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Unpacking the Complexities of Emotional Responses to External Feedback, Internal Feedback Orientation and Emotion Regulation in Higher Education: A Qualitative Exploration

Lan Yang , Yiqi Wu, Yuan Liang and Min Yang

Department of Curriculum and Instruction, The Education University of Hong Kong, New Territories, Hong Kong, China

* Correspondence: yanglan@eduhk.hk

Abstract: Research suggests that unpleasant emotions induced by feedback may reduce its efficiency in enhancing students' performance, which is a crucial issue to address in education. In the context of Chinese language instruction in higher education, this study sought to investigate how students regulate their emotions as a result of feedback through the lens of individuals' feedback orientation. In light of the feedback orientation lens and its conceptual framework, we applied in-depth qualitative interviews to explore how students experienced feedback, the negative emotions they experienced, and the emotion regulation strategies they used. Eleven undergraduates across years one to five joined our in-depth interviews. Students reported negative emotions when they received feedback that did not live up to their expectations or was unrealistic for them to accept. However, students' feedback orientation supported their emotion regulation techniques, which in turn supported students' adaptive feedback processing to interpret and take action to use feedback for academic performance improvement. Students also actively sought further teacher feedback or peer support to deal with a wide range of negative emotions. These findings imply the significance of fostering in students a high level of feedback orientation and the necessity of additional empirical investigation into the relationships between feedback orientation and emotional well-being in higher education. By shedding light on how students regulate the emotions that external feedback causes in them, the study adds valuable qualitative findings to the existing literature on positive psychology research in terms of emotions and emotion regulation. It also emphasizes how crucial students' personal feedback orientation is for improving emotional well-being in the context of feedback.

Keywords: emotions in feedback; feedback orientation; emotion regulation; higher education



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1. Introduction

Feedback is information usually given by external agents (e.g., teachers, peers) to inform students' academic performance [1]. Feedback could be a continuous and interactive process that allows learners to receive, process, and use information about their learning progress to make necessary adjustments to learning strategies for performance improvements and goal achievements [2]. Research shows that feedback is one of the most effective ways to improve students' academic achievement, with a high effect size of 0.70 [3]. However, the impact of feedback on performance improvement can be influenced by how feedback receivers perceive and interpret the feedback information provided to them [4,5]. An increasing number of researchers argue that students might not receive and understand feedback in the same ways as teachers expect [6,7]. To maintain the effectiveness of feedback in promoting learning and academic success, educational researchers need to understand how students perceive and process feedback from an early stage of anticipation and receiving to the behavioral stage of taking action on feedback [8]. Researchers have found students' positive perceptions of teacher feedback are associated with school engagement [7] and feedback use [9]. Recently, ref. [6] published a review of 164 studies on

feedback perception, suggesting that a general theoretical framework is needed to guide feedback perception research in educational settings. To address these concerns, this study introduces the concept of feedback orientation and its conceptual framework, abbreviated as the Feedback Ecological Model (FEM), for understanding how students perceive, process, and respond to feedback [5,10].

2. Literature Review

2.1. Feedback Orientation and the Feedback Ecological Model

2.1.1. The Definition of Feedback Orientation

Feedback Orientation (FO) is a concept that was originally developed in organizational psychology to describe an individual's receptiveness towards feedback as a means to improve their performance, as well as their openness to guidance and coaching on how to effectively use feedback [10]. In educational settings, [8] extended FO research and examined the appropriateness of four dimensions of feedback orientation among Chinese students. These dimensions include: (1) Feedback Utility (FBUT), which measures the perceived usefulness of external feedback for improving performance; (2) Feedback Self-Efficacy (FBSE), which measures perceived abilities to interpret and use external feedback appropriately; (3) Feedback Social-Awareness (FBSO), which measures awareness of using feedback to maintain or enhance good social relationships with feedback providers; and (4) Feedback Accountability (FBAT), which measures perceived obligations to respond to feedback received from others in a responsible manner.

Despite its relative newness in education research, recent studies suggest that FO plays a critical role in students' learning. Two scholars [7] found that FO had a positive relationship with student engagement, explaining more than 60% of the variance in learning engagement for both mainstream and vocational secondary students. Moreover, both vocational and mainstream students' FBAT served as a significant mediator in the relationship between FBUT, FBSE, FBSO, and their learning engagement. Additionally, ref. [11] found that three dimensions of students' FO (FBUT, FBSE, and FBAT) predict students' self-reported frequency of feedback use. However, the underlying mechanism of how FO leads to proactive engagement with feedback remains unexplored. To address this gap, the leading author of this study [5] introduced a conceptual framework, named the Feedback Ecological Model (FEM), based on previous research [8,10]. FEM is a holistic framework that includes external feedback provision, internal feedback perceptions, feedback processes, and the outcomes of teaching and learning. This comprehensive framework illustrates the links between students' FO, the complicated feedback processes they engage with, and their learning outcomes.

2.1.2. The Feedback Ecological Model (FEM)

FEM describes the feedback response process and considers both individual and contextual factors, providing a conceptual framework for FO in educational settings. For the purposes of this study, we utilized a concise version of the Feedback Ecological Model (FEM). Despite its brevity, the framework provides a comprehensive understanding of the connections between students' Feedback Orientation (FO), complex feedback processes, and learning outcomes (as depicted in Figure 1). Recent research [5] has implemented FEM as a critical lens to review updated studies on students' feedback perception and responses, demonstrating that students' FO can facilitate learning by stimulating their engagement with feedback after processing (i.e., from stage 1 to stage 3 in Figure 1). However, the application of FEM as a theoretical foundation in educational research is limited, as it was initially developed in the management field [10].

