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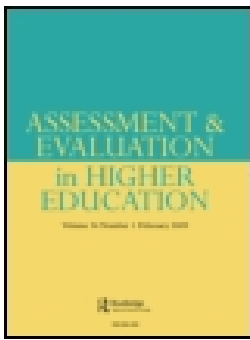
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# The anonymous reviewer: the relationship between perceived expertise and the perceptions of peer feedback in higher education

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## ABSTRACT

Peer feedback often has positive effects on student learning processes and outcomes. However, students may not always be honest when giving and receiving peer feedback as they are likely to be biased due to peer relations, peer characteristics and personal preferences. To alleviate these biases, anonymous peer feedback was investigated in the current research. Research suggests that the expertise of the reviewer influences the perceived usefulness of the feedback. Therefore, this research investigated the relationship between expertise and the perceptions of peer feedback in a writing assignment of 41 students in higher education with a multilevel analysis. The results show that students perceive peer feedback as more adequate when knowing the reviewer perceives him/herself to have a high level of expertise. Furthermore, the results suggest that students who received feedback from a peer who perceives their expertise as closer to the reviewee's own perceived expertise was more willing to improve his or her own assignment.

## KEYWORDS

Higher education; expertise; peer feedback; perceptions

## Introduction

Feedback is one of the most influential features of learning (Butler and Winne 1995) and has a major impact on students' learning and achievement (Hattie and Timperley 2007). Feedback can be conceptualised as information regarding aspects of one's performance or understanding, provided by an agent. It is a consequence of the expertise and performance of a student, and aims at reducing the discrepancy between the current and desired level of performance or understanding. To accomplish this, the feedback needs to be related to the task or process of learning or the self-regulation of students. However, students in higher education tend to be less satisfied with the received feedback than with the other features of their education, such as teaching quality and intellectual stimulation (Nicol, Thomson, and Breslin 2014; Baik, Naylor, and Arkoudis 2015).

Although feedback can come from inside a person, here we focus on externally provided feedback. The agent giving the feedback could for instance be a teacher or a peer (Hattie and Timperley 2007). The communicative function of the feedback depends both on the agent giving the feedback and the receiver of that feedback. For example, Carless (2006) found that, whereas teachers thought their feedback was detailed, useful and fair, students receiving that feedback did not. Contrarily, Price et al. (2010) state that the effectiveness of feedback in higher education is often limited as students read the feedback only

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superficially, if at all. Furthermore, different agents provide different forms of feedback, and perceptions of the usefulness of feedback depend both on the content of the feedback as well as on the provider of that feedback (see Evans 2013).

### **Peer feedback**

Peer feedback might alleviate the problem of not understanding and using feedback, because students often perceive peer feedback as more helpful and understandable than teacher feedback due to more accessible language (Gibbs and Simpson 2004; Nicol, Thomson, and Breslin 2014). Teachers give feedback based on their own expert models, which are not just aimed at divulging content information, but ideally also foster generative skills (Mathan and Koedinger 2005; Metcalfe and Kornell 2007). Generative skills are involved in the process of selecting and implementing aspects of problem solving in the specific learning context; however, providing such information alongside complex content-related information may be too complicated for students, possibly exacerbated the language used.

Peer feedback is mostly based on intelligent novice models, depending on the level of expertise of the reviewer, which provide evaluative skills next to generative skills (Mathan and Koedinger 2005). Evaluative skills are needed when assessing the effect of the applied problem-solving aspects, and help students acquire deeper conceptual understanding of principles, show better transfer and demonstrate retention of skills over time. Peer feedback thus provides the student with a broader scope of skills, but also has some other advantages. Research on peer feedback suggests that involving students in the process of giving feedback improves the effectiveness of formative assessment and supports the learning process and outcomes (Liu et al. 2001; Lu and Bol 2007).

Students' evaluative skills and performance can be raised by the clear view of the criteria and goals of the assignment, obtained by the provision or reception of peer feedback (Cho and MacArthur 2011; Meusen-Beekman, Joosten-ten Brinke, and Boshuizen 2015). Whereas students receiving feedback only read the criteria in relation to their own product, feedback providers also actively engage with these criteria. Providers of peer feedback may also feel more supported in terms of autonomy, whereas teacher feedback may result in more dependent and passive students (Miao, Badger, and Zhen 2006).

Social factors play a role in the process of giving and receiving peer feedback, in which students can feel a positive pressure from their peers. The perceived and actual expertise of the student providing the feedback (reviewer) is supposed to have a positive impact on the content (Govaerts et al. 2011) as well as the acceptance and application of the peer feedback (Strijbos, Narciss, and Dünnebier 2010). For example, Govaerts et al. (2011) conducted research to explore the cognitive processing underlying the judgement of the performance of a reviewee. Their findings showed that more expert reviewers were more likely to translate the performance of the reviewee in a more comprehensive interpretation than less experienced reviewers. Despite this research taking place in a workplace-based assessment context, the researchers assume that these findings can be generalised to other settings as well, such as higher education.

