The Relationships Between the Growth Mindset, Writing Feedback Literacy, and Feedback Engagement of Undergraduate Students in L1 Chinese Writing Learning

Abstract

While the body of research on student feedback literacy in the field of education is growing, the impact of such literacy on feedback engagement in L1 writing education remains relatively unexplored. Moreover, the potential influence that a growth mindset, which serves as a motivational factor, has on student feedback literacy has yet to be thoroughly investigated. In light of these gaps, the present study sought to investigate the relationship between a growth mindset, student writing feedback literacy, and feedback engagement. A sample of 236 sophomore English major students from a Chinese university was recruited. Employing path analysis, the study revealed that having a growth mindset was positively associated with all five features of student writing feedback literacy: appreciating feedback, acknowledging different feedback sources, making judgments, managing affect, and taking action. Moreover, the study revealed a nuanced relationship between students' writing feedback literacy and their feedback engagement, with different features of writing feedback literacy having differential associations with distinct dimensions of feedback engagement. The study contributes to the literature in three ways. First, it expands our knowledge of the relationship between student feedback literacy and feedback engagement by delving deeper into the one-to-one association between different features of writing feedback literacy and various dimensions of feedback engagement. Second, it advances our understanding of how a growth mindset is related to shaping students' feedback literacy. Finally, it provides evidence supporting the construct validity of the student writing feedback literacy scale in L1 writing.

Keywords: student writing feedback literacy; feedback engagement; growth mindset

Given its crucial role in promoting students' writing development, the issue of feedback on student writing has recently been a hot topic for both scholars and educators (e.g., Yu et al., 2022, 2023; Zhang & Mao, 2023). Although our understanding of the leveraging feedback

mechanisms for student learning remains inconclusive (e.g., Carless & Boud, 2018; Chong, 2022; Zhan, 2022), scholars have underscored the significance of fostering "students' ability to evaluate and use feedback, and to self-regulate their cognitive and affective reactions" (Yu & Liu, 2021, pp. 1–2), an ability commonly known as *student feedback literacy*, in promoting student learner agency throughout the writing feedback and learning process (e.g., Yu & Liu, 2021; Zhang & Mao, 2023; Zhang-Wu, 2023).

Nonetheless, research concerning this "emerging concept" (Nieminen & Carless, 2022, p. 1) is scarce. Notwithstanding initial investigations into the characteristics, underlying construct, and developmental trajectory of student feedback literacy (e.g., Li & Han, 2022; Yu et al., 2022; Zhang & Mao, 2023), there remains a lack of understanding regarding its impact on students' feedback engagement in learning to write. Feedback engagement, which pertains to the way in which students respond to feedback, is considered the linchpin that connects student feedback processes with learning benefits (Mao & Lee, 2023; Zhang & Hyland, 2022). Hence, an empirical investigation is imperative for elucidating the relationship between student feedback literacy and feedback engagement.

Moreover, given the growing recognition of the role of individual student factors in shaping feedback practices in writing instruction (Yu & Liu, 2021; Yu et al., 2023), it is important to consider the potential relationship between students' beliefs as learners and their feedback literacy. One particular learner belief of interest is the growth mindset, which, as a motivational belief, has frequently been associated with positive educational outcomes (Authors, 2021a, 2021b, 2022b; Xu, 2022). However, insufficient scholarly attention has been given to its relationship with student feedback literacy.

To address these gaps, the current study built primarily upon Yang's (2021) comprehensive feedback framework and sought to investigate the relationships among student growth mindset, student writing feedback literacy, and student feedback engagement in the context of L1 Chinese writing. Specifically, this study endeavored to scrutinize the process of the internalization of external feedback into learning opportunities, with the aim of unraveling how different features of student writing feedback literacy might be related to various dimensions of feedback engagement in a one-to-one manner and how having a growth mindset could serve as a motivational factor that is connected to the various features of student writing feedback

literacy. The results of this study contribute to the advancement of existing knowledge on student feedback literacy and engagement and provide insights for educators on how to motivate students in the feedback process.

Literature Review

Student Writing Feedback Literacy

Drawing upon earlier notions of academic literacies (e.g., Lea & Street, 1998), Sutton (2012) defined student feedback literacy as the "ability to read, interpret, and use written feedback" (p. 31). Research has since expanded on this concept in various areas of education, exploring its features from diverse theoretical perspectives, including social constructivism (Carless & Boud, 2018), learner-centered approaches (Molloy et al., 2020), socio-material perspectives (Nieminen et al., 2022), and ecological perspectives (Zhan, 2022). Scholarly inquiries into student feedback literacy with different conceptualizations and features have contributed to a more nuanced understanding of its multifaceted nature and its importance for student learning and development in education.

The domain of writing education, however, is still at the nascent stage of comprehending this budding concept (Zhang & Mao, 2023). Yu and Liu (2021) proposed that student feedback literacy encompasses learners' comprehension and evaluation of feedback as well as their self-regulation of their learning process; they introduced an evidence-based framework that emphasizes the essential knowledge base and dynamic interactions with teachers and peers required for the development of feedback literacy in academic writing. Han and Xu (2021) and Li and Han (2022) took a further step to explore feedback literacy in specific writing contexts, such as L2 writing, characterizing it as comprising of the cognitive and social-affective capabilities and dispositions that enable students to engage with feedback in L2 academic writing. Recently, Yu et al. (2022) conceptualized L2 student writing feedback literacy as "students' knowledge, beliefs, practices, abilities, and skills regarding how to appreciate, evaluate, and use L2 writing feedback and manage their emotions in this process" (p. 3). To evaluate this construct, they worked with 1,868 Chinese undergraduate students to develop and validate their L2 Student Writing Feedback Literacy Scale (L2-SWFLS). The results of their confirmatory factor analysis (CFA) revealed five features of L2 student writing feedback literacy: (a) appreciating feedback (i.e., how students perceive the value of feedback and their

roles in the feedback process), (b) acknowledging different feedback sources (i.e., how students understand the learning benefits from different sources of feedback), (c) making judgments (i.e., how students evaluate their own and others' work), (d) managing affect (i.e., how students regulate their emotions during the feedback process), and (e) taking action (i.e., how students act on the feedback they have received).