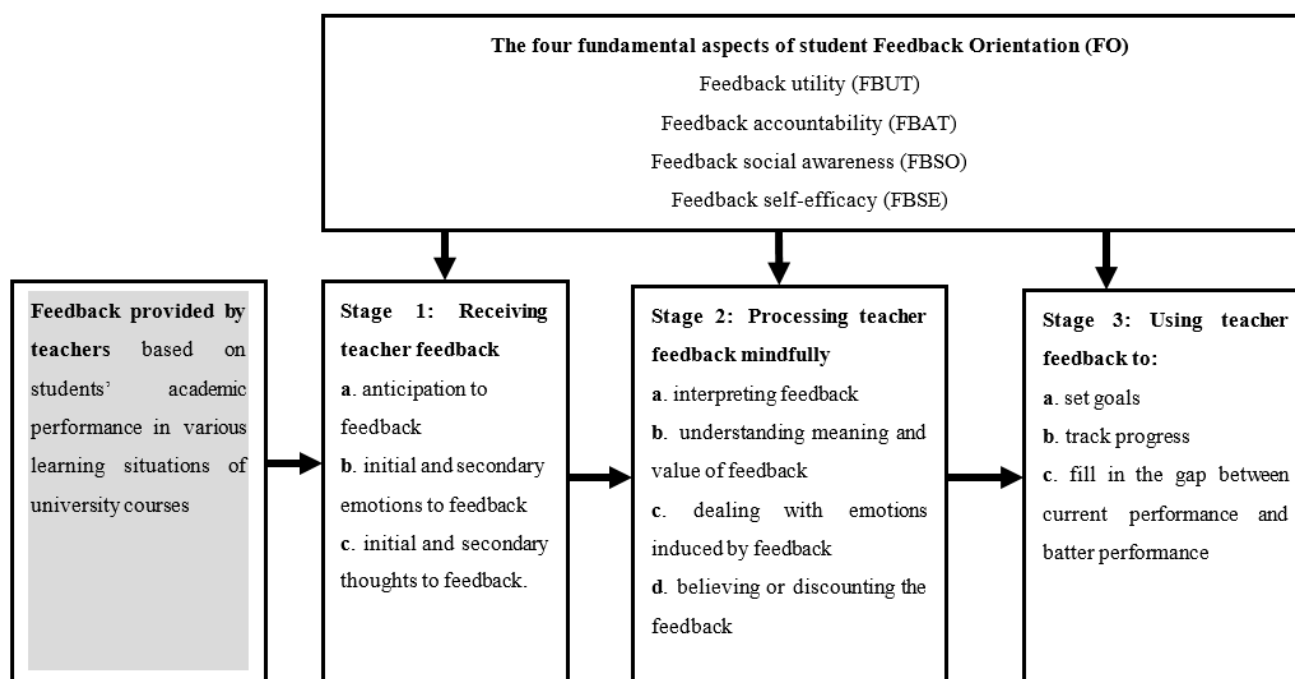


Figure 1. The conceptual framework of feedback in this study based on the work of [5,8].

Individuals' FO, according to [10], facilitates feedback processing, and individuals with a higher FO level are more likely to process feedback deeply, connect personal meaning, and attribute learning internally. Specifically, FO can help individuals regulate negative emotions immediately induced by the feedback received from the interpretation and decoding process. Otherwise, if students' negative emotions are not properly managed, they may dismiss the feedback (i.e., disregard the feedback). According to FO researchers [10,12], emotions induced by feedback can arise from both individuals' anticipated outcomes and the authentic feedback provided by the teacher. In other words, if the feedback students receive aligns with their anticipated outcomes, they experience positive emotions; otherwise, negative emotions could be caused by the feedback with discrepancies between what students had expected and what they actually received [10,13]. The following sections provide an in-depth review of the research exploring the relationship between feedback and emotions.

2.2. Feedback and Emotion

"Feedback, as a set of practices geared for learning and closely linked with assessment, is an inherently emotional business" [14]. While research on the emotions induced by feedback is not yet well established, educational researchers have begun to explore the topic in recent years. Ref. [15] found that feedback could elicit strong emotions that either benefit (i.e., positive emotions) or harm (i.e., negative emotions) students' learning motivation and performance. Negative emotions may also hinder students' use of feedback [14], which is consistent with FEM's arguments that individuals' emotional reactions to feedback are embedded in the anticipating and responding processes.

To assess the extent to which emotions within the feedback-specific context have been studied, we reviewed previous publications. Recent studies (see [14,16,17]) have identified a discrepancy between students' expectations and the actual feedback they receive, which can cause an emotional response, supporting FEM's arguments [8,10]. Other studies found that feedback style and wording can elicit students' affective responses [18–21]. For example, if feedback is written in a generic manner, students may feel disgruntled and disappointed [22], and if feedback includes ambiguous questions, it may induce negative emotions [23]. Recent studies also suggest that negative emotions induced by feedback have worse effects than just impacting students' use of feedback [15,20]. Negative emotions

consistently hinder long-term learning [24] and may even affect students' identity and career decision-making [25–27]. Negative emotions also affect students' attitudes toward teachers and may lead to avoidance of teacher-student interactions [28]. Compared to negative feedback, it is worth mentioning an interesting study done by [29] to examine positive written comments in psychology students' four multiple-choice tests. A total of 140 Italian university students were randomly assigned to two conditions: one group ($n = 70$) received normal feedback, and the other received normal feedback plus positive written comments on four multiple-choice tests as part of their coursework. The researchers mainly assessed academic achievement through students' test marks. However, the results showed that the group with written approval did not outperform the group with normal feedback based on their test marks. The finding identified in [29] may not be surprising given that multiple-choice tests may primarily assess factual knowledge. In contrast, assignments commonly used in Chinese language education, such as essays, oral presentations, and projects, require detailed and constructive feedback that is essential to guide language students' acquisition of comprehensive linguistic knowledge and development of communicative competence. This usually involves applying linguistic concepts and requires contextual understanding. These features of language learning and demands for feedback may make negative feedback from language teachers more influential on language students' emotions. However, studies on how language students regulate emotions induced by teacher feedback are lacking.

FEM suggests that students' FO helps them regulate the emotions induced by negative feedback [8]. Recent research reported that feedback self-efficacy weakened the negative effects of sadness on performance [30]. Furthermore, ref. [31] emphasized the significance of social awareness in helping students manage their negative emotions and use feedback in an effective way. Students may be better able to control their emotions in reaction to feedback if they cultivate a positive FO and form close social relationships with their teachers. This could result in improved academic performance. For maintaining a positive teacher-student relationship, even when students perceived feedback as negative, they would work hard to please the teacher's request for performance improvement in these negative feedback comments [32]. A case study conducted by [33] would be one of the first to investigate the experiences and perceptions of feedback among five Chinese postgraduate students studying in UK higher education, with a focus on the affective and cognitive aspects of teacher feedback. Through the case study design with background interviews, stimulated recall, and retrospective interviews, ref. [33] found that students' engagement with feedback was a recursive process, where their cognitive understanding of the feedback moderated their affective reactions, providing valuable insight into the role of feedback in shaping students' emotional responses. However, their study lacks a solid conceptual framework to guide the research design and interpretation of the results. A comprehensive understanding of how students manage emotions induced by feedback may require a holistic framework to examine the complex interplay between the external feedback provided, students' perceptions and interpretations of that feedback, the emotional responses it elicits, and its impact on learning outcomes. The FEM provides just such a framework.