Feedback received from a student with a higher academic level is perceived as more positive than feedback received from a student with a low academic level, and this feedback seems to stimulate intrinsic motivation more compared to feedback received from those of a lower academic level (Strijbos, Narciss, and Dünnebier 2010). However, this can only be true when the student receiving the feedback is aware of the academic level of the student giving the feedback, either because this information is given or the feedback receiver can infer the expertise level from the feedback received. Strijbos, Narciss, and Dünnebier (2010) state that not only the actual, but also the perceived, academic level of both the reviewer and reviewee affects the acceptance and application of the peer feedback. The positive relationship between the reviewer's expertise and the perceptions of the peer feedback may be mediated through the feedback content or through the peer characteristics, such as expertise, reliability and intentions toward the receiver (Raes, Vanderhoven, and Schellens 2015).

Several challenges underlie the successful application of peer assessment. First, to provide good quality feedback, that is, feedback that the receiver can use to effectively enhance their learning, a

minimum level of domain and content knowledge (Mathan and Koedinger 2005; Geithner and Pollastro 2016) and problem solving skills (Cho and MacArthur 2011) is required. A second concern is that students may be consciously or unconsciously biased due to peer relations, peer characteristics and personal preferences (Lu and Bol 2007; Raes, Vanderhoven, and Schellens 2015). This may decrease the quality and usefulness of the feedback. Many students hesitate in using the peer feedback and in taking the feedback seriously when knowing the peer giving the feedback has less expertise compared to themselves, regardless of the correctness of the feedback. Although social influences can be beneficial in the process of giving and receiving peer feedback, too much sense of social pressure is disadvantageous for student learning; if students feel too much pressure, students may feel more stressed or even anxious to share their products, and students may find it difficult to give negative feedback (Raes, Vanderhoven, and Schellens 2015; Machin and Jeffries 2016). Another concern may be the validity and reliability of the peer feedback. However, when assessing in appropriate conditions, such as using rubrics, students can be reliable and valid sources of feedback (Panadero, Romero, and Strijbos 2013).

### ***Anonymous peer feedback***

To alleviate most of the challenges mentioned in the prior section, rather than providing the identity of a reviewer, anonymous peer feedback could be used (Lu and Bol 2007). Researchers suggest that anonymity within the peer feedback process may encourage student participation and reduce the insecurity when giving feedback by reducing peer pressure (Vickerman 2009; van Gennip, Segers, and Tillema 2010; Raes, Vanderhoven, and Schellens 2015). This reduction of peer pressure may result in more critical feedback (Lu and Bol 2007). For example, Raes, Vanderhoven, and Schellens (2015) investigated the effects of increasing anonymity by means of emerging technology. These researchers showed that anonymous peer feedback through a digital feedback system combines the positive feelings of safety, by being anonymous, with the perceived added value of giving peer feedback. Giving peer feedback anonymously may also provide more objective feedback, which means students are less biased by the knowledge of and relationship with the peer (Raes, Vanderhoven, and Schellens 2015). The anonymity of the feedback thus seems to influence the way the message is received and processed.

Whereas in previous studies the way students give anonymous peer feedback was investigated, less research has been conducted in the field of perceptions of received anonymous peer feedback. Nevertheless, the way in which a student perceives a learning situation is crucial to learning, because the conceptions and beliefs underlying their conception affects the learning process and subsequent performance (Yang and Tsai 2010), and determines the potential of the learning or assessment activities (Boud and Soler 2016). Forsythe and Johnson (2017) concluded that the way in which students interpret their ability influences their attitude towards provided feedback. Although they refer to the interpretations of a fixed vs. a growth mindset, this conclusion may also be true for the interpretation of the quality of students' ability. However, Rotsaert et al. (2017) concluded that the trust in students own and peer's capabilities in assessing positively relates to the educational value of peer assessment in education.

### ***The current study***

The current study aims to investigate students' perception of anonymous peer feedback when only the self-perceived expertise of the reviewer is provided, but no other identifiers of the reviewer are given, using the three dimensions of perceptions of peer feedback of Strijbos, Pat-El, and Narciss (2010): (a) perceived adequacy of feedback, (b) willingness to improve, and (c) affect.

The following research question was examined: how does the self-perceived expertise of the reviewer relate to students' perceptions of peer feedback? This research question will be answered through examining the following sub questions:

- In which way does the perceived expertise of the reviewer influence the perceptions of peer feedback?
- In which way does the gap between the perceived expertise of the reviewee and the reviewer influence the perceptions of peer feedback?

It is expected that the perceived academic level of the student giving the feedback correlates positively with the perception of the feedback. To give useful feedback to the peer, a student has to detect and diagnose the problems in the written assignment (Cho and MacArthur 2011). Expert writers are better at this detecting and diagnosing than novice writers, and may therefore be more accurate in reviewing. This may result in a higher perceived adequacy of feedback in the perceptions of reviews received from students with a high level of perceived expertise.

A positive gap between the reviewer's expertise and the reviewee's expertise, meaning the reviewer perceives his or her expertise higher than the reviewee perceives his or her own expertise, is expected to relate positively with the perceptions of the feedback.

Perceived feedback is often measured in the single component 'usefulness' (Strijbos, Pat-El, and Narciss 2010). A broader perspective might be necessary, so (1) the adequacy of feedback (usefulness, fairness and acceptance), (2) willingness to improve, and (3) affect will be taken into account. If students are not willing to improve their performance, the impact of the peer feedback will be reduced, despite the usefulness of the feedback. Students may also have doubts about the fairness of the peer feedback and, therefore, may not accept it (Strijbos, Narciss, and Dünnebier 2010). Rotsaert et al. (2017) found accuracy to be an important, positive predictor of the perceived educational value of peer assessment in secondary education. Therefore, accuracy of the feedback will be taken into account as a covariate.

