EFFECTS OF A COMPARATIVE FEEDBACK METHOD ON PEER FEEDBACK CHARACTERISTICS AND REVISION QUALITY

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Abstract

Peer feedback is regularly used in secondary education to improve students' writing. However, effective implementation can be quite complicated. This study investigates whether a comparative feedback method affects how students provide peer feedback and if revising based on peer feedback is more effective than without feedback. Participants were 65 10th grade secondary students, who each wrote and revised a persuasive text. Classes were randomly assigned to three conditions: comparative (peer) feedback, non-comparative (peer) feedback and a no-peer feedback condition. Results showed that text quality increased after revision in all conditions and that revision in both peer feedback conditions resulted in the highest text quality scores. There were no differences in text quality between these two peer feedback conditions, but students provided feedback quite differently. Students in the non-comparative condition provided more lower-order feedback than students in the comparative condition. Furthermore, those lower-order concerns were more directive and specified than in the comparative condition. In both conditions, the quality of the first draft was related to the number of higher-order concerns. However, there was no relationship between feedback comments and revision quality. Further research is needed to understand what support students need to understand and use comparative peer feedback more effectively for revision.

Keywords: peer feedback, revision, secondary education, comparative judgment, writing assessment

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1. INTRODUCTION

Peer feedback is widely considered as a powerful way to support student writing because it can help students understand the reader's perspective and revise accordingly. However, effective implementation in educational practice can be quite complicated (Boud & Molloy, 2013; Hattie & Timperley, 2007; Winstone et al., 2017). For instance, in a recent meta-analysis, Double et al. (2020) demonstrated a significant positive, but small effect of peer feedback on student learning across various assessment contexts. This meta-analysis also indicated that peer feedback promotes student learning more than teacher feedback and no-feedback. However, the variation in effect sizes between peer feedback studies is large. This large variance may be due to the broad assessment context of the meta-analysis, including the assessment of skills other than writing. To gain a deeper understanding of the extent to which peer feedback supports students in their writing process beyond mere revision, research is needed that particularly investigates the effects of peer feedback on writing and rewriting compared to a no feedback condition.

Furthermore, given the complexity of peer feedback in writing education, it is not yet known how peer feedback can be implemented more effectively. For instance, studies on peer feedback in writing education indicate two challenges (Aben, 2022; Cho & MacArthur, 2010; Huisman, 2018; Topping, 1998). The first challenge is the quality of feedback that students provide on each other's work. Research shows that feedback on higher-order concerns, such as content and structure, can help students improve the quality of their text; peer feedback of developing writers however focuses primarily on lower-order concerns (Keh, 1990). The second challenge is that students might not always know how to revise their text effectively, with or without feedback. Previous research has emphasized the importance of revision for text quality (e.g., Chanquoi, 2001; Graham et al., 1995; Kellogg, 2008). However, revision is a complex task, especially for 10th grade students who are still developing their writing skills. It involves evaluation of one's work and making informed decisions about what changes to implement (Fitzgerald, 1987). Moreover, Faigley and Witte (1981) have shown that students revise only little, and their revisions are primarily focused on lower-order aspects such as spelling, grammar, and genre conventions, instead of making higher-order changes in the content and structure of the text. A more recent study (Oliver, 2018) argues that poor revision may be an adaptive response to school requirements rather than an innate limitation.

Different methods can be used to improve the quality of peer feedback and text revision, such as rubrics or analytic criteria. These methods can have an impact on students' learning: although students receive specific feedback on predefined criteria, it can be questioned if this leads to effective revision and whether they also learn something about the communicative effectiveness of their text as a whole (cf. Sadler, 2009). Recently, comparative judgment has been introduced as an alternative to support students in providing peer feedback on the quality of texts as a whole. In this method, students compare the work of their peers in randomly

composed pairs and for each pair, the student indicates which work is of higher quality and why (Bouwer, Goossens, et al., 2018). Comparing pairs is based on the principle that people are better at comparing two products than at judging one product separately from the rest (Laming, 2004). That is one of the reasons why it is proposed that comparative judgment can be an effective peer feedback method (Bouwer, Lesterhuis, et al., 2018; Stuulen et al., 2022). This study investigates whether a comparative or non-comparative feedback method affects how students provide peer feedback and if revising based on comparative peer feedback is more effective than revising based on non-comparative peer feedback or no feedback at all.

1.1 Importance of peer feedback for revision

Writing is a basic skill that enables students to organize their thinking (Graham, 2013). Furthermore, writing proficiency is associated with educational success (Graham & Perin, 2007). Therefore, it is important to organize well-structured writing lessons in secondary education. Unfortunately, the last report of the Dutch Inspectorate of Education (Onderwijsinspectie, 2021) shows that there is still a lot to improve in the way writing is currently taught because students' writing does not meet the required standards. These concerns about students' writing development are not limited to The Netherlands but are common across the globe (Graham & Rijlaarsdam, 2016).

