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Feedback and focus: Exploring post-secondary students' perceptions of feedback, mindfulness, and stress

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ABSTRACT

Addressing feedback-associated stress as a barrier to learning is increasingly relevant to student success and well-being. Mindfulness practices support stress management for students during the academic feedback process. Even if students receive high-quality feedback, the receiving end of feedback can be stressful, perhaps raising feelings of anxiety, confusion, or inadequacy. Feedback literacy and mindfulness practices complement one another. Mindfulness can potentially support feedback literacy by focusing one's attention on the tasks needed to address feedback, instead of being distracted by emotions triggered by feedback. This study, comprised of an online survey ($n = 237$) and focus groups ($n = 6$), assesses post-secondary students' perceptions concerning feedback literacy, mindfulness, and stress, and their thoughts about digital mindfulness tools intended to support students experiencing feedback-associated stress. Recruitment of students was from courses in Health Sciences, Medical Sciences, Media Studies, and Law. The survey data demonstrate that students with greater mindfulness have significantly greater feedback literacy as well as lower stress. Focus group data shows that a broad range of affective and behavioral responses are shaped by students' perceptions of their abilities, circumstances, and feedback itself. Although students expressed familiarity with mindfulness practices, few considered explicitly linking mindfulness to their feedback process. Nevertheless, students expressed interest regarding the development of digital mindfulness tools to alleviate feedback-associated stress and offered recommendations for implementation.

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1. Introduction

An integral aspect of the academic learning process for students is interpreting and implementing feedback received from evaluators, whether professors, teaching assistants, or peers. Although the aim of academic feedback is to assist students to develop their competencies and skills, engaging with feedback may prove stressful and detrimentally impact learning, as cognitive processing may be impaired while experiencing strong emotions, such as anxiety (Boud & Falchikov, 2007; Boud & Molloy, 2013; Rowe, 2017). Academic stress is a type of situational stress encountered by students in the educational context and is related to the demands and requirements of the academic environment, among others (Córdova Olivera et al., 2023). Programs are available at many universities that are designed to alleviate generalized academic stress; however, few such programs target stress associated with receiving

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feedback or instruct students how to engage with feedback effectively. While the feedback landscape (i.e., providing and receiving feedback) has been explored extensively (Evans, 2013), less well understood is how students experience feedback-associated stress, how they perceive its impact upon feedback engagement, and whether students are mindful about the feedback process.

1.1. Feedback literacy is impaired by stress

Students susceptible to developing stressful rather than thoughtful responses to feedback are at risk of missing learning opportunities due to having low feedback literacy. Feedback literacy is a student's ability to engage with the feedback process of reflecting and acting on feedback, followed by seeking more feedback on the actions that they have taken. Feedback literacy develops when students can appreciate feedback, make judgements on what needs to be addressed, manage their affective responses, such as developing appropriate responses to feelings of stress or worry, and take action (Carless & Boud, 2018; Sutton, 2012). Developing strong feedback literacy skills is necessary to make sense of feedback and use it to enhance learning and work strategies (Carless & Boud, 2018; Winstone et al., 2017). Although students may be given rich feedback, if they do not know how to engage and learn from feedback, this feedback for improvement may be ineffective. Several interventions have been successful in improving students' appreciation for feedback, or ability to take action (Carless, 2020; Carless & Winstone, 2020; Hoo et al., 2022; Little et al., 2023; Man et al., 2022; Winstone et al., 2019); however, few studies investigated the impact of their intervention on managing affect with respect to feedback (Little et al., 2023). It is especially important to support a student's ability to manage affect while training them in feedback literacy, as feedback-associated stress (feelings of anxiety, confusion, inadequacy, hopelessness, or injustice) may act as a barrier to developing other feedback literacy components (Lindsey & Cresswell, 2017; Lipnevich & Smith, 2018; Rowe & Fitness, 2018; Ryan & Henderson, 2018). As such, investigating if and how students already manage affect is first required to inform the development of appropriate training in feedback literacy.

Along with student's expectations, anticipations, and relationship to evaluators, students' affective responses influence their willingness to engage with feedback (Price et al., 2011; Van der Kleij & Lipnevich, 2021). Although the benefit of helping students recognize and address their own emotional reactions to feedback is essential to supporting their feedback literacy journey (Lindsay & Creswell, 2017; Malik & Perveen, 2021), we do not yet know if students currently employ mindfulness as a stress-managing practice.

