specific constructs and processes outlined by popular motivation theories. Cross-pollination between these two literatures can lead to fruitful insights about how engagement with feedback necessitates multiple motivational and emotional dimensions.

Finally, we acknowledge that we limited our purview to four popular theories in educational psychology. Other frameworks such as control theory (Carver & Scheier, 2012), goal systems theory (Kruglanski et al., 2002), self-regulatory focus theory (Higgins, 2000), and identity-based theories (Markus & Nurius, 1986) may provide additional insights into the connection between motivation and feedback and can be integrated with the theories we reviewed into future studies.

Educational Applications

As an approach to understanding the feedback process, our five-question framework may also be useful for instructors. First, instructors may benefit from engaging in perspective-taking, reflecting upon the impact of feedback on students' motivation. Whereas the learner is responsible for engaging with the feedback (Carless & Boud, 2018), the instructor is responsible for learning from how the learner has responded to feedback, refining how to provide feedback more effectively. In this cyclical process, the learner's response acts as feedback to the instructor.

Second, awareness of students' affect during feedback interactions could help instructors deliver feedback messages with sensitivity to their students and respond in autonomy-supportive ways that show empathy for students

experiencing difficult emotions. Third, feedback that scaffolds students' learning and provides clear pathways for improvement is essential. Beyond identifying what needs to be fixed, elaborating how a learner can improve and providing rationales for suggestions may motivate feedback implementation. Fourth, instructors can communicate the value of improvement feedback by fostering a mastery goal structure with a focus on formative, self-based assessments. Including autonomy-supportive language in feedback may be effective practice that nurtures students' agency; however, such language should be balanced with directions for improvement to mitigate any uncertainty from receiving friendly feedback (Fong et al., 2021). Finally, instructors who cultivate rapport with students improve the likelihood their feedback will convey genuine care. To this end, delivering wise feedback setting high expectations with clear guidance for improvement is a promising technique.

Final Conclusion

Our article has outlined how motivation and emotion processes are reciprocally intertwined with feedback by exploring theoretical implications and relevant empirical evidence. As some of the relationships between feedback and core mechanisms within motivation theories can be somewhat opaque, one contribution of this review is elaborating upon these connections and asserting feedback's role in motivation theories and vice-versa. Further, as feedback studies have developed largely independently from motivation scholarship, we identified how feedback and motivation researchers might expand their purview to address what makes feedback effective for student motivation and learning. Whereas motivation scholars have tended to focus on either learners' motivational qualities influencing how feedback is perceived or learners' motivational states upon receiving feedback, feedback researchers have been more concerned with what learners do with feedback. In our review, we aimed to integrate these facets because real-world, instructional situations lack such boundaries. In all, this review points to potential directions for scholarly work and educational practice, acting as feedback to the future.

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Table 1

Five-Question Framework and Connections to Theories of Motivation and Emotion

	Motivation Theories			Emotion Theory
Question	Self-Determination	Expectancy-Value	Achievement Goal Orientation	Control-Value
1. What does the feedback mean to me?	Feedback represents information that threatens or supports need fulfillment.	Feedback supports self-efficacy for a valued task. Affective memories and cultural milieu shape feedback interpretations.	Feedback indicates whether mastery or performance goals are met.	Feedback is appraised via control- and value-appraisals.
2. How do I feel about the feedback?	Motivated by introjected regulation to please/ disappoint important others, learners feel pride/shame upon feedback.	Attributions of success/failure lead to affective responses. Feeling unpleasant emotions can be an emotional cost.	Goal orientations mediate feedback's impacts on emotion.	Various prospective, activity, and retrospective emotions emerge depending on feedback appraisals.
3. Can I improve from the feedback?	Effectance-relevant feedback informs competence to improve. Praise might (de)motivate improvement.	Knowing how to improve matters. Feedback providing a pathway to improve is helpful.	Believing that ability is malleable and improvement is possible is relevant.	Control-appraisals of the task inform whether learners improve.
4. Do I want to improve from the feedback?	Autonomy-supportive language nurtures motivation to improve.	With cost and value considerations, learners may uptake feedback to improve.	Improvement is central to mastery goal orientations and less pertinent to performance-focused goals.	Value-appraisals of the task inform whether it is worthwhile to improve.
5. Am I supported by others or by the context in dealing with feedback?	Relatedness needs can be satisfied by supportive feedback.	Social persuasions inform self-efficacy and vary by cultural context.	Classroom goal structures promote learning- or competition-focused feedback.	Instructional context is a precursor for appraisals and emotions.