Why is it so hard to improve students' writing skills? In secondary education, students perceive writing as a complex and cognitively demanding task (Kellogg, 2008; Rijlaarsdam et al., 2012), let alone when students also have to learn writing from this task. An effective way to manage cognitive overload during writing is to reduce the number of cognitive processes that are active at the same time (Kellogg, 2008), for example by dividing the writing process into different steps such as planning, formulating, and revising (Bouwer & Koster, 2016). In particular, several studies have shown that a separate revision phase improves text quality for more experienced writers in higher education (Cho & MacArthur, 2010) and for developing writers in secondary education (Elving, 2019; Rijlaarsdam et al., 2004). These findings highlight the crucial role of revision in the writing process as emphasized by researchers such as Fitzgerald (1987), Flower and Hayes (1981), and Scardamalia and Bereiter (1987). Revision is such a fundamental component of the writing process that writing is largely a matter of revision, or as Murray (1978) stated, "Writing is rewriting" (p. 85).

Within the revision process, various subprocesses come into play, including re-reading the text, evaluating and identifying problems, providing solutions, and revising the text accordingly (Flower & Hayes, 1981). Developing writers frequently struggle to adopt the reader's perspective when reading and evaluating their own text. As a result, they fail to identify problems which hampers effective revision (Rijlaarsdam, 1986; Scardamalia & Bereiter, 1987).

However, even when developing writers are supported to have a separate revision phase after writing their first draft, they show limited revisions (Faigley & Witte, 1981). This limitation might be an adaptative response to the school context (Oliver, 2018) or more inherent to challenges in the revision process (Lindgren & Sullivan, 2006). Consequently, it has been proposed that these writers benefit from feedback (Hattie & Timperley, 2007; Rijlaarsdam, 1986). Feedback helps developing writers understand whether they adequately communicate a message to a reader (Hillocks, 1982). Feedback can also offer specific guidelines for students to revise their text. Although feedback is usually provided by a teacher or instructor, it can also be provided by peers. Several studies show that students in secondary education improve their writing even more with peer feedback (Denneman et al., 2020; Rijlaarsdam, 1986).

Providing peer feedback also has a positive learning effect on developing writers (Huisman, 2018; Topping, 1998; Van Popta et al., 2017). By providing feedback on the work of peers, students develop evaluative skills that can support their own revision process (Nicol & Macfarlane-Dick, 2006; Rijlaarsdam, 1986; Tai et al., 2018). Previous studies have indeed shown that students learn more from providing and receiving feedback than only from receiving feedback (Huisman, 2018; Reinholz, 2016). By providing peer feedback, students participate in each other's learning: they make comparisons between quality criteria and a peer's performance and use this in the (re)composition of their own performance (Boud & Molloy, 2013; Cho & MacArthur, 2010, Winstone et al., 2017). This may contribute to the improvement of one's own performance, because reflection may help students monitor, evaluate, and adjust their writing process (Graham & Perin, 2007; Hoogeveen & Van Gelderen, 2013). In short, receiving (peer) feedback seems to be helpful for revision. Furthermore, the act of providing feedback alone seems to be beneficial to one's own writing process.

1.2 Characteristics of peer feedback

Feedback can vary in its focus, specificity and directiveness (Underwood & Tregidgo, 2010). The focus of feedback is defined as the topic of the issue that is central to the feedback (e.g., grammar, word choice, layout, structure or content). These issues can be split into two main categories: lower-order concerns (LOCs) and higher-order concerns (HOCs) (Keh, 1990; Van Steendam et al., 2014). LOCs include feedback on superficial aspects of the text, such as layout, grammar, and spelling, and HOCs include feedback on the meaning of a text, such as the content, structure and style (Cho & MacArthur, 2010). Research shows that students tend to provide feedback on LOCs rather than on HOCs, even though especially feedback on HOCs is related to improvements in text quality (Keh, 1990).

Specificity of the feedback entails whether a certain matter is specifically pointed out in the text or not. A specified comment is defined as a comment that explicitly refers to the location of the issue (Patchan et al., 2016). Surprisingly little research

has examined the impact of specified comments in writing. In only one study it was demonstrated that students were more likely to put their feedback into practice when the problems had been clearly located in the essay (Nelson & Schunn, 2009).

The directiveness of feedback primarily involves whether feedback is offered in a directive or facilitative manner. Directive feedback tells the students with concrete instructions what needs to be revised (Straub, 1996). Facilitating feedback, on the other hand, emphasizes the student's own responsibility (Shute, 2008; Straub, 1996), for instance by asking questions or providing suggestions for changes to the text instead of dictating the path of revision. HOCs are generally revised more often if the feedback is not given in a directive, but in a facilitating way (Cho & MacArthur, 2010), although this is not always the case for weak students (Shute, 2008).

