

Relevance of student motivation for providing high-quality peer-feedback: Results of two field studies

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ABSTRACT

Background: The prevailing interest in peer-feedback practices in higher education is grounded in their potential to foster students' learning, understanding, and performance while reducing instructor workload. This potential depends on students' motivation to provide high-quality peer-feedback. Within this, students' expectancies for and the value they place on peer-feedback provision as well as their achievement goals seem to be particularly impactful. However, barely any research has investigated these relations.

Aims: We aim to explain differences in peer-feedback quality based on feedback providers' motivation in terms of mastery goals (task and learning goals), work avoidance goals, expectancies for success, task value, and cost.

Methods and Sample: To answer these questions, we conducted two field studies in higher education courses in which 254 and 173 students provided peer-feedback on written assignments. Students reported their mastery goals, work avoidance goals, expectancies for success, task value, and cost regarding the task right before providing feedback. This feedback was assessed in terms of its quality along three aspects: criteria-based rating by trained raters, receiver-perceived quality, and feedback length.

Results: Consistently across both studies, path models showed that particularly task goals and utility value mattered for high-quality peer-feedback. Expectancies for success and cost were partly positively associated with feedback-quality.

Conclusions: The motivation of students providing peer-feedback seems to be relevant for the quality of the peer-feedback they provide and is thus a crucial factor to consider in instructional settings implementing peer-feedback. Within this, particularly the effects of cost warrant further investigation.

1. Theory

1.1. Introduction

Feedback on performance and learning is commonly considered to be a stepping stone for learning and achievement in educational contexts (Lipnevich & Panadero, 2021). Implemented as peer-feedback (i.e., equal-status students provide feedback to each other; Topping, 2017), the benefits for both students and teachers are apparent: Particularly in large, impersonal higher education courses, peer-feedback provides information and interaction for all students that teachers might be barely able to provide on such large scales (Rowe, 2011; Wu & Schunn, 2023). In contrast to providing instructor feedback or using computer-based feedback for large-scale feedback provision (e.g., for essay-type written tasks), peer-feedback offers a twofold learning opportunity as

students can develop competences by both providing and by receiving feedback. Correspondingly, research shows that receiving peer-feedback positively impacts academic performance (Double et al., 2020). Some evidence suggests that providing feedback might even be equally or more effective in enhancing performance than merely receiving it (Lundstrom & Baker, 2009). That is, by assessing a peer's work, students can explore other approaches and internalize assessment criteria, possibly improving self-assessment skills and domain knowledge during assessment (Lundstrom & Baker, 2009; Topping, 1998). Furthermore, qualitative results imply that students generate ideas for revising their own work while assessing their peers (Kaufman & Schunn, 2011).

However, the products of peer-feedback might not be as accurate as expert feedback (Gielen et al., 2010). Accordingly, one of the main limitations of peer-feedback is the risk of student feedback providers providing low quality feedback (Nicol et al., 2014) or an insufficient

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amount of feedback lacking useable content (Price et al., 2011), which is detrimental to their own progress and for the recipient of their feedback. Even though the uncertainty of the provider's competence—as a fellow peer—is likely to foster critical thought when receiving peer-feedback and subsequently enhance performance (Yang et al., 2006), instructors arguably need to carefully design peer-feedback scenarios in order for both providers and receivers to profit from it.

Without doubt, students do need some basic knowledge about a topic to successfully provide peer-feedback. Nonetheless, dealing with other interpretations and viewpoints and trying to assess those (as a peer-feedback provider) and receiving critical comments or further ideas (as a peer-feedback receiver) can both broaden and deepen the understanding of a topic. Issues that arise out of missing specific knowledge and advanced understanding can be supplemented through structured evaluation criteria, supporting materials, and guided instruction. However, peer-feedback providers need to also use such material and put effort into trying to understand and assess their peers' texts.

In general, students' motivation is a central factor for driving such investment of effort and strategy choice in learning situations (Wigfield et al., 2021). In other words, when students lack subject-specific knowledge or skills in peer-feedback provision, they can compensate for it by being motivated to understand and apply criteria for good feedback, research the topic, or seek guidance from instructors. Consequently, students' motivation for peer-feedback (provision) should be fundamental for profiting from the act of providing feedback and for the quality of feedback they provide: In their role as a peer-feedback provider, they are more likely to benefit from providing peer-feedback if they are motivated to invest effort in deep strategy use and comprehension. When this motivation translates into the actual feedback they produce, their willingness to engage deeply and apply effective strategies enhances the quality of their peer-feedback. In the same vein, recipients of peer-feedback should benefit from highly motivated providers who are likely to deliver more insightful and constructive feedback. While the motivation of feedback recipients to engage with and act upon the received feedback is undoubtedly important, the focus of this paper lies on the providers' motivation and the resulting peer-feedback quality.

While the important role of motivation in providing and receiving peer-feedback has been acknowledged, its processes have been barely researched or understood (Panadero et al., 2023). This gap in research may stem from the unique nature of peer-feedback as a learning activity, where traditional motivational theories may not seamlessly apply—especially considering the social dynamics involved. There are some studies exploring how receiving (peer-)feedback might impact student motivation (e.g., Chang et al., 2020) or how motivation matters for deciding to participate in voluntary peer-feedback (Özbek et al., 2024).

Compared to those, studies exploring how motivation affects providing or receiving peer-feedback are particularly lacking (Panadero et al., 2023) despite the potential of such studies to support the understanding of why students provide higher or lower quality peer-feedback. To summarize, from a motivational perspective, students necessarily need to be favorably motivated to provide peer-feedback in order to induce successful learning during peer-feedback for both the provider and the receiver, as their motivation drives them to use resources and to invest effort into providing sufficient, high-quality feedback (Wigfield et al., 2021), but this notion needs to be empirically tested.

Providing peer feedback is not only a cognitively demanding task but also a socially embedded activity. While competence-related aspects are relevant, such as students' ability to apply feedback criteria, research the topic, or seek help, an equally important factor is the unique social context in which peer-feedback occurs. Specifically, providers must anticipate that their feedback will be evaluated by the recipient, creating a situation in which their own competence is indirectly judged by others. Achievement goal approaches provide a particularly useful framework for understanding how students' motivation in such socially embedded tasks shapes their engagement and performance. It explains how

students' thoughts about gaining or demonstrating competence influence their motivation and behavior—especially in contexts where their performance is subject to peer evaluation. Besides achievement goals, expectancy-value approaches highlight that students' willingness to engage in and persist with demanding tasks like peer-feedback provision depends on their perceptions of the task's value (e.g., Is it enjoyable? Is it important? Is it useful?), the costs associated with it, and their confidence in succeeding (Eccles & Wigfield, 2020; Wigfield & Eccles, 2000).

Utilizing these two frameworks, we consider the mastery-focused goals that students strive for when providing peer-feedback and the expectancies and value they ascribe to peer-feedback provision to understand how they matter for peer-feedback quality in Study 1. Both Achievement Goal Theory and Situated Expectancy-value Theory suggest that the components of motivation (achievement goals, expectancies, values, and cost) contain a certain amount of situational fluctuation. Accordingly, in Study 2, we broaden our perspective to account for fluctuations of motivation over time from task to task, also on a within-student level. In Study 2, we additionally include work avoidance goals next to mastery goals to account for the high workload for students in this high-frequency design.

1.2. Capturing students' peer-feedback quality

Within the broad realm of feedback quality and associated studies, we are focusing on the quality of written peer-feedback given on essay-type writing assignments. The quality of written feedback that students provide is fundamental in determining whether the receiving student can profit from it, and also mirrors the feedback provider's effort in dealing with the content and requirements of the task that feedback is given on. Additionally, providing feedback allows students to deepen their understanding and cultivate their own cognitive process (Nicol et al., 2014). Relatedly, there is evidence that students who provide high-quality feedback subsequently perform well in writing tasks (Li et al., 2010). Therefore, by capturing the quality of the written peer-feedback, we can explore an integral part of the learning process involved during peer-feedback provision (Cho & Cho, 2011).

Many aspects determine the quality of feedback in general, spanning surface and content criteria as well as organizational aspects like timing (for an overview, see Shute, 2008). In organized, written peer-feedback, students usually shape the content, length, and style of their feedback, while aspects like timing are out of their control. Several aspects of peer-feedback quality in terms of content and style have been outlined in previous studies (e.g., Wu & Schunn, 2020a). In this paper, three different perspectives are considered which cover potentially related, but different aspects of written peer-feedback quality as outlined below: (1) Criteria-based feedback quality, as defined by established feedback principles, (2) student-perceived feedback quality, capturing how students experience and interpret peer-feedback, and (3) feedback length, which may serve as an indirect indicator of elaboration but requires nuanced interpretation.