1.2. Mindfulness practice complements feedback literacy skills

Mindfulness is a practice that increases focus, awareness to the present moment, and has been defined as 'paying attention, on purpose, without judgement' (Kabat-Zinn, 2003). It is effective at reducing stress (Bamber & Morpeth, 2019; Jha et al., 2007; Kemper, 2017; Schussler et al., 2021), and has impacts upon task-completion, self-compassion, gratitude, and emotional resilience, which all impact learning (Brown & Ryan, 2003; MacDonald, 2020; Messer et al., 2016; Morrison et al., 2014). Positive emotions may also impact engagement with feedback literacy (Rowe et al., 2014), which needs further exploration. Mindful practices enable students to pay attention, accept a range of emotions associated with feedback, develop a sense of gratitude for learning opportunities, and increase their self-compassion, allowing students to use feedback to re-appraise their understanding. This may allow students to be open-minded and curious, which increases cognitive engagement (Rowe & Fitness, 2018) and can help students make judgments about what actions they need to take to increase their learning.

Making judgments and taking action require an iterative process of monitoring and evaluating one's own progress and strategic approaches to learning (Winstone et al., 2017). With mindfulness, the flexible application of attention to both the feedback and one's impulse to react to feedback may create space for recognition of how to respond (Brown et al., 2007). Furthermore, paying attention on purpose and without judgment strongly relates to having a reflective attitude, and students who are given opportunities to reflect become better skilled at making judgements, thereby improving feedback literacy (Nicol & Macfarlane-Dick, 2006; Winstone et al., 2017).

As educators at Western University, and congruent with reports by numerous sources (Hoyt et al., 2021; Zimmermann et al., 2020), we experienced a perceptible rise in negative feedback reactions from students upon the return to campus following the COVID-19 pandemic. As such, we sought to understand how to better support student feedback literacy and manage affect. Tracey Ropp, coauthor on this article from Western University, has developed a mental health initiative called Mindfulness and Learning. This initiative counsels students on how to apply mindfulness to academics. Together, as researchers and educators, we recognized that mindfulness skills complement and support feedback literacy; however, whether these two skills influence the presence of each other in a student is unknown. We further wanted to answer the questions of whether students already use mindfulness practices to support managing affect while receiving and engaging with feedback, and what their thoughts would be on potential digital training tools related to mindfulness and feedback literacy. We hypothesized that students who exhibit mindful behavior would also have higher feedback literacy, and lower stress, and that students would strongly consider using digital mindfulness and feedback literacy training tools if made available.

2. Methods

To address these objectives and questions, we used a mixed method approach of combining survey and focus group data across a multitude of disciplines and years of education at Western University.

2.1. Participants and procedure

Students were recruited from courses taught by the authors for an online Qualtrics survey concerning feedback literacy, mindfulness, and stress from nine courses between September and December 2022. Incomplete surveys were excluded. Gender identity, program, and year of study were also collected. The survey required five to ten minutes to complete, at the conclusion of which students were invited to enter a draw to win one of ten $20 Indigo Canada egift cards and to specify interest in participating in a future focus group to discuss their thoughts on feedback literacy, mindfulness, and stress, as well as digital tools related to these topics.

The focus groups were completed approximately six to eight weeks after survey completion. Seventeen individuals accepted the invitation to participate in the focus groups and were divided into groups (up to five people per group) comprising a mix of years of study and disciplines. Focus group sessions were conducted by two graduate student research assistants which were recorded and transcribed via Zoom. While one graduate student research assistant guided participants through the focus group prompts, the second research assistant made note of key ideas addressed. The focus groups lasted approximately 1 hour, and students were compensated with $20 Indigo Canada e-gift cards.

The survey and focus groups were preceded by completion of Letters of Information and Consent which indicated that feedback literacy is defined as the capacities necessary to make sense of feedback and to use it to enhance learning and work strategies, while mindfulness is commonly referred to as paying attention to and being aware of the present moment. The purpose of the overall research study was indicated to be the exploration of post-secondary students' attitudes toward and experiences of feedback, mindfulness, and stress to develop digital tools that may assist to mitigate feedback-related stress.

Ethics approval was granted by the Western University Non-Medical Research Ethics Board, approval #121025.

2.2. Materials

As the association between feedback literacy, mindfulness, and stress has yet to be explored, we focused on obtaining a diverse sample comprised of students from various programs and years of study. To encourage participation in the survey, we designed the survey to keep the estimated participation time to 5 min. As such, we elected to use the brief measures of mindfulness (MAAS-State)

and stress (PSS-4). Participants were also given a subset of items from a Feedback Literacy Scale (Zhan, 2022).

