



Feedback processing and emotion regulation in nursing students during internship

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ABSTRACT

Introduction: As feedback that nursing students receive during internships triggers emotional episodes, it results in changes in self-esteem, motivation, and learning behaviors. The adaptive or maladaptive nature of emotions is modulated via emotion regulation strategies.

Method: To understand how the students experienced and acted upon these emotional episodes, we applied an existential phenomenological approach.

Results: Students experience a wide range of emotions in feedback situations. These emotions regularly require the use of emotion regulation strategies. We have described three kinds of such strategies. Based on the results of this and previous studies, we have developed a comprehensive model of feedback processing by students in the context of nursing internships, in which emotions and their regulation are central.

Discussion: Emotion regulation strategies are often unconscious and should be developed by students during their training, especially in consciously designed feedback conditions of teachers and instructors, in which students should feel understood, respected, and invited to actively involve themselves in the processing of feedback. Finally, we make a few recommendations to education professionals.

Conclusions: Feedback processing by future nurses during internships involves a complex emotional process that affects their behavior, either conducive to learning or not. Emotion regulation strategies may be required in these situations. Moreover, students' emotions are influenced by various determinants, which evolve in a circular dynamic as feedback occurs over time.

1. Introduction

Emotional responses to feedback in an academic context can be the clue that there is an issue related to the self, since self-esteem is an emotional reaction to the perceived discrepancy between who an individual would like to be and who that individual feels they actually are (Guindon, 2010). Feedback can be viewed not only as information about one's performance, but also as information about oneself (Bosson & Swann, 1999). Since feedback can focus on both the task and the person (Hattie & Timperley, 2007), both dimensions of self-esteem – i.e., worthiness and competence (Mruk, 2013) – can be impacted. Therefore, students with different self-esteem profiles are likely to interpret the same feedback differently. Self-esteem profiles are primarily of three types: high (positive perception of both dimensions), low (negative perception of both dimensions), and defensive (positive perception of one dimension and negative of the other) (Mruk, 2013).

We previously reported on research aimed at identifying and understanding the events likely to impact nursing student self-esteem and clinical skill development. Nursing students pointed to internship feedback as a major factor affecting their self-esteem (Dancot et al., 2022). Moreover, we found that feedback interpretation engendered emotions, which in turn influenced self-esteem. We also found that self-esteem, in reciprocal fashion, influenced the interpretation process (Dancot et al., under review). Finally, we described how feedback characteristics (e.g., focus, tone, etc.) impacted that process, generally leading to either self-regulated learning or self-protection (Hausman et al., 2022a). These various findings have allowed us to progressively develop an integrative model on how feedback is processed during nursing internships which we presented in two previous publications (Dancot et al., under review; Hausman et al., 2022a). In its first version, our model mainly presented the mutually influential linkage between students' self-esteem and the interpretation of feedback. In its second

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version, we focused on how feedback – including its characteristics and the contexts in which it was given – was interpreted by students, and how this did or did not foster behaviors that supported their learning.

In the second version, we also highlighted the emergence of emotions in students involved in feedback situations, the need to engage emotion regulation strategies and changes in their motivational beliefs. However, we didn't elaborate on these elements in detail. Therefore, we have yet to describe more extensively how students deal with the emotions they experience when processing feedback, and so our main aim here is to fill in that gap. Furthermore, we'll integrate these latest findings into our overall model in order to add to previous versions and provide a broader picture of the phenomenon we've been studying.

1.1. Why do we need to focus on students' emotions in processing feedback?

Recent work (Henderson et al., 2021; Lipnevich et al., 2016) has shown that learner aptitude and disposition are important to processing and using feedback effectively in higher education. This view of the student as an active participant in feedback processing can be represented by the concept of "student feedback literacy" (Carless & Boud, 2018), which experts increasingly acknowledge is necessary for students (Winstone & Carless, 2020). Learner involvement in making sense of the information – still an essential part of the feedback process – and incorporating it into metacognitive knowledge and/or learning regulation behaviors is fundamental. While the scientific community debates whether feedback is a process or a product, our position is consistent with that of other specialists in the field, such as Lipnevich and Panadero (2021).

The "student feedback literacy" model (Carless & Boud, 2018) suggests four skills that students need in order to make the most of the information they receive. One of them, emotion management, seems important because despite it having an impact on feedback processing (Falchikov & Boud, 2007; Värlander, 2008) and learning (Pekrun et al., 2007, 2011), it has yet to be fully investigated in education.

1.2. Emotions in feedback processing

1.2.1. The emotional process

"Emotions are relatively brief states caused by a specific stimulus or a specific situation and are expressed at the physiological, behavioral and subjective levels" (translated from Luminet, 2002; in Mikolajczak et al., 2020b, p. 15). What we usually call "emotion" is in fact a complex process that includes a cognitive assessment responsible for triggering the response to a given event.

In a learning context, Pekrun's "control-value theory" (2006) posits that the learner's subjective evaluation is based mainly on the perceived level of control over the task and the importance ascribed to the task and/or its outcome. With feedback that deals primarily with learning activity outcomes, students experience achievement emotions (Pekrun, 2006; Pekrun et al., 2007), which can be positive – such as joy, hope, pride, gratitude, contentment, and relief – or negative – such as anxiety, shame, anger, sadness, disappointment, and hopelessness. Those emotions can be activating or deactivating, depending on their propensity to support or hinder action. Hence there are at least four types of emotions, based on their valence and activation (Pekrun et al., 2011): positive activating emotions, positive deactivating emotions, negative activating emotions and negative deactivating emotions.