1.3 Methods of peer feedback

Research shows that only the more experienced revisers and writers are able to detect certain problems at the global level of a text (Keh, 1990; Van Steendam et al., 2014). To also support less experienced writers in detecting problems at the higher level of a text, peer feedback might help. One possible approach to peer feedback is not to provide feedback on a single text, one by one, but to compare texts and use this comparison as a basis for feedback. Comparative judgment (CJ) is an assessment method that allows for such comparative feedback. In CJ, students evaluate the quality of a text by comparing it to another text. This way, students also develop evaluation skills, which are needed to assess and regulate the quality of their own work (Nicol & Macfarlane-Dick, 2006; Tai et al., 2017). When students use comparative judgment, they compare the work of their peers in randomly composed pairs and for each pair, the student indicates which work is of higher quality (Bouwer, Goossens, et al., 2018). Comparing members of pairs is based on the principle that people are better at comparing two products than at judging one product separately from the rest (Laming, 2004). After each comparison, students are required to provide feedback on the texts. Research suggests that pairwise comparison might trigger higher-order comments (Lesterhuis, 2022), as compared to methods in which only one text is commented on. Therefore, revisors might have more and better cues which in turn may lead to more higher-order revisions (Bouwer, Lesterhuis, et al., 2018) and this is why comparative judgment seems to be an effective method for peer feedback (Bouwer, Goossens, et al., 2018).

To investigate whether comparative peer feedback is effective for students in secondary education, Stuulen et al. (2022) recently compared the effectiveness of two different peer feedback methods: a comparative approach and an analytic criteria model. The results showed that, while students in the comparative condition provided generally less feedback on HOCs than students in the analytic criteria condition, there were no differences in text quality between both peer feedback conditions of the final text. This could imply that both peer feedback methods are equally effective for revision. However, it is yet unknown whether comparative peer

feedback is more effective for revision than non-comparative peer feedback. In addition, it is hardly defined which types of feedback are effective for revision; only a few studies focus on the specificity and directiveness of feedback (Nelson & Schunn, 2009; Shute, 2008), especially not in the context of peer feedback. Finally, to investigate whether the effect is due to peer feedback or rewriting, it is needed to compare the effectiveness of peer feedback to a control condition in which students revise without any peer feedback.

1.4 Research questions

The aim of this study is to investigate if revising based on peer feedback is more effective than revising without peer feedback, and whether a comparative feedback method affects how students provide peer feedback for revision. Specifically, the present study investigates:

1) What is the effect of peer feedback on the quality of the revised text? (RQ1)
2) What is the effect of comparative versus non-comparative peer feedback on the type of feedback comments that students provide? (RQ2)
3) What is the relationship between peer feedback comments and text quality in both peer feedback conditions? (RQ3)

In line with previous research, it is expected that the quality of the rewritten texts will exceed the quality of the first drafts (Bouwer & Koster, 2016; Chanquoi, 2001; Elving, 2019; Fitzgerald, 1987). Moreover, it is expected that these increases in quality are related to peer feedback (Aben, 2022; Cho & MacArthur, 2010; Huisman, 2018; Topping, 1998): we expect higher improvements in quality for conditions with peer feedback in comparison to a control group without peer feedback.

Regarding the second research question, we hypothesize that students in the comparative feedback condition will provide more comments on HOCs than students in the non-comparative feedback condition. This builds on the theory of evaluative judgment and learning by comparison: students learn to assess quality based on making comparisons (Tai et al., 2018). Additionally, we expect the nature of the feedback in the comparative condition to be less directive and specified than the feedback in de non-comparative condition.

Finally, we expect that there will be a relation between the quality of the first draft and the amount of peer feedback. Students in tenth grade are not completely novice writers and have already some evaluative skills, hence we expect a negative relationship: poor texts are likely to receive more feedback on HOCs than high-quality texts. Based on previous research (Keh, 1990), we also expect a positive correlation between the amount of feedback comments and the quality of the revised text, after controlling for the quality of the draft.

2. METHOD

2.1 Participants

In this study, participants were 65 10th grade students from three different classes of a large public secondary school in the Netherlands. Their average age was 16 years (*SD* = .4). The classes were randomly assigned to three different conditions: a comparative condition (*n* = 25), a non-comparative condition (*n* = 20) and a control condition (*n* = 20). Two teachers were involved in this study: one taught the comparative class; another teacher taught both the non-comparative class and the class without peer feedback.

2.2 Materials and procedure

This study was conducted in an introduction course Literary History during regular lessons of Dutch Language. Instructions were delivered in four, 55-minute, whole-class sessions. The context of the writing assignment was the book *Max Havelaar*, written by Multatuli, one of the most famous 19th-century Dutch authors. At the end of this book, the main character made a plea to the King to expose the abuses in the Dutch East Indies. In this way, he wanted to persuade the King to intervene and to change something about the situation. In the first lesson, the teacher informed the students about the particular book and author (see Appendix A for the writing assignment and a link to the video materials).

During the second lesson, students had to write a persuasive text similar to Multatuli's plea. In this case, however, students were asked to write a letter to the King to convince him to solve a Coronavirus-related problem. The persuasive aspect was central to this and emphasised by the teachers. Students wrote this text on a computer in approximately 300 words. They had no limitations concerning style or content. Students in the peer feedback conditions were informed that they would receive feedback on their writing. All students were informed that the persuasive writing assignment was not graded by their teacher. Everyone finished a first draft during this lesson.