2.2.1. Mindfulness

Mindfulness was assessed using the 5-item State – Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003). The full 15-item MAAS was designed to measure participants' general mindfulness disposition or "trait"-level mindfulness. The State-MAAS was then designed to measure participants' present engagement with mindfulness during momentary ecological assessments (Brown & Ryan, 2003). As the current study is interested in students' engagement with mindfulness practices as opposed to their trait-level dispositions, we chose to employ the State-MAAS. As our design is cross-sectional and we are interested in students' overall propensity to engage in mindfulness practices, we asked students to think of their "everyday experience" when completing the measure. Students were instructed to indicate how frequently or infrequently they experience each of the statements provided (e.g., "I find it difficult to stay focused on the present"). Students rated each statement on 1–6 Likert scale (1 = almost always, 6 = almost never). As outlined by Brown and Ryan (2003), scores for each participant were averaged such that higher scores indicate greater self-reported mindfulness.

2.2.2. Stress

Stress was measured using the 4-item Perceived Stress Scale (PSS-4; Cohen et al., 1983). Items were rated on a 1–5 Likert scale (1 = never, 5 = very often). In line with the PSS-4 scoring guide, Questions 2 and 3 were reverse scored such that higher totals across all four items reflect greater perceived stress.

2.2.3. Feedback literacy

Feedback literacy was assessed using a selection of items from the Student Feedback Literacy Scale (Zhan, 2022). The Student Feedback Literacy Scale was designed to measure feedback literacy in post-secondary students and includes six subscales with four items per subscale. To reduce participant burden, two items from each subscale were shown to each participant. The questions from each subscale that each participant received were randomised. Thus, each participant answered twelve items from the Student Feedback Literacy Scale to assess their feedback literacy. Students rated each item on a 1–6 Likert scale (1 = almost always, 6 = almost never). Items were reverse scored such that higher totals across the 12 items indicate greater self-reported feedback literacy.

2.2.4. Focus groups

All focus groups were conducted via Zoom with a trained graduate student researcher who provided discussion prompts and who was not a course instructor or teaching assistant to students. A second graduate student researcher was present during the focus groups to keep a record of the general topics that arose throughout the session; they also had no instructional responsibilities involving the students. The semi-structured nature of the focus groups used prompts and allowed for additional questions and probes if students brought up additional topics.

At the beginning of each focus group, the lead graduate student researcher provided definitions for feedback literacy and mindfulness. Once all session members were introduced, the main portion began where students discussed five different topics developed by the research team. Students were asked about their emotions (topic 1) and strategies (topic 2) that pertain to receiving feedback, and their understanding of mindfulness both generally (topic 3) and as a tool for learning and coping with stress (topics 4 and 5). Before the sessions' end, students were also asked if they would like to share any further thoughts about the topic. The focus groups, which lasted approximately 1 hour, also served to gauge student interest in the development of asynchronous, voluntary feedback literacy and mindfulness tools integrated within the university's learning management system (LMS).

2.3. Data analysis

Quantitative analysis was conducted using R 4.2.2. (RStudio Team, 2020). Effect sizes were interpreted using the criterion outlined in Schober et al., 2018. Results were considered statistically significant at the

$p < .05$ level. QQ-plots revealed a normal distribution for both stress and mindfulness variables. Points on the QQ-plot for feedback literacy fell in a slightly curved pattern, indicating a potential deviation from normality. Further inspection of the boxplot for feedback literacy indicated the presence of several outliers. Statistical outliers were then removed by assessing the inter-quartile range. Ten outliers on the Student Feedback Literacy Scale and two outliers on the 4-item Perceived Stress Scale were removed. There were no outliers across the 5-item State-Mindful Attention Awareness Scale. After removal of outliers, all three QQ-plots displayed a normal distribution. Mean imputation was used for missing values ($n = 9$).

Qualitative data from the focus groups was interpreted following Braun and Clarke's (2006; 2015) guide to thematic analysis. The two graduate student researchers (SMJ and HS) that conducted the focus groups transcribed the audio/video data for further analysis. Transcripts were de-identified using pseudonyms for participant names and shared with three lead researchers (CSD, EI, and CEB) on the project. All five researchers familiarized themselves with three of the six transcripts and wrote down initial thoughts and key words/phrases that stood out. Several codes were identified (e.g., physiological responses, checking behavior, etc.). From the codes, the team discussed potential themes during which seven themes were identified. The two graduate student researchers then examined all six transcripts in relation to the proposed themes, bringing the results of their analysis back to the research team for discussion of patterns and discrepancies. During discussion, theme names and descriptions were modified to reflect our refined insight into the data, and the seven overlapping themes were condensed into three distinct themes.