We opted to utilize Yu et al.'s (2022) conceptualization of student writing feedback literacy and their corresponding L2 scale for two reasons. First, the scale has undergone rigorous empirical validation, aligning with prior research emphasizing the multidimensional aspects of feedback literacy (e.g., Carless & Boud, 2018). Second, this scale is specifically tailored to the feedback processing within academic writing context, making it highly contextually relevant for our study compared to scales designed for broader educational contexts.

A Growth Mindset and Student Writing Feedback Literacy

In recent years, interest in developing student-centered feedback modes for writing has been increasing (Yu & Liu, 2021). Research has highlighted individual-student factors, such as subject knowledge (Li & Han, 2022) and learner beliefs (Han & Xu, 2021), that can play a role in shaping students' writing feedback literacy. Of these, learner beliefs are particularly important because they represent individual socio-affective dispositions that are closely linked to students' willingness to develop their writing feedback literacy (Han & Xu, 2021). However, one type of learner belief that has not been explored extensively is language mindset, which refers to students' beliefs about their own language abilities (Lou & Noels, 2017, 2019). Generally, there are two types of language mindset: a fixed mindset and a growth mindset. Students with a fixed mindset tend to believe that their language abilities are innate and unchangeable, whereas those with a growth mindset believe that their language abilities can be developed through effort and effective learning strategies (Lou & Noels, 2016; Papi et al., 2019). The growth mindset is of particular interest in our context because it acts as a motivational belief that has frequently been linked to positive language learning experiences and outcomes (Authors, 2021a, 2021b, 2022b; Xu, 2022).

Recent research has suggested that a growth mindset is connected to various features of student writing feedback literacy. For example, students with a growth mindset tend to perceive feedback as being helpful and motivational for their writing development (Authors, 2021a),

and they demonstrate deliberate feedback-seeking behaviors (Authors, 2022b; Papi et al., 2019; Xu & Wang, 2023). Such findings indicate that a growth mindset may be associated with students' writing feedback literacy by fostering an appreciation for feedback and taking action, which are two important aspects in the L2-SWFLS proposed by Yu et al. (2022).

Furthermore, Papi et al. (2020) found that students with a growth mindset may seek feedback from multiple sources, including teachers and peers, to enhance their learning, and such seeking behavior may point to the relation of a growth mindset with students' writing feedback literacy in terms of the students' acknowledgment of different feedback sources. In addition, empirical research suggests that students with a growth mindset tend to view written corrective feedback, which indicates the errors or shortcomings of a piece of work, as an opportunity to improve their competencies (Lou & Noels, 2019; Papi et al., 2020). This finding suggests that students with a growth mindset may be more active in making critical evaluations in feedback processes for the purpose of improvement—the so-called "making judgments" in the L2-SWFLS.

Moreover, students with a growth mindset are inclined to exhibit an optimistic response toward negative emotions stemming from evaluations or challenging situations (Authors, 2021b; Lou & Noels, 2017). This optimism suggests a possible link between a growth mindset and an enhanced capacity for emotion regulation, thus highlighting the potential connection of a growth mindset with students' writing feedback literacy in terms of managing affect.

Taken together, these enlightening findings indicate that a growth mindset may indeed be linked to the five aspects of students' writing feedback literacy as defined by Yu et al. (2022). Nevertheless, these findings were drawn from separate studies, and thus a comprehensive analysis is needed that investigates the effect of a growth mindset on students' writing feedback literacy.

Student Writing Feedback Literacy and Feedback Engagement

Research has indicated that the learning benefits obtained from feedback processes rely not only on students' feedback literacy but also on their feedback engagement (e.g., Mao & Lee, 2023; Nieminen et al., 2022), which refers to how students react to feedback (Tsao et al., 2021). Although feedback engagement is frequently thought of as a multidimensional construct, there is no consensus on its components (e.g., Mao & Lee, 2023; Reeve & Tseng, 2011; Tsao et al., 2021). Our study primarily employed Tsao et al.'s (2021) feedback engagement model, which

breaks down the concept into three dimensions: cognitive, behavioral, and social. The cognitive dimension focuses on how students respond to feedback through conducting revisions and using cognitive/metacognitive strategies. The behavioral dimension concentrates on how students use feedback in their revisions. The social dimension centers on how students interact with others who give feedback.

We opted for this model for two reasons. First, the cognitive and behavioral dimensions are commonly examined in pertinent studies (e.g., Zhang & Hyland, 2022). Second, because feedback is a reciprocal process that involves students in socially interactive scaffolding with others (e.g., teachers and peers) (Yu et al., 2023), social engagement is also an essential component that relates to their learning benefits.

The nexus between student feedback literacy and feedback engagement has been studied extensively in the field of education, thus underscoring the significance of feedback literacy in augmenting student engagement in the feedback process (e.g., Carless & Boud, 2018; Little et al., 2023). Nonetheless, the current literature on this matter in the domain of writing is sparse. Of the limited research available, the feedback provided by teachers and peers is of particular interest given that they are the two primary sources of feedback employed in classroom settings.