## Method

### *Participants*

Forty-one third-year students of the academic teacher training programme participated in the current research. The original sample consisted of 51 students. However, two students did not hand in their assignment and another eight students did not fill in the questionnaire. This led to a sample consisting of 35 women and six men, with an average age of 21.27 ( $SD = 1.29$ ), ranging from 20 to 26. Within this group, students divided themselves into groups of two to four students. In total, fourteen groups were formed in which the students made an assignment.

### *Instruments*

#### *Student assignment*

Students collaboratively had to write a short paper (500 words), wherein they had to select a statement made by a newspaper or news website, and argue for and/or against this statement using academic literature. Although students had worked on writing papers before, the assignment of arguing academically for or against a statement was new to them.

#### *Feedback form*

Students gave peer feedback through a standardised feedback form. This feedback form was developed by the teachers of the course. The form consisted of criteria that had to be rated with a five-point Likert-scale, and contained the following main criteria: clarity of the text, relevance of the text, clear argumentation within the text, quality of English of the text, size of the text, adequate proposition, clear referencing and sufficient academic prose (decent and adequate use of language in terms of spelling, punctuation, etc.). Students were asked to add comments to the rating. The reviewing participant was also asked to fill in his or her self-perceived expertise, both in terms of content and providing feedback, by grading their expertise from 1 (very poor) to 10 (very good), based on their own subjective judgement without providing criteria for this.

## Feedback perception

For measuring students' perceptions of the feedback, the Dutch version of the Feedback Perceptions Questionnaire of Strijbos, Narciss, and Dünnebiel (2010) was used. This 18-item questionnaire measures perceptions in terms of perceived adequacy of feedback (PAF), willingness to improve (WI) and affect (AF). The items were measured on a scale from 1 (fully disagree) to 5 (fully agree). PAF was measured with nine items (e.g. 'I consider this feedback helpful' and 'I accept this feedback'). Three items measured WI (e.g. 'I am willing to improve my performance'). Another six items were used to measure AF (e.g. 'I felt offended after this feedback' and 'I felt satisfied after this feedback'). Other questions about personal details (name, age and gender) were added to the questionnaire. Table 1 shows all the items used from the Feedback Perceptions Questionnaire. Strijbos, Pat-El, and Narciss (2010) validated the questionnaire using passive phrasing, asking how the students would react if they would receive given feedback. In this current research, active phrasing has been used.

Before using the questionnaire for the current research, the reliability was computed with a sample ( $N = 12$ ) of first-year bachelor student of the Bachelor of Nursing. PAF had a reliability of  $\alpha = .746$ , WI of  $\alpha = .649$  and the reliability of AF was  $\alpha = .715$ . One item (AC3 (R)) did not only need a literal translation, but also some reworking in order to get the intended meaning of the item across.

Within the sample used in the current research ( $N = 41$ ), PAF showed a reliability of  $\alpha = .862$ , WI of  $\alpha = .680$  and the reliability of AF was  $\alpha = .911$ . This means that all reliability scores increased using the current sample and were sufficiently high.

## Procedure

Before participating in any part of the research, the students were informed, both written and oral, about the design of the research and their rights to withdraw from participating in the research (passive consent). The students were informed about the anonymous processing of the data and it was told that the teacher would not read the answers on the questionnaires. Due to this precautions, it can be expected that the information about the research had not impacted the findings.

The students handed in their concept version of the assignment to the researcher. The researcher anonymized the assignments and randomly distributed them among the students. Thereafter, each student gave feedback to one of the other groups by filling in the feedback form and returned the feedback to the researcher. The quality of the provided feedback was graded, which may have caused the students to be more serious in filling in the feedback form. The feedback was also anonymized by giving each filled-in form a random number which was only known by the researcher. The filled in feedback forms were distributed over the group members of the group that wrote the assignment, without the

**Table 1.** Feedback perceptions questionnaire.

|                      |   |
|----------------------|---|
| FA1                  | I am satisfied with this feedback                     |
| US1                  | I consider this feedback useful                       |
| AF1 (R) <sup>a</sup> | I felt offended after this feedback                   |
| AC1                  | I accept this feedback                                |
| WI1                  | I am willing to improve my performance                |
| AF2                  | I felt satisfied after this feedback                  |
| FA2                  | I consider this feedback fair                         |
| US2                  | I consider this feedback helpful                      |
| AF3 (R)              | I felt angry after this feedback                      |
| AC2 (R)              | I dispute this feedback                               |
| WI2                  | I am willing to invest a lot of effort in my revision |
| AF4                  | I felt confident after this feedback                  |
| FA3                  | I consider this feedback justified                    |
| US3                  | This feedback provides me a lot of support            |
| AF5 (R)              | I felt frustrated after this feedback                 |
| AC3 (R)              | I reject this feedback                                |
| WI3                  | I am willing to work on further assignments           |
| AF6                  | I felt successful after this feedback                 |

<sup>a</sup>Items with an (R) are reversed items and are recoded in the data.



name of the reviewer, but with the perceived expertise of the reviewer. After that, the students had to fill in the Feedback Perceptions Questionnaire based on the received feedback form. The students were asked to fill in this questionnaire as soon as possible and before they discussed the feedback with their fellow students to avoid bias by affecting each other's opinions.