In the third lesson, students in the comparative and non-comparative condition provided feedback on each other's texts. In the comparative condition students compared their peers' work in anonymous pairs and selected the most persuasive text in each pair. For both texts in each pair, they answered the follow-up question: Why do you think this text is better? After this step, students provided written feedback for each individual text by giving as many feedback comments as possible. This instruction was provided to ensure that both peer feedback conditions would be as equivalent as possible. In the comparative condition, an unlimited amount of commentary could also be provided. Each student made four comparisons in total, and consequently, provided feedback on eight texts. The comparisons were randomized, and the feedback was given anonymously. We used Peersquared to

make the comparisons (www.peersquared.nl). Peersquared is a web-based tool, developed for Dutch students in secondary education to compare their texts and provide feedback.

In the non-comparative condition, each student provided written peer feedback on single texts, eight texts in total, by indicating aspects that needed improvement on a separate piece of paper. This reflects business as usual in today's writing education in upper secondary grades. In this condition, the feedback was anonymous as well.

In the final lesson, students received peer feedback on their own text and revised their first draft without any further instructions for revising. In the comparative condition, students could find their peer feedback at the bottom of their first draft in Peersquared. The students of the non-comparative condition were handed over the separate notes with peer feedback. Students in the control condition revised their first draft (in the third lesson) without receiving any peer feedback.

2.3 Rating text quality

The text quality of both the first and revised drafts was individually rated by three experienced secondary school teachers. All texts were mixed up, so it was not visible to the raters which text was from which condition and whether it was the first or second version. Additionally, the texts were anonymised. They used a so-called benchmark rating scale for assessing text quality, which often leads to high agreement among raters (cf. Bouwer et al., 2023). The benchmark rating scale in this study (see Appendix B) included three benchmarks: one average text, an example of a below-average text (i.e., 70 points: one standard deviation below the mean) and an example of an above-average text (i.e., 130 points: one standard deviation above the mean). The average benchmark text received an arbitrary score of 100 points. The range of the scale varied from 0 to 200 points. Three independent and experienced benchmark raters selected these benchmarks. The below-average benchmark text was characterized by a chaotic text structure and substandard sentence structure. Furthermore, the quality of information in the text was limited. The average text consisted of a higher quality of information but there was still limited use of examples and details. The structure of this text was less chaotic than the below-average benchmark, but there was no variation in word choice and sentence structure. The above-average text had a clear division in paragraphs, a more varied sentence structure and remarkable word choice. This text also included more specific ideas and examples.

Raters compared the texts to be rated with the benchmarks and independently assessed the quality of all the students' texts, blind to experimental condition. They did so by comparing each text to the benchmarks on the rating scale and scoring the text accordingly, using all possible scores on the rating scale, including scores below 70 or above 130 points. The consensus between the three independent raters was

high (Cronbach's α = .91). The average text quality scores of the three raters were used for further analysis.

2.4 Coding peer feedback

To evaluate the effect of the comparative and non-comparative peer feedback condition on students' feedback, all feedback comments were categorized on three dimensions, using the coding scheme based on Bouwer and Koster (2016), see Table 1. First, it was assessed if a comment was directed at higher or lower aspects of the text. For this dimension, we also evaluated the specific object to which the feedback was directed. Feedback on 'content', 'structure', or 'style' of the text was considered higher-order feedback, whereas feedback regarding 'punctuation', 'spelling', 'grammar', or 'lay-out' was considered lower-order feedback. For the second dimension, it was evaluated whether the feedback was specifically pointed at a certain location in the text. For the third dimension, it was evaluated whether the feedback directed the student to a solution or whether it facilitated the student's own revision process. A second and third rater coded all comments of a random selection of 10 percent of the texts. The average reliability between the two raters was .69 (Cohen's Kappa), and varied depending on the pair of raters and the assessed aspect of the feedback from .46 to .87 (i.e., fair to almost perfect, Landis & Koch, 1977).

Table 1. Coding scheme for focus, specificity and directiveness of peer feedback

Dimension	*Description*	*Code*	*Example*
Focus of the peer feedback	Is the feedback aimed at higher-order or lower-order aspects of the text?	Higher-order concerns: a. Content b. Structure c. Style and language use	*a. First make a short introduction to your letter.* *b. Use more paragraphs to make your text more pleasant for a reader.* *c. Try to have a less aggressive tone.*
		Lower-order concerns: a. Punctuation and capitalization b. Spelling c. Grammar d. Lay-out and conventions	*a. Start your sentence with a capital letter.* *b. Measures -> measures* *c. You have to use your grammar much better!* *d. Use a smaller font.*