1.2.2. The impact of emotions on feedback processing

The Price et al. (2011) model of student experience and response to assessment feedback describes how students proceed through immediate attention, cognitive response, and immediate or latent actions such as applying feedback insights, making developmental changes, or rejecting the feedback. The model shows that students engage in cognitive analysis before deciding on action (or inaction). Other models

describe the action phase more extensively – including goal setting, habit modification, and developing a "new normal" (Schuler, 2021) – or add an affective phase, where emotion management is required in parallel with evaluating the feedback and making a judgment, prior to action being taken (Carless & Boud, 2018). Thus the impact of feedback depends not only on the information given and the context in which feedback takes place, but also on the student's emotional response (Goetz et al., 2018; Lipnevich et al., 2016). In their model, Carless and Boud (2018) posit that emotion management allows students to maintain emotional equilibrium and avoid defensiveness when receiving critical feedback. They note that negative emotions are usually associated with poor perception and low engagement with feedback. Even in that case, however, it is important to dialogue with the feedback source, when needed, and to strive for continuous improvement. Yet few studies describe the emotional aspect of feedback reception among students and how they deal with it, especially during internship where the stakes are such that they encourage students to be involved in feedback processing (Noble et al., 2020), and trigger many emotional episodes.

1.2.3. Emotion regulation

Emotions matter because they act as signals, telling the individual that events or situations are important enough to require a response. In a learning context, these may be moments – including feedback – when learners feel they are getting closer to or farther from achieving their goals. But such signals can be rejected or misunderstood; emotions can be adaptive or maladaptive in terms of achieving goals (Mikolajczak, 2020a, 2020b). The emotion regulation process depends on the individual's goals and needs. Emotion regulation strategies aim to modify the nature, intensity, expression or duration of emotions (Gross & Thompson, 2007).

The "process model of emotion regulation" posits that emotions can be regulated through situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross & Thompson, 2007). In achievement situations, the "integrated model of emotion regulation" indicates that situation selection or modification concerns an academic achievement situation; that attentional deployment is about an activity or outcome and can be prospective, concurrent or retrospective; that cognitive change is about the appraisal of control and value; and that response modulation regards the expression and feeling of emotions themselves (Harley et al., 2019). These strategies apply at different points in an emotional episode, and can be conscious or not, deliberate or unintentional (Sander et al., 2005). Modalities can be behavioral or cognitive, wellbeing- or competence-oriented, and functional or dysfunctional, depending on the short- and longer-term benefits and consequences (Mikolajczak, 2020a, 2020b).

Given the aims of the study and the dimensions presented above, the research questions we want to answer are: What emotions do students experience during feedback processing? How do students regulate these emotions when needed? What place does the emotional dimension take in the feedback processing?

2. Method

2.1. Context

This paper reports on the last part of a larger longitudinal mixed-methods study that followed nursing students from their first to fourth academic year in order to explore how their self-esteem changes over time and the relationship between self-esteem and clinical skill development. Four out of the sixteen vocational colleges in French-speaking Belgium offering a Bachelor's degree in nursing were invited to participate in the study, using purposive sampling based on geographical, network, size, and institutional criteria, yielding maximum diversity. A cohort of 813 first- and second-year students was assembled in October 2017 using accidental sampling (attending class) and followed annually with quantitative and qualitative data collection. Interviews could be

agreed to or refused in the questionnaire. The qualitative component of the study's first and third years – regarding internship feedback only – is reported here.

2.2. Design

The study used an existential phenomenological design (Thomas & Pollio, 2002). The aim of this qualitative approach is to describe how people experience situations in emotionally sensitive contexts as free, responsible, and valuable individuals. Their interpretations, and those of the researchers, were used to reveal the patterns experienced by the participants, both holistically and within their relationships.

2.3. Participants

Using sequential sampling (Creswell, 2009), sixty volunteers from the quantitative cohort were invited to participate in the qualitative phase of the study. Theoretical sampling was used to obtain a purposive sample based on self-esteem profile and to yield maximum diversity regarding age, gender, study year, academic performance (non-first-year students), and institution. Thirty-nine of those students participated in the T1 interview process from February to May 2018, and twenty were still present for the final interview of the longitudinal study in March–April 2020 (T2).

2.4. Data collection

We conducted semi-structured interviews during non-internship periods to avoid any recent 'sensitive clinical situations' in T1; it was sometimes impossible to avoid internships periods in T2. Appointments were scheduled based on participant availability. Interviews were done in a secluded room with no others present. The T1 interviews were designed to provide an understanding of participants' self-esteem experience; participants cited feedback, unsolicited, as a significant moment. We added the following open-ended, feedback-specific question to the T2 interviews: 'Talk about feedback that had an impact on you during your nursing education.' Interviews lasted approximately 1 h and were recorded and transcribed in their entirety.

2.5. Data analysis

The present study only considered data about feedback during internships. The data was analyzed in two phases, descriptive and interpretive. Analysis was performed independently by two researchers whose coding was compared at a number of different points, first to agree on the codes to be used, then for validation. When necessary, consensus was reached via discussion between the researchers.