The teachers reviewed the assignments as well and a comparison was made between the students' feedback and the teachers' review. With this comparison, the accuracy of the peer feedback was computed. The teacher feedback was communicated to the students after all the participating students filled in the questionnaire.

### Data analysis

That students wrote a paper in groups may have influenced the way they provided peer feedback individually to other groups. To take this into account a multilevel regression analysis was used to analyse the relationship between the perceived expertise of the reviewer and the perceptions of the peer feedback by the reviewee. Within level one, the feedback perceptions of the individual students were included. The second level consisted of the groups in which the assignments were made. The accuracy of the peer feedback was considered as a covariate.

The same multilevel analysis was conducted for analysing the relationship between the gap between the perceived expertise of the reviewer and reviewee and the perceptions of the peer feedback. As a covariate, the accuracy of the peer feedback was taken into account.

The gap between the perceived expertise of the reviewer and reviewee was calculated by subtracting the perceived expertise of the reviewee from the perceived expertise of the reviewer. The accuracy of the peer feedback was calculated by summing up the absolute differences of each item between the peer and teacher feedback. A positive score means that the peer scored higher than the teacher.

## Results

Due to two students not handing in their paper, a difference in the number of reviewers ( $n = 39$ ) and the number of reviewees ( $n = 41$ ) exists. Because a few students did not take part in the questionnaire, there are small differences in the mean and standard deviation of the perceived expertise of the students giving the feedback and the perceived expertise of the students receiving the feedback (see Table 2).

A comparison of the matched reviewer and reviewee on perceived expertise in both the assignment and giving feedback shows, on average, no significant differences (Figure 1). The discrepancy on the perceived expertise in making the assignment shows a mean of .00 ( $p = 1.00$ ), whereas the discrepancy on the perceived expertise in giving feedback shows a small difference with a mean of -.05, which is insignificant ( $p = .81$ ).

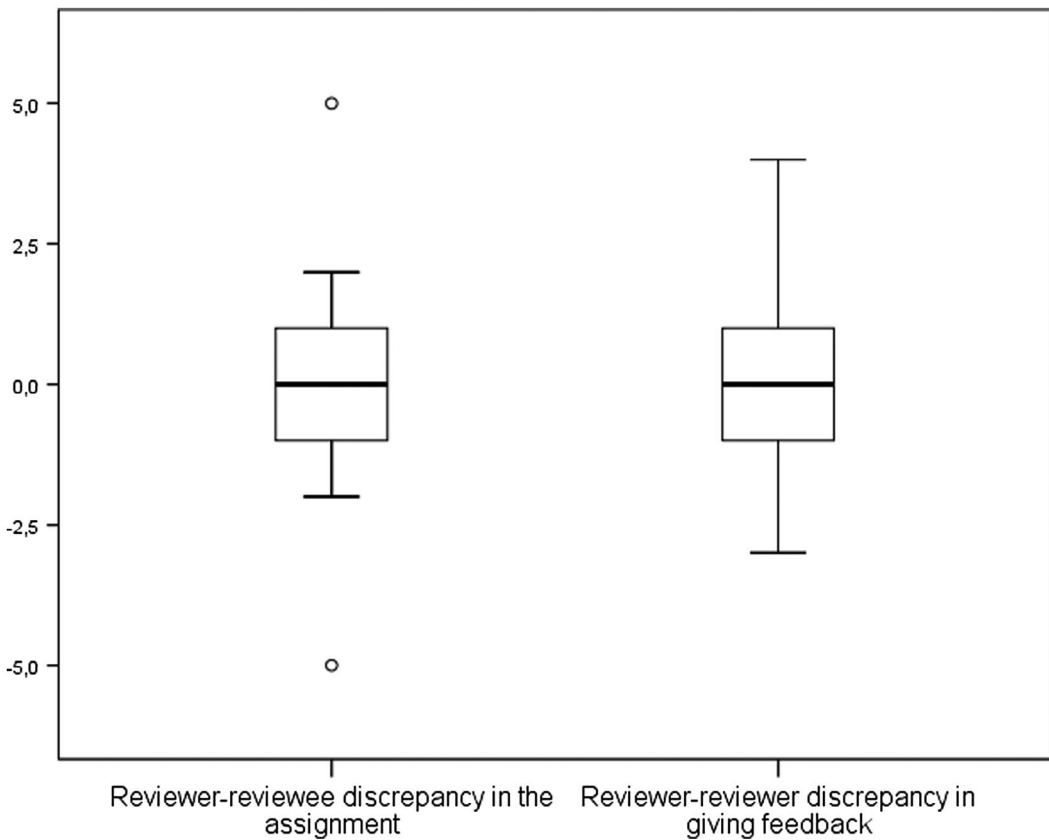
### Accuracy of the peer feedback

The students had to fill in 35 items on the feedback form. Each item was scored from 1 to 5 points. So, the students could give a minimum of 35 points and a maximum of 175. The students scored the papers with a mean of 129.88 ( $SD = 14.60$ ). The students received a mean score of 113.46 ( $SD = 20.94$ ) from the teachers. The accuracy of the peer feedback has been conducted by adding up the absolute differences