2.3. Feedback in Teacher Education

Several studies have explored the crucial role of feedback in teacher education programs. For example, a study done by [34] drew our attention to the issue of inadequate feedback quality in higher education contexts. An example solution to enhance feedback quality, ref. [35] underscored the importance of feedback as a two-way communication process that facilitates student progress. Ref. [36] examines the use of written comments as a form of feedback in higher education and their impact on student learning. Ref. [37] highlights the role of confirmatory feedback in catalyzing student teachers' growth. While [38] examined the role of video feedback in teacher education, ref. [39] study explored the impact of cooperating teachers' feedback on intern perceptions. In identifying individual correlates to feedback, ref. [40] explored the relationship between teacher self-efficacy and

feedback, focusing on peer feedback in education. Recently, ref. [41] introduced a case study on the use of mobile tools and video-enhanced observation for peer feedback in teacher education. Taken together, these studies indicate that feedback is a crucial component of teacher education and should be approached as a two-way communication process between teachers and students. Effective feedback helps students identify their strengths and weaknesses and provides guidance on how to improve [42]. The use of written comments, video feedback, and peer feedback are all potential avenues for enhancing the quality of feedback in teacher education. Notably, feedback has the potential to foster teacher self-efficacy, which can ultimately improve teaching effectiveness. Therefore, educators are encouraged to prioritize feedback in their teaching practices to provide an optimal learning experience for students in teacher education programs.

While the importance of feedback has been discussed in the above sections, research on this topic in the context of Chinese language education remains limited. Differences in feedback perceptions have been identified between Chinese and English language education [43–45]. Given the vast body of research on feedback in English language education [46,47] (for comprehensive reviews), there is a compelling need to investigate Chinese students' perception of teacher feedback and how it impacts their motivation and professional development. Such research is critical for enhancing language education practices in teacher education.

2.4. The Present Study

Feedback is a crucial component of language education, but its effectiveness depends on the recipients' willingness to actively seek it out, fully comprehend it, and effectively use it [1,8,48]. Negative emotions induced by feedback can hinder students' willingness to accept and use feedback, thereby impeding the learning process [14]. To improve language learning outcomes, it is important to develop more effective feedback practices that consider students' feedback orientation and how they regulate negative emotions in response to feedback. Therefore, this study aims to investigate how pre-service teachers in Chinese language education regulate their emotions in feedback-specific contexts and how their feedback orientation (FO) influences this process. By exploring the effects of FO on emotion regulation and feedback response behaviors, this study seeks to contribute to the development of more effective feedback practices in Chinese language education. Moreover, conducting this study within the context of Chinese language education will expand our understanding of feedback in Chinese language learning and its implications for effective teaching practices. To guide this qualitative study, two research questions were proposed:

- What emotions do pre-service teachers' experience when receiving critical or negative feedback in teacher education?
- How do pre-service teachers' four aspects of feedback orientation influence their emotion regulation in feedback contexts in teacher education?

3. Method

3.1. Research Context and Participants

Participants were pre-service teachers who undertook a five-year bachelor of Chinese education program comprising ten semesters across five academic years. The program incorporates professional training through school-based practicums at both the primary and secondary levels to prepare graduates to transition into the teaching profession as in-service teachers. There are usually three assessment tasks in each course. Taking the core course of Modern Chinese as an example, assessment tasks include (a) Group presentation on Chinese data analysis (20–25 min; 20%): The task requires students to select a linguistic topic in modern Chinese, collect and analyze data on this topic, and complete the presentation; (b) Exam (1.5 h; 20%): Students are tested on their basic knowledge of modern Chinese; (c) Project Report (2900 words; 60%): Students are required to select a modern Chinese text or discourse, use modern Chinese knowledge to analyze the language

characteristics of the text or discourse, and write a report. Oral feedback is provided during group presentations, whereas written feedback is provided on exams and written assignments. Lecturers' feedback addresses strengths and weaknesses as well as makes recommendations to improve presentation skills and teaching strategies. Students can also schedule individual meetings with lecturers to seek further feedback, review previous feedback, and discuss strategies to improve their learning.

Individual interviews were conducted, and participants were recruited via the convenience sampling approach at a local university. All students were selected from a feedback research project, and they were encouraged to participate by sending the invitation letter. Among the sample pool research gathered, thirteen pre-service teachers from Chinese language education programs responded to our invitation, and two of them dropped out for not showing up during the interview. Therefore, eleven participants remained, and all of their demographic information was introduced in Table 1, and researchers assigned each participant a pseudonym.

Table 1. Demographic information of participants in this qualitative study.

Student	Age	Gender	School Year
Lillian	22	Female	Year 5
Gwen	21	Female	Year 5
Queena	22	Female	Year 5
Linda	22	Female	Year 4
Zoe	22	Female	Year 4
Hedy	23	Female	Year 4
Yetta	21	Female	Year 4
Hannah	21	Female	Year 3
Hulda	21	Female	Year 3
Louis	21	Male	Year 2
Tiffany	20	Female	Year 2

3.2. Data Collection and Preparation

Due to the limitations posed by the COVID-19 pandemic, the researchers conducted semi-structured interviews through the Zoom video conferencing platform in the summer of 2020. This allowed for data collection to take place while ensuring the safety and well-being of all participants. Prior to the interviews, ethical approval was obtained from the Human Research Ethics Committee, and participants were informed of their rights, including the right to withdraw from the study at any time without fear of punishment or unfair treatment. The interviewer also ensured that the participants understood the purpose of the research before starting the interviews.

As suggested by [49], to ensure that data saturation was reached with the limited number of participants, we carefully designed the interview questions according to the FEM-specific context. The researchers utilized PowerPoint slides to present the interview questions in a synchronized manner with the verbal questioning, thereby ensuring consistency in the data collection process. Participants were encouraged to share their experiences and feelings until the research questions were fully addressed, and each interview lasted for approximately 60–75 min. Recognizing the one-hour time commitment required for interviews, we provided compensation of HKD70 per hour for participants. This incentive rate is based on our university regulations for hourly student assistance in research, which ethically acknowledges participants' time and effort to participate. Following the interviews, the audio recordings were transcribed and double-checked by independent coders to maintain transcription accuracy. The Chinese transcripts were then translated into English by the second author, with the accuracy of the translation double-checked by the first and last authors.

3.3. Data Analysis

Thematic analysis was chosen as the analytical method for this study. Thematic analysis is a widely used method for analyzing qualitative data, particularly in research that aims to identify patterns and themes in the data [50]. The process of thematic analysis includes multiple stages, including familiarization with the data, coding, and the generation of categories and subcategories. In this study, the second author performed the thematic analysis by first reading and familiarizing themselves with the transcripts. To ensure the reliability of the coding, the second author and the first author had multiple rounds of moderating meetings to discuss the coding results and key themes, reaching at least 80% consistency. The last author also read and commented on the appropriateness of the coding results in relation to their quality of reflecting key themes in this paper. Next, they highlighted essential reflections related to students' conceptualization of feedback, the negative emotions induced from the feedback, and emotion regulation strategies used in the feedback-specific context.