In the descriptive phase, coding was based on theoretical criteria to describe feedback (Brookhart, 2008) such as timing, mode, focus, tone for example, on the achievement emotions delineated in control-value theory (Pekrun et al., 2007), on criteria derived from participants' own words (e.g., expectation of results, task preparation, motivation), on the chronology of what happened before, during, and after feedback, and on the pleasantness or unpleasantness of the participants' experience. This coding was done in a Word file using a system of tables (chronology in rows and good/bad experiences in columns) and colors (characteristics of feedback and of events that happened before and after it, which were identified and refined during coding). Table 1 shows an example of possible emotions.

In the interpretive phase, we identified the themes (e.g., antecedents of feedback, feedback implications) and subthemes (e.g., emotional regulation, behaviors favoring learning, motivation) that emerged from discussions between the researchers; these were coded using NVivo12 software. After coding, words were reviewed by theme or subtheme and by matrix queries (crossing two subthemes in the software) in order to understand the significations and patterns. As this is a central construct

in our work, transcripts were also read by self-esteem profile (Mruk, 2013) to discover potential patterns related to that. Impressions and interpretations concerning these patterns and their relevance were discussed between the researchers and with pedagogy and public health experts, and then compared with the literature. Once the processes were identified, the complete transcripts were reread by both researchers to check for consistency and to validate the interpretations.

All identified patterns were condensed into a nomothetic description (Thomas & Pollio, 2002) containing structured data, words, links to relevant theory, and the (sub)theme's contribution to answering the research questions. In doing so, we were able to establish a detailed understanding of feedback processing in nursing students during their internship, identifying components such as its determinants (e.g., self-esteem), its outcomes (e.g., regulation of learning), and the mechanism by which its constituents are activated (e.g., cognitive analysis of information and emotional regulation). The entire feedback reception and processing experience was modeled in a comprehensive schematic description (see Fig. 1).

2.6. Quality criteria

Our method used the criteria of reliability, validity, "the unconscious", and generalizability to ensure rigor (Thomas & Pollio, 2002).

To ensure reliability and validity, the interview guide was reviewed by experts in pedagogy, psychology, and sociology. J.D. undertook a bracketing effort, i.e., listing preconceptions in writing to refer to as needed, rereading the entire interviews to identify any statements that contradicted preconceptions. In addition, having two people coding independently revealed any preconceptions linked to the researchers' specific fields, i.e., nursing and pedagogy. All of the data were given equal consideration, with variation valued over quantity; 'negative cases' were explored and explained. Discussions between researchers and especially with experts helped ensure reflexivity (Malterud, 2001). While the longitudinal design prevented us from asking participants to comment on our interpretations, the results were presented to nursing students and professionals in the field such as instructors and were acknowledged as relevant to their experience.

Accessing the students' "unconscious" – that is, the information they wouldn't have given us spontaneously – was done through the depth of the interviews, during which questions continued until a sufficiently shared understanding of the experience was obtained. To achieve this, the interviewer was careful to ask descriptive questions.

Generalizability (Thomas & Pollio, 2002) was sought by means of the number and variety of participants. The themes and subthemes gave a comprehensive view of the topic and of all aspects of the phenomenon being explored, and the large and diverse sample provided sufficient replication in the data. That broad view of the phenomenon ensures transferability (Fortin & Gagnon, 2016; Malterud, 2001).

3. Results

We present these findings according to the feedback processing sequence as we have identified it. Please note that findings related to emotions and their regulation are most detailed as they represent the core of this article. However, other aspects of feedback processing (i.e., antecedents and implications for learning) are detailed in our other publications (Dancot et al., under review, 2021, 2022; Hausman et al., 2022a).

3.1. Participants

The thirty-nine T1 participants included 32 females and 7 males between the ages of 18 and 44 years, with a median age of 20 years (19–21). Twenty-six were first-year students, including 5 repeating students, and thirteen were second-year students. Eleven students had a high self-esteem profile and fifteen had a low self-esteem profile; the

other thirteen students had a defensive self-esteem profile based on acceptance (6) or success (7). All participant quotes were translated from French.

3.2. Internship feedback

3.2.1. Feedback given to students

Feedback is very frequent during internship. One of the reasons is the diversity of its potential sources (e.g., nurses, teachers, patients and/or their relatives, and peers). Feedback is primarily given to students by nurses and is done on a daily basis, for formative purpose, in an informal manner, more briefly and on more specific tasks. Teachers and the head nurse provide more formal feedback, taking more time and addressing more tasks and intervening at more punctual times. Teachers evaluate students two to four times a month, and the head nurse evaluates them at the end of the internship. While formal feedback usually includes written support (i.e., rubrics and/or internship report), students mostly mentioned the one-on-one time with these different sources as significant events with regard to self-esteem and learning.

3.2.2. Feedback context and students' perception of it

Feedback is always received in a specific context. This context can be

experienced as supportive or adverse by students, depending on how they perceive the task (e.g., new or mastered, easy or hard, and with high or low stakes, depending on the purpose of the assessment), the feedback as information (e.g., positive and/or negative, focused on task and/or person, expected or not), the conditions of feedback (e.g., private or public, scheduled or not) and their individual dispositions such as physiological state (e.g., tired or not), psychological state (e.g., motivated in a certain way, prepared or not) and affective state at the time (e.g., in good or bad mood, more or less nervous) and their perception of how the task was performed and its outcome (e.g., self-assessed, expecting success or failure).