Firstly, non-domain-specific characteristics of peer-feedback quality are considered that allow for seamless transfer between contexts and disciplines (Rotsaert et al., 2018) and thus are particularly valuable in peer-feedback (Gielen et al., 2010). Summarizing Hattie and Timperley (2007) as well as Shute (2008), high-quality (peer-)feedback encompasses the goal the recipient is supposed to achieve and offers suggestions on how to reach this goal based on the recipient's current standing (e.g., following feed-back, feed-up and feed-forward criteria by Hattie & Timperley, 2007), and focuses on the process rather than the product or the person. From a motivational perspective, high-quality peer-feedback is motivating by offering favorable attributions of successes and failures (Graham, 2020).

Secondly, students bring their own implicit standards and expectations to the feedback process, acting as a background for how they perceive the feedback they receive (Van der Kleij, 2019). While the assessment of the received feedback depends partly on the receivers'

characteristics (Van der Kleij & Lipnevich, 2021), how students perceive and make sense of peer-feedback plays a critical role in determining its impact (Winstone & Nash, 2023). Thus, beyond evaluating peer-feedback quality based on predefined criteria, our studies consider students' holistic judgments of the feedback they receive, reflecting their individual interpretations and potential mismatches with expert-derived quality criteria.

Thirdly, peer-feedback length can indicate elaboration (Zou et al., 2018). Even though feedback might be too complex or diluted in some cases if it becomes too long (Shute, 2008), it still needs to be sufficiently long to consider the criteria-based aspects, and longer feedback might contain more helpful information (Patchan et al., 2018). Prior research suggests that longer peer-feedback comments might help the receiver understand the feedback (Wu & Schunn, 2020b). Besides, peer-feedback length partly illustrates the effort and thought the feedback provider poured into the task and seems to be associated with the providers' subsequent provided peer-feedback quality (Zong et al., 2021). We argue that each of these three aspects alone do not represent feedback quality holistically, but peer-feedback content, student-perceived peer-feedback quality, and peer-feedback length outline key, potentially related elements of the quality of student feedback.

As elaborated, achievement goal approaches and expectancy-value approaches offer insights into how students approach tasks during learning (Pintrich, 2000; Eccles & Wigfield, 2020; Wigfield & Eccles, 2000). Consequently, in this paper, we build on students' goals for providing feedback and on their expectancy and value ascriptions to explain why peer-feedback quality might vary.

1.3. How students' achievement goals matter for peer-feedback quality

When students are facing tasks and learning opportunities, their personal goals are a core part of their motivation. Achievement Goal Theory aims to capture such goals and explain their impact on students' learning and achievement (Pintrich, 2000). Achievement goals encompass an array of academic goals students might strive for in achievement contexts, ranging from being eager to learn as much as possible to trying to avoid work at all costs (Elliot, 2005; Hulleman et al., 2010).

In contemporary conceptions of achievement goals, the traditional distinction between mastery goals (focused on learning and self-improvement) and performance goals (focused on demonstrating ability) has been further differentiated in terms of both content and valence (see Daumiller, 2023). Specifically, besides approach and avoidance orientations, mastery goals can be subdivided into learning goals, which emphasize developing personal competence and expanding one's knowledge, and task goals, which focus on getting tasks right or not wrong based on task-inherent standards.

When students provide written, anonymous peer-feedback, both types of mastery goals may be particularly relevant, as providing feedback involves not only applying but also broadening one's competence. In contrast, because the peer-feedback provided in this study was not formally evaluated by teachers or peers, the demonstration of competence (which is central to performance goals) should be less relevant in this context. Consequently, we focus on these mastery approach goals and not performance goals in this study.

In general, from a theoretical perspective, students' mastery goals drive their approach to achievement tasks: Prior evidence shows that mastery-oriented students tend to perceive a task as an opportunity to learn (Korn et al., 2019), which also leads to them being resilient when facing obstacles (Urdan & Kaplan, 2020) and coping adaptively with errors (Grassinger & Dresel, 2017). Concerning meta-analytic findings, mastery goals are positively associated with academic performance in general (Payne et al., 2007).

In feedback provision, when students' competence is challenged, their mastery goals might guide the way they approach the task as well: A task goal-oriented student can be assumed to focus on using their competence to develop objectively good feedback as it is demanded in

the specific peer-feedback provision task, applying given criteria of how good feedback is supposed to look like. This encompasses investing effort in thoroughly reading supporting materials or by carefully phrasing their sentences, and thus should lead to a higher level of peer-feedback quality. In contrast, a learning goal-oriented student can be assumed to perceive an array of opportunities to broaden their competence when having to provide feedback to a peer, especially as they are not experts in the topic or in providing feedback. Such opportunities include rehearsing the topic at hand and learning about alternative solutions or making sense out of conflicting ideas. This might, but not necessarily does, result in peer-feedback that is helpful for the student receiving it, who possibly faces the same content-related challenges. In peer-feedback provision, the aim to develop own competence might also include the aim to improve own feedback skills, which could, but not necessarily does, entail practicing by applying the given criteria for high-quality feedback. For learning goal-oriented students, the product (feedback) might not be as central as for students with pronounced task goals, and learning goal-oriented students might successfully learn during feedback provision without necessarily delivering high-quality feedback.

As learning goals focus on the individual and task goals focus on the task, both goals are to work differently in achievement contexts (Elliot et al., 2011). In several higher education learning contexts, like attending a lecture or reading an assigned text, the task that needs to be completed is equivalent to learning something. In those cases, task and learning goals both target the same outcome. In the social context of peer-feedback provision, however, this might be different. Indeed, limited prior research in other areas of learning and achievement hint at different mechanisms of learning vs. task goals in specific tasks (Daumiller, Rinas, & Dresel, 2023). However, there is next to no evidence on the different influences of task vs. learning goals that could hint at how these goals work in peer-feedback provision. In the light of the processes described above, students pursuing task goals should provide higher-quality peer-feedback than students who do not. Students pursuing learning goals might also provide higher-quality peer-feedback as a result of developing their own competence, but this connection does not seem as direct as the one to task goals.

Providing peer-feedback is frequently a challenging task for students given its cognitive demands to retrace another student's thoughts, reiterate assessment criteria, apply domain knowledge, and formulate their own thoughts in an effective and understandable manner (Alqassab et al., 2018). Given these demands, generating high-quality peer-feedback requires both effort and sustained engagement. In this light, besides applying or broadening competence, students might want to limit their effort to the lowest possible amount, especially if providing feedback is coupled with a high workload. In achievement goal research (King & McInerney, 2014), this idea is reflected in work avoidance goals, which are particularly relevant in contexts where tasks are perceived as complex, effortful, or burdensome—such as peer-feedback provision.

If students aim to limit their efforts (i.e., follow work avoidance goals), feedback quality might suffer, as students then might tend to provide superficial feedback, gloss over difficult areas and might not elaborate on discrepant viewpoints. This aligns with prior findings linking work avoidance goals to lower engagement and reduced academic achievement (King & McInerney, 2014).

In this light, mastery goals (and work avoidance goals) can be assumed to explain why, given the same resources, some students provide high-quality feedback for their peers and some do not, and why the same students sometimes provide higher quality peer-feedback than other times. Accordingly, research is needed to unravel these connections between achievement goals and peer-feedback (Panadero, 2016).

1.4. How expectancies for success, value, and cost for providing peer-feedback matter for peer-feedback quality

In (Situational) Expectancy-Value Theory, expectancies for success are

represented as students' belief about how well they will do in a task (Eccles & Wigfield, 2020), or in the case of peer-feedback provision, how well they expect to provide feedback. The value that students ascribe to learning is encompassed by the concept of task value (Eccles & Wigfield, 2020). Task value can be differentiated into three dimensions: Intrinsic value encompasses the intrinsic joy a student experiences during a task (e.g., the student might simply have fun while providing feedback to another student), attainment value describes the personal, identity-focused value of the task (e.g., a student might perceive themselves as someone who provides high-quality feedback), and utility value entails the usefulness of the task for future goals (e.g., a student might believe that the skill of providing feedback is useful for their aspired profession). The experienced cost of the task, such as the time, effort, and/or emotional strain that accompanies feedback provision, is commonly conceptualized on the value-side of motivation. However, it can be conceptualized as separate from task value with own dimensions and unique effects (Jiang et al., 2020). A widely accepted framework describes cost as consisting of three core sub-factors (Perez et al., 2014), namely effort cost (i.e., the struggle and work required by a task), opportunity cost (i.e., the lost opportunity to spend time doing other things), and emotional cost (i.e., the negative emotions connected to the task). Other models propose more subdimensions of cost, underscoring the complexity of this construct (Flake et al., 2015).