Specificity of the peer feedback	Is the feedback pointing at a certain location in the text?	a. b.	Specifically pointed out in the text Not specifically pointed out in the text	*a.* *b.*	*After 'yours sincerely' always a blank line.* *Also show the consequences of school closures due to corona.*
Directiveness of the peer feedback	Is the feedback directing students to a solution, or is it facilitating students' learning by providing hints, explanations, questions, or reader responses?	a. b.	Directive feedback Facilitative feedback	*a.* *b.*	*Use paragraphs!* *Already well written, but maybe you can overthink the last paragraph.*

3. RESULTS

3.1 Effects of peer feedback on text quality

Multilevel analysis (MLWiN, 2016) was used to estimate the differences between conditions on the text quality of the first and second draft. More specifically, a saturated model with fixed effects of draft, condition and their interaction, as well as a variance component for differences within and between students is estimated. Table 2 presents the mean text quality score per condition, for the first draft as well as the deviation in text quality between the first and second (revised) draft. It is shown that the average quality of the first draft ranges between conditions from 82.86 to 86.31. A contrast analysis (Goldstein, 2011) shows that this difference in text quality of the first draft did not vary between conditions (χ^2 (2) = .33, p = .85). Also, revision resulted in all three conditions in a better second draft: text quality scores significantly improved between draft 1 and draft 2 (χ^2 (1) = 93.8, p < .001). The effect of rewriting (Δ draft 2) in both peer feedback conditions was larger than in the no-peer feedback condition (χ^2 (1) = 5.20, p =. 02). The difference between the two peer feedback conditions (18.70 vs. 17.89) was not significant (χ^2 (1) = .04, p = .84).

Table 2 also demonstrates the effect sizes of revision for the three conditions; it shows that the effect size of revising one's text is moderate in the no-peer feedback condition (ES = .57), but large in the comparative and non-comparative peer feedback condition (ES = .90 and .99, respectively).

Table 2. Means (M), Standard Error (SE) and Effect sizes (ES) for Text Quality per Condition and Draft ($S^2_{within\ students}$ = 71.73 (SE = 13.21); $S^2_{between\ students}$ = 285.51 (SE = 58.76)

	Draft 1		Δ Draft 2		
Condition	*M*	*SE*	*M*	*SE*	*ES*
Comparative peer feedback	86.31	3.94	18.70	2.50	0.99
Non-comparative peer feedback	82.86	4.55	17.89	2.98	0.95
No-peer feedback (control condition)	85.33	4.23	10.75	2.68	0.57

3.2 Characteristics of peer feedback

The total amount of comments in the comparative condition was 440. In the non-comparative condition, students gave 555 comments in total. Table 3 shows the average number of HOCs and LOCs in both conditions, separated by the specificity and directiveness of the feedback. There was no difference in the average number of HOCs between the two conditions (10.20 vs 9.65, $F(1, 43) = .11$, $p = .74$). The average number of specified HOCs across conditions did also not differ from the average number of unspecified HOCs (4.87 vs. 5.06, $F(1, 43) = .20$, $p = .66$). The interaction effect of specified and unspecified HOCs and condition was also not significant ($F(1, 43) = 3.30$, $p = .08$, see Figure 1A).

There was, however, a significant difference in the average number of LOCs between the two conditions ($F(1, 43) = 40.82$, $p < .001$). In the comparative condition the average number of LOCs ($M = 7.36$, SD= 3.52) was lower than in the non-comparative condition ($M = 17.15$, SD = 6.59). Also, there was a difference in the average number of specified LOCs versus unspecified LOCs across conditions (9.70 vs 2.56, $F(1, 43) = 98.30$, $p < .001$). Furthermore, the interaction effect of specified and unspecified LOCs and condition was significant ($F(1, 43) = 25.19$, $p < .001$). That is, in the comparative condition, the average number of unspecified LOCs was lower ($M = 1.92$, $SD = 1.80$) than in the non-comparative condition ($M = 3.20$, $SD = 3.22$), however, in the comparative condition the number of specified LOCs was even more lower ($M = 5.44$, $SD = 3.10$) than in the non-comparative condition ($M = 13.95$, $SD = 5.38$, see Figure 1B).

The average number of directive HOCs across conditions differed significantly from the number of facilitative HOCs (7.03 vs. 2.90 $F(1, 43) = 48.1$, $p < .001$). In both conditions more directive HOCs were provided, but the difference between conditions is not significant ($F(1, 43) = .20$, $p = .66$). The interaction effect of directive and facilitative HOCs and condition was not significant ($F(1, 43) = .001$, $p = .98$) as well (see Figure 1C).