Regarding teacher feedback as a source of feedback, Han and Xu (2021) undertook a qualitative case study with two Chinese undergraduate students to explore the impact of students' feedback literacy on their engagement with written feedback from teachers in L2 writing. They discovered that a lack of balanced development of the features of feedback literacy (e.g., having a low socio-affective capacity but high cognitive capacity) appeared to constrain students' subsequent engagement with teacher feedback as a whole. While their study provided evidence for a potential connection between student feedback literacy and feedback engagement, it did not delve into how these literacy features might be related to various dimensions of feedback engagement.

Regarding peer feedback as a source of feedback, interestingly, the relationship between feedback literacy and engagement with feedback from peers in writing remains underexplored in the literature. However, a few empirical studies have offered indirect evidence for this association (e.g., Fan & Xu, 2020; Yu et al., 2019). These studies shed light on how feedback literacy features may be tied to various dimensions of feedback engagement. For instance, Fan

and Xu (2020) examined 21 Chinese undergraduate students' engagement with peer feedback in L2 writing. Their results showed that students who exhibited capacities and dispositions associated with feedback literacy, such as perceiving peer feedback as beneficial and helpful (i.e., appreciating feedback) and strategizing how to incorporate peer feedback into revisions (i.e., taking action), tended to display better cognitive engagement (e.g., understanding and evaluating the appropriateness of feedback) and behavioral engagement (e.g., using feedback in the revision process) during feedback interactions. Moreover, those students who actively employed strategies to cope with embarrassment in receiving critical feedback from peers (i.e., managing affect) demonstrated better social engagement; they tended to openly communicate text errors and the contents of feedback with their peers.

Overall, the existing literature suggests that students' feedback literacy in writing may be related to their engagement with feedback from both teachers and peers. However, the limited sample sizes and qualitative designs of these studies may curtail the generalizability of their findings. Therefore, a quantitative study with a larger sample is necessary to establish more generalizable findings.

Moreover, Fan and Xu's (2020) research highlights the possible association between students' writing feedback literacy and their engagement with peers across different dimensions, including cognitive, behavioral, and social aspects. This sparked our interest in exploring the relationship between students' writing feedback literacy and their engagement with multiple feedback sources (i.e., teacher and peers).

Overview of the Literature and the Rationale of the Present Study

From our review of the existing literature, three major issues emerged. First, student feedback literacy has gained increasing attention in relation to facilitating learning (e.g., Nieminen & Carless, 2022), yet the exploration of this nascent concept remains limited in both L1 and L2 writing contexts, particularly in assessing students' feedback literacy in L1 writing. Comparatively, empirical research on feedback in L1 writing is less extensive than that in L2 contexts. Existing studies within the L1 purview primarily concentrate on aspects like students' feedback features (e.g., Wu & Schunn, 2020) and the effectiveness of feedback on enhancing students' writing performance (e.g., Authors, 2022a). However, there remains a dearth of research on the concept of feedback literacy and its associations with other factors in L1 writing.

Further research is needed to establish a more comprehensive and robust understanding of this multifaceted construct in academic writing.

Second, despite an increasing acknowledgment of the association between student feedback literacy and feedback engagement, the existing research falls short in illuminating how their engagement across different dimensions may be connected to the various features of feedback literacy. Furthermore, prior studies have focused primarily on students' engagement with a single source of feedback, such as either teachers or peers (e.g., Fan & Xu, 2020; Han & Xu, 2021), and have neglected to examine how feedback literacy relates to engagement when both sources of feedback are used concurrently. Given the increasing recognition of the integrated use of feedback from both teachers and peers as a pedagogical strategy to promote students' feedback engagement (e.g., Authors, 2022a; Zhang & Hyland, 2022), it is critical to investigate the relationship between feedback literacy and engagement in such a context. This research endeavor is essential to uncovering the stability of the relationship between feedback literacy and engagement when multiple feedback sources are provided to students. Moreover, it offers teachers comprehensive insights into the mechanisms of feedback literacy, empowering them to provide effective support that fosters substantial student engagement with feedback, be it from singular or multiple sources. Ultimately, this understanding aids students in optimizing the benefits derived from feedback processes.

Third, there is a need for research to examine how a growth mindset is related to student writing feedback literacy. Such investigations could provide new perspectives for motivating students in the feedback process.

In light of these needs, the present study sought to investigate the relationships among a growth mindset, student writing feedback literacy, and feedback engagement in the context of L1 writing. Drawing from the existing research progress primarily in L2 writing, it is important to acknowledge the transferability of insights from L2 research to the L1 context. Feedback processes in both L1 and L2 writing may share similarities, as highlighted by frameworks that treat feedback processes generically and do not distinguish the linguistic backgrounds of writers (e.g., Yang, 2021; Yu & Liu, 2021). Indeed, academic writing, as a broad concept encompassing both L1 and L2, allows for the application of feedback processes to both contexts (Yu & Liu, 2021). By leveraging this perspective, we drew on relevant research progress in L2

writing to establish our study within the L1 writing context. In turn, the findings from feedback research in L1 writing can provide valuable insights for investigating feedback in L2 writing. Ultimately, the research outcomes pertaining to feedback in both L1 and L2 writing mutually complement each other, fostering concurrent development in the field.

Conducting such "feedback-concerned" research in the L1 writing context serves two critical purposes. Firstly, L1 writing forms the basis for language development and communication in one's native tongue. Insights into effective feedback strategies in L1 writing enable educators to employ pedagogical approaches that optimize learning benefits from feedback, facilitating the development of students' native language skills. Secondly, given the potential similarities in feedback processes between L1 and L2 academic writing (e.g., Yu & Liu, 2021), findings from L1 research can inform L2 teaching, learning, and assessment.