Concerning the relations to written peer-feedback quality, students who expect to do well in a task subsequently show better performance in it, even when controlling for prior performance (Wigfield & Eccles, 2000). Accordingly, students expecting to be able to provide high-quality peer-feedback should produce peer-feedback of higher quality.

If a student places high value on a task, whether this is because they enjoy it, they deem the task important or they consider it useful for their future, they will be persistent with it, demonstrate high effort and generally show high achievement (Eccles & Wigfield, 2020). This notion is supported by a broad array of research in various academic achievement contexts (e.g., Dietrich et al., 2017; Harackiewicz et al., 2014). Within this, the three value components can play differential roles, with utility value being closely related to outcomes like grades and task performance (Hulleman et al., 2008).

Projected onto peer-feedback provision, students should produce high-quality feedback if providing peer-feedback seems like a fun activity to them, if they think it is important to provide high-quality feedback to their peer, or if they expect peer-feedback provision to be useful for their understanding of the topic or for developing skills for their future career.

The question of how perceived cost of providing peer-feedback impacts peer-feedback quality is more complex. On the one hand, high perceived cost generally impairs students' engagement with a task and lowers their performance (Barron & Hulleman, 2015). On the other hand, if students perceive providing feedback as costly, this might imply that they actually invest considerable time and emotional effort in peer-feedback provision, resulting in a carefully created product. From an empirical perspective, the latter idea is less supported, as cost rather seems to hinder achievement (Rosenzweig et al., 2020). However, Beymer et al. (2023) found that while experienced cost was negatively associated with grades, anticipated cost was positively associated with grades.

Students' expectancies for success for providing feedback as well as their ascriptions of task value and cost to feedback provision might vary from week to week (Dietrich et al., 2019). Actually, in some specific cases, such as intraindividual variations may showcase different processes than interindividual variation (Goetz et al., 2016). However, in the current context we would argue that there are no theoretical reasons underlying such diverging processes in the case of motivation for providing peer-feedback. In other words, the aforementioned associations would be expected to work similarly for intraindividual fluctuations of motivation. For example, if one student ascribes particularly

high value for one specific peer-feedback task as compared to other peer-feedback tasks (e.g., because of the specific topic), they would be expected to provide peer-feedback of higher quality in this specific task compared to other tasks.

To this end, from a theoretical perspective, it seems promising to explain peer-feedback quality by investigating providers' motivation. However, even though students' individual motivational characteristics seem likely to affect peer assessment outcomes, meta-analytic results show that few studies have asked about how individual characteristics affect peer-feedback provision, with the motivational perspective being particularly underrepresented (Panadero et al., 2023).

Existing studies have mostly employed an undifferentiated view on motivation without building on sound motivational theories. Filius et al. (2019) surveyed 108 higher education students participating in written and audio peer-feedback in online courses on various subjects in the Netherlands about if they feel personally committed to it, which might be some form of attainment value, and found that the personal commitment was important for providing peer-feedback. Zou et al. (2018) found that, in a sample of 234 Chinese engineering and English majors, students valuing peer-feedback provided feedback to less students, but their peer-feedback was of higher quality. Building on an expectancy-value approach, Guo and Lei (2020) aimed to manipulate students' value-oriented motivation by offering monetary incentives and by using verbal persuasion about the academic value of peer-feedback. In a sample of 838 Chinese high school students, they found that successful manipulation led to students providing higher-quality ratings of their peers. Replicating these findings from a more detailed expectancy-value-perspective, that is, differentiating between empirically confirmed theoretical value dimensions, will help our understanding of Guo and Lei's (2020) results and contribute to explaining how students' motivation matters for peer-feedback quality.

1.5. Present study and research question/hypotheses

We conducted two studies that are guided by the question of how student motivation relates to the quality of peer-feedback they produce. Specifically, based on Achievement Goal Theory and (Situated) Expectancy-Value Theory, we shed a light on students' achievement goals for peer-feedback provision as well as the expectancies and value they ascribe to it. From this perspective, achievement goals, expectancies for success, task value, and cost should be relevant for students' provided peer-feedback quality, but there is little evidence to underpin these theoretical notions. In Study 1, we investigate students' mastery goals, expectancies for success, task value, and cost and how they matter for peer-feedback quality. In Study 2, we investigate these aspects over time in a high-frequency design with six feedback occasions, including work avoidance goals because of the high workload for students.

As achievement goals provide direction for how students canalize their efforts, we expect task goals and learning goals to be positively related to peer-feedback quality (Hypothesis H1 and H2; investigated in Study 1 & 2), while work avoidance goals should be negatively related to peer-feedback quality (H3; Study 2).

Following (Situated) Expectancy-Value Theory, we expect students' expectancies for success in providing peer-feedback to be positively related to the quality of feedback they provide (H4, Study 1 & 2). Furthermore, as all components of task value are positively connected to academic performance, we expect intrinsic value for providing peer-feedback (H5), attainment value of providing peer-feedback (H6), and utility value of providing peer-feedback (H7; Study 1 & 2) to be positively related to the quality of the feedback that students provide.

In line with Barron and Hulleman (2015), we treat cost as a factor separate from task value. Given the twofold perspective on cost—as an indicator of invested effort vs. as negative value—we expect cost to be related to peer-feedback quality, but do not specify a direction of effects (H8; Study 1 & 2).

2. Study 1

With Study 1, we aim to elucidate how students' mastery goals, their expectancies for success and their task value towards the task of providing peer-feedback are connected to the quality of the feedback students provide to each other. Within this, we focus on the intrinsic, attainment, and utility value they ascribe to the task of providing feedback and the perceived cost of this task. For full transparency, we included the Instrument to report the characteristics of peer assessment designs and interventions by Panadero et al. (2023) in our [supplementary material \(see S1\)](#), containing detailed background information about both studies.

2.1. Procedure and participants

This study took place in a large undergraduate level course on Educational Psychology taught in a university in southern Germany in the winter term of 2022/2023. In this course, students needed to submit weekly written assignments of approximately 500 words, in which various educational psychology theories are to be explained or applied, in order to pass the course. The assignments are pass/fail and there usually is no further feedback given to the students. For this study, students uploaded their task into the peer-feedback tool of the university's learning management system (Fey, Wekerle, Beckmann, Schröder, & Kollar, 2023) for the fifth assignment (mid semester). In this tool, each submission was randomly and anonymously assigned to another student in the course. All students then provided peer-feedback to the draft they received. We provided students with a list of criteria for high-quality feedback, including guidelines on how to implement them. Two exemplary student feedbacks are presented in the [supplementary material \(S2\)](#). After receiving peer-feedback, students had the opportunity to revise their own assignment using the received feedback before officially submitting it. Providing feedback was mandatory for students to pass the course but an opt-out of participating in the questionnaires was possible. We asked students about their expectancies for success and mastery goals for providing feedback right before providing feedback, embedded as a pop-up in the learning management system, and for their task value and costs towards the feedback right after feedback provision using established instruments. Students' consent to use the questionnaire data as well as their submitted feedback for research purposes was obtained.

In total, 249 (203 female, 45 male; age: $M = 20.2$, $SD = 2.5$) students responded to our baseline survey with sufficient data to conduct our analysis (excluding 28 students spending less than one second per item or not passing attention checks in the survey), representing the demographics of the course quite well. They were mostly in their first (84 %) or second (14 %) year of study.

2.2. Measures

2.2.1. Measures of motivational aspects

Mastery goals for providing peer-feedback were measured according to Daumiller et al. (2019), using four items for each goal, assessed on an 8-point Likert-scale from 1 (*do not agree*) to 8 (*fully agree*). The item stem "When producing this feedback, I ..." was followed by the mastery goal items, namely, task goals (e.g., "... want to complete this task as well as possible"; $\omega_{McDonalds} = .93$) and learning goals (e.g., "... want to develop my competencies as much as possible"; $\omega_{McDonalds} = .94$).

Students' *expectancies* for successfully providing peer-feedback were measured according to Bergann et al. (2019) using three items, assessed on a 5-point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*), e.g., "I am confident that I am able to successfully provide feedback on this task" ($\omega_{McDonalds} = .89$).