**Table 2.** The perceived expertise of the reviewers and reviewees.

|         | Reviewers ( $n = 39$ )            |  | Reviewees ( $n = 41$ )            |  |
|---------|-----------------------------------|--|-----------------------------------|--|
|         | Perceived expertise in assignment | Perceived expertise in giving feedback | Perceived expertise in assignment | Perceived expertise in giving feedback |
| Minimum | 2.00                              | 4.00                                   | 2.00                              | 4.00                                   |
| Maximum | 8.00                              | 9.00                                   | 8.00                              | 9.00                                   |
| Mean    | 6.60                              | 6.71                                   | 6.60                              | 6.76                                   |
| SD      | 1.03                              | 1.01                                   | .98                               | 1.07                                   |





**Figure 1.** Boxplots of the discrepancy between reviewer and reviewee in the assignment and in giving feedback.

**Table 3.** Correlations of study variables.

|                                | 1      | 2      | 3      | 4    | 5    | 6   | 7      | 8 |
|--------------------------------|--------|--------|--------|------|------|-----|--------|---|
| 1. Expertise assessment        | –      |        |        |      |      |     |        |   |
| 2. Expertise feedback          | .41**  | –      |        |      |      |     |        |   |
| 3. Gap of expertise assessment | .76*** | .41**  | –      |      |      |     |        |   |
| 4. Gap of expertise feedback   | .36*   | .61*** | .55*** | –    |      |     |        |   |
| 5. Accuracy of feedback        | .08    | .14    | .10    | –.04 | –    |     |        |   |
| 6. WI                          | –.14   | –.09   | –.39*  | –.05 | –.18 | –   |        |   |
| 7. AF                          | –.05   | .03    | –.20   | –.01 | –.04 | .06 | –      |   |
| 8. PAF                         | –.13   | .23    | –.12   | .13  | –.16 | .08 | .52*** | – |

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

between the peer feedback and the teacher feedback. This number could have a range from 0 to 140 and resulted in a mean accuracy of 32.29 ( $SD = 10.55$ ). This number is quite low compared to the possible range, which indicates that the student feedback did not differ substantially from the teacher feedback.

### Correlations

Table 3 presents the correlations between the different study variables. The independent variables (expertise in assignment, expertise in giving feedback, gap of expertise in assignment and gap of expertise in giving feedback) correlate significantly with each other. The independent variable willingness to improve correlates significantly with the independent variable gap of expertise in assignment. Furthermore, the dependent variables affect and perceived adequacy of feedback correlate significantly.

### Multilevel analysis

Tables 4–6 show the results of the multilevel analyses. For every dependent variable (affect, willingness to improve and perceived adequacy of feedback), a null-model was conducted to separate the variance into between-group and within-group variance. For all null-models, only within-group variance was found to be significant. For all dependent variables, Model 1 describes the model in which the perceived expertise of the reviewer in making the assignment (expertise assignment) and in giving feedback (expertise feedback) were included as independent variables, and the accuracy of the feedback (accuracy feedback) was taken in consideration as a covariate. The second model included the gap in perceived expertise between the reviewer and reviewee in making the assignment (gap of expertise assignment) and in giving feedback (gap of expertise feedback). Also, the accuracy of the feedback was taken in consideration as a covariate.

In Table 4, a null-model for the scale affect is shown with a great part of the variance on the student level and with a deviance of 247.941. Model 1 shows that adding the independent variables and covariates did not result in a better model fit ( $\chi^2 = .50, p > .25$ ). None of the added variables revealed a significant effect on the scores of the scale affect. In Model 2 a better model fit is shown than in Model

**Table 4.** Multilevel models for the perceptions of feedback (Scale: affect).

|                                  | Model 0           | Model 1            | Model 2            |
|----------------------------------|-------------------|--------------------|--------------------|
| <i>Fixed</i>                     |                   |                    |                    |
| Constant                         | 22.985 (1.076)*** | 24.816 (6.472)***  | 24.250 (3.085)***  |
| Expertise assignment             |                   | -.379 (.748)       |                    |
| Expertise feedback               |                   | .317 (.780)        |                    |
| Gap of expertise assignment      |                   |                    | -.722 (.597)       |
| Gap of expertise feedback        |                   |                    | .577 (.678)        |
| Accuracy of feedback             |                   | -.045 (.092)       | -.037 (.090)       |
| <i>Random part</i>               |                   |                    |                    |
| Level 2 – group                  | 9.441 (6.241)     | 9.435 (6.213)      | 8.444 (5.813)      |
| Level 1 – students               | 18.211 (4.922)*** | 17.936 (4.843) *** | 17.784 (4.798) *** |
| <i>Model fit</i>                 |                   |                    |                    |
| Deviance ( $-2^*$ loglikelihood) | 247.941           | 247.437            | 246.265            |
| $\chi^2$                         |                   | .504               | 1.676              |
| Df                               |                   | 3                  | 3                  |
| Reference model                  |                   | Model 0            | Model 0            |

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Table 5.** Multilevel models for the perceptions of feedback (Scale: willingness to improve).