To illustrate the complex potential links among these variables, we referred primarily to Yang's (2021) ecological feedback framework to establish a hypothesized model (Figure 1).

<insert Figure 1>

As Yang (2021) noted, the internalization of external feedback into learning opportunities requires students to process and engage with feedback. Therefore, building on our literature review, we hypothesized that students' feedback literacy, which underpins their feedback processing, will impact their subsequent engagement with feedback from teachers and peers.

Moreover, we believe the motivational determinants highlighted by Lui and Andrade (2022) to be crucial in shaping students' responses to feedback processing. Hence, we posited that a growth mindset, representing students' initial state of motivation, should be added to the model. This addition is essential in order to capture the extent to which a growth mindset is associated with students' feedback literacy pertaining to their feedback processing, and it allows us to investigate the potential association with more effective feedback engagement.

Therefore, two research questions guided this study:

RQ1: To what extent is students' growth mindset associated with their writing feedback literacy?

RQ2: To what extent is students' writing feedback literacy related to their engagement with

feedback from teachers and peers?

Research Method

Contexts and Participants

A total of 236 sophomore English majors were recruited from a university located in southern mainland China; 75.8% of the participants were female, and the average age of the participants was 20.07 years (SD = .73). They were all L1 Chinese native speakers. Throughout the academic year, the students were registered on a Chinese language course and attended sixteen 90-minute sessions per semester.

Prior to the study, all participants provided their consent by signing a form indicating their voluntary participation in the research, with no compensation. The study procedures were approved by the University Research Ethics Board (Institutional Review Board).

To foster student-centered learning and harmonious teacher-student and student-student relationships, the course includes regular teacher and/or peer feedback activities. Written corrective feedback is among the most frequently used type of feedback, categorized as direct (explicit indication and correction of errors or weaknesses) and indirect (implicit indication and correction). This type of feedback is widely recognized for developing students' problem diagnosis and solution decision-making abilities (Ferris et al., 2013; Han & Xu, 2021). Furthermore, in the context of Chinese higher education, the traditional exam-oriented culture has influenced the nature of feedback practices in the classroom, with the primary focus being on error correction in students' writing. Thus, students are well acquainted with receiving such written corrective feedback from teachers and/or peers.

After receiving consent from the participants, we administered the questionnaires at the end of the autumn semester in 2022 with the assistance of their classroom teachers. The questionnaires were distributed using "Wenjuanxing (问卷星)", a web-based platform for questionnaire publishing and data collection. Participants completed the questionnaires on their own mobile phones, and teachers provided clarifications when necessary. The entire process took approximately 40 minutes. After collecting the data, we conducted a comprehensive data cleaning process to check for responses with perfunctory answers. Fortunately, due to the efforts made by the classroom teachers in motivating the students, we did not encounter any

questionnaires with perfunctory answer issues. As a result, all participants' responses were included in the data analysis.

Instruments

The questionnaire utilized a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) to assess the students' language mindsets, L1 writing feedback literacy, and feedback engagement (see Appendix A). The questionnaire was originally in English and was subsequently translated into Chinese by the third author of the study. To ensure the accuracy of the translation, a Chinese expert in bilingual education translated it back into English. During the translation process, there was no loss of information, and all participants completed the questionnaire in Chinese. The construct validity of the questionnaire was examined using CFA with SPSS-compatible Amos 25.0 software (Arbuckle, 2017), wherein the corresponding items for a growth mindset, L1 student writing feedback literacy, and feedback engagement were loaded onto their respective dimensions.

We measured the students' mindsets about their Chinese writing ability by utilizing six items from Dweck's (1999) influential work, as adapted by the authors (2022b). Three of these items were related to a growth mindset (e.g., "You can always greatly change how talented you are in Chinese writing"), while the other three related to a fixed mindset (e.g., "You can learn new things, but you can't really improve your Chinese writing skills"). The growth-mindset items were averaged to create a growth-mindset variable for each participant.

Figure 2 presents the standardized regression weights for the two-factor language mindset model. The results indicated an acceptable level of fit to the data: χ^2 (8) = 21.357, χ^2/df = 2.670, CFI = 0.964, RMSEA [90% CI] = 0.08 [0.042, 0.129], and SRMR = 0.058. The standardized estimated loadings ranged from .59 to .91 at a significance level of $p < .001$. A negative association was observed between a growth mindset and a fixed mindset.

<insert Figure 2>

We utilized a 28-item scale adapted from Yu et al.'s (2022) L2-SWFLS to assess the students' writing feedback literacy in the L1 context. The scale consisted of items related to appreciating feedback (10 items), acknowledging different feedback sources (five items), making judgments

(five items), managing affect (three items), and taking action (five items). Minor changes were made to the wording of some items to make them more appropriate for the L1 Chinese writing context. Specifically, these adjustments focused on contextualizing the items by replacing "English writing" with "Chinese writing" while ensuring that the fundamental aspects of feedback literacy were preserved. For example, the original item from the L2 scale, "I think that communicating with feedback givers can improve my understanding of English writing standards and criteria", was modified to "I think that communicating with feedback givers can improve my understanding of Chinese writing standards and criteria." This contextual adaptation was done to enhance the scale's relevance and applicability for L1 students without compromising its intended measurement of feedback literacy. By making these adjustments, we aimed to ensure that the L2-SWFLS is well suited for investigating feedback literacy in the L1 Chinese writing learning context. We created variables representing each dimension by averaging the items in each dimension.