The particular emotions experienced by students – and their intensity – depend not just on the characteristics of the feedback, but also on its interplay with the characteristics of the context and those of the student within that context.

3.3. Emotions experienced during internship feedback

3.3.1. Emotions experienced by students

Students experience a range of emotions in feedback situations. These are identified, described and illustrated with students' words in [Table 1](#) below.

Table 1

Emotions connected with feedback in nursing internship.

Joy	Positive feeling of happiness tied to the present and to the situation	"I was so happy. When she left, afterwards, we went to eat, and I partied." Susan-T1
Hope	Positive feeling about the future and the idea of being capable of succeeding (in a future evaluation, in education) or of being a good nurse	About one's evolution: "I was happy because I know that I lack confidence in myself [...] so it proved to me that the evolution I think I've made, it's really there. It is there." Lisa-T2 About the ability to be a good nurse: "By just saying that I would be a good nurse for me it meant that I would do my job well." Angela-T2
Pride	Positive feeling toward the self	"Simply, the nurse at the end of my internship, she told me that I would be a good nurse, and that immediately made me happy, I was proud of myself." Angela-T2
Gratitude	Positive feeling toward others, acknowledgement of their valuable behavior	"It touched me a lot because I told her that she was one of the first people to remark on it and someone who recognizes the fact that I would really like to develop my human side, it really touched me and I told her that it made me very happy, especially coming from her." Anna-T2
Surprise	Feeling of something unexpected, which can be positive or negative	Positive: "[I expect to be judged negatively] When I see my grades, I'm like, 'Oh well, that's okay'." Angela-T1 Negative: "I was shocked by her reaction, I didn't understand why she was telling me that, so I immediately got teary-eyed, I thought: 'What does she want from me, why is she attacking me like that?'" Betty-T2
Contentment	Feeling of quiet satisfaction	"You are always happy when, at the end of the course, they tell you, everything went well." Kimberly-T1
Disappointment	Negative feeling of dissatisfaction when the situation does not meet expectations	"The evaluation by the teacher, I found that it was much too quick, I was really disappointed because I didn't have enough objective criticism. She gave me a quick mark like that, without saying why this mark, it's a good mark but, so I wasn't going to complain about this mark, but I didn't have any ways to improve." Michael-T1
Shame	Negative feeling toward the self	"I was in the way she told me things, it was really, it was oppressive. And in fact, when I'm spoken to like that, I don't know anything, I'm like an idiot, I open my mouth and I don't even know how to say a word, [...] to be put down in front of the patients is quite humiliating." Virginia-T1
Anxiety	Feeling of fear of some unspecified threat	"He judged me a bit too quickly, and afterwards, every time I saw him, I didn't feel good, I didn't want to work with him, so ... It's true that when he told me that I was going to double, I didn't feel good." Sarah-T1
Anger	Negative feeling toward the self or others, implying something assessed as bad	Against oneself: "To always say to myself 'I could have done better', that annoys me." Dorothy-T1 Against others: "It really pissed me off. Really, it pissed me off, I think you could tell, she understood very well that I was very upset, it was the end of the night in, it was my fourth night, I couldn't take it anymore, so I was very, very upset really and I think they all sensed it very well. [...] So I was very, very angry." Amy-T2 "I was very depressed after that placement." Brenda-T2
Sadness	Negative feeling of sad mood	
Hopelessness	Negative feeling about the future and the idea of being incapable of succeeding (in a future evaluation, in education), of being a good nurse, or of changing an unpleasant situation	About students' status: "That's what's also very stressful in an internship is that you always have to adapt to everything, to the teams and to the people you work with, and it's quite a burden. To think that I'm trying to make an effort, to improve myself, and it doesn't work, so it's a bit destabilizing. [...] It's really very hard, I tell myself, I only have a few months left and then I'll finally be considered, or so I hope, because it's really, it's hard." Sarah-T2 About oneself: "I didn't see myself well, especially as she hadn't given me any concrete things I could have changed, so I couldn't see how I could have improved, so that was a problem for me." Angela-T2

3.3.2. Feedback interpretation and emotional response

Positive feedback that focused on the student as a person caused pleasant emotions such as joy, hope, pride, gratitude, and sometimes surprise, with a high intensity. Positive feedback focused specifically on the task mostly generated hope and pride. When positive feedback was quite general and not really enthusiastic (e.g., “It’s good”), students reported pleasant but deactivating emotions like contentment or unpleasant and deactivating emotions like disappointment, depending on their expectations regarding feedback.

Negative feedback that focused on the task generated unpleasant and activating emotions like shame and anxiety, or pleasant and activating emotions like hope if the students were given or identified clues for improvement. Negative feedback that focused on the students’ person caused unpleasant and activating emotions such as anger, shame, anxiety, and surprise with a high intensity; it also generated unpleasant and deactivating emotions like sadness, disappointment, and hopelessness, directed towards themselves, the quality of the training, or the likelihood of being able to join the profession.