In the coding stage, these essential reflections were organized into codes that were guided by the FEM framework, including students' FO, the negative emotions induced within the feedback-specific context, and emotion regulation strategies related to the four FO factors (i.e., FBUT, FBSE, FBSO, and FBAT). In the third stage, categories and subcategories were generated based on the theoretical framework, and connections were examined and interpreted using FEM. The final themes that emerged from the analysis were: *receiving feedback and students' initial perceptions; students' reactions to negative feedback; the role of FO in regulating students' emotions; and other emotion regulation strategies used by students* (see also Table A1). These themes provide insight into the emotional experiences of students receiving feedback and how they use FO and other strategies to regulate their emotions. The results relating to these key themes are discussed in detail in the following sections.

4. Results

At the outset, we discussed the feedback that students received. They generally perceive feedback as grades or comments on assignments, such as essays or group projects. Additionally, seven out of eleven participants believe that individual or group consultations are the channels through which they can seek feedback from teachers, as Gwen (Year 5) stated: "The teacher will arrange consultations for us, in which we can ask any questions".

When relating teacher feedback to performance improvement, four participants recognized the helpfulness of feedback when we initially discussed the form of the feedback they received. Specifically, they believed that feedback helped improve their performance, and if they followed it, their grades would be higher. For example, Yetta (Year 4) stated, "If I communicate more with teachers and listen to their suggestions, my final essay grade will be higher". They also found feedback helpful in understanding teachers' expectations and standards. As Queena (Year 5) explained, "Most of the time, we don't have directions in lecturing, writing, and assessment and such things, especially in more formal essay writing. We lose our direction in the writing easily. Teacher's feedback can be a guidance".

Moreover, feedback does not only benefit students' academic achievement in higher education. Hulda, Hedy, and Linda believe that feedback enhances their career development, given that they regard teachers as more experienced than them. As Linda (Year 4) said, "The teacher's feedback is more intuitive, affecting students' improvement and revision afterward, or the feedback might be helpful for the following assignment or career practice". In sum, students generally recognized feedback's usefulness for their performance improvement and professional academic development. As one of the core aspects of feedback orientation, how feedback usefulness helps participants regulate negative emotions induced by feedback is reported in Section 4.3. The below section concisely reports these participants' initial reactions to negative feedback.

4.1. Students' Initial Reactions to Critical/Negative Feedback

Students mentioned various negative emotions, such as unhappiness, sadness, a sense of loss, anger, anxiety, and disappointment, as a result of receiving negative feedback from teachers. This finding aligns with previous research showing that negative feedback can induce a range of negative emotions in students [20,51,52]. Students' reflections support the FEM (Figure 1) that students often develop expectations prior to receiving feedback based on their self-assessments. When teacher feedback falls below these expectations, it can induce negative emotions like disappointment, anxiety, and shame. As Lilian (Year 5) explained, "I have an anticipation of where my subject's grade will be. If the teacher gives me feedback that is not as good as I expected, I would feel down then".

Apart from the discrepancy between negative feedback and good performance as perceived by students themselves, unreasonable teacher feedback can lead to feelings of anger and mistrust towards the feedback. As Lillian (Year 5) stated, "If I think the evaluation or comment is unreasonable and the teacher still believes I'm wrong after my explanation, I would feel a little bit angry". Additionally, students' perception of the significance of the task (i.e., high stake vs. low stake) can moderate their potential negative emotions. Two students reported feeling anxious and angry upon receiving negative feedback that indicates poor performance in high-stakes tasks. For example, Lilian shared "If I know the critical feedback has something to do with my (final) report's grade, I will feel anxious". Similarly, Quenna expressed her unhappiness and self-doubt after receiving extremely low grades, and she still has a strong personal resistance towards that teacher.

4.2. The Role of Students' FO in Emotion Regulation

Regarding the role of students' FO in emotion regulation, we conducted retrospective interviews to investigate whether FO helped participants regulate negative emotions induced by feedback and its mechanisms. All students reported that their FO could release their unhappy feelings to some extent by reappraising or suppressing the feeling, and at least one aspect of their FO was activated during this process. Table 2 presents some keywords from students' sharing of how their emotions could be affected and managed by their FO. Through our coding of student responses, we found that all eleven students recognized the crucial role of feedback usefulness (FBUT) in regulating their negative emotions triggered by negative feedback, followed by FBAT (6/11). Based on students' sharing, FBSO and FBSE were equally effective in helping five out of 11 students reduce negative emotions caused by negative feedback.

Specifically regarding FBUT, students were able to interpret feedback as valuable and beneficial for improving their performance. This allowed them to focus on using the feedback to improve their work rather than perceiving the teacher's intention in giving feedback as negative. Recognizing feedback's value in promoting learning, even when critical, enabled students to effectively cope with negative emotions and accept the feedback. As Louis (Year 2) explained, "Both positive and negative feedback must be valuable to me because they are critical parts of the teaching process. Therefore, this idea supports me to fight against these negative emotions". Tiffany (Year 2) also shared a similar sentiment, saying, "I think when I realize feedback improves my performance and it is valuable, this belief can ease my (negative) feelings".

Table 2. Sample quotes from the 11 students' perceived effectiveness of FO in helping students regulate negative emotions.

	FBUT	FBSE	FBSO	FBAT
Lillian	"The teacher gave the feedback not to criticizing, and he hoped my performance can be better".			"I believe students are responsible for responding to the feedback"
Gwen	"If it (feedback) improves my work, why don't I accept it?"	"My self-efficacy helps me not to feel so bad".		
Queenia	"I think the teacher's feedback is valuable . . . so I would not think it is denying me".			
Linda	"Valuable feedback must be helpful to my grades"	"I can still make revisions during the process and improve".		"I would focus on how I should revise"
Zoe	"Comments that could help me do better"		"I could sense my teacher was intended for me to become better"	
Hedy	"Feedback is helpful to my study"	"I feel I can use it, and it improves my performance if I use it"		
Yetta	"It (useful feedback) helped me to avoid the worse grade".		"The teacher didn't give me negative feedback intentionally just to make me feel bad".	"I feel responsible for responding to it, because achieving the grade is my own thing".
Hannah	"The comments are valuable for me to reconsider and comprehend the learning content deeper".			"I should respect my teacher's time and effort to respond to the feedback".
Hulda	"The teacher's feedback must be reasonable"		"I can improve the relationship with my teacher"	
Louis	"Feedback must be valuable to me"	"I know that I can respond to it"	"I always believe that the nature of feedback is communication, so no matter what feedback I received, my teacher gave with the good intention".	"If I ignored it, the feedback is meaningless"
Tiffany	"Feedback improves my performance and it is valuable"	"The confidence to respond to the feedback helped me to feel satisfied a little".	"I know I can improve the relationship between my teacher and me".	"I think my responsibility mobilized me to respond to the feedback"