|                                  | Model 0          | Model 1           | Model 2          |
|----------------------------------|------------------|-------------------|------------------|
| <i>Fixed</i>                     |                  |                   |                  |
| Constant                         | 14.000 (.176)*** | 15.568 (1.407)*** | 14.440 (.514)*** |
| Expertise assignment             |                  | -.132 (.185)      |                  |
| Expertise feedback               |                  | -.016 (.191)      |                  |
| Gap of expertise assignment      |                  |                   | -.380 (.127)**   |
| Gap of expertise feedback        |                  |                   | .189 (.144)      |
| Accuracy of feedback             |                  | -.018 (.017)      | -.013 (.015)     |
| <i>Random part</i>               |                  |                   |                  |
| Level 2 – group                  | .000 (.000)      | .000 (.000)       | .000 (.000)      |
| Level 1 – students               | 1.268 (.280)***  | 1.207 (.267)***   | 1.003 (.222)***  |
| <i>Model fit</i>                 |                  |                   |                  |
| Deviance ( $-2^*$ loglikelihood) | 126.097          | 124.066           | 116.491          |
| $\chi^2$                         |                  | 2.031             | 9,606*           |
| Df                               |                  | 3                 | 3                |
| Reference model                  |                  | Model 0           | Model 0          |

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Table 6.** Multilevel models for the perceptions of feedback (Scale: perceived adequacy of feedback).

|   | Model 0           | Model 1           | Model 2           |
|---|-------------------|-------------------|-------------------|
| <i>Fixed</i>                            |                   |                   |                   |
| Constant                                | 38.376 (.843)***  | 40.309 (5.682)*** | 42.328 (2.328)*** |
| Expertise assignment                    |                   | -1.210 (.680)     |                   |
| Expertise feedback                      |                   | 1.625 (.707)*     |                   |
| Gap of expertise assignment             |                   |                   | -.671 (.565)      |
| Gap of expertise feedback               |                   |                   | .961 (.641)       |
| Accuracy of feedback                    |                   | -.150 (.078)      | -.121 (.080)      |
| <i>Random part</i>                      |                   |                   |                   |
| Level 2 – group                         | 2.694 (4.030)     | 4.972 (4.097)     | 4.761 (4.261)     |
| Level 1 – students                      | 20.555 (5.504)*** | 15.119 (4.071)*** | 16.814 (4.525)*** |
| <i>Model fit</i>                        |                   |                   |                   |
| Deviance ( $-2 \times \log$ likelihood) | 244.786           | 236.943           | 240.345           |
| $\chi^2$                                |                   | 7.843*            | 4.441             |
| Df                                      |                   | 3                 | 3                 |
| Reference model                         |                   | Model 0           | Model 0           |

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

1; however, this model fit is still not significant ( $\chi^2 = 1.676, p > .25$ ) and both models show a lower deviance than the null model, suggesting that the null model is a better predictor of the scale affect. Also, none of the variables show a significant effect on the scale affect.

Table 5 shows the results of the multilevel analysis with the scale willingness to improve as a dependent variable. The null-model shows that all variance is found on the student level ( $p < .001$ ) and has a deviance of 126.10. Model 1 did not result in a model with a better fit compared to the null model ( $\chi^2 = 2.03, p > .25$ ). It also shows a lower deviance than the null-model, suggesting that model 1 is a better predictor of the scale willingness to improve than Model 0, however this difference is insignificant. Adding the gap in perceived expertise in the assignment, and in giving feedback and the covariate accuracy of the feedback to the null model (model 2), resulted in a model with a significant better fit ( $\chi^2 = 9.61, df = 3, p < .05$ ). The relationship between the gap of perceived expertise in making the assignment on the scale willingness to improve was found to be significant, but, contrary to the hypothesis, negative. This indicates that willingness to improve significantly increases when the gap in perceived expertise in making the assignment decreases. Further inspection of this relationship shows that the highest scores on willingness to improve are obtained when the gap in expertise of making the assignment is close to zero. No other variable was found to be a significant predictor of willingness to improve.

The multilevel model with the scale perceived adequacy of feedback as a dependent variable is shown in Table 6. The null model shows, even as the other models, that almost all variance is found on the student level ( $p < .001$ ). Table 6 also shows that Model 1 ( $\chi^2 = 7.84, p < .05$ ) is a significant better model than the null model and Model 2 ( $\chi^2 = 4.44, p > .25$ ) did not seem to have a better model fit compared to the null model. The reviewer's perceived expertise in giving feedback is found to be a significant predictor of the perceived adequacy of feedback ( $p = .011$ ), indicating that a higher perceived expertise in giving feedback results in a higher perceived adequacy of feedback. Furthermore, no significant predictors of the perceived adequacy of feedback were found.

## Conclusion and discussion

The current study examined the relationship between perceived expertise of the reviewer and the perceptions of anonymous peer feedback in higher education, with the reviewee being aware of the perceived expertise of the reviewer.