3. Results

3.1. Demographic data of survey participants

Students' current year of study ranged from first-year undergraduate to second-year graduate and were from a range of programs (e.g., Dentistry, Journalism and Communications, etc.). For further demographic details see Table 1. Associations between variables of interest were examined using Pearson's Correlation, which is suitable for assessing correlations between continuous variables that are normally distributed and do not contain outliers (De Winter et al., 2016; Schober et al., 2018). In line with predictions, mindfulness was significantly correlated with feedback literacy [$r(235) = .29$, $p < .001$] (Figure 1(A)). Specifically, high levels of self-reported mindfulness ($M = 3.15$, $SD = 0.91$) were associated with greater self-reported feedback literacy ($M = 56.25$, $SD = 6.06$); however, this effect was weak (Figure 1(A)). Both

Table 1. Demographic information for sample.

Characteristic	n	%
Gender ($n = 237$)		
Woman	202	85.23
Man	34	14.25
Non-binary/third gender	1	< 1
Program ($n = 236$)		
Dentistry	14	5.91
Journalism & Communications	11	4.64
Law	6	2.53
Media, Information and Technoculture	10	4.21
Nursing	31	13.08
Occupational Therapy	63	26.58
Physiology & Pharmacology	33	13.92
Other*	68	28.69
Year of Study ($n = 236$)		
Undergraduate ($n = 157$)		
Year 1	36	15.19
Year 2	67	28.27
Year 3	17	7.17
Year 4	37	15.61
Graduate ($n = 74$)		
Year 1	41	17.37
Year 2	33	13.92
Other*	5	2.11

*Students who did not select from options provided.

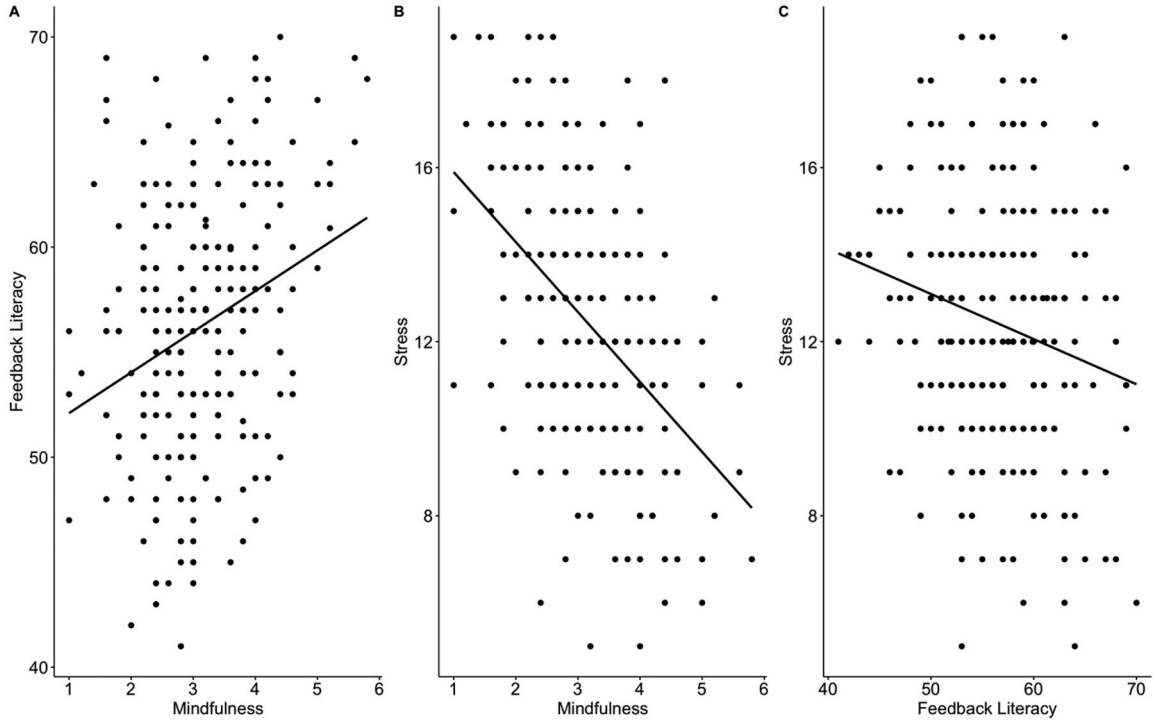

Figure 1. Correlations between Feedback Literacy, Mindfulness, and Stress. A) Association between feedback literacy and mindfulness; B) association between stress and mindfulness; C) association between stress and feedback literacy.

self-reported mindfulness and self-reported feedback literacy were significantly and negatively associated with self-reported stress ($M = 12.45$, $SD = 3.02$) (Figure 1(B)). Thus, in line with predictions, higher levels of mindfulness were associated with lower levels of stress and this effect was moderate (Figure 1(B); $r(235) = -0.48$, $p < .001$). The findings that higher levels of feedback literacy were associated with lower levels of stress supports the hypotheses, though this effect was weak (Figure 1(C); $r(235) = -0.21$, $p = .001$].