Furthermore, we found that students' perceived self-efficacy in responding to feedback (FBSE) could mitigate their negative emotions by enabling them to recover quickly. As Louis (Year 2) explained, "If I feel I'm capable of responding to the feedback, negative emotions will be lightened, and I can recover from them faster". Students also felt that FBSE reduced the perceived difficulty of responding to feedback, as Linda (Year 4) shared, "Teacher give feedback during the process I'm doing the assignment, and I feel I'm capable to respond to the feedback to make my following performance better . . . then I feel better". Our findings support previous research indicating that FBSE helps individuals adjust their negative emotions induced by negative performance feedback [30]. Additionally, we found that perceived self-efficacy in dealing with negative feedback encouraged students to respond to feedback without the need for negative emotion regulation. As Gwen (Year 5) explained, "I would keep using negative feedback if I feel confident to use it". In summary, our participants' responses provided valuable insights into how FBUT and FBSE help regulate negative emotions.

As for the role of FBSO, five participants in our study reported that they responded to negative feedback from their teacher, and their negative emotions were regulated by their FBSO. Two of these participants, Hulda (Year 3) and Tiffany (Year 2), indicated that they continued to use the feedback that initially aroused their negative emotions. Both participants explained that they wanted to impress their teacher by carefully responding to the feedback. Hulda (Year 3) also expressed a desire to improve her relationship with her teacher, which aligns with the finding of [26], observing that "feedback impacted faculty-student relationships. It was clear that students worked hard to please their instructors and when they interpreted feedback negatively" (p. 307)". In contrast, three participants described how their FBSO helped to mitigate their negative emotions by re-interpreting the teacher's intentions underlying the feedback. These participants were able to infer the teacher's effort and responsibility from the feedback they received, which reduced the intensity of their negative emotions. As Louis (Year 2) explained, "I always believe that the nature of feedback is communication, so no matter what feedback I received, my teacher gave it with good intentions". However, we also found that the effects of FBSO could sometimes lead to a worse condition. Lillian (a Year 5 student) shared that if she had to accept negative feedback reluctantly for the sake of considering the teacher-student relationship, she might experience even more negative emotions.

Regarding the role of FBAT, we found that although students' sense of responsibility to respond to feedback might not directly regulate their negative emotions, it can motivate them to engage constructively with negative feedback despite those emotions. Five participants reported that their FBAT effectively urged them to respond to negative feedback because they believed that students have a responsibility to respond to feedback, whether it is positive or negative. Lillian (a Year 5 student) explained, "I will use negative feedback because it is the responsibility of students. For this reason, my negative emotions will be reduced". However, two students expressed different opinions, as they did not believe that students have an absolute obligation to address their teacher's feedback. Thus, their FBAT, according to their reflections, had no effect on regulating their emotions. Queena (Year 5 student) explained, "I might achieve my task at 90, and teachers can help me improve to about 95. However, it is not absolutely necessary for me to do so as it is not my responsibility".

In summary, these findings suggest that the other two aspects of feedback orientation, FBSO and FBAT, also play important roles in helping students regulate negative emotions in response to negative feedback from their teachers. However, it is also important to note that the nature of these effects could be complex, as the same mechanisms that reduce negative emotions in some students might not operate identically for others.

4.3. The Indirect Role of FO in Emotion Regulation via Students' Appreciation of the Meaning and Value of Feedback

FO could also indirectly reduce negative emotions by encouraging mindful processing of feedback (stage 2 conceptualized in FEM), leading to the development of an appreciation for the meaning and value of feedback. This appreciation of feedback's positive, long-term impact can help regulate negative emotions as students reflect on feedback. This finding lends support to the appreciating feedback aspect of the concept of feedback literacy [53] in terms of its emotional impact. Reinterpreting negative feedback to develop a constructive understanding of its value and purpose can also aid in regulating negative emotions. Notably, this cognitive reframing may differ from how FBUT operates directly, as this reframing may be activated during students' high level feedback processing. Participants also reflected that cognitive reappraisal of negative feedback did not necessarily happen during the learning process, but rather during self-reflection upon course completion. Looking back at feedback, students can realize its importance in the learning process, leading to reduced negative emotions. As Louis (Year 2) explained, "The course would come to an end eventually. When you look back at the teacher's positive and negative feedback, you will feel it is very important to help you in the whole learning process, then the emotion will no longer exist".

In summary, there are several essential ways in which they perceive the four aspects of feedback orientation as helpful in regulating the negative emotions of pre-service teachers in Chinese language education. The possible ways are as follows: First, pre-service teachers acknowledge the value of feedback: Many students in our interviews recognized the importance of feedback in improving their performance and grades. They perceived feedback as a valuable tool for helping them identify areas for improvement and guiding them to make revisions during the learning process. There are two sub-functions where this acknowledgment can help pre-service teachers effectively respond to critical feedback: (1) focusing on the intent to help them improve can regulate negative emotions that may arise. This shifts their attention from the criticism itself to the useful information aimed at growth; and (2) viewing the feedback as information rather than a judgement of their abilities can move them from a fixed to a growth mindset, seeing it as a positive opportunity for development. Their focus on improvement rather than criticism could reduce the negative emotions induced by negative feedback. Third, students' perceived capability of using feedback can also be a positive way of enhancing their personal control to manage feedback and the negative emotions they may infer from receiving negative feedback. Last but not least, students' perceived responsibility for their own learning also contributed to their sensitivity to negative emotions associated with negative feedback, see also [54]. Being responsible for their learning further helped students recognize the constructive value of feedback in helping them improve academic performance and engage in the learning process of Chinese.

4.4. Other Strategies to Regulate Negative Emotions

4.4.1. Seeking Further Feedback

One commonly used strategy for regulating negative emotions was seeking additional feedback from teachers to clarify the meaning of the feedback received. This behavior was found to reduce students' initial negative emotions from prior negative feedback, which supports the findings of [32]. As Hannah (Year 3) shared, "If I don't quite understand something in the feedback, I'll ask the teacher again to clarify to avoid feeling bad". Additionally, students mentioned that the teachers' comfort they experienced in seeking further feedback also helped their management of negative emotions. For instance, Lillian (Year 5) said, "Sometimes I think the teacher's feedback or comments are unreasonable, then I will let him/her know, or I think maybe he/she misunderstood me. I will find the teacher to explain why I did this (in my performance). Then I'll wait to see if the teacher can give me new feedback according to my explanation of my performance".