First, it was predicted that there would be a positive relationship between the perceived expertise of the reviewer and the perceptions of the feedback. Consistent with this hypothesis, the perceived expertise of the reviewer in giving feedback was found to be positively related to the perceived adequacy

of feedback. This suggests that students perceived peer feedback as more adequate when knowing the peer reviewer perceived his or her expertise in giving feedback to be high, which is in line with the research by Strijbos, Narciss, and Dünnebier (2010). These findings confirm that students with a higher perceived expertise may be more accurate and comprehensive in reviewing due to their better underlying skills in detecting and diagnosing the problems (Cho and MacArthur 2011; Govaerts et al. 2011). The higher perceptions of adequacy when receiving feedback from a student perceiving their expertise as higher could also be explained by the idea that students are biased in their perceptions of adequacy by their knowledge of the peer giving the feedback (Lu and Bol 2007). However, in the current study, the overt peer characteristics were kept to a minimum by only providing the self-perceived expertise of the peer. Further research could provide more evidence on whether this positive relationship could be explained by either higher expertise of the feedback-giver correlating with better feedback, or the *perception* of the feedback-receiver on the expertise of the feedback-giver (Strijbos, Narciss, and Dünnebier 2010; Raes, Vanderhoven, and Schellens 2015).

With regard to affect and the willingness to improve, no relationships between the perceived expertise of the reviewer and the perceptions of the feedback were found, for both perceived expertise in the assignment as well as with regard to providing feedback. This indicates that students show no different levels of affect or willingness to improve due to the perceived expertise of the reviewer. The current study did not find that students perceive the feedback as more adequate due to the perceived expertise in the assignment. The covariate, accuracy of the feedback as an indicator of the quality of the feedback, also did not turn out to have a significant effect on the perceptions. As such, both the actual performance as well as the perceived expertise did not seem to be a significant predictor of the perceptions of peer feedback.

These findings are not in line with the finding of Strijbos, Narciss, and Dünnebier (2010) that a higher level of expertise of the reviewer would result in a higher level of acceptability, more application and a higher motivation of the reviewee. However, that no significant relationships were found can be due to several reasons. There was a relatively homogeneous group of students in our sample. Although some common ground is necessary for effective peer feedback (Topping 2003), there needs to be some variability. All students followed the same level of education and completed the same courses in the study, which may lead to too small differences in (perceived) expertise and, therefore, do not differ in the comprehensibility and quality of their feedback to find any differences (Govaerts et al. 2011). The low standard deviations shown in Table 1 as well as the insignificant gaps in perceived expertise underpin this likely explanation. It is also possible that the students do not know how to improve or feel or even are unable to interpret the received feedback. Training or support in how to use the feedback is rarely offered (Weaver 2006), despite the fact that this may be very helpful to increase the students' ability, and maybe even willingness, to improve their work based on the peer feedback. Qualitative research could further give insight into this question, which may lead to the suggestion to increase the training and support in the use of feedback.

Second, the relationship between the perceived expertise gap and the perceptions of the feedback was analysed. Here, it was also predicted that there would be a positive relationship between the gap of perceived expertise and the perceptions of the peer feedback. A multilevel analysis showed that the model with the dependent variable willingness to improve appears to be a better fitted model. One of the independent variables was a significant predictor of willingness to improve, namely, a negative relationship was found between the gap in perceived expertise in making the assignment and the willingness to improve. Further inspection of this relationship shows that the highest scores are obtained when the gap is close to zero. This suggests that students who received feedback from a peer who perceived their expertise as closer to the reviewee's own perceived expertise in making the assignment was more willing to improve his or her own assignment. This relationship can be explained by students with a higher perceived expertise not always being effective in explaining the skills and knowledge to novices explicitly (Cho and MacArthur 2011). Cho and MacArthur (2011) explain this behaviour as using knowledge of their own (expert) models that novices cannot refer to, even though they are aware that the novices do not understand this. Another behaviour typical for these experts is underestimating the difficulty level for novices of the assignment, which may lead to less understandable feedback.

The other two dependent variables did not show significantly better fitted models or significant predictors. This suggests that the willingness to improve the assignment after receiving feedback seems unrelated to the perceived adequacy of feedback and the emotional state of the students. Stribos, Narciss, and Dünnebier (2010) mentioned that the impact of peer feedback will be reduced if students are not willing to improve their performance, no matter how useful the feedback is perceived to be. It can be concluded that the gap in expertise in making the assignment should be close to zero to minimize the reduction of the effect of peer feedback.

The data showed that most of the variance occurred at the student-level, rather than the group-level. Considering our hypotheses with regards to mechanisms of perception, finding variance mostly at group-level would have implied either too much selective behaviour in group composition or group-processes and perceptions having more influence on one's own perceptions than self-perceived expertise of the reviewer and reviewee. With the current results, we show that even when students are working together, their perceptions of their own competence as feedback providers (Rotsaert, Panadero, Estrada, and Schellens 2017), as well as their perceptions of received feedback (Stribos, Pat-El, and Narciss 2010) are mostly due to individual characteristics.

### **Limitations**

This research had a few limitations. First, the research was conducted in a specific context, namely the academic teacher training programme, with a small sample consisting almost completely of women. This makes it hard to generalise the findings of this research to a larger population of all students in higher education. The small sample size also causes the problem of a high standard error, which makes it harder to find significant results. Therefore, it is recommended to conduct the study again with a larger sample size.

Second, that the assignment was a group assignment makes it hard to interpret the perceived expertise in making the assignment. Students may be influenced by the expertise of their group members, which may indicate that the perceived expertise in giving feedback could be a better independent variable than the perceived expertise in making the assignment, although students' perceived expertise in giving feedback may also be influenced by their group. This influence, however, is expected to be smaller due to the individual character of giving feedback within this research.