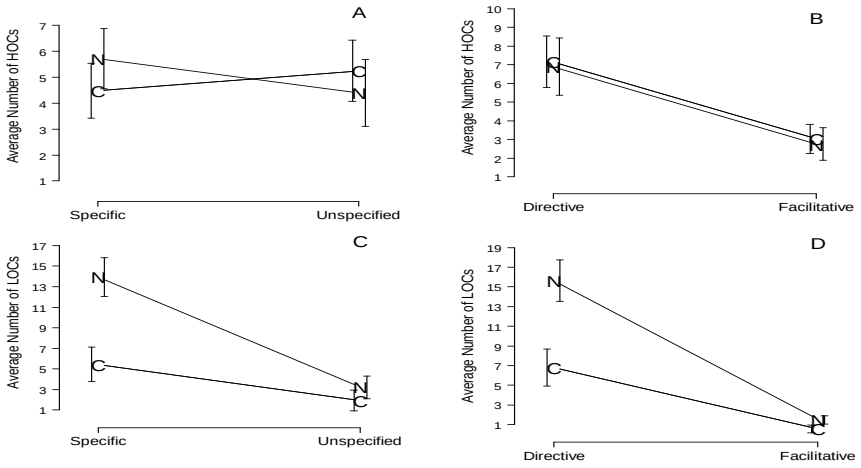
The average number of directive LOCs across conditions differed significantly from the facilitative LOCs (11.23 vs 1.03, $F(1, 43) = 208.41$, $p < .001$), and differed between the two conditions (7.36, 17.15, $F(1, 43) = 40.8$, $p < .001$). Furthermore, the

interaction effect of directive and facilitative LOCs and condition was significant (F (1, 43) = 31.4, p < .001). That is, in the comparative condition the number of facilitative LOCs was lower (M = .56, SD = .77) than in the non-comparative condition (M = 1.50, SD = 1.15) and the average number of directive LOCs was even lower (M = 6.80, SD = 3.35) than in the non-comparative condition (M = 15.65, SD = 6.12, see Figure 1D).

Table 3. Means (M) and Standard Deviations (SD) for Number of Specific and Directive HOCs and LOCs per Condition

	Comparative Feedback				Non-comparative Feedback			
	HOC		LOC		HOC		LOC	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Specific	4.48	2.33	5.44	3.10	5.25	3.35	13.95	5.38
Unspecified	5.72	3.10	1.92	1.80	4.40	2.74	3.20	3.22
Directive	7.16	3.26	6.80	3.35	6.90	3.77	15.65	6.19
Facilitative	3.04	2.34	.56	.77	2.75	1.41	1.50	1.15
Total	10.20	3.87	7.36	3.52	9.65	4.28	17.15	6.59

Figure 1. Average number of HOCs and LOCs in the Comparative (C) and the Non-comparative (N) condition for Specific and Unspecified Feedback (respectively A and C) and Directive and Facilitative Feedback (respectively B and D), I is the 95% confidence interval.



3.3 Relationship between peer feedback and text quality

We analysed the relation between the quality of the first draft and the amount and type of feedback in both conditions using regression analysis. Results show that

there is a significant relationship between the number of HOCs and the quality of the first draft (β = -3.38, *se* = .98, *p* <.001); the lower the quality of the first draft, the more higher-order peer feedback students received. However, this relation did not differ between conditions (*p* = .16). Regarding the quality of the first draft and number of LOCs, results showed that there was neither a significant relationship between the number of LOCs and the quality of the first draft (β = -1.29, se = 1.22, *p* = .30), nor a difference between conditions (*p* = .63).

Furthermore, we analysed the relation between the amount and type of comments and the quality of the final draft, controlling for the quality of the first draft. Results showed that the relation between the number of HOCs and quality of the final draft was not significant (β = -.45, *se* = .78, *p* = 57). This relation did not differ between both conditions (*p* = .31). The relation between the number of LOCs and quality of the final draft was also not significant (β = -.57, *se* = .74, *p* = .45), and did not differ between conditions (*p* = .44).

4. DISCUSSION

This study examined the effects of peer feedback on revision quality. Students wrote and revised a text in three different conditions: (1) a comparative condition in which students compared the texts of their peers and provided feedback accordingly, (2) a non-comparative condition in which students provided feedback comments on each text separately, and (3) a control condition in which students revised their text without any form of peer feedback. Regarding the effect of peer feedback on the quality of the revised text (RQ1), we can conclude that revision works. In all three conditions, the second draft yields a significant improvement of text quality (ES = .57 to .99). This is consistent with research by Fitzgerald (1987) and Chanquoy (2001). However, revision based on peer feedback resulted in texts of higher quality than revision without peer feedback. These results are in line with findings by Cho and MacArthur (2010) and Aben (2022), showing that peer feedback supports the revision process. There was no difference in peer feedback methods regarding revised text quality: in both peer feedback conditions, students revised their texts with equal effectiveness.

The type and amount of feedback comments (RQ2) was influenced by condition. The average amount of comments was the same in both conditions. There was no difference in the average number of HOCs between the two conditions. However, we found a significant difference in the average number of LOCs between the two conditions. In the comparative condition the average number of LOCs was lower than in the non-comparative condition. This provides evidence for the validity of comparative feedback (cf. Bouwer, Goossens, et al., 2018), as it indicates that comparative feedback can effectively reduce the number of LOCs. Comparative feedback helps students to recognize the importance of focusing on HOCs and prioritize substantive feedback over superficial comments. Therefore, comparative feedback not only evaluates but also actively enhances the quality of the feedback.