Since feedback interpretation is a complex process, students experienced a mix of simultaneous emotions including anger, disappointment, sadness, and, to a lesser extent, shame – as illustrated by this quote:

“Now, there are also critical comments to be taken in. Maybe the one where I was told I wasn’t spontaneous enough. I was a bit disappointed, because I was proactive, I wanted to learn, I wanted to be given tasks to do. And I wasn’t necessarily given the opportunity to do them. And being told that disturbed me a bit because that wasn’t my objective. And the fact that I wanted to do something and that we were told no, you didn’t do it, even though technically we wanted to do it, and that we were given barriers, but then we were given critical comments, that didn’t go down well. That’s the kind of comment that doesn’t go down well. But not in the sense that it doesn’t go down well or that it’s not a good learning experience, but in the sense that we feel a little hurt, because we say to ourselves, it’s not my fault, I only wanted to make progress, but it’s you who put up barriers, so don’t blame me for not being proactive. And that’s what’s always a bit hurtful. It was more difficult, in the sense that she made the comment to me in a way that was not, for me, kind. It was really, borderline, ‘you’re completely stupid, why didn’t you look?’ I think that if she had made the comment in a nice way, if she had said it to me differently, I might have taken it better, and I might have made better progress.” Sharon-T1

Before drawing some kind of conclusion regarding agreement or disagreement with the feedback, students need to go through simultaneous processes of emotion regulation and cognitive analysis. We consider those processes interrelated given that cognitive analysis is both the trigger for the emotional process and a means of regulating it. Note that emotion regulation applies to both pleasant and unpleasant emotions (e.g., when students strive not to slacken their efforts after positive feedback).

3.4. Emotion regulation following internship feedback

3.4.1. Emotion regulation strategies

A process of emotion regulation was often required before students could decide – not always consciously – whether or not to accept feedback and whether or not to act upon it, especially (but not exclusively) when it caused unpleasant emotions. We observed three steps in that process, though not all students described all the steps and in some cases they were mixed together. We named them (1) experiencing emotion; (2) reconnecting to the profession; and (3) processing emotion and information.

Experiencing emotion was about reducing the intensity of the emotion so that students could recover their ability to work. According to Gross and Thompson’s model (2007), those strategies rely on emotional

response after emotion(s) arise. It can be done through an organized place to talk, a platform, or seeking support while speaking with peers, parents, or friends. It can also be done alone, by isolating oneself for a few minutes, or prior to the task by focusing on one’s breath or preparing to manage stress. With positive feedback, it is often done by talking to parents or relatives. These are more often behavioral strategies in which the student does something concrete.

“I went to the bathroom to calm down.” Betty-T2

Reconnecting to the profession was about speaking specifically to another professional, who knew what was normal or expected in the profession and was legitimately able to temper the student’s interpretation of the feedback – peers (sometimes further along in the program), instructors, nurses, or in one case, a psychologist. It was done in formal or institutionalized ways such as discussion spaces, spontaneously at the student’s initiative, or offered by sources of support. Here the student aimed to put the negative feedback into perspective with other more reassuring – or at least more nuanced – feedback. This strategy can be considered an attempt to alter the impact of the feedback situation that triggered the emotional episode. Here too, behavioral strategies were more common.

“I talked about it to the mates I was on internship with there and then, once I got home, it was over.” Kimberly-T1

Processing emotion and information was linked to a more conscious cognitive analysis process. It could involve cognitive reappraisal strategies such as reaffirming the person’s status as a student and their right to make mistakes.

“I discussed with the nurses, we had a big open discussion and so it allowed me to say ‘OK, it’s not serious’ and then they told me yes, we are here to make mistakes.” Helen-T2

Some also chose to assess the legitimacy of the feedback source or content. Some students chose to “let it go” or give up on some practice areas, which can be understood as a form of situation selection. Another strategy was to focus on improving and to look for clues to making progress. Finally, some chose to take back some form of control by changing the situation so that it would not happen in future internships.

“With my teacher, we said that the next internship, I absolutely had to take charge of myself as we say and really come up with objectives by saying: ‘Here, I want to achieve this, this, this and this in my internship’, being polite of course, so that an internship like that would never happen again.” Brenda-T2

In this last step, students made a cognitive change, adjusting their mindset, before taking more concrete actions such as engaging in discussion or planning new learning strategies.

3.4.2. Facilitators of emotion regulation

When emotions were very intense, the first response was often to take time to experience it – for example, by being conscious of the emotional process, sharing the story with loved ones or by writing it down, or by being alone for a while. Students who prepared themselves before being evaluated performing a task or getting feedback needed less time to regulate their emotions and could move on to the cognitive analysis step more easily. In addition, students with high self-esteem more readily sought support than others.

3.5. Decision-making regarding feedback

3.5.1. Agreeing with feedback

Regarding the information at the heart of the feedback process, agreeing with positive information led students to conclude that they were able to perform the task in question and could use clues for

improvement in future tasks. It resulted in a higher self-esteem and stronger self-determined motivation. Such outcomes then facilitate reception of other positive feedback, implementation of emotion regulation strategies, and task-oriented interpretation of new feedback. Conversely, agreement with negative information that was accompanied by unpleasant deactivating emotions led students to conclude that they were not up to the task or could not improve. The result was lower self-esteem and the opposite outcomes, which included defensive behaviors (e.g., avoiding certain tasks and/or people, inhibition, less initiative, loss of motivation and/or a more extrinsic orientation, oriented towards the avoidance of failure and unpleasant emotions).

“It’s true that I’m slow. But then, I have to practice for that. Maybe if I practice, I’ll be faster, or maybe not, we’ll see. Come what may.” James-T1

3.5.2. Disagreeing with feedback

Disagreeing with (negative) feedback and concluding that it was not relevant led to temporary protection of self-esteem. In those cases, students thought that improvement was possible but could not see how to get there. They then took one of two different paths, depending on the nature of the emotions experienced. If their emotions were negative and activating (e.g., anger towards themselves or the feedback source), students strove to prove their abilities and value by showing their mastery of the skills. If they instead experienced unpleasant and deactivating emotions (e.g., powerlessness), they became defeatist, feeling that they could not change the situation they disagreed with. This last reaction led to an attitude of resistance against evaluators.