4.4.2. Peer Support

Four students reported seeking emotional support from peers by expressing their negative emotions and discussing the received feedback with their friends. Lillian (Year 5) stated, “If I feel unpleasant, I choose to talk to my friends about the teacher. And we will judge the teacher together, and this process can help me to vent the feeling of anger”. Some students also explicitly expressed their feelings about negative feedback to group members. Students found that expressing feelings to friends provided a sense of ‘validation’ and alleviates the feelings of being “bad”. Louis (Year 2) said, “Everyone in the same group received the same negative feedback. We would resolve this negative emotion by sharing our complaints in the group”. Linda (Year 4) shared, “I talked with my friend when I feel bad . . . It is a little bit odd, because every time I expressed to me friend, I felt better”. In general, sharing negative emotions with peers serves as an “emotional outlet” that helps reduce the intensity of those feelings. Discussing with peers their shared experience in the same situation generates a sense of community that alleviates some of the negative impact induced by negative feedback.

5. Discussion

The results of the current study showed that negative emotions are induced by negative feedback, especially when it does not match students’ expectations. Moreover, pre-service teachers in this study shared their emotion regulation strategies during the interviews. Through the lens of FEM (see Figure 1), all students perceived their lecturers’ feedback as valuable and useful information for performance improvement (i.e., FBUT), and their FBUT further played a significant role in regulating the negative emotions arising from negative feedback. In the following section, we discuss the qualitative findings thoroughly.

5.1. Receiving Critical/Negative Feedback and Dealing with Emotions

First of all, we examined how negative emotions were generated from negative feedback. Eleven participants responded that when feedback failed to meet their expectations, negative emotions (e.g., upset, disappointment) were evoked. The results supported previous researchers’ observations [15,55] that the inconsistency between individuals’ expected outcomes (or anticipation of their learning) and the external feedback they received may trigger unpleasant emotions (e.g., anger and shame). In addition, we also noticed that students’ evaluation of the importance of the given tasks would also moderate their emotions. As suggested by [56,57] when a failure might happen and the consequences of failure are harmful (e.g., being at risk of failing in an important examination), anxiety can be induced (i.e., the control-value theory).

5.2. FO’s Important Roles in Emotion Regulation

In our current study, we have found that FO plays a significant role in regulating negative emotions resulting from critical or negative feedback, which is consistent with recent research [26,30]. Among the four key aspects of FO, FBUT was the most frequently mentioned aspect when participants were asked how they managed their negative emotions. Students reported that perceiving critical/negative feedback as useful in improving their performance led to a decrease in their negative emotions, and FBUT facilitated emotional reappraisal by reframing feedback as a means of improving performance rather than personal criticism (as illustrated in Figure 2). Additionally, FBSE and FBSO, as two aspects of feedback orientation, were found to have unique roles in helping students regulate their negative emotions. Our findings also suggest that students’ responsibility to actively seek and use teacher feedback matters, supporting the concept of “new paradigm feedback” in higher education [57]. The mapping analysis results of our qualitative study on the FEM are presented in Figure 2, and a detailed discussion of the findings is presented in our subsequent sections. The results from our qualitative study are mapped onto the Feedback Ecological Model, visually summarized in Figure 2, with an in-depth discussion in subsequent sections.

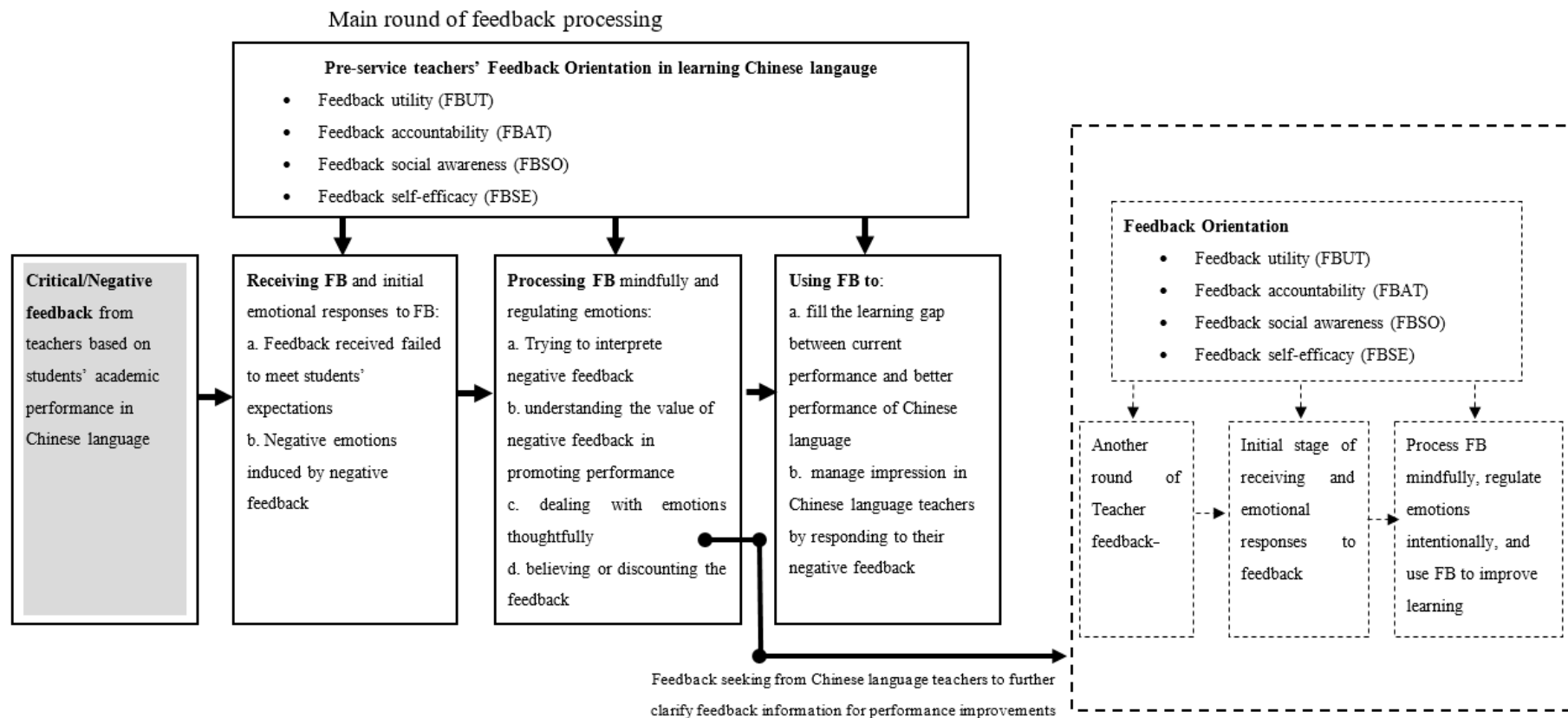


Figure 2. The qualitative results of this study provided preliminary empirical support for the conceptual links depicted in Figure 1. *Note:* The area with dotted lines indicates another potential round of feedback processing that may be facilitated by students' feedback seeking and teachers' further feedback provision as indicated by the qualitative results on the left side.