Task value for providing feedback was measured according to Ziegler et al. (2008) using three items each, assessed on a 5-point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*). We measured intrinsic value

(e.g., "I think providing feedback was interesting"; $\omega_{McDonalds} = .88$), attainment value (e.g., "It was important to me to provide feedback"; $\omega_{McDonalds} = .91$), and utility value (e.g., "It was very useful to provide this feedback"; $\omega_{McDonalds} = .89$).

Cost of providing peer-feedback was measured according to Gaspard et al. (2015) representing various cost dimensions in three items, assessed on a 5-point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*), e.g., "Providing feedback drained me" ($\omega_{McDonalds} = .89$).

2.2.2. Operationalization of feedback quality

We employed two different ratings of *peer-feedback quality*. Firstly, we developed a rating scheme based on the criteria for helpful, motivationally favorable feedback along the criteria provided to the students (i.e., feed-back, feed-up, and feed-forward principles; focus on product instead of person, on the learning process instead of right/wrong; specificity of the feedback, and favorable attributions of success or errors). Two trained raters then rated every feedback according to these 7 criteria using a rating scheme, yielding an interrater reliability of on average $\kappa = .84$ (weighted κ) across the subscales (lowest $\kappa = .70$) in both studies. The scores on each criterion were summarized to yield the total, criteria-based feedback quality sum score for each student, which ranged from a theoretical minimum of 0 to a theoretical maximum of 13 (see Table 1 for details). Secondly, the students receiving the feedback assessed the quality of their received feedback anonymously on a scale from 1 (*low quality*) to 5 (*very high quality*). Thirdly, we measured *feedback length* by counting the words per peer-feedback using the stringer package in R (Wickham, 2023).

2.3. Analyses

To analyze our data, we calculated path models in R (package lavaan 0.6.17, Rosseel et al., 2023). The three aspects of feedback quality (criteria-based feedback quality, receiver-perceived feedback quality, and feedback length) were regressed on task goals, learning goals, expectancies for success, the three value dimensions, and cost. We used maximum likelihood estimation with robust standard errors (MLR) as a robust estimator to control for deviations from normal distribution in the path models. (Residual) correlations between goals, task value/cost and the three outcome variables were allowed. The alpha level was set to $p < .05$. We included gender, age, and year of study as covariates in an additional model that can be found in the supplementary material (see Table S10).

2.4. Results and discussion

2.4.1. Preliminary findings

A CFA confirmed a good model fit for our measurement model, $\chi^2(df = 209, n = 254) = 4595.941$; $p < .001$; CFI = .98; TLI = .97, RMSEA = .04; SRMR = .04, gauged using the guidelines by Hu and Bentler (1999), with CFI and TLI values $\geq .95$, and RMSEA and SRMR values $\leq .08$ indicating an optimal fit. Detailed factor loadings can be found in the supplementary material (Table S5). Results of descriptive statistics (see Table 1) indicated, on average, rather strong task and learning approach goals, high expectancies for success, and strong utility value for providing feedback in our sample, along with moderate intrinsic and attainment value and rather low cost. In university settings, especially in the domain of psychology, high mastery goal endorsement is generally common (Darnon et al., 2009). In this study, the favorable motivation for peer-feedback provision in particular in this course might additionally be explained by the fact that students usually do not receive any feedback on their assignments in this course, so they might have been eager to use this opportunity.

Both receiver-perceived and criteria-based feedback quality was, on average, rather high and peer-feedback was, on average, considerably long with 196 words. However, there was a broad range of both peer-feedback quality and text length. Both for criteria-based feedback

Table 1
Descriptive statistics and bivariate correlations in Study 1.

	Descriptive Statistics						Bivariate Correlations								
	<i>M</i>	<i>SD</i>	Min	Max	# items	ω	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
[1] Task Goals	7.11	1.08	1	8	4	.93									
[2] Learning Goals	7.19	1.06	1	8	4	.94	.55								
[3] Expectancies for Success	3.68	0.67	1.67	5	3	.89	.33	.40							
[4] Intrinsic Value	3.64	0.88	1	5	3	.88	.17	.28	.37						
[5] Attainment Value	3.45	0.98	1	5	3	.91	.28	.33	.25	.55					
[6] Utility Value	4.38	0.71	1.67	5	3	.89	.13	.19	.12	.50	.36				
[7] Cost	2.07	0.89	1	5	3	.80	−.07	−.18	−.25	−.32	−.09	−.21			
[8] Criteria-based Quality	8.04	2.21	1	13	–	–	.04	.03	.02	.04	.03	.10	.15		
[9] Receiver-perceived Quality	4.05	0.81	1	5	1	–	.03	−.01	−.07	.08	.06	.10	−.05	.18	
[10] Feedback length (words)	330	196	51	1788	–	–	.15	.11	.08	−.01	.10	.07	.15	.37	.10

Note. $N = 249$. Internal consistency is reported with McDonalds' ω . Displayed are the descriptive statistics and bivariate correlations for mastery goals and expectancies for success for providing feedback and task value and cost of providing feedback and feedback quality (feedback quality rated along a criteria-based scheme, feedback quality assessed by the receiver, and feedback length). Statistically significant correlations are printed in bold.

quality and for receiver-perceived feedback quality, the range encompasses the full scale; text length ranged from 51 to over 1700 words (see Table 1), illustrating considerable differences in students' feedback quality. Histograms for peer-feedback quality aspects can be found in the supplementary material (S4).

2.4.2. Results and discussion of path modeling

Results of path modeling are summarized in Fig. 1 (see Table S6 in supplementary material for full model results, including separate models for each outcome in Table S8). In Study 1, students reporting pronounced task goals and students placing attainment value and utility value on feedback provision provided longer feedback as expected, but their feedback was not rated as being higher quality than the feedback of

students with weaker task goals/less attainment value. Surprisingly, learning goals, expectancies for success and intrinsic value did not show any relations to the three aspects of feedback quality. Both utility value and cost were positively related to both feedback length and criteria-based feedback quality. However, in Study 1, students' motivation did not predict receiver-perceived feedback quality.

The additional analyses with covariates revealed no consistent relations between age/year of study and peer-feedback quality but suggested that female students provided longer peer-feedback that was of higher quality both criteria-based and as perceived by the receivers. Considering that the feedback was anonymous in our study, these findings reiterate prior evidence of women providing longer and higher-quality peer-feedback than men (Ocampo et al., 2024). Still, the

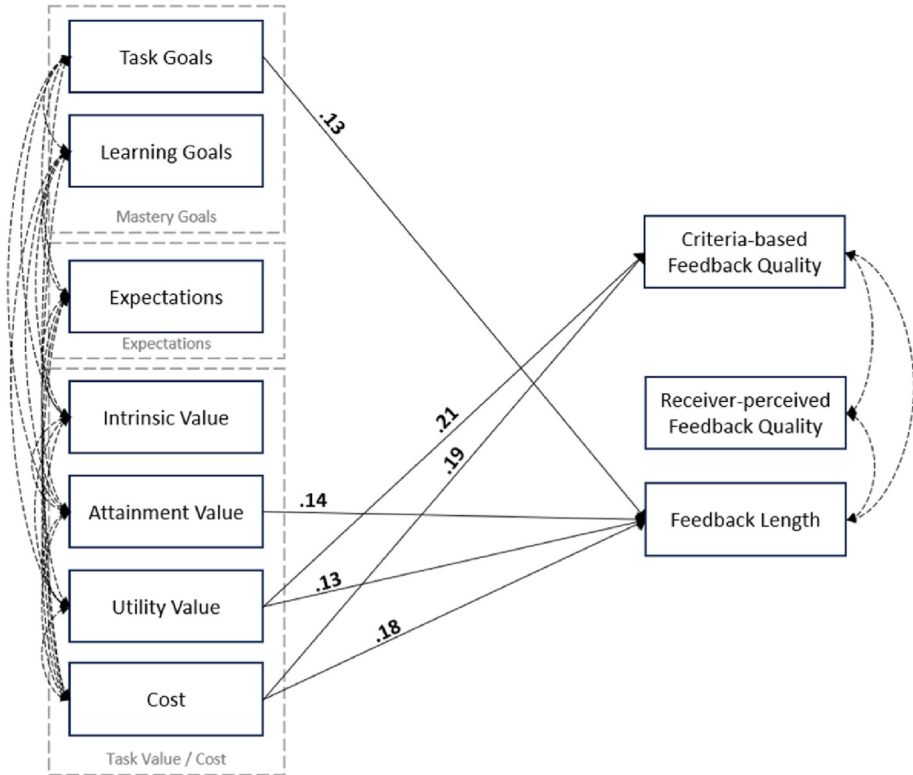


Fig. 1. Results of path modeling with mastery goals, expectancies for success, task value, and cost on feedback quality in Study 1. Note. $N = 198$. This figure shows the modeled standardized effects of mastery goals and expectancies for success for providing feedback and task value and cost of providing feedback on feedback quality (feedback length, feedback quality assessed by the receiver, and feedback quality rated along a criteria-based scheme). The model was fully saturated, thus yielding a perfect fit ($\chi^2(df = 24, n = 198) = 52.817; p < .001$; CFI $> .99$; TLI $> .99$; RMSEA $< .01$; SRMR = .01). The alpha level was set to $p < .05$. For clarity, only statistically significant relations are shown, and correlations are included but not depicted.

relations between motivation and feedback quality remained unchanged when controlling for these covariates.