We also found a significant difference between conditions regarding the nature of the feedback. In the non-comparative condition, students provided significantly more specific and directive lower-order comments than students in the comparative condition. By explicitly referring to a local issue in the text and directing the student immediately towards a specific solution, the text quality may improve, but the students may not necessarily increase their knowledge about the underlying problem, and hence, to understand what constitutes good writing and how to use this knowledge when revising one's own text. Facilitative comments, on the other hand, could entail deeper learning (Underwood & Tregidgo, 2010). As Brannon and Knoblauch (1982) pointed out, with facilitative feedback students may develop a deeper understanding of the revision process. This is because they learn to modify their text to meet communicative purposes, rather than simply trying to meet the expectations and standards of teachers or peers. This suggests that the comments in the comparative condition may support students' writing development more than comments in the non-comparative condition.

Concerning the relationship between peer feedback comments and text quality (RQ3), it is demonstrated that there is a relationship between peer feedback comments and text quality for the first draft, in both peer feedback conditions. Texts of poor quality received more HOCs than texts of higher quality. This suggests that students adjust their feedback comments to the quality of their peer's texts. Regarding the quality of the first draft and number of LOCs, results showed that there was neither a significant relationship between the number of LOCs and the quality of the first draft, nor a difference between conditions. There are several possibilities for this unexpected lack of a relation between the number of LOCs and text quality. First of all, it is by no means guaranteed that all LOCs of a text are mentioned in the feedback; a text with many lower order concerns does not necessarily receive much feedback on these issues. Second, the effectiveness of feedback depends not only on its quantity or type but also on how it is perceived and utilized by the recipient. Students may not always understand or know how to implement feedback effectively, especially if it is not clear, specific, or actionable. This could partly explain why we could not show a relationship between the quality of the peer feedback and text quality of the revised draft. Furthermore, the quality of the first drafts differed, which is not necessarily taken into account when relating peer feedback to the quality of the final draft.

4.1 Limitations and further research

The data for this study are only from one school and one grade level in The Netherlands. More research is needed to generalise the effects over schools, teachers, and text genres and with different age levels of students.

Further research could investigate in more detail when, why and how students use peer feedback to revise their text. Of course, what support students need to use feedback more effectively also deserves attention. For instance, Denneman et al.

(2020) and Elving (2019) highlighted the effectiveness of a revision phase, but only for students who receive prior instruction on how to use feedback for revision.

A limitation of this study is the lack of distinction between provision and reception of peer feedback. Future research should separate these processes to better understand their individual effects. Additionally, factors such as individual differences in motivation, prior knowledge, and writing skills can influence how feedback is incorporated into revisions.

Our study also showed that there was no relationship between feedback comments and the quality of revised texts; this could indicate that students did not use feedback effectively. Recently, Bouwer and Dirkx (2023) found that students use only part of the feedback during revision and should be guided and instructed by their teachers to evaluate feedback and effectively deal with comments in a second draft.

4.2 Conclusion and implications for educational practice

The writing challenges in the 21st century ask for effective writing lessons. How can our study contribute to this? First, the findings of the current study provide useful insights for maximizing the benefits of peer feedback for secondary school students. Although peer feedback has already been identified as a high-leverage practice for writing instruction (Aben, 2022; Huisman, 2018; Rijlaarsdam, 1986), secondary school students are generally provided with few opportunities to write and receive feedback on their writing (Elving, 2019). Our findings provide support for adopting peer feedback in writing instruction in secondary education.

Second, students in the non-comparative condition provided significantly more lower-order feedback than students in the comparative condition. Moreover, peer feedback based on comparative judgment tends to be less directive and more facilitative, teaching students how to evaluate and revise their own writing. These are all factors that are considered crucial for the improvement of writing performance (Graham & Perin, 2007; Hoogeveen & van Gelderen, 2013) and can be enhanced by using comparative judgment.

Third, this study emphasizes the difficulty for students in using feedback for revision. As in previous studies (Bouwer & Dirkx, 2023; Winstone et al., 2017), we also couldn't establish a direct relationship between peer feedback and the quality of the revised text. A crucial factor in determining the effectiveness of peer feedback might be how students actively engage with the feedback they receive and use it to improve their performance.

To summarize, although we do not yet know all underlying cognitive processes concerning providing feedback and revision, it stands out that revision based on peer feedback leads to higher quality texts. Comparative feedback can help teachers implement peer feedback more effectively in their writing education. It not only supports students to focus on less specific and less directive lower-order concerns when providing feedback, but it also supports them in revising the content of their

own text. Furthermore, comparing multiple texts enhances evaluative skills which can support the revision process (Nicol & Macfarlane-Dick, 2006, Tai et al., 2018). However, to maximize the effective use of peer feedback for revision, students probably need more guidance and instruction from their teachers.