3.2. Focus groups results

Three themes were identified from the focus group data: (1) contextualization of feedback and its impact on affective responses; (2) students' affective and behavioral responses pertaining to instructor feedback; and (3) students' experiences and perceptions regarding mindfulness including its relevance to instructor feedback. Figure 2 depicts how these themes are connected.

3.2.1. Contextualizing feedback: Assessing one's own abilities and circumstances

Focus group participants described initial affective responses that were experienced during the receipt of feedback. The ways in which students felt after their initial affective responses were impacted by how they characterized feedback, such as whether the feedback was deemed fair, specific, and timely. A student named Cassandra, for example, commented within a focus group comprised entirely of Occupational Therapy graduate students,

> … [U]sually through our OWL [Western University's LMS] page you can see the grade first, and then you have to click to see the feedback. I think that when I see a grade, there's an initial kind of deciding of whether I feel good or bad about it. But then I do always go and look at the particular feedback that a prof or TA has given, and then it's a lot more reflective. I read it and I think I interpret the tone of what they might be writing, and then that can either help or harm the feelings that I'm experiencing. Even if I didn't do well on something, if the feedback is very constructive, I find that I don't end up feeling that bad anyway because I can see that there's a reason for it … (Cassandra, Focus Group 3)

These comments foreground the iterative, staged aspect of accessing instructor feedback via a university LMS while also highlighting the potentially interpretive and reflective dimensions of the feedback

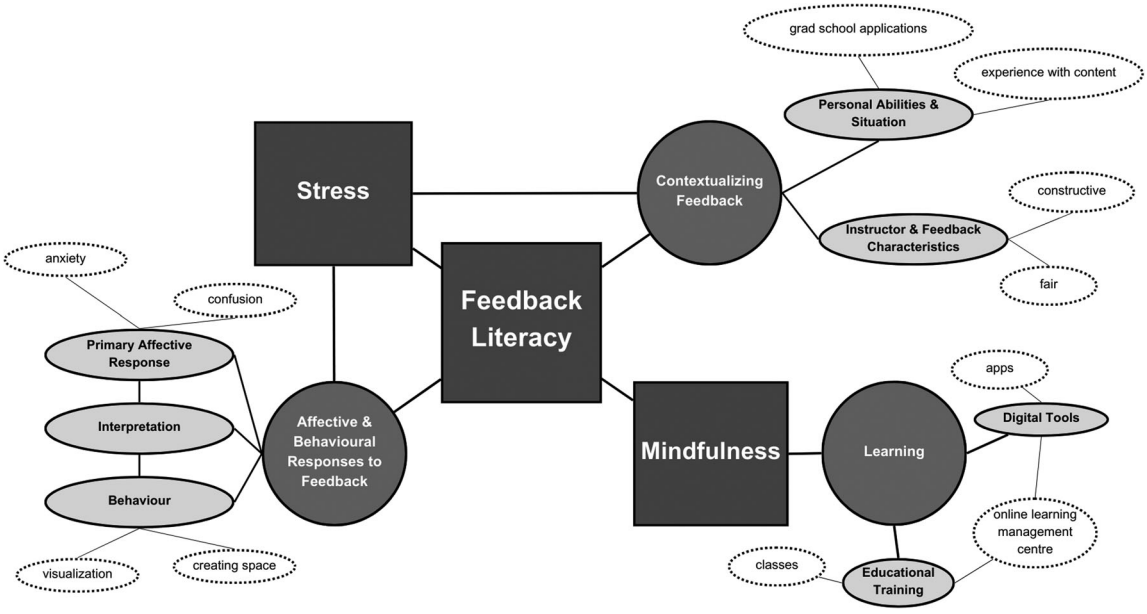

Figure 2. Conceptual Mapping of Feedback Literacy, Mindfulness, and Stress. Square boxes represent the current study's constructs of interest: feedback literacy, mindfulness, and stress. Grey circles represent the three overarching themes found across the focus groups: contextualizing feedback, affective and behavioral responses to feedback, and learning through mindfulness. The grey ovals represent subthemes while the white ovals with dotted lines provide examples of topics within each sub-theme.

process. Within the LMS, an assigned grade is typically made available first, followed by instructor feedback that may be accessed independently (e.g., clicking on a new page or tab). The initial interpretation of the grade produces an affective response that is followed by a secondary process of interpreting and reflecting upon instructor feedback. Interpreting and reflecting upon instructor feedback may in turn inform the initial affective response generated by the grade. Thus, the initial affective response to a poor grade may be moderated if instructor feedback is characterized as constructive or reasonable, such as it being fair, specific, or timely.