Figure 3 presents the standardized regression weights for the five-factor L1 student writing feedback literacy model. The results indicated that this model also fitted the data well, as evidenced by the acceptable fit indices: χ^2 (338) = 606.405, χ^2/df = 1.794, CFI = 0.906, RMSEA [90% CI] = 0.058 [0.051, 0.066], and SRMR = 0.053. The standardized regression weights ranged from .51 to .79 at the significance level of $p < .001$. Furthermore, the five dimensions of L1 student writing feedback literacy showcased positive associations with each other.

<insert Figure 3>

To measure the students' feedback engagement, we adapted the feedback engagement scale from Tsao et al. (2021) to measure their cognitive, behavioral, and social dimensions. However, because each dimension originally had a small number of items (fewer than three), which could impact the scale's reliability (Kopalle & Lehmann, 1997), we developed new items based on the work of Zhang (2021) and Zhang and Hyland (2022) to address this issue. Specifically, we added one new item for the cognitive dimension (i.e., "Upon receiving the written corrective feedback (e.g., from teachers and students), I evaluate whether it is appropriate to use in my revision and what extra revisions I need to make to improve my Chinese writing"), two items

for the behavioral dimension (e.g., "Upon receiving the written corrective feedback (e.g., from teachers and students), I work hard to revise my Chinese writing in order to improve the quality of the composition"), and one item for the social dimension (i.e., "I consult my classmates or teachers' suggestions when I revise my Chinese writing"). The revised scale contained nine items in total (three items per dimension), and we averaged each dimension's items to create a variable to represent each dimension.

Figure 4 shows the standardized regression weights for the three-factor feedback engagement model, which exhibited acceptable fit indices: χ^2 (24) = 36.449, χ^2/df = 1.519, CFI = 0.979, RMSEA [90% CI] = 0.047 [0.002, 0.076], and SRMR = 0.036. The standardized regression weights ranged from .54 to .77 at the significance level of $p < .001$. Moreover, all three dimensions of feedback engagement showed positive associations with each other.

<insert Figure 4>

In summary, these results provided evidence for the construct validity of a growth mindset, L1 student writing feedback literacy, and feedback engagement among Chinese university L1 writers. The results also supported the suitability of the modified scales originally used in the L2 context for the L1 context.

Data Analysis

Preliminary analyses, including descriptive statistics, Cronbach's alphas, and bivariate correlations, were conducted using SPSS version 25.0 statistical software. Subsequently, path analyses using Amos 25.0 were performed to examine the relationships between a growth mindset, L1 student writing feedback literacy, and feedback engagement using maximum likelihood estimators. Several fit indices, including the chi-squared-based goodness-of-fit indices (χ^2 and χ^2/df), the comparative fit index (CFI; acceptable > 0.90), the root mean square error of approximation (RMSEA; good < 0.06, acceptable < 0.08), and the standardized root mean square residual (SRMR; acceptable < 0.08) (Hu & Bentler, 1999), were used to evaluate the model's data fit. In addition, a bootstrapping approach was employed with 2,000 samples to investigate the potential mediating effect of L1 student writing feedback literacy in the model. The significance of the mediation effect was determined using 95% confidence intervals (CIs)

excluding zero, following the recommendation of MacKinnon et al. (2004).

Results

Table 1 displays the descriptive statistics, Cronbach's alpha coefficients, and bivariate correlations among the primary variables. All of the variables had normal distributions, as indicated by all of the kurtosis and skewedness values being below ± 3, as per Kline (2016). Furthermore, the Cronbach's alpha coefficients of a growth mindset and the subdimensions of L1 student writing feedback literacy and feedback engagement surpassed the required cutoff of 0.70 for linguistic research, as per Dörnyei (2007). Positive correlations were found between a growth mindset and every subdimension of L1 writing feedback literacy, as well as between every subdimension of L1 writing feedback literacy and every subdimension of feedback engagement.

<insert Table 1>

The relationships between students' growth mindset, L1 writing feedback literacy, and feedback engagement were then examined. A path model, depicted in Figure 5, was constructed to represent these relationships. The model exhibited an acceptable level of fit to the data: χ^2 (3) = 5.410, χ^2/df = 1.803, CFI = 0.997, RMSEA [90% CI] = 0.058 [0.000, 0.136], and SRMR = 0.017. The squared multiple correlations of every subdimension of feedback engagement were significant at the $p < 0.05$ level, with values of 0.368, 0.252, and 0.259 for the cognitive, behavioral, and social engagement variables, respectively. This finding suggests that the model respectively explained 36.8%, 25.2%, and 25.9% of the variance in the cognitive, behavioral, and social engagement variables.

<insert Figure 5>

Student growth mindset showed a significant positive association with all five dimensions of L1 student writing feedback literacy. Specifically, it was positively related to appreciating feedback ($\beta = 0.20$, $p = 0.001$), acknowledging different feedback sources ($\beta = 0.19$, $p = 0.004$), making judgments ($\beta = 0.24$, $p < 0.001$), managing affect ($\beta = 0.17$, $p = 0.009$), and taking

action ($\beta = 0.16$, $p = 0.011$).

The L1 student feedback literacy features were found to be significantly associated with the different dimensions of feedback engagement. Appreciating feedback was positively correlated with cognitive engagement ($\beta = 0.30$, $p < 0.001$) and social engagement ($\beta = 0.17$, $p = 0.049$), but no significant association was observed with behavioral engagement ($\beta = 0.04$, $p = 0.610$). Acknowledging different feedback sources had a negative correlation with social engagement ($\beta = -0.26$, $p = 0.002$), while no significant association was found with cognitive engagement ($\beta = -0.03$, $p = 0.661$) or behavioral engagement ($\beta = 0.07$, $p = 0.404$). Making judgments showed positive associations with cognitive engagement ($\beta = 0.15$, $p = 0.048$), behavioral engagement ($\beta = 0.24$, $p = 0.004$), and social engagement ($\beta = 0.32$, $p < 0.001$). Managing affect was significantly correlated with cognitive engagement ($\beta = 0.18$, $p = 0.003$) and social engagement ($\beta = 0.12$, $p = 0.057^{+}$), while no significant association was found with behavioral engagement ($\beta = 0.09$, $p = 0.166$). Finally, taking action exhibited significant positive associations with cognitive engagement ($\beta = 0.17$, $p = 0.008$), behavioral engagement ($\beta = 0.20$, $p = 0.005$), and social engagement ($\beta = 0.21$, $p = 0.003$).