5.3. Feedback Seeking from Teachers to Form Dialogical Feedback

In addition to the emotional reappraisal stimulated by individuals' FO, seeking additional feedback from teachers is widely used by students as a strategy to regulate their negative emotions induced by feedback. Three participants reflected that they would seek a second or third round of feedback from teachers based on the first round to resolve misunderstandings and clarify what their teachers expected them to improve. Seeking and interrelating teachers' additional feedback assisted students in acquiring a better understanding of teachers' feedback information and intentions for their improvement. We found that this approach can help students focus on taking action rather than dealing with their emotions. Furthermore, a student mentioned that teachers were aware of her emotions when she sought a new round of feedback, and the teacher would console her. Both comfort and feedback from teachers helped students understand the feedback clearly to improve performance and reduce their negative emotions. Feedback receiving and further feedback-seeking also help teachers and students create a feedback loop [58] or promote dialogic feedback, as advocated in the new paradigm of feedback in higher education [57].

Considering the significant role of perceived feedback usefulness and active feedback-seeking strategies among pre-service teachers, it can be assumed that a positive feedback culture exists in the Chinese language programs selected by these teachers. However, to better understand how to develop more effective language training programs that meet their professional needs, further interviews are necessary not only with pre-service teachers, but also with their lecturers/teacher trainers in teacher education. Specifically, further research could explore how to cultivate a high level of feedback orientation in a positive feedback culture that encourages students to seek, perceive, and use feedback. This also align with the calling for advancing research on effective feedback practices with a focus on activating student agency e.g., [5,23,57].

5.4. Implications and Future Directions

5.4.1. To Emotion Regulation Research in the Feedback Context

Cultivating adaptive regulation strategies has been a critical concern in emotion regulation research for the past two decades (e.g., [59,60]). While cognitive reappraisal has been identified as a commonly used emotion regulation strategy to help individuals re-evaluate negative emotion-eliciting situations, little research has been conducted in the feedback context to assess the roles of students' feedback perceptions in helping them regulate negative emotions induced by negative feedback (see also [20] for a similar argument). Although this study used a small sample size, it provided valuable insights into the role of feedback orientation in regulating negative emotions in pre-service teachers in teacher education (see Table 2). This study extends the general scope of cognitive reappraisal in traditional emotion regulation literature to more concrete steps for regulating negative emotions in the feedback context. Students were able to regulate emotions by interpreting feedback as useful for learning improvement (feedback utility), holding positive beliefs in their capability to respond to feedback (feedback self-efficacy), and feeling responsible for using feedback (feedback accountability). Additionally, building a good student-teacher relationship through acting on teacher feedback (feedback social awareness) was also found to play a role in regulating emotions. Furthermore, the impact of each feedback orientation factor on regulating students' emotions might be different, which would be a meaningful area worth systematic investigation in future research.

Future studies should expand the sample size to incorporate more pre-service teachers and students from diverse disciplines to develop a more holistic understanding of the role of feedback orientation in mitigating negative emotions elicited by critical feedback. Taking into consideration larger and more heterogeneous groups of students, scholars can further explore the role of feedback orientation in regulating feedback-induced emotions, which would significantly contribute to this important area of inquiry.

This consideration could include students from different disciplines, backgrounds, and cultures, as well as students at different levels of education (e.g., graduate students).

By doing so, researchers could gain a more comprehensive understanding of how feedback orientation relates to emotion regulation in the academic context. Future research could also explore the effectiveness of different feedback orientation interventions designed to promote adaptive emotion regulation strategies among students. For example, researchers can investigate whether providing feedback that emphasizes its utility for learning improvement (i.e., feedback utility) or that emphasizes students' responsibility to use feedback (i.e., feedback accountability) helps reduce the negative emotional impact of feedback. It would also be worthwhile to examine the relationship between feedback orientation and other variables (e.g., self-esteem, academic resilience, and career orientation) that may collectively influence students' emotional responses to and actions upon feedback. Understanding how these factors interact with feedback orientation could provide valuable insights to tailor support mechanisms for individual students to regulate their emotional responses to feedback that may either facilitate or obstruct their response to maximize learning outcomes.

5.4.2. To Explore the Construct of Feedback-Specific Emotions

Regarding the expansion of empirical research exploring the influence of emotions on feedback, it is imperative to consider feedback-specific emotions when designing quantitative studies to test relationships between feedback orientation and feedback-specific emotions. Through the lens of control-value theory [57,61] would be the first study to examine the relationships between the competence (feedback self-efficacy) and value (feedback utility) dimensions of feedback orientation and learning-related emotions in over 3000 secondary Chinese students. The findings demonstrated statistically significant and positive associations between feedback self-efficacy and utility and students' positive emotions (enjoyment, hope, and pride) in learning contexts. However, learning contexts would be broader, and research on feedback-specific emotions remains limited. Explicit investigations of feedback-related emotions would contribute more to understanding the links between FO and emotions evoked by feedback, which would support the development of tailor-made intervention programs that promote effective emotional regulation strategies in feedback contexts. Therefore, instructional designs and enhancement programs on feedback utility, which play a significant role in helping students regulate feedback-related emotions, may help students enhance academic performance while reducing negative emotions [16,62].

The finding on the role of feedback social awareness in managing emotions is aligned with a core argument by previous feedback research [59] that developing quality student-teacher partnerships is necessary to foster productive student feedback experiences. Therefore, further research can investigate the effectiveness of intervention programs aimed at enhancing social feedback awareness, promoting productive feedback experiences, and reducing negative emotions. Such programs can be designed to help students develop a better understanding of the importance of building good student-teacher partnerships and how this can positively impact their feedback experiences. These programs can also provide practical strategies for students to engage in effective communication with their teachers, such as seeking clarification and guidance when necessary, and using feedback as an opportunity to build relationships rather than a source of stress or anxiety.