Along with students' characterizations of instructor feedback, their affective responses while receiving feedback were also impacted by their characterizations of their own abilities and contexts. An undergraduate Medical Sciences student, for instance, observed within a second focus group comprised of undergraduate students from diverse disciplines,

> … [I]f [an assignment] is something that I don't totally know and it's kind of new, then I'll tell myself, 'Listen, you've never done this before, so how would you know how to do well, if realistically you've never actually done it?' And sometimes that helps, because then I think, 'You can't do well on something that you don't really know.' And then it doesn't hurt as much because it comes from a place of not knowing, rather than, 'I made a mistake.' And I think it also depends on how the feedback is framed: if the [instructor] make[s] it sound like you were in the wrong, then you think, 'Oh, I did something wrong, I should have known but I didn't.' But if you're more, like, 'I didn't know and this is new information,' then that makes it feel better. (Aya, Focus Group 4)

Such observations suggest that to manage the initial affective response generated by instructor feedback accessed online, the cultivation of a state of self-knowledge and compassion may prove beneficial. Similarly, another undergraduate Medical Sciences student remarked within a different focus group comprised of undergraduate and graduate students from diverse disciplines, that "… [T]he first step of actually using feedback is to try to be present while I'm looking, to take away that initial shock and really just focus on what I am being told. What do I need to work on? What did I do well, what did I do not so well?" (Josephine, Focus Group 2) The student goes on to explain that she then reflects upon the feedback or reaches out to a professor to gain more insight into why she received a certain grade.

Josephine, like Aya, explains that the cultivation of a state of self-knowledge is essential to mitigating the initial 'shock' of an assigned grade and feedback, even as interpreting, reflecting upon and enacting this feedback may be challenging or unfamiliar. While Aya's observations concurrently emphasise the

importance of the feedback's "framing," Josephine's remarks prompt incremental affective and behavioral adjustments. Across the focus groups, most students underscored that their characterisations concerning feedback, and their own abilities or circumstances, informed their affective and behavioral responses.

3.2.2. Assessing, interpreting, and enacting instructor feedback

The second main theme was that a broad range of affective responses are elicited while accessing, interpreting, and enacting instructor feedback. While discussing emotions that may precede the receipt of instructor feedback accessed online, for example, graduate Occupational Therapy student Anthony expressed the following:

> Besides anxiety, which is probably the primary feeling that I get before receiving feedback, I guess I also perhaps experience curiosity, or something almost like confusion, although less so confusion than curiosity, as to what feedback I'm receiving and what the evaluators said about the work that I submitted. (Anthony, Focus Group 3)

Anthony's comments suggest that an affective response to instructor feedback may involve several primary and secondary emotions. An affective response may simultaneously encompass conventionally positive emotions including "curiosity," as well as negative emotions, such as "anxiety" and "confusion." The occurrence of such emotions may be linked to assigned grades that are first accessed and interpreted prior to subsequently evolving into generalised affective states. Soon after, during the same focus group, Anthony also expressed the following sentiment regarding interpreting and enacting feedback, for example, "It again really depends on the grade I'm receiving and how satisfied I am with that grade." He goes on to explain that he will be more open to criticisms if he feels positive emotions, yet he may not want to see the feedback, or be resistant to it, if he feels more negative emotions.

Affective responses to instructor feedback in turn impact students' behavioral responses, which then may be immediate and reactionary or strategic and proactive. While discussing specific practices employed to implement instructor feedback, graduate Occupational Therapy student Magdalena (Focus Group 6) explained that if feedback was fair, well done, or she felt that she could improve, it would inspire her to do better and to set goals for herself.

Similarly, while discussing comparable practices during yet another focus group, undergraduate Law student Pazia (Focus Group 5) commented on first feeling defensive, then giving herself time before reading it through, comparing comments to her work, digesting the feedback, and returning to it with "more of a level-head."

Magdalena and Pazia's comments underscore that distinct practices are used to interpret and enact instructor feedback, and that such practices may be employed in tandem. While Magdalena describes engaging in processes of visualization and self-reflective questioning, Pazia describes a process of carefully comparing and contrasting an assignment and instructor feedback and creating space and time in order to achieve a more balanced perspective concerning the feedback. Pazia's comments further illuminate that an immediate, reactive behavioral response to instructor feedback may be translated into a more strategic, proactive response.