From a theoretical perspective, the target of learning goals (expanding own knowledge and skills) is less directly connected to peer-feedback quality and length as the target of task goals (succeeding in the task, i.e., providing helpful feedback). Conversely, task goal-focused students consequently rather focus on providing a high-quality product when providing peer-feedback while learning goal-focused students rather focus on gaining knowledge and skills for themselves. In this light, it is not surprising that task goals were connected to peer-feedback length, but learning goals were not.

Concerning task value, students for whom providing feedback was personally important (high attainment value) provided longer feedback, as expected, but their feedback was not rated as being of a higher quality. In contrast, students who saw a high utility value in providing feedback provided both longer feedback and feedback of a higher quality, confirming our expectations and fitting with prior research on utility value (e.g., Hulleman & Harackiewicz, 2021), possibly because students ascribing high utility value towards providing feedback invested more effort and displayed critical thinking and meta-cognitive self-regulation (Üner et al., 2020).

The cost of providing feedback that students reported regarding their feedback provision was positively and moderately related to both peer-feedback quality and peer-feedback length. One possible explanation would be that students who provided exhaustive, thoughtful feedback perceived this as being strenuous and time-consuming, and thus reported high perceived cost. In this light, cost of a task does not seem to be inherently negative, but high cost seems to be a symptom of dealing with the task intensively and creating a high-quality product. This is mirrored, for example, by the inconsistent results by Karabenick et al. (2021) who partly found positive correlations between cost and reported use of metacognitive strategies. Still, in our studies, we asked students about their experienced cost after providing feedback, so in the light of the results by Beymer et al. (2023) it would rather be expected that we find negative relations with our outcome (i.e., peer-feedback quality). Relatedly, students' desires to avoid work seem to be of relevance when looking at peer-feedback quality. In terms of achievement goals, work avoidance goals thus seem to be a fruitful aspect of explaining differences in peer-feedback quality.

Receiver-perceived feedback quality moderately correlated with criteria-based feedback quality, however, surprisingly, there were no significant relations of motivation to receiver-perceived feedback quality but only for the criteria-based measure. To further investigate these relations, it is fruitful to consider not only one, but multiple instances of feedback per student, as we do in Study 2. In this design, situation-specific variation of achievement goals for providing feedback, expectancies for success, task value, and cost of providing feedback can be considered to explain differences in peer-feedback quality over time.

3. Study 2

In Study 2, we expand the basic ideas of Study 1 in two ways: First, we implemented feedback multiple times. This strategy allows students' variability to be investigated over time in addition to the variation between students. Secondly, as this high-frequency design entails considerable effort for students, we included work-avoidance goals as an additional goal class next to mastery goals (King & McInerney, 2014), as we would expect work avoidance goals to be a particularly influential concept for students with a high workload.

3.1. Procedure and participants

The design of Study 2 was similar to that of Study 1, taking place in the same higher education course at the same university and with the same teachers, but conducted in the following semester (summer term of 2023) with different students. This time, we implemented peer-feedback

not only once, but in 6 consecutive assignments during the semester. Participating in the peer-feedback process was mandatory for all students in all 6 assignments and, like before, assignments were graded pass/fail. Opting out of participating in the questionnaires was possible. Each time, students were asked about their task and learning goals, their work avoidance goals, their expectancies for success, their task value, and cost regarding providing feedback for the particular task at hand in a timely manner to feedback provision. Each time students' provided feedback, we obtained criteria-based feedback quality, the quality perceived by receivers, and the length of each feedback. Students' consent to use the questionnaire data as well as their submitted feedback for research purposes was obtained.

In Study 2, 174 students (103 female, 65 male; age: $M = 20.7$, $SD = 2.4$) participated in the 6 measurement points, generating 743 data-points useable for our analyses. We excluded 7 students who spent less than one second per item or did not pass the attention checks in the survey. These students again were mostly in their first (79 %) or second (17 %) year of study.

3.2. Measures

We built on the instruments used in Study 1 and used short scales due to the high-frequency design. For the measurement of motivation, single-item measures are considered suitable in such high-frequency designs (Goetz et al., 2016).

Mastery and work avoidance goals for providing feedback were measured according to Daumiller, Janke, et al. (2023), using single items (item stem "When producing this feedback, I ..."; Task approach goals: "... to provide feedback as well as possible."; Learning approach goals: "to broaden my subject knowledge and methodological knowledge as much as possible."; Work avoidance goals: "... to have the lowest possible workload."), assessed on an 8-point Likert-scale from 1 (*do not agree*) to 8 (*fully agree*). The psychometric properties of these items, including their validity, were previously examined in Daumiller et al. (2021) and found to be adequate for capturing the intended constructs. Please refer to the [supplementary material \(S3\)](#) for a description on how we gauged the reliability of these measures.

Expectancies for success were measured as self-efficacy building on Keller et al. (2024) with three items on a 5-Point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*), e.g., "I am confident that I will be able to provide good suggestions for improvement even for complex aspects" ($\omega_{McDonalds} = .89$).

Task value for providing feedback was measured according to Dietrich et al. (2019) using one item each, assessed on a 5-point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*). We measured intrinsic value ("I liked providing feedback"), attainment value ("It is important to me to provide good feedback"), and utility value ("What I learn about feedback provision will be useful for my future job"). The results reported by Dietrich et al. (2019) suggest satisfactory construct and criterion validity for these items.

Cost of providing feedback was measured according to Dietrich et al. (2019) with three items representing the dimensions of effort cost, emotional cost, and opportunity cost, assessed on a 5-point Likert-scale from 1 (*do not agree*) to 5 (*fully agree*), e.g., "Providing feedback drained me" ($\omega_{McDonalds} = .83$). The results reported by Dietrich et al. (2019) suggest satisfactory construct and criterion validity for these items.

Feedback quality and feedback length were assessed identically to Study 1, with one exception: Receiver-perceived feedback quality was now assessed on a 10-point scale to mirror a possibly broader range of feedback quality.

3.3. Analyses

To analyze our data, we conducted manifest two-level path models (Level 1: measurement points, Level 2: students) to adequately reflect the nested student data and to analyze both between-student variations

as well as variations within students over time. Again, analyses were conducted in R (package lavaan 0.6.17, Rosseel et al., 2023), and the three aspects of feedback quality (criteria-based feedback quality, receiver-perceived feedback quality, and feedback length,) were regressed on task goals, learning goals, expectancies for success, value dimensions, and cost, allowing correlation between goals, expectancies, task value/cost and the three outcome variables. Data were group-mean centered on the within-level and grand-mean centered on the between-level (Hamaker & Muthén, 2020). The alpha level was set to $p < .05$. Additionally, we included gender, age, year of study, and self-reported prior experience with peer-feedback as covariates in an additional model that can be found in the supplementary material (see S11).

3.4. Results and discussion

3.4.1. Preliminary findings

Descriptive statistics (see Table 2) showed slightly lower mean values for students' task and learning goals, for their expectancies for success and for the dimensions of task value as well as slightly higher cost reported by students in the second study compared to Study 1.

For the motivational variables, the ICC1 values imply that one half to two thirds of variability was due to differences between students, illustrating considerable variability both on the between-student level and the within-student level. Peer-feedback quality varied less between students and consequently seemed to vary over time. Histograms for peer-feedback quality aspects can be found in the supplementary material (S4).

Although not a primary research interest, we also used linear mixed effects modeling to analyze how feedback length and quality developed over time. The results indicated a decline in both measures, despite prior findings suggesting that repeated feedback practice should enhance feedback skills (Zong et al., 2021). This suggests that competence alone does not determine feedback quality—students also need sustained motivation to apply and refine their skills.