The mediating effect of L1 student feedback literacy was also examined. Table 2 shows the standardized estimations, standard errors, and 95% CIs for each indirect path.

<insert Table 2>

The results indicated that having a growth mindset was indirectly related to students' cognitive engagement, with mediation through their appreciation of feedback ($\beta = 0.060$, 95% CI = [0.022, 0.124], $p = 0.006$), managing affect ($\beta = 0.041$, 95% CI = [0.009, 0.083], $p = 0.023$), and taking action ($\beta = 0.029$, 95% CI = [0.005, 0.097], $p = 0.024$). Similarly, a growth mindset was indirectly associated with students' behavioral engagement via the mediation of their making judgments ($\beta = 0.057$, 95% CI = [0.016, 0.116], $p = 0.012$) and taking action ($\beta = 0.032$, 95% CI = [0.007, 0.101], $p = 0.018$). Moreover, a growth mindset was indirectly related to students' social engagement via the mediation of their acknowledgment of different feedback sources ($\beta = -0.048$, 95% CI = [-0.123, -0.005], $p = 0.021$), making judgments ($\beta = 0.075$, 95% CI = [0.017, 0.140], $p = 0.024$), and taking action ($\beta = 0.035$, 95% CI = [0.004, 0.086], $p = 0.033$). These findings suggest that L1 student feedback literacy plays a crucial role in the

relationship between a growth mindset and students' feedback engagement.

Discussion

This study extends the current literature on student feedback literacy in the L1 writing domain by elucidating the association of a growth mindset in students with their feedback literacy and by revealing the connection of their feedback literacy to their engagement with feedback from teachers and peers. In the following sections, we present the major findings of this study.

A Growth Mindset and Student Writing Feedback Literacy

Regarding our research question one—to what extent is students' growth mindset associated with their writing feedback literacy—the results of the path analyses demonstrated a significant positive relationship between a growth mindset and student writing feedback literacy in all five aspects—in how the students perceived, evaluated, and utilized written feedback, as well as their ability to manage their emotions during the feedback process. Specifically, the study found that a growth mindset was positively linked to both appreciating feedback and acknowledging different feedback sources. This finding aligns with extant research suggesting that growth-mindset students generally have positive feedback perceptions (Authors, 2021a) and are more likely to seek feedback from various sources (Papi et al., 2019).

Students with a growth mindset also tend to be proactive recipients of feedback (Papi et al., 2020; Xu, 2022), playing an active role in the feedback process by both "knowing" about feedback and "acting" on it. Knowing about feedback involves not only recognizing the learning potential of feedback in general (Carless & Boud, 2018) but also understanding the value of diverse feedback sources in facilitating learning (Yu et al., 2022). Recognizing the learning potential pertains to whether students recognize the necessity of engaging in feedback processes, while understanding the value of diverse sources relates to the extent to which they value the involvement of diverse feedback sources. By establishing a good knowledge about feedback, growth-mindset students are better equipped to be proactive in the feedback process, and that in turn translates into a greater willingness to seek feedback from different sources, as well as to an increased appreciation of feedback.

On the other hand, students' acting on feedback can be seen as an externalization of their knowing about feedback. Therefore, it is reasonable that we found that a growth mindset has

a positive association with students' writing feedback literacy in terms of their willingness to take action. Students with a growth mindset must enhance their proactive involvement in feedback processes by translating their good understanding of feedback into actual feedback behaviors.

The study also discovered a significant positive relationship between having a growth mindset and student writing feedback literacy in terms of students making informed judgments and managing their affect. One plausible explanation for this finding is that students with a growth mindset are inclined to view written corrective feedback as an opportunity for improvement, as previous studies have suggested (Lou & Noels, 2019; Papi et al., 2020). This interpretation has two implications. First, growth-mindset students are likely to dedicate more effort to providing and receiving written corrective feedback in an effort to optimize the benefits of learning. Corrective feedback, which was used in the present study, is increasingly recognized for its effectiveness in promoting learning (Ferris et al., 2013; Han & Xu, 2021). Providing this type of feedback can help students develop their ability to evaluate their own and others' work, whereas receiving it can help them enhance their ability to evaluate the relevance of received feedback information to their work and determine which aspects of it can be used to improve their writing. Thus, students with a growth mindset may develop their feedback literacy in making judgments by being actively involved in providing and receiving this feedback.

Second, growth-mindset students are likely to have a more positive attitude toward negative judgments embedded in their feedback because they tend to view those judgments as useful diagnostic information for learning improvement rather than as criticism about themselves (Xu, 2022). This may explain why a growth mindset has a positive connection to students' management of their affect. In addition, the close association between a growth mindset and a mastery goal orientation may also explain this result, as previous studies have suggested (Lou & Noels, 2017; Authors, 2021a). Growth-mindset students tend to adopt a mastery-oriented pattern in the face of difficulties or setbacks, and that pattern directs their attention toward learning goals and encourages them to acknowledge their inadequacies. This, in turn, could lead to better regulation of their emotions and a more positive outlook toward feedback.