“I took a dislike to her and, as a result, I was obsessed with this urinal, and every room I was in I would search everywhere, even if there wasn’t one, to show her [...]” Sharon-T1

3.6. A comprehensive model of internship feedback processing

Putting these findings together with those obtained previously yields an integrated model of the feedback processing in nursing students during internship (Fig. 1 below).

In our model, feedback processing can be seen as a sequence within which several phases can be identified. We distinguish four of them. The first stage of feedback processing relates to the activation of a range of key determinants, among which we have highlighted students’ personal dispositions, their perception of the task to which feedback relates, and context in which feedback is provided. A second phase deals more directly with the interpretation of feedback, both in terms of content (i.e., information) and form (i.e., conditions). This stage involves both a cognitive and emotional process for the students. A third phase involves making a decision about feedback (e.g., agreeing to negative feedback), resulting in a more or less constructive attitude towards making use of feedback. Finally, a fourth step deals with the consequences of the previous ones on students’ motivational beliefs and behaviors, which are then more oriented towards self-protection or learning regulation.

As can be seen by examining the dimensions included and how they are articulated, this model operates in a circular dynamic. Indeed, the consequences of feedback processing on students’ perception of themselves in the context of the task and on the behaviors and attitude they choose to adopt (consciously or unconsciously) influence in turn their personal dispositions as well as their perception of the next task, in similar context.

Since the focus of the article is on the emotional dimension of feedback processing, these dimensions appear in bold in the model.

4. Discussion

The two main objectives of this study were to explore in depth the emotional dimension of students’ processing of internship feedback and to situate it within a broader understanding of this process, depicted in an integrative model.

4.1. Emotions tied to internship feedback and their regulation

Our first research question was to understand what emotions are experienced by nursing students when processing feedback, and the second on how they manage these emotions. As expected, we identified mainly outcome-related achievement emotions (Pekrun, 2006; Pekrun et al., 2011). Positive feedback was usually associated with positive

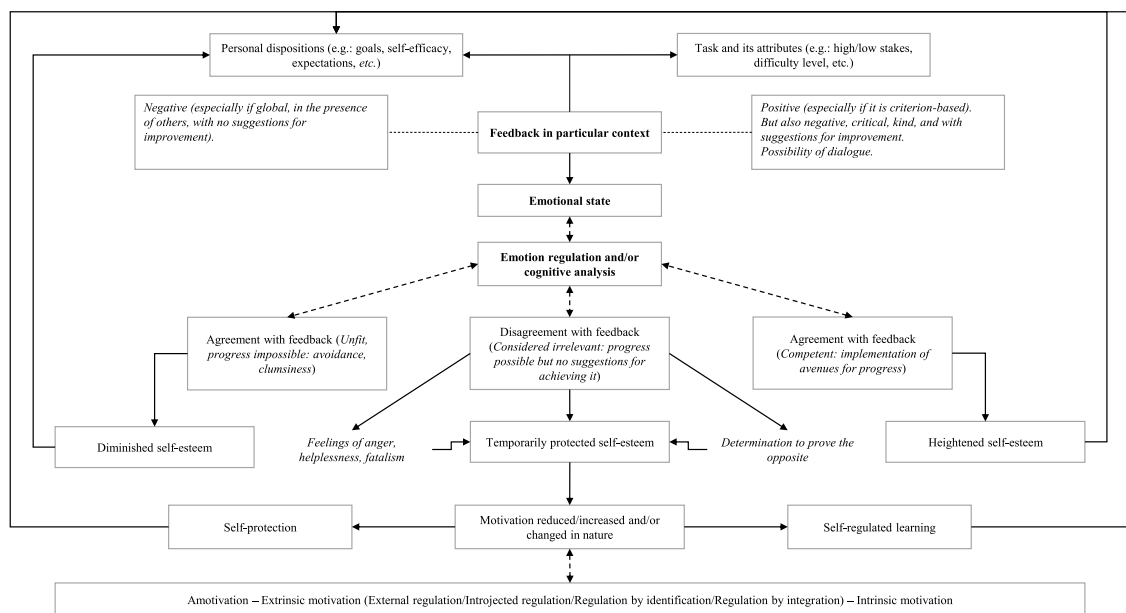


Fig. 1. Integrated model of feedback reception during nursing internships.

emotions unless feedback was overly general and unenthusiastic. And while negative feedback usually caused negative emotions, it could generate hope if students received tips on how to improve. In addition, we also found surprise, which relates more to achievement activities (Pekrun et al., 2007), thus confirming the dynamic nature of feedback processing, which can be understood as an activity. According to our findings, surprise could be pleasant or unpleasant, and precede other more standard achievement emotions.

What stood out in our participants' words was the intensity of those emotions. As Pekrun et al. (2007) reported, achievement emotions are intense and this intensity depends on the importance attached to the situation or its outcomes. As we already demonstrated the importance of internship feedback to nursing student success and self-esteem (Dancot et al., under review, 2022), it is logical that those emotions are very intense, and that intensity was even greater when feedback sources expressed emotion (e.g., enthusiasm) themselves.