Given the largely parallel sample to Study 1, the overall less adaptive motivation in Study 2 might be attributed to the fact that the six consecutive, partly overlapping peer-feedback rounds comprised quite a high workload for students that they knew about from the start. Presumably because of the additional workload and overlapping tasks as well as the required assignment length of the assignment that feedback was given on, students' feedback length was shorter. However, feedback quality was, on average, rated considerably lower than in Study 1 both in the criteria-based rating and perceived by students.

On the between-level, the motivational constructs in this study were more strongly correlated than in Study 1, with correlations up to $r = .76$ between constructs. This might be due to the six measurement points in comparison to just one as in Study 1, reducing background noise in the data, but might lead to misleading results when estimating the path models because of collinearity (Petraitis, Dunham, & Niewiarowski, 1996). To mitigate this, we eliminated intrinsic value and attainment value from our statistical model in Study 2 post-hoc. Those two constructs were chosen out of the three value constructs as (1) their correlations with other constructs in the model were particularly high on the between level (see Table 2) and (2) because, from a theoretical side, utility value is expected to be most prevalent predictor for performance-like outcomes like feedback quality (Hulleman et al., 2008).

3.4.2. Results and discussion of two-level path modeling

The full results of the model are summarized in Table S7 in the supplementary material, including results on separate models for each of the three outcomes (Table S9). Concerning the within-level results, students provided longer feedback in assignments in which they reported higher task goals. Additionally, when students reported more endorsement of learning goals in one assignment, their feedback was

Table 2
Descriptive statistics and bivariate correlations in Study 2.

	Descriptive Statistics					Bivariate Correlations												
	M (L2)	SD (L2)	SD (L1)	Min	Max	ICC1	ICC2	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
[1] Task Goals	5.45	0.88	1.63	1	8	.58	.86		.86	-.43	.61	.74	.74	.73	-.52	.05	.57	.17
[2] Learning Goals	6.23	0.98	1.82	1	8	.60	.87	.49		-.55	.70	.75	.76	.76	-.58	-.09	.29	.04
[3] Work Avoidance Goals	5.02	1.06	2.07	1	8	.64	.89	-.08	-.04		-.43	-.62	-.54	-.46	.64	.10	-.11	-.01
[4] Expectancies for Success	3.49	0.84	0.71	1	5	.59	.87	.39	.42	.12		.74	.69	.62	-.53	-.05	.10	.13
[5] Intrinsic Value	3.13	0.72	1.20	1	5	.52	.83	.13	.23	-.08	.24		.78	.18	-.74	-.05	.18	.09
[6] Attainment Value	3.45	0.65	1.16	1	5	.59	.87	.26	.24	-.01	.22	.46		.97	-.53	-.03	.38	.12
[7] Utility Value	3.52	0.61	1.16	1	5	.61	.88	.19	.21	-.07	.14	.43	.39		-.52	.09	.56	.23
[8] Cost	2.92	0.60	1.18	1	5	.65	.89	-.17	-.27	.33	.01	-.33	-.20	-.24		.06	-.04	-.01
[9] Criteria-based Quality	4.54	1.81	2.51	0	12	.38	.79	.07	-.01	-.08	.09	.09	.13	-.01	-.03		.78	.91
[10] Receiver-perceived Quality	6.84	1.82	2.30	1	10	.17	.39	-.02	.13	.01	.05	.10	.05	.09	-.09	.17		.85
[11] Feedback Length (words)	130	59.1	89.0	5	834	.28	.77	.10	-.03	-.11	.02	.12	.14	.02	-.06	.63	.13	

Note. $m = 743$ observations from $n = 150$ students. Displayed are the descriptive statistics, intraclass correlations, and bivariate correlations for mastery goals, work avoidance goals, and expectancies for success for providing feedback and utility value and cost of providing feedback and feedback quality (feedback length, feedback quality assessed by the receiver, and feedback quality rated along a criteria-based scheme) on both levels. Correlations on the between level are reported in the upper triangular, correlations on the within-student level are reported in the lower triangular. Internal consistencies are reported with ICC2. ICC1 shows the variability of the constructs located at the student level. Statistically significant correlations are printed in bold. Because of high intercorrelations, attainment value and intrinsic value were not included in Study 2.

assessed as higher quality by the students receiving it. If students expected to be able to provide feedback successfully, their feedback scored higher in the criteria-based rating (see Fig. 2).

On the between-student level, as in Study 1, students who reported stronger task goals and placed high utility value on the task of providing feedback in general provided longer feedback than students reporting weaker task goals or lower utility value across measurement points. At the same time, task goals were positively related to criteria-based

feedback quality and student-perceived feedback quality. In contrast to Study 1, however, we did not find any connections between perceived cost and feedback quality. Concerning work avoidance goals, students with strong work avoidance goals seemed to not provide peer-feedback of lower quality (between level), and on days in which students were particularly keen to have as little work as possible they also did not provide feedback of lower quality than on other days (within-level).

Again, task goals seemed to be focal to answer the question of how

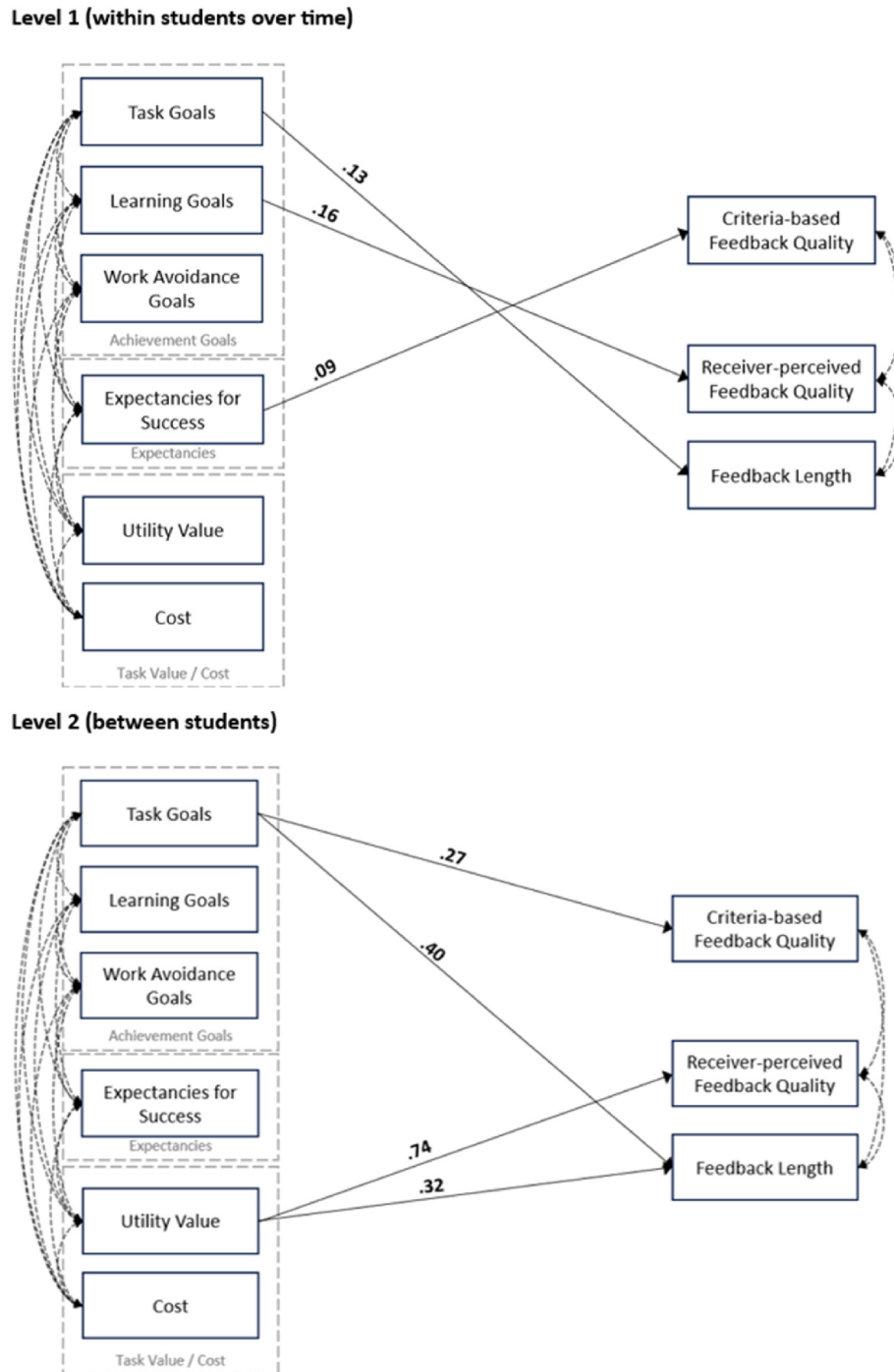


Fig. 2. Results of two-level path modeling with mastery goals, work avoidance goals, expectancies of success, task value, and cost on feedback quality in Study 2. Note. $m = 418$ observations from $n = 150$ students. This figure shows the modeled standardized effects of mastery goals, work avoidance goals, and expectancies for success for providing feedback and utility value and cost of providing feedback on feedback quality (feedback length, feedback quality assessed by the receiver, and feedback quality rated along a criteria-based scheme), on the within- (level 1) and the between-student level (level 2). Standard errors are given in brackets. The model yielded an acceptable model fit ($\chi^2(df = 42, n = 418) = 367.49; p < .001$; CFI $>.99$; TLI $>.99$; RMSEA $<.01$; SRMR_{within} = .001; SRMR_{between} = .006). For clarity, only statistically significant relations are shown, and correlations are included but not depicted. The alpha level was set to $p < .05$.