Overall, the study's findings underscore the significance of a growth mindset in cultivating multiple aspects of students' writing feedback literacy, including appreciating feedback, acknowledging different feedback sources, making judgments, managing affect, and taking action. This offers a new perspective on promoting a growth mindset among students to enhance their writing feedback literacy.

Student Writing Feedback Literacy and Feedback Engagement

In regard to our second research question—to what extent is students' writing feedback literacy related to their engagement with feedback from teachers and peers—the path analysis results revealed a complex relationship between students' writing feedback literacy and their feedback engagement; the different features of feedback literacy were found to have varying connections to the different dimensions of feedback engagement.

Specifically, the results indicated that student behavioral engagement had a positive association with two features of writing feedback literacy: making judgments and taking action. This finding may be attributable to the nature of behavioral engagement, which reflects how students utilize feedback to improve their writing. As outlined in the Literature Review section, making judgments and taking action are two literacy features that relate to students' use of feedback, such as when they evaluate their own work to check the appropriateness of feedback received and when they respond to feedback for purposes of improvement. Therefore, it is plausible to suggest that these features would be positively related to behavioral engagement given their relevance to feedback usage.

Moreover, student cognitive engagement was positively associated with four features of writing feedback literacy: appreciating feedback, making judgments, managing affect, and taking action. This result can be attributed to the complex requirements of cognitive engagement. First, cognitive engagement necessitates students' willingness to invest in and exert effort toward learning (Blumenfeld et al., 2006). Appreciating feedback is a literacy feature that concerns students' perception of the value of feedback, and it may form the basis of their willingness to engage with feedback and their proactivity in the engagement process. Hence, it is reasonable to assume that students are more likely to engage cognitively if they have a positive attitude toward feedback.

Second, cognitive engagement requires students to decide which cognitive and/or

metacognitive strategies to use. This requires that students possess the capacities for evaluating their own work, planning how to utilize feedback, and monitoring or adjusting their goal setting (Zhang & Hyland, 2018). Therefore, it is understandable to find that the feedback literacy features of students making judgments and taking action are positively related to their cognitive engagement. This finding supports Fan and Xu's (2020) results, which indicated that students who exhibit the planning capacity to integrate feedback into their revisions show increased cognitive engagement. The students in Fan and Xu's study employed monitoring strategies to evaluate the appropriateness and relevance of feedback for enhancing their writing. Furthermore, the association between students managing their affect and their cognitive engagement can be explained by the close relationship between cognitive engagement and emotional regulation (Iqbal et al., 2022; Zeidner et al., 2008). Deep cognitive engagement involves delicate work, including the use of elaboration and the organization of strategies (Greene, 2015), and such work requires students to possess the ability of emotional self-regulation in order to avoid any potential negative impacts from negative emotions.

Furthermore, we found that student social engagement was positively associated with four features of writing feedback literacy—appreciating feedback, making judgments, managing affect, and taking action—but negatively related to acknowledging different feedback sources. As is the case with cognitive engagement, social engagement requires students to possess multiple individual capacities and dispositions toward feedback. Specifically, *appreciating feedback* involves fostering a positive outlook on the feedback process in general, which serves as the mental basis for students' willingness to interact with teachers and peers on feedback. *Making judgments* and *taking action* are concerned with students' ability to evaluate their own work and that of their peers and then to respond to feedback from teachers and peers, thereby forming the basis for their action in their interactions with teachers and peers in the feedback process. *Managing affect* is crucial because feedback can expose students' weaknesses and flaws to their teachers and peers, which in turn can result in students experiencing negative emotions and tensions with classmates during their feedback interactions (Authors, 2021a). As indicated by Fan and Xu (2020), students may feel embarrassed or anxious when their potential errors are diagnosed by their peers. Such

emotions may hinder their communication with peers unless students take measures to alleviate these emotions. Therefore, students with a strong ability for emotional self-regulation can better maintain emotional stability during their feedback interactions and can view judgments from teachers and peers as a necessary part of improving their writing rather than perceiving feedback as attacks on them personally, thus reducing their resistance to interactions with their teachers and peers.

The negative relationship between acknowledging different feedback sources and students' social engagement is an interesting finding. At first glance, one might expect a positive relationship between the two variables, as acknowledging diverse feedback sources suggests a deeper understanding of the meaning and value of feedback from various perspectives. Students with such understanding may have more interaction with different feedback sources. However, this result challenges this intuitive expectation and highlights a potential counterproductive aspect of students' acknowledgement of feedback sources. When students focus primarily on selecting the "best" feedback sources, they may overlook the valuable insights that other sources can offer. In fact, previous research has indicated that students tend to compare different feedback sources and choose the one that they consider the "most" helpful or easiest to follow (e.g., Tian & Zhou, 2020), thus leading them to use predominantly one source of feedback and neglect other sources. Therefore, although students may recognize the importance of engaging with feedback from both teachers and peers, they may not necessarily engage in active social interactions with both groups. Instead, they may interact solely with either teachers or peers if, for instance, they persistently regard teacher feedback as authoritative or peer feedback as approachable. This unexpected result sheds light on the importance of exploring ways to promote the acknowledgment of different sources of feedback as a means of enhancing student social engagement. Further elaboration on this topic will be provided in the following section.

In summary, these findings support the argument that students' writing feedback literacy has the potential to foster feedback engagement (Carless & Boud, 2018; Little et al., 2023). Furthermore, they align with the research seeking to establish these relationships in L2 writing (e.g., Fan & Xu, 2020). The findings carry two significant implications. Firstly, they contribute to identifying the intricate one-to-one associations between writing feedback

literacy and feedback engagement in L1 writing, thereby informing L1 writing teaching to focus intently on these complex relationships and devise pertinent pedagogical strategies tailored to L1 Chinese learners. Secondly, by substantiating the stability of these relationships, our results offer valuable insights for adapting pedagogical strategies drawn from findings in the L1 context to guide teaching in the L2 context.