AUTHOR'S NOTE

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APPENDIX A

Persuasive writing task: Letter to the king

Intro: Multatuli - Durf te Denken – YouTube

Max Havelaar is a rebellious book. All kinds of norms and values that were still self-evident in the nineteenth century are mocked or thrown overboard. For example, in those days a writer was expected to instill patriotism in his readers. Multatuli deviated from this expectation and sharply criticized the Netherlands. At the end of the book, Multatuli addresses himself in a flaming indictment directly to King Willem III, who as head of state was ultimately responsible for the abuses and corruption in the Dutch East Indies.

You are now going to write a letter to the king, just like Multatuli did back then. The letter is not about the abuses in the Dutch East Indies, but about an abuse that plays a major role in everyone's life today: Corona. You try to convince our current king Willem-Alexander in your letter to solve a corona-related problem. This can be anything: Sywert's mouth cap deal, (lack of) vaccination obligation, spectators at sports competitions, et cetera.

Your letter consists of approximately 300 words.

APPENDIX B

Benchmark rating scale

Dear, I would like to draw your attention to the Corona rule, which applies to sports training. Sports canteens are open from 8 am to 7 pm. Visitors over 18 years of age need a Corona admission ticket. No corona admission ticket is required for take-out catering establishments. However, there is a mouth guard requirement. Most workouts can no longer be used for play as a result of this new rule. Times must be adjusted, leaving many youths without enough time to train. This is mainly due to the late school days these teens have. This rule is normally used to reduce corona spread. However, the earlier times of these workouts do not help this. This gives the youngsters less opportunity to train which causes their bodies to become less strong. So if they become infected they will suffer more. If the training sessions are allowed again until 8 a.m., then most of the youth can just train again. This creates stronger immunity to corona. I don't want to talk only about workouts, but also about gyms. The exact same thing applies to this. To train later does not create more infections. So the rule of exercising until 5 o'clock does not affect the numbers much. What I see more often now in gyms is sprinting before 5. The gyms are super full at these times. Because	Dear Lord of the Netherlands, I am writing this letter in response to the coronavirus. At the moment, we can well speak that the coronavirus is ahead 1-0. Something must be done about this! Devise new measures and see if they would really help before we introduce them. Closing stores, gyms and sports clubs at five o'clock only works against it. Sports venus should remain open at all times, because that is precisely where we stay healthy. If we close the sports venues and shops at five o'clock we are actually limiting the spread of it only increasing. So come up with wiser measures and actually enforce them. For example, enforce the 1.5 meter measure more strictly. We could also use an extra week of Christmas vacation so that people can recover from this period and that there will be a little peace and quiet in the ICU. Do not forget to listen to the advice of the experts, after all that is what they are there for. Please also share this advice with the world so that we can win against the coronavirus. Also discuss the plan of action with other countries. This way we can find the best measures and/or solutions against this pandemic faster.	J. Johnson Sportavenue 27 1185 TB Amsterdam Palace Noordeinde Post Code 30412 2500 GK The Hague Dear H.J. King Willem-Alexander, The pandemic is far from over. 605 ICU beds are occupied by Covid-19 patients. And there are an average of 305 admissions per day. Of these, a large proportion are unvaccinated. Too many unvaccinated people enter the hospital and/or ICU beds than are needed. About 15% of the Netherlands have not vaccinated or have an appointment scheduled for a vaccine. To prevent ICU beds from filling up again and hospitals from getting too crowded I think there should be a vaccination requirement. Everyone over 18 and who does not yet have the vaccine should be vaccinated. Other countries like Germany are probably going to introduce mandatory vaccination as well. And some countries like Austria already has mandatory vaccination. It makes more sense if everyone

of these crowds, there are higher chances of infections. So I ask you to think about this rule more carefully. It seems best to me to abolish this rule	In short, to win against the coronavirus, we must work together with other countries and listen to the experts. Also, we must use only measures that really work otherwise we will fall by the wayside. Sports facilities must remain open at all times, because this is the place where we stay healthy. So whatever you do, do it right! Sincerely,	is vaccinated because then fewer people will end up in the hospital and on ICU beds. Also, everything can be more open we have to adhere to fewer measures, so fewer people are unhappy with the measures. There are also people who cannot take the vaccine for medical reasons. This is only a small percentage of the population and therefore has little impact on society. So the larger the percentage of vaccinations the more open society can be. People also have free will, but vaccinations are more important than people not wanting a vaccine because this is about public health. And so people who don't vaccinate endanger public health. Compulsory vaccinations is one of the best, most convenient and reliable solutions right now. And ensure that we are one step closer to a world where Covid-19 has no impact on our society. For this reason, I ask you to introduce mandatory vaccination for everyone over 18 as soon as possible. I hope to hear from you soon. Thank you in advance. Yours sincerely, J. Johnson.
70	100	130
• structure: chaotic; no proper salutation, no ending • content: limited quality of information in the text, no variation • language: substandard sentence structure	• structure: less chaotic overall structure • content: limited use of examples and details • language: no variation in word choice and sentence structure	• structure: clear division in paragraphs, varied sentence structure • content: specific ideas and examples • language: remarkable word choice