students need to be motivated to provide high-quality peer-feedback. However, when focusing on the fluctuation of students' goals over the semester, it became visible that receivers assessed the feedback to be better to a small degree when the provider reported stronger learning goals. This effect only becomes visible at the within-student level, but not when looking at differences between students (neither in Study 1 nor in Study 2).

The fundamentally different pattern between criteria-based and receiver-perceived feedback quality suggests that, even though both were correlated to some extent, they captured different aspects of feedback quality. The relation of learning goals only to receiver-perceived quality might imply that students rather assessed quality in terms of subject-specific content: When students endorsed learning goals more than they usually did in one particular assignment, they presumably dealt with the content to learn something about it and consequently tended to make content-related suggestions in their feedback. The receivers of this feedback then assessed the feedback as high quality because of the content-related suggestions, while subject-specific content was not rated in the criteria-based rating. This difference only came to light if students were more focused on learning goals than they usually were, but not when comparing students with strong vs. weak learning goals in general. However, this line of reasoning cannot be supported or denied with the path model results. To investigate this line of argumentation in future studies, students need to be asked about the criteria they used in assessing the received feedback.

Surprisingly, work avoidance goals did not display significant relations to peer-feedback quality. However, this fits the results of a previous study by Özbek et al. (2024), in which work avoidance goals also were not associated with students' choice to use a peer-feedback tool.

In Study 2, students who placed more utility value on peer-feedback provision provided both longer feedback and feedback of a higher quality, paralleling the results of Study 1 and again replicating prior research on utility value and performance in general (Hulleman & Harackiewicz, 2021). This effect was not visible when looking at within-student changes between assignments. Expectancies for success or cost were not related to any measure of feedback quality on any level in Study 2.

Concerning the additional analysis with covariates (gender, age, year of study, and prior experience with peer-feedback), there were no significant relations, and the inclusion of variables did not change any of the relations between motivational aspects and feedback quality.

4. General discussion

4.1. How do achievement goals, expectancies for success, task value, and cost matter for peer-feedback quality?

We investigated the role of motivation for providing high-quality peer-feedback in two field studies that were conducted in a real higher education course, supporting the external validity of the findings. We incorporated self-reported measures that are crucial for our understanding of how peer-feedback works considering students' characteristics (Nicol et al., 2014). At the same time, none of our measures of peer-feedback quality were self-reported data, but instead were objective measures (feedback length) or externally assessed (by another student and by the researchers along a criteria-based rating). Hence, the fact that we found relations between self-reported motivational aspects of students during feedback provision and non-self-reported characteristics of feedback-quality provides strong empirical support for our hypotheses. Concerning construct validity, a CFA suggested that the aspects we considered out of Achievement Goal Theory and (Situated) Expectancy-value Theory were correlated, but conceptually distinct and statistically separable.

In our first, cross-sectional study, we obtained insights on whether our hypotheses based on Achievement Goal Theory and (Situated) Expectancy-Value Theory were, on principle, applicable to peer-

feedback provision. Our second study added a more fine-grained, longitudinal perspective and investigated our hypotheses on both the within- and between-student level over six measurement points, partly replicating our results of Study 1 and identifying additional positive relations between learning goals and receiver-perceived peer-feedback quality.

Firstly, it became apparent that the three ways in which we measured feedback quality were differently associated with the facets of goals, expectancies, value, and cost. Feedback length as an objective measure that, at least indirectly, informs about effort poured into feedback provision, was consistently greater when students aimed to solve the task of feedback provision as well as possible (task goals, in line with H1), but not with learning goals (H2); students who valued the task as being useful for their goals also provided longer feedback than students who placed less utility value on feedback provision in both studies (in line with H7). Furthermore, on the within-level, students provided longer feedback on instances where they, compared to other instances, placed higher utility value on providing feedback to the specific task.

Criteria-based feedback quality was positively associated with utility value as well, but also partly (and positively) with task goals, expectancies for success and perceived cost (in line with H1, H3, and H8). Receiver-perceived feedback quality was also significantly positively related to utility value at least in Study 2, but also to learning goals.

For both studies, the criteria-based rating used a defined list of criteria with high interrater reliability. Students, in contrast, assessed the quality of the feedback they received on a single, undifferentiated scale, as we were interested in their subjective, general impression. This kind of back-evaluation of feedback quality by students is considered a helpful source of data to study peer-feedback quality (Zong et al., 2021), and as learning goals were related to receiver-perceived feedback quality on the within-level in Study 2 (in line with H2), it might be possible that receivers rated the feedback rather on a subject-specific content level and thus rated feedback more highly when it intensively dealt with content-related issues. This means that when students aimed to learn as much about the content as possible when providing feedback and consequently elaborated the content more, receivers liked the feedback better. This does not necessarily affect the length of the peer-feedback, but rather the content density, which was also not an aspect coded in the criteria-based rating but might have led students to rate the feedback more highly. However, the undifferentiated scale for receiver-perceived feedback quality might have led to this measure being less reliable than the other measures, consequently, those interpretations need to be viewed in a critical light.

Another interpretation of the relation between learning goals of the provider and receiver-perceived feedback quality would be that learning-oriented students provide learning-oriented feedback that, in turn, helps the receiver to learn from their mistakes. However, this interpretation might not be self-evident: If one student pursues learning goals for themselves during peer-feedback provision, they might rather focus on things that help themselves develop their own competences (e.g., researching aspects that they do not understand), but they do not necessarily pursue learning goals for the receiver on the other end—results from other contexts (e.g., the goals teacher hold for themselves and for their students; Daumiller et al., 2022) indicate that rather weak to moderate associations can be expected here.

Secondly, our results support the idea that learning goals and task goals, as components of mastery goals, are two concepts that are similar, but display different mechanisms in tasks like peer-feedback provision in which the desired end states of both mastery goals are related, but not congruent (Grant and Dweck, 2003). In detail, task goals are aimed at solving the task (i.e., creating useful feedback) as well as possible, while learning goals could also be partly reached without being visible in the feedback product, for example, by dealing with the content, maybe analyzing the peer's work for mistakes that oneself might avoid in the future, or internalizing instructions on how to provide high-quality feedback. In sum, these behaviors can lead to students providing

better peer-feedback, but high-quality feedback with all of its criteria is not part of the desired end state of learning goals.

Such research on the diverging mechanisms behind task vs. learning goals is sparse (Daumiller, Rinas, & Dresel, 2023), but called for studies to test the differences between mastery goals focused on the task and mastery goals focused on competence development in various contexts (Mascaret et al., 2015). This call is answered in both our studies.

Viewed more generally, our results align with the pattern that task goals seem to be more connected to performance outcomes than learning goals (Daumiller et al., 2019; Mascaret et al., 2017). Notably, our results do not imply that learning goals are maladaptive for peer-feedback provision. Even if our findings that learning goals are barely related to peer-feedback quality are replicated by future studies, students aiming to learn as much as possible when providing feedback might still profit from this task by broadening their own knowledge and skills, which is another key goal of peer-feedback (Li et al., 2010). However, our results do imply that learning goals might lead to more “selfish” work than task goals in the case of peer-feedback provision, as higher quality feedback provides feedback recipients with a better learning opportunity.