3.2.3. Students' experiences and perceptions regarding mindfulness, including the application thereof to instructor feedback

All students were familiar with the concept of mindfulness, and many shared their perceptions thereof. Returning to the first abovementioned focus group, graduate Occupational Therapy student Cassandra stated, for example,

> One of my placements was a mental health placement, so I led mindfulness sessions and would often explain what mindfulness is beforehand. So, I think that definitely influenced a lot about how I see mindfulness, as being aware of the present moment and eliminating all of the thoughts about the past and thoughts about the future and grounding into where you are right now and things that are concrete. A lot of times we did things like focusing on your body positioning or your breathing, focusing on the things that you know are fact, to help get you out of your head. (Cassandra, Focus Group 3)

Later during the same focus group with all Occupational Therapy participants, Anthony expressed similar sentiments, and added that he also looks up mindfulness strategies and how they affect behaviors and feelings.

Both Cassandra and Anthony experienced mindfulness practices within the Occupational Therapy curriculum and commented that their peers within the program would also be similarly exposed.

Although Occupational Therapy students were familiar with mindfulness practices, few had considered linking them to processes of interpreting and enacting instructor feedback. Nevertheless, students expressed considerable interest concerning the development of digital mindfulness tools to help alleviate feedback-related stress and offered recommendations for their implementation. While discussing the potential implementation of such tools within Western University's LMS, Josephine stated, for example:

> I think that specifically having something close to, or incorporated within, the grade book system would be really great, even just something like before getting your mark, having an optional moment for breathing, or something that draws your attention to the fact that maybe you should practice mindfulness right now, because I do think that we all forget because we just want to see our marks! (Josephine, Focus Group 2)

Echoing her earlier remarks, Joesphine's statement suggests that mindfulness practices' emphasis upon present-moment attention may additionally be cultivated via asynchronous and online mechanisms. Josephine's statement underscores that such mechanisms may contribute to self-regulation and the cultivation of a calm demeanor. Undergraduate health sciences student Saloni (Focus Group 4) indicated that the implementation of such a tool may also contribute to self-regulation and explained that providing it directly in an LMS increases its accessibility and usability, when it would be required at the moment of receiving feedback. Saloni suggests incorporating mindful breathing as an exercise; however, she stressed that any mindfulness practice should be made optional to students.

Taken together, Josephine and Saloni's comments suggest that the development of online mindfulness tools possess potential to alleviate feedback-associated stress by bringing awareness to one's reactions.

4. Discussion

Our study investigated the potential association between feedback literacy, mindfulness, and stress, and provided insights into the affective and behavioral responses to feedback in students in higher education. We further elicited thoughts about the possibility of embedding a mindfulness tool within an LMS to alleviate feedback-associated stress. A strength of this study was the multidisciplinary approach involving recruitment of students from several disciplines across Health Studies, Medical Sciences, Media Studies, and Law, and from both undergraduate and graduate programs. From our data, we conclude that having higher mindfulness behavior is associated with having higher feedback literacy skills and lower stress. The former point highlights a new association that has not been investigated with regards to feedback literacy. Having higher mindfulness behavior may support several components required for feedback literacy, such as appreciating feedback and having a strong affective domain. This data suggests that a possible mechanism for continuing to improve feedback literacy would be to develop a personal mindfulness practice. That mindfulness was inversely correlated with stress is consistent with many studies that have demonstrated that a mindful practice is effective at managing stress (De Vibe et al., 2013; Kabat-Zinn, 2003; Messer et al., 2016). Previous research indicates that while feedback provides opportunities for students to grow in their skills and abilities (Carless, 2019; Carless & Boud, 2018; Hattie & Timperley, 2007), it may foster stress (Crommelinck & Anseel, 2013; Rowe, 2017; Ryan & Henderson, 2018). The stress associated with feedback must be managed to effectively engage with and enact the feedback (Boud & Molloy, 2013; Carless & Boud, 2018). Accordingly, we found that students who reported greater levels of stress also reported lower levels of feedback literacy. However, it is important to consider that the results from our study are cross-sectional and indicate correlations. Therefore, it cannot be said whether stress impedes feedback literacy skills, or a lack of feedback literacy skills foster stress. A bidirectional association likely exists between feedback literacy and stress whereby stress results in poorer feedback literacy which fosters greater feelings of stress.

This idea of worry associated with feedback was present throughout the focus groups and was specifically associated with how students characterized feedback. Research indicates that the characteristics of the feedback that students receive impact their perception of the feedback (Ackerman & Gross, 2010) and their emotional responses to said feedback (Flores et al., 2015). Our study identified characterization of feedback as fair, specific, and timely as important predictors to how a student might respond to feedback, but our study revealed that these elements were mostly impacting the affective domain. Particularly, feelings of anticipation and worry were relieved once grades were available; thus, timeliness was impactful as it relieved negative emotions. Once grades were received, affect remained a barrier to student engagement with feedback. Lipnevich and Smith (2009) investigated student perceptions of the impact of different forms of instructional feedback on their emotions. They reported that low grades elicited negative affect and students reported a drop in self-efficacy, while high grades resulted in decreased motivation and lessened students' perceived need to improve. We suggest mindfulness training could alleviate these emotions prior to obtaining grades, thereby creating space for students to reflect on feedback and respond instead of allowing emotions to distract from engaging with feedback.