The issue is that the more intense these emotions, the more students needed some type of regulation to use feedback efficiently. This was not difficult for pleasant emotions, which were shared with loved ones and tapped to give extra energy and motivation. Unpleasant emotions, on the other hand, were a problem because students were more likely to reject or ignore comments if they evoked negative emotional responses (Ryan & Henderson, 2018). It is therefore important to understand precisely how students regulate their emotions in internship feedback situations.

Our findings show that students' preparation for feedback influences their emotion regulation. This step is not described in the ERAS model (Harley et al., 2019); we connect it to the notions of surprise and intensity. Students who had prepared themselves were able to use the regulation strategies described in that model. While some could do it alone, many – after an initial, more personal, step – sought support from professionals they considered legitimate, something we call “reconnecting to the profession.” These were appropriate resources that helped students use regulation strategies. The ERAS model acknowledges the role of personality, culture, and development in emotion regulation, and proposes exploring it further (Harley et al., 2019). We found that personal characteristics like high self-esteem could prompt students to seek support when needed, which in turn helped them use more “learning-effective” regulation strategies (Dancot et al., under review).

Lastly, the students used cognitive analysis to process both their feelings and the information from feedback. They employed all of the regulation strategies described in the ERAS model (Harley et al., 2019); some were more helpful to their learning than others. We described that impact on learning in an earlier paper (Hausman et al., 2022a).

4.2. The internship feedback reception process in nursing students

Our third research question focused on understanding the role of emotion arousal and management in feedback processing. Most models that consider emotions and feedback are educational models describing the self-regulated learning process. In some of these models – those of Boekaerts (2011) and Efklides (2008), in particular – emotions have a prominent place. They play a mediating function (Goetz et al., 2018) that allows students to alter their thinking or behaviors in accordance with the goals they are pursuing and the information they receive; this is the monitoring phase of the learning regulation process. This contrasts with other models, which often overlook the emotional component by including it in motivational processes. In our opinion, the link between emotions and feedback is basically due to the way in which feedback – whether internal or external, formal or informal, whatever its form – informs learners about their own situation in the learning context.

Feedback perceived as negative normally generates a negative emotional response, characterized mainly by unpleasant emotions whose exact nature will vary depending on the emotional drivers activated primarily by the individual (e.g., goals, value, control, self-efficacy, self-esteem, etc.). The deleterious effects of unpleasant

emotions on learning have long been known (Vogl & Pekrun, 2016), and several authors have acknowledged discrete emotions that occur as part of feedback processing, while others incorporate emotion management into the very same feedback process as a key component. For example, discussion of discrete emotions can be found in Lipnevich et al.'s (2016) “feedback-student interaction” model, and affect management in Carless and Boud's (2018) “student feedback literacy” model, which emphasizes the importance of maintaining the student's emotional equilibrium. To this we add the work of Pitt (2019), who promotes the development of students' “emotional literacy” so that they can better handle their emotional responses while processing feedback. However, some of the well-known models that include both feedback and emotions suffer from potential limitations in understanding the emotional process.

In general, the literature addressing issues related to both feedback and emotions is not very clear or detailed. As Rowe (2017) has pointed out, terms relating to the affective domain are frequently used interchangeably, with the result that the emotional process involved in feedback situations may be misunderstood, causing some oversimplification of this complex phenomenon. Some models, for example, consider emotions solely in terms of their valence, which is only one component of the process. Our study is in line with the models that acknowledge the complexity of the emotional process in feedback situations. We stressed the relative nature of emotional valence and recalled the importance of its (de)activating nature and intensity. We highlighted the fact that in some cases unpleasant emotions can motivate students to put extra effort into achieve their learning goals, and that pleasant emotions may be dampened in order to sustain the effort made up to that point, via a process of emotion regulation. We also emphasized the iterative nature of feedback situations, each of them generating a complex process involving the learner's personal dispositions, his or her perception of the learning context, and the characteristics of the feedback as information, leading to changes in the personal components of that process, including self-esteem. From a “spiral” (Carless, 2019) perspective, reflexive analysis of these different components is likely to enrich the learners' metacognitive repository, thus increasing the resources that can be acted upon when processing subsequent feedback and applying self-regulated learning strategies.

Although we did not focus on this aspect of feedback processing at the start, it became clear in our analyses that feedback, giving rise to emotional episodes, also had repercussions in terms of motivation. Beyond simply increasing or decreasing student motivation, what we observed were changes in the type of motivation. While it is reasonable to assume that nursing students enter an internship with a desire to experience their future profession, or even to demonstrate their ability to be good nurses, negative feedback and the cognitive/emotional processing applied to it leads to changes, especially in terms of goals and motivation (Linnenbrink & Pintrich, 2002). In the examples above, students pursued goals of avoidance (continuing to practice so as not to fail) and approach (showing that a trivial remark was taken into account, and that the evaluator misjudged the task). The work of Deci and Ryan (2000) shows us that while such goals are not entirely counterproductive to learning, they are not the best drivers of learning because they impact motivation and engagement. These new goals cost such students behavioral self-determination and impact their motivation, leading to external regulation-supported extrinsic motivation or even amotivation. Interestingly, the students who reacted in this way had a low or defensive self-esteem.