Thirdly, utility value emerged as an impactful aspect of task value, being connected to both feedback length in both studies, to criteria-based feedback quality in Study 1 and to student-perceived feedback quality in Study 2, as was expected by prior research (e.g., Hulleman et al., 2008). While students for whom providing feedback was inherently important (i.e., high attainment value) provided longer feedback in Study 1, as expected in H6, students who perceived the task of feedback provision as inherently enjoyable (i.e., high intrinsic value) did not differ in peer-feedback quality or length compared to students reporting lower intrinsic value, conflicting with H5. This is puzzling, as it would be expected that students enjoying feedback provision should engage more in the task and thus provide longer and higher-quality feedback (Eccles & Wigfield, 2020).

The unexpected findings might be traced back to statistical issues, as considerable correlations between the value aspects might have led to false negatives in the path models (Johnston, 1972). Consequently, we omitted the two value aspects that displayed high intercorrelations in Study 2. Future research might elucidate if and why some value aspects might be more important than others for feedback provision, and whether there are different mechanisms on the within- and between-student level. Still, circling back to the findings of Guo and Lei (2020), we were able to replicate the result that students who were convinced about the value of peer-feedback for their own learning did indeed provide higher quality feedback.

Fourth, expectancies for success were associated with criteria-based feedback quality only on the within-level. This implies that, other factors considered, students provide better feedback within assignments in which they feel competent to do so, for example if the topic at hand seems easier to them compared to other topics in the semester.

Lastly, students provided longer feedback of higher quality if they reported a high cost of feedback provision in Study 1, while no effects were found in Study 2. We did expect effects of cost on feedback quality (H8). According to (Situating) Expectancy-Value Theory, cost is seen as a negative aspect of value and therefore should negatively relate to performance (Eccles & Wigfield, 2020; Flake et al., 2015).

However, as previously argued, students reporting high cost could do so because they invested considerable effort and time in feedback provision, which should be related to long and high-quality feedback. In this case, the positive relation between cost and peer-feedback quality should become apparent on the within-student level in Study 2: When students invested more effort in feedback provision than on the other feedback occasions, they should have reported higher costs and provided longer feedback of a higher quality than on the other feedback occasions. We did not find this effect on the within-level in Study 2.

Recent research suggests that different components of cost might be distinct and work differently in learning situations (Flake et al., 2015;

Kim et al., 2023). Even though we measured cost in a situation-specific way, which seems to be important, additionally differentiating the different components of cost might lead to more nuanced insights. Consequently, future research needs to untangle the complex question of cost effects in feedback provision revealed by our studies, potentially in a laboratory setting in which other factors, like time on task as a proxy for effort, can be recorded.

In the courses we conducted our studies in, students were required to submit the assignments, provide peer-feedback, and revise their assignments in order to pass the course. This compulsory nature of peer-feedback presumably introduced some amount of external regulation, which could have limited self-determined motivation like goals, expectancies, and values to some extent. Yet, we still found meaningful effects of students' motivation on peer-feedback quality. Consequently, we would expect motivational effects to be even stronger in non-compulsory settings, where students have more autonomy in deciding whether and how to engage in feedback provision.

4.2. Limitations

The participants of both our studies were students in teacher education, presumably limiting the generalizability of our findings. However, there is no apparent reason as to why achievement goals, expectancies, and value in regard to peer-feedback should work differently for other students in the same peer-feedback outline. Still, in other contexts of peer-feedback, some goal classes of Achievement Goal Theory that have not been considered in this study could be of high relevance: If feedback is graded or given on high-stakes assignments, performance goals (both appearance and normative goals; Elliot et al., 2011) could be highly prevalent and influential for peer-feedback quality.

Furthermore, the students in the course we conducted our studies in seemed to be highly positively motivated, particularly in Study 1, impeding the detection of effects. Again, this points to our findings being rather robust, especially for those findings that were found in both studies. At the same time, we yielded high ecological validity with our approach, facilitating practical implications derived from our results.

Cost as a conceptualized within Situating Expectancy-value Theory emerged to be more complex than anticipated. Importantly, the way we conceptualized cost as a single factor in our study likely serves as a first estimation, but untangling the separate subdimensions and investigating their differential mechanisms could be a next step to explain our mixed results and understand the true role of cost when providing peer-feedback (Kim et al., 2023).

The high-frequency design in Study 2 called for the use of single items which limit some aspects of interpretation and prevent longitudinal invariance testing. While we assume that students' understanding of the motivation items remained stable over eight weeks, we cannot statistically test this assumption. Moreover, repeated exposure to peer-feedback provision and motivational questions might have acted as an unintended intervention, prompting students to reflect on the meaning of motivational aspects for providing feedback, and thus subtly shaping students' perceptions of feedback-related motivation.

4.3. Implications for practice and areas for future research

Our findings in both studies suggest that students striving for task goals in and placing high utility value on a feedback provision task provide feedback of higher quality. Both should consequently be fostered when employing peer-feedback in higher education. There is a broad range of successful utility value interventions in the current literature (Soicher & Becker-Blease, 2023), some of which could be adapted to the task of providing peer-feedback. In summary, to foster utility value, students should be made aware of the value of peer-feedback for their studies or their future work life, ideally by coming up with own ideas about how the task might be useful for their

future goals (Hulleman & Harackiewicz, 2021). In peer-feedback provision, such values could be threefold: Value of the assignment topic, value of writing skills (or problem-solving skills, depending on the task), and value of feedback provision skills. Such kinds of interventions might be tested empirically by future studies to provide an easy-to-use tool for teachers to foster favorable motivation and, as a consequence, feedback quality when using peer-feedback.

As for achievement goals, our results do not imply that task goals should be fostered over learning goals. Learning goals might have supported the peer-feedback providers' learning in ways beyond feedback quality that we did not capture in our studies. Generally, mastery goals should be fostered to encourage students' task performance and learning gains. Empirically, students' goal structure can be impacted by classroom goal structure (Self-Brown & Mathews, 2003), so favoring a mastery-focused classroom goal structure might be a very broad way to provide a framework for students to promote high-quality peer-feedback.

The results of this study imply that achievement goals, expectancies of success, and task value matter for how students provide feedback. At the same time, earlier studies show that achievement goals of students are not necessarily static (e.g., Fryer & Elliot, 2007) and received feedback matters for students' motivation (Fong et al., 2019) and for their achievement goals (Senko & Harackiewicz, 2005). Taken together, there seems to be a circular interplay between students' motivation for the peer-feedback process, the feedback they provide, the feedback they receive, and their subsequent motivation for both revising their work (Keller et al., 2024) and, to close the circle, for providing further peer-feedback. Further studies in this field might consider this potentially dynamic interplay between peer-feedback and motivation in longitudinal studies.

Finally, the situational approach in both our studies needs to be considered. We assessed goals, expectancies, values, and cost both in proximity and in regard to the specific feedback provision task at hand. Given that especially such motivational beliefs can vary across contexts and situations, this approach aligns with recommendations in recent research (Kim et al., 2023). However, students' general achievement goals for the course or for their study program could also set the tone for the value they ascribe to certain tasks (e.g., Hulleman et al., 2008). For instance, students who are learning goal oriented in general might welcome all kinds of feedback situations as beneficial, ascribing strong utility value also to providing feedback. The other way around, the underlying values students ascribe to their studies might shape the fine-grained, situational goals they follow in small-scale tasks like peer-feedback provision. For instance, students who perceive their psychology assignments as costly might rather adopt work avoidance goals when working on details of the assignment (i.e., providing feedback on it). Underpinning this latter idea, Jiang et al. (2018) found evidence for expectancies of success, task value, and cost predicting achievement goals. As we assessed all constructs on the same level, these ideas cannot be tested with our data. Still, examining whether task values serve as antecedents to achievement goals, or vice versa, could offer new insights into why students provide high-quality feedback and under what conditions they are more likely to learn from it.

5. Conclusion

Our study contributed to the understanding of how students need to be motivated to provide substantial, high-quality peer-feedback in higher education: Students provided longer and higher-quality feedback when they were aiming to solve the task at hand as well as possible and when they valued the task for their future studies or their future job. These findings need to be replicated in further studies, possibly extending to different circumstances, or considering cultural differences, and the cost component needs to be further disentangled. In summary, the results of our studies suggest that it might not be sufficient to limit research to cognitive aspects when aiming to understand how

students act in peer-feedback processes. Augmenting peer-feedback research by looking at students' motivation, especially by using sound motivational theories, has the potential to deepen our understanding and improving support for peer-feedback in higher education.

CRedit authorship contribution statement

Melanie V. Keller: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Martin Daumiller:** Writing – review & editing, Supervision, Project administration, Methodology, Conceptualization. **Markus Dresel:** Writing – review & editing, Supervision, Resources, Project administration, Methodology.

Authors statement

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.learninstruc.2025.102152>.

Data availability

Data will be made available on request.

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