Third, that the students gave anonymous feedback before receiving their feedback may have influenced the perceptions of the anonymous peer feedback. Receiving feedback has benefits for learning, but so does providing feedback to another on one's own learning (Lundstrom and Baker 2009). However, providing feedback may also influence the way students perceive the feedback from peers by making the students more critical reviewers of their own work and better writers, which may lead to a different view of their own work and therefore also a more critical view on the peer feedback received on their own work. Experimental research could further investigate the added value of giving feedback on the perceptions of anonymous peer feedback and the effect of expertise in this relationship.

At last, the assessment process is a time-consuming process. However, when not using it for research purposes, the process could be much less time-consuming due to the reduction in needed information about the process compared to the current research. Digital systems can be used to anonymously divide the papers to give peer feedback.

### **Implications**

The results of this study provide only moderate support for the practice of peer feedback in higher education courses. Students sometimes hesitate in accepting peer feedback in higher education (Lu and Bol 2007; Raes, Vanderhoven, and Schellens 2015). However, previous research has also shown many advantages of giving and receiving peer feedback (Liu et al. 2001; Gibbs and Simpson 2004; Pope 2005; Lu and Bol 2007; Cho and MacArthur 2011; Meusen-Beekman, Joosten-ten Brinke, and Boshuizen 2015). The current study shows how being aware of the expertise of the reviewer influences the perceptions of peer feedback. The outcomes of this research may help teachers and curriculum

developers to make decisions about giving students this type of information when giving (anonymous) feedback. This study indicates that students with more similar expertise who give peer feedback may lead to a higher level of willingness to improve. This is consistent with other research findings on peer feedback (Gibbs and Simpson 2004; Cho and MacArthur 2011). Teachers could use this information in forming pairs or groups for peer review.

The results of this study also provide indications for future research. Little is known about giving and receiving peer feedback anonymously, despite the potential benefits of anonymizing peer feedback. This research provides an insight into the effects of anonymous peer feedback. Students are more likely to be biased by the peer relations, peer characteristics and personal preferences when giving and receiving peer feedback (Lu and Bol 2007; Raes, Vanderhoven, and Schellens 2015). Given the results of this study, expertise seems to have certain relationships with the perceptions of peer feedback. When receiving peer feedback from a peer communicating a perceived high expertise in giving feedback, students seem to perceive the feedback as more adequate. Also, when receiving feedback from a student perceiving their expertise only a little higher than the reviewee, the reviewee is more willing to improve the assignment.

The role of anonymity was implemented due to the fact that emotional aspects, for example due to personal relationships, can play a role in peer feedback. However, these emotional aspects were not further investigated in the current research. Emotional components of peer feedback could be investigated, for instance by using social network analysis or dynamic system modelling, in the future. Moreover, the data showed that students had bias towards the work of their peers, even when assessments were anonymous. In line with recent work of Leenknecht and Prins (2018), it seems that students should be scaffolded in providing peer feedback. Providing such scaffolds or training is effective in the context of self-assessment (Kostons, van Gog, and Paas 2012) for both assessment accuracy and learning performance.

Considering the results of this study, perceived expertise seems mostly not to be one of the factors that influences the process of giving and receiving peer feedback. This finding may raise new research questions, since research has shown that students with more expertise produce on average more comprehensive feedback (Govaerts et al. 2011), which can be expected to have a positive influence on the perceptions of peer feedback. A new research question would be how the actual expertise of the reviewer or the gap in actual expertise between reviewer and reviewee influences the perceptions of peer feedback when communicating or not communicating these data to the reviewee.

Whether or not it is necessary to grade the provided feedback, as in the current research, is an open question. On the one hand, students may need a carrot in order to apply themselves towards giving adequate feedback regardless of their own perceived expertise. On the other hand, applying a possibly summative effect to a formatively intended exercise may act as a stick, stifling learning from providing feedback. Considering the design of this particular study, it was not possible to disseminate these possible effects.

Further research is needed in this field to investigate the relationship between the (gap of) perceived expertise and perceptions of peer feedback, considering the limitations in, for example, context and sample size. To further investigate this relationship, it is recommended to conduct an experimental study, with an experimental condition (giving the perceived expertise) and a control condition (not giving the perceived expertise). It may also be interesting to investigate what happens with the relationship between the (gap of) perceived expertise and perceptions of peer feedback when the perceived expertise has been manipulated. This may give a further insight in whether the relationships found or not found are due to the actual (perceived) expertise or that the students are biased by the communicated (perceived) expertise, which would support the idea of bias suggested by Lu and Bol (2007) and Raes, Vanderhoven, and Schellens (2015). Given the reduced anonymity when filling in their perceived expertise, which may reduce the benefits of reviewing anonymously, the reviewers could have given the feedback differently they would have otherwise (Vickerman 2009; van Gennip, Segers, and Tillema 2010; Raes, Vanderhoven, and Schellens 2015). The effects of filling in their perceived expertise on the content and quality of the feedback could also be investigated in future research.

Overall, it can be concluded that the perceptions of peer feedback are partly affected by the expertise of the reviewer. A reviewer with a high expertise in giving feedback results in the perceptions of more adequate feedback, whereas the gap in expertise in making the assignment between the reviewer and reviewee should be close to zero to obtain the most willingness to improve the assignment. However, further relationships between the expertise and perceptions of peer feedback were not found in the current research and it is recommended to further investigate these relationships.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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