5.4.3. To Advance Feedback Research in Teacher Education

From an educational standpoint, feedback is widely recognized as a critical component of language pedagogy, with research investigating various types of feedback, including written corrective feedback [63,64] and peer feedback [65,66], and their effects on language acquisition. From the perspective of students and psychology, growing research focuses on pre-service teachers' perceptions of feedback and its impact on language education given the pervasive use of feedback in second language classrooms. The current study's findings on the role of feedback orientation in facilitating emotion regulation also inform feedback literacy research [53]. The study found that key aspects of feedback orientation (e.g.,

feedback utility and self-efficacy) helped students manage emotions by promoting their mindful processing of feedback, providing empirical support for calls to nurture feedback-literate learners [53,58]. By highlighting the role of feedback orientation in regulating emotions and fostering understanding of feedback, this study could inform feedback literacy research by suggesting potential interventions or strategies that could promote feedback literacy. For example, interventions that promote FO could be designed to help pre-service teachers better appreciate and process feedback with a growth mindset that treats critical feedback as a chance to learning improvement than a threat to ego, which in turn could help them regulate their emotions when receiving negative feedback comments from various learning tasks. Furthermore, this study's finding that cognitive reappraisal of feedback can help regulate negative emotions can also be useful for enriching the aspect of 'managing emotion' in the feedback literacy framework [53]. This finding suggests that interventions of growth mindset (see a systematic review by [67]) target at providing guidance that focuses pre-service teachers on the processes and effort needed to improve, rather than judging innate ability, and communicating to pre-service teachers that intelligence and skills of acting on feedback are not fixed traits but can be cultivated through feedback strategies (see detailed guidance in [68]). As a consequence, reframing negative feedback with a positive mindset in light of the empirically derived competency framework suggested by [68] could equip feedback literate pre-service teachers with the knowledge and skills they require to perform language teaching effectively in the classroom.

5.4.4. To Further Test and Modify the Conceptual Framework of Feedback Orientation

This study has a theoretical contribution in terms of examining the conceptual framework of feedback orientation [8] in the context of Chinese language education research through a qualitative research approach. This perspective has not been previously considered in higher education. Given the dominance of feedback research in English language education, this study has its significance in exploring pre-service teachers' feedback orientation and the relationships between FO, emotions, and emotion regulation. Based on the findings, this study makes several theoretical contributions to the context of Chinese language education research. First, it expands the use of FO research in this context, which had not previously been explored. The study provides evidence of the relevance and applicability of feedback orientation in understanding Chinese language education students' feedback orientation and its relationship with emotions and emotion regulation. Second, the study highlights the importance of considering feedback-specific emotions when investigating the relationship between feedback and emotions. By explicitly investigating feedback-related emotions, this study contributes to a comprehensive understanding of how feedback orientation can be used to promote effective emotion regulation strategies in feedback contexts. Third, the study identifies the four dimensions of feedback orientation (utility, self-efficacy, accountability, and social awareness) that are most relevant for promoting effective emotion regulation strategies. This understanding can inform the development of tailored interventions aimed at enhancing feedback orientation in students, facilitating the paradigm shift from receiving feedback as external information only to processing feedback mindfully (see also [69]). Finally, the study suggests that students' emotion regulation in the feedback context could be a dynamic process that involves students' understanding and processing the received feedback, as well as actively seeking more feedback to better understand teachers' critical/negative feedback. This feedback loop, which might be triggered first by negative feedback, can be utilized to promote productive feedback experiences for students by nurturing their high level of feedback orientation. This finding contributes to the ongoing dialogue on effective teaching and learning design considerations to facilitate effective dialogical feedback [54,55].

Future research could replicate this study with a larger and more diverse sample to enhance the generalizability of the findings. Second, research could investigate the relationship between feedback orientation, emotions, and emotion regulation across different educational contexts to gain a more comprehensive understanding of how these concepts

interact. Third, future research could investigate the potential benefits of incorporating feedback orientation and emotion regulation strategies into educational interventions aimed at promoting feedback literacy. Both feedback orientation and feedback literacy are important concepts in educational assessments that highlight the pivotal role of feedback in learning and emphasize the importance of developing skills to manage emotions and take action based on feedback. For example, interventions could be designed to promote a growth mindset towards feedback, encourage students to actively seek feedback, and provide students with guidance to manage their emotions when receiving feedback [17,67,68].

5.5. Limitations

This study made theoretical contributions to the field of Chinese language education research by highlighting the importance of considering feedback-specific emotions, identifying the relevant dimensions of feedback orientation, and acknowledging the dynamic and proactive nature of students' emotion regulation processes. However, this study also has some limitations. First, the sample size was relatively small, which may limit the generalizability of the findings. Second, the study focused solely on pre-service teachers, and future research could explore the relationship between feedback orientation, emotions, and emotion regulation in other educational contexts among different learner populations. By resolving these constraints and pursuing these future directions, feedback researchers can further advance the current understanding of the role of feedback orientation and emotion regulation in promoting effective learning experiences through feedback. In particular, examining emotion regulation strategies in the context of assessment feedback across educational contexts and learners could inform productive interventions to enhance students' high levels of feedback orientation and feedback literacy skills. As discussed in the previous section, future investigations could build upon the current study's findings and extend its research design by addressing its limitations and exploring new research avenues.

6. Conclusions

This study highlights the significant role of feedback orientation in facilitating effective emotion regulation among pre-service teachers facing evaluative feedback. The findings reveal that students' emotional responses to negative feedback are influenced not only by the feedback content itself but also by their own perceptions of the feedback provided by teachers. By developing emotion regulation skills like cognitive re-framing and social support-seeking, students can mitigate the negative emotions caused by feedback. Educators should consider students' feedback orientation and promote the development of emotion regulation skills to support effective feedback uptake and emotional wellbeing. Future studies can extend the current study design to diverse disciplines in higher education and different educational contexts to assess how feedback orientation and emotion regulation develop over time and evaluate interventions that nurture adaptive feedback processes from a motivational perspective to promote students' engagement with feedback.

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Appendix A

Table A1. Themes and brief descriptions based on our data analysis results.

Key Themes	Brief Description
Receiving feedback	We introduced how students initially perceived, experienced and reacted to feedback received from teachers.
Reactions to negative feedback	We explained how students regulated emotions and responded emotionally, cognitively and behaviorally to negative feedback
Role of feedback orientation (FO) in emotion regulation	We articulated the role of students' multiple aspects of FO (e.g., utility, self-efficacy, responsibility) in helping them managing feedback-induced emotions through interpretation, meaning-making and behavioral responses
Additional emotion regulation strategies	We reported other cognitive and behavioral strategies students utilized to regulate negative emotions induced by teacher feedback.

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