Students identified both positive and negative emotions with respect to feedback, and expressed how that might impact their behavior, which was consistent with previous reports (Hattie & Timperley, 2007). Although receiving feedback can certainly be associated with negative emotions, which our data confirmed as numerous students spoke of stress or anxiety, along with feelings of being wrong, or worry, we were also interested to hear students concurrently experienced emotions such as curiosity, a desire to reflect, and self-compassion. While studies have shown that negative emotions can deter learning, and these emotions may include sadness or anxiety over a low grade, or even loss of motivation due to a high grade (Lipnevich & Smith, 2009; Rowe, 2017), our data demonstrates that students simultaneously experience both positive and negative emotions. This could possibly present an opportunity for students to apply mindfulness training and focus on the affective responses that can best serve their learning. Interestingly, when students expressed positive emotions, such as curiosity, they also expressed mindful behaviors, such as taking time to be in the present moment or expressing self-knowledge or compassion through reflection. This suggests that students are using mindful practice to manage their affect prior to engaging with feedback. In their study on distress and distraction, Mesghina et al. (2021) discussed the impact of distress during the COVID 19 pandemic and how it caused increased distraction in undergraduate students, impacting their learning. They discovered that providing a three-minute video introducing students and instructing them on mindfulness practices helped to reduce distraction, although it did not improve learning. This might be explained by the briefness of the intervention but, nevertheless, the immediate benefit of a digital mindfulness tool points to a greater potential of mindfulness training in academics. Although many students in our study were aware of mindfulness, they did not specifically link mindfulness to receiving feedback and were unaware of their own mindfulness practices related to receiving feedback. When presented with the idea of including a mindfulness tool as part of an LMS to help alleviate feedback-associated stress, students agreed that this would be a welcome addition. Taken together, students are receptive to having opportunities to increase their mindfulness practice; however, they are unaware of how this might specifically benefit them with respect to feedback literacy, and perhaps, with respect to learning in general. We therefore suggest that mindfulness training be incorporated alongside feedback literacy training, as it has the potential to support students by addressing their affective domain and helping them focus while they learn.

4.1. Limitations

To our knowledge, this is the first study to directly examine how feedback literacy, mindfulness, and stress directly relate to one another. Thus, we were interested in obtaining and surveying a large and diverse sample of undergraduate, graduate, and professional students. Given the time constraints of students, a short survey was designed to attract a larger sample of participants. As a result, the findings from the quantitative portion may be lacking in construct validity given that both shortened versions of stress and feedback literacy measures were employed, reducing breadth and depth in our measurement of these constructs. Given that this study is the first study of its kind, we felt that obtaining a diverse and larger sample was imperative to gaining insight into general associations between feedback literacy,

mindfulness, and stress in higher education. Thus, findings from this study should be viewed as preliminary with further and more in-depth investigation necessary to gain a strong understanding of how feedback literacy, mindfulness, and stress are associated.

While a sample diverse in program and year of study was obtained, self-selection is important to consider when examining the results from the focus groups. In both the quantitative survey and focus groups, participants were told they would have an opportunity to share their thoughts and feelings on mindfulness, feedback literacy, and stress. As such, individuals interested in these constructs, particularly how they are associated in post-secondary students, may have been more likely to participate in both portions of the study. Thus, the results from this study may reflect the perceptions of students already familiar with feedback literacy and mindfulness. Indeed, our focus group found that most participants were familiar with mindfulness and often engaged in the practice. However, we did find that individuals varied in *how much* they engaged in mindfulness and most indicated that they had not considered using mindfulness to manage feedback-associated stress. Thus, the results from this study highlight the gap between feedback literacy and mindfulness in managing stress in post-secondary students. Moreover, these findings call attention to the need for feedback-oriented mindfulness training in higher education, including for students who already practice mindfulness in their day-to-day life.

5. Conclusion and future directions

Students who score higher on mindfulness scales may also be experiencing less stress and may have higher feedback literacy. Students demonstrate aspects of mindful behavior in the feedback process but are unaware that these behaviors have their roots in mindfulness; therefore, they would potentially benefit from training in both feedback literacy and mindfulness. Introduction to mindfulness may be in the form of a digital tool embedded directly into an LMS, so students can apply their mindfulness practice as they receive feedback. Further considerations for the development of such a tool would be to further engage students with feedback, and to consider the mindfulness practices relevant to their disciplines.

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