Pedagogical Suggestions

The study's research findings have important pedagogical implications. First, because a growth mindset is significantly related to student writing feedback literacy, teachers should recognize the importance of fostering a growth mindset as a motivational belief and should employ various strategies to promote it; for example, teachers can organize mindset lectures or workshops to increase students' understanding of a growth mindset (Dweck, 2006). Furthermore, teachers can provide students with regular encouragement when they undertake challenging tasks and can remind them that they are able to enhance their abilities through perseverance and hard work (Derakhshan et al., 2022). Teachers can also incorporate messages and activities in the classroom that foster students' belief that their language abilities can be improved and changed (Authors, 2021a). In particular, collaborative learning activities, such as peer feedback, are recommended because such activities can help students set mastery goals and thereby further strengthen their growth mindset (Authors, 2021b; Lou & Noels, 2019).

Second, considering the positive relationship between student writing feedback literacy and feedback engagement, teachers should consider implementing appropriate interventions to help develop their students' writing feedback literacy. Teachers could begin by explaining to students the meaning of feedback literacy and clarifying the connections of different literacy features with the actions that students should take prior to engaging in feedback, during feedback, and after receiving feedback (Lee, 2021). This approach should deepen students' understanding of writing feedback literacy and encourage them to take an active role in the feedback process. Classroom activities, such as training sessions on feedback, utilizing multiple feedback sources, and providing support after feedback, could also be employed to provide students with ongoing opportunities for feedback and for developing their capacity to make productive use of feedback to optimize their learning (Zhang & Mao,

2023). Moreover, given the adverse associations of acknowledging various feedback sources with students' feedback engagement in the social dimension, we suggest that teachers increase their comprehension of the significance of diverse feedback sources while motivating students to learn from multiple sources rather than depending on a single source. One way to accomplish that would be for teachers to promote a learning-goal orientation among students—something that has been found to increase their focus on learning improvement (Authors, 2021b; Zhao et al., 2021). This shift in perspective should encourage students to appropriately use various sources of feedback for their own improvement rather than simply seeking what they perceive as the best feedback source.

Third, we suggest that teachers consider the various dimensions of feedback engagement, knowing that students cannot reap the benefits of feedback until they actively engage in it (Fan & Xu, 2020; Zhang & Hyland, 2022). Therefore, teachers should provide students with training on how to respond to feedback cognitively, behaviorally, and socially. Specifically, students' social engagement may need to be strengthened when multiple feedback sources are used concurrently. To achieve this, teachers should encourage students to engage in dialogs with their teachers, peers, and/or other feedback sources in an effort to gain insights from different perspectives. Creating an inclusive and cooperative learning environment that promotes positive rapport among peers and students, as well as between teachers and students, is also encouraged (Han & Xu, 2021). Such a learning environment can help create a safe and supportive space where students feel comfortable exchanging feedback with their peers and teachers, thus promoting social engagement with feedback and leading to improved learning outcomes.

Conclusion

In summary, this study investigated the relationship between a growth mindset in students, student writing feedback literacy, and student feedback engagement. The study contributes to the literature in three ways. First, it extends the existing literature on the relationship between student feedback literacy and student engagement with feedback from peers and teachers (e.g., Han & Xu, 2021). Specifically, it illustrates how different features of student writing feedback literacy are associated with the three dimensions of feedback engagement (i.e., cognitive, behavioral, and social feedback engagement), thereby improving our

understanding of how feedback processing and engagement interact to create learning opportunities (Yang, 2021).

Second, the study demonstrates the role of a growth mindset in enhancing students' writing feedback literacy—which, in turn, shows associations with their feedback engagement. This helps demonstrate the argument by Lui and Andrade (2022) that mindset can function as a motivational determinant to influence students' feedback processing.

Third, most of the existing studies concerning feedback literacy and/or engagement were conducted in L2 writing contexts (e.g., Yu et al., 2022). In contrast, the present study provides empirical evidence for the construct validity of the feedback literacy scale for L1 student writing, which advances the pioneering work of Yu et al. (2022) in L2 writing and enhances our comprehension of the multifaceted nature of student writing feedback literacy.

This study has several limitations that warrant further investigation. One potential limitation is the narrowness of the sample, which comprised only English major students from a single university in China. Therefore, it is essential to be cautious when generalizing the findings to other populations and educational contexts.

The second limitation of the study is the lack of explicit differentiation between teacher and peer feedback in the feedback engagement scale. The concurrent use of multiple feedback sources may have made it challenging to determine the specific impact of student writing feedback literacy on feedback engagement from teachers, peers, or both. It is worth noting that teacher and peer feedback operate through distinct mechanisms for learning (e.g., Yu et al., 2020; Zhao, 2010), and those different mechanisms may lead to subtle differences in how writing feedback literacy affects students' engagement with feedback from these sources. Therefore, future research could focus on specific feedback sources, such as investigating the relationship between students' writing feedback literacy toward peer feedback and their engagement with peer feedback. This would help to shed more light on the nuances of the relationship between feedback literacy and engagement with different feedback sources and should provide further insight into the roles of different feedback sources in feedback engagement.

Finally, this study relied primarily on self-reported survey data, which may have been subject to single-measure bias. To mitigate this limitation, future research could incorporate

more qualitative methods for data collection, such as semi-structured interviews and classroom observations. Such methods would allow for a more in-depth exploration of both the factors that contribute to students' writing feedback literacy and the mental processes involved in feedback engagement.

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