4.3. Educational implications

Our study highlights the fact that feedback in nursing placement situations elicits a strong emotional process among students. These emotions influence students' attitude (Hausman et al., 2022b) towards feedback and, ultimately, behaviors conducive or deleterious to learning achievement. If emotions hamper improvement, then it is helpful for students to use emotion regulation strategies to sustain their

determination to attain their educational goals.

As asking teachers and nursing professionals to ensure application of emotion regulation strategies might be difficult, it seems more realistic to refer them to the recommendations from many years of research on how to incorporate feedback into instructional settings. Being aware of – and if possible, applying – the guidance offered by established authors such as Brookhart (2008), Shute (2008), Hattie and Timperley (2007), and Nicol and Macfarlane-Dick (2006) would be a good start. Among those recommendations, our previous work (Dancot et al., under review; Hausman et al., 2022a) has highlighted the importance of ensuring that feedback focuses on the task and the process, emphasizing what is going well, providing suggestions for improvement, and ensuring that the tone is not aggressive, disrespectful, or fatalistic. Moreover, the latest research strongly emphasizes the importance of dialogue – internal and/or external – in the feedback process (Lipnevich & Panadero, 2021). Beside the quality of the information provided to students, it matters that they are able to share their views, their understanding, and their feelings, and that they feel understood and respected, in order to process feedback constructively. Given that, we have also highlighted the importance of teacher empathy (Dancot et al., under review; Hausman et al., 2022a), allowing students to experience their emotions and ensuring that they have the resources to best regulate them when needed. These elements belong to the relational dimension of “Teacher Feedback Literacy” (Winstone & Carless, 2020). Regarding instructional design it is important to give feedback a truly functional role, ensuring that it is useful, and allowing students to really make sense of it by giving them the space they need to do so. That will create a healthy dynamic of “shared responsibility” between teachers/instructors and students (Winstone & Carless, 2020). While it is obviously not the instructor’s role to act directly on students’ emotions, the use of feedback in instructional settings can be an indirect yet powerful means of doing so. We therefore believe that feedback literacy can support better emotional skills.

4.4. Strengths and limitations of the study and future research

The broad research from which this article is based originally focused on changes in student self-esteem and skills in nursing education. Data collected at T1 was therefore not purposely targeted at feedback or academic achievement emotions experienced by students.

As a result, although we have come to appreciate the importance of the emotional process in feedback situations, we have sometimes been frustrated at not being able to grasp its full subtlety or complexity. For example, because the T1 interview questions did not ask about emotion regulation strategies, it is impossible to know whether such strategies were used consciously or for a specifically identified purpose. Nor did we ask students about their own beliefs about their emotions and the role these may have played in their learning experience. It is likely that students’ repertoire of emotional regulation strategies, or more broadly, their level of emotional skills, also influence this process, but these factors were not included in our study.

Despite this limitation, we were able to recognize the centrality of the emotional process to feedback processing in a nursing internship context. We were able to identify the emotions experienced by students and go beyond a classification based solely on the valence of those emotions by also considering their activation potential and intensity. We have highlighted the nuanced role of unpleasant emotions in learning, according to whether they are activating or deactivating. Finally, we are able to go one step further by identifying some of the emotion regulation strategies used by students as a part of feedback processing.

5. Conclusions

This study is part of a broader research project that aims to understand how students’ self-esteem changes during their nursing training and how these changes influence the development of students’ clinical

competence. It was found that internship feedback is particularly impactful in this respect (Dancot et al., 2022). After describing the connections between self-esteem and feedback processing (Dancot et al., under review) and the consequences in terms of self-regulated learning and self-protection (Hausman et al., 2022a), we attempted to understand the emotional process that occurred with feedback in this context.

Emotions help create a positive or negative attitude toward feedback that can cause students to either improve their learning or protect their self-esteem. One element that can help determine which of these two outcomes will happen is students’ ability to apply functional emotion regulation strategies, which appear crucial to constructively processing instructor feedback. If these emotion regulation strategies are dysfunctional or if students do not employ them, their self-esteem may decline, thus affecting their personal dispositions (e.g.: motivation type or strength); this may in turn influence future feedback processing.

In addition, we have proposed an integrative model that highlights the main steps of feedback processing in nursing students. This model works in a dynamic and iterative way. Finally, we have offered recommendations for teachers and nursing professionals to ensure the necessary conditions for students to process feedback constructively at both the cognitive and emotional levels.

Ethical approval

This study was approved by the Ethics Committee of the University Hospital and of the Faculty of Medicine of the University of Liège under the reference number 2017/233. Schools and participants were given information about the study and about their participants’ rights, and they signed an informed consent form. Data were anonymized during transcription.

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Authors statement

Mathieu Hausman: Conceptualization, Methodology, Formal analysis, Validation and Writing – Original Draft. **Pascal Detroz:** Conceptualization, Supervision and Writing – Review & Editing. **Benoît Pétré:** Conceptualization and Supervision. **Michèle Guillaume:** Conceptualization and Supervision. **Jacinthe Dancot:** Conceptualization, Methodology, Investigation, Formal analysis, Validation, Writing – Review & Editing and Project administration.

Mathieu Hausman and **Jacinthe Dancot** are the main authors and the two independent researchers. They contributed equally to the article. **Pascal Detroz** was a member of JD’s doctoral thesis committee and is MH’s doctoral thesis co-director. **Benoît Pétré** and **Michèle Guillaume** were JD’s thesis directors.

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Declaration of competing interest

The authors have no competing interests to declare that are relevant to the content of this article.

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