

Research paper

Examining how the presence, absence and numerical value of a grade affects students' perceptions of assessment feedback

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We explored whether the academic grade a student sees influences how positively or negatively they interpret written assessment feedback. Specifically, an experimental design was used where $N = 94$ psychology students each read an identical passage of neutrally worded feedback. Depending upon which of three experimental conditions they had been allocated to, they also saw with the feedback either a grade of (i) 75 per cent (High Grade; $N = 33$); (ii) 45 per cent (Low Grade; $N = 31$) or (iii) No Grade (control condition; $N = 30$). Next, they answered seven questions relating to their perceptions of the feedback they had read. As predicted, those in the High Grade and No Grade conditions provided significantly more positive perceptions of the neutral feedback compared to those in the Low Grade condition. Implications for those within higher education, who are responsible for deciding how and when grades and feedback are released to students, are discussed.

Keywords: *Feedback-perception, higher education, students; grade-perception, grade-priming.*

Introduction

QUALITATIVE assessment feedback is a key component in learning gain (Hattie & Timperley, 2007), and recent years have seen considerable interest in improving feedback practices across higher education (see e.g. Evans, 2013 for a review). Although a large proportion of research related to feedback content and practices is carried out in the UK (perhaps in response to the NSS, Evans, 2013), the issue is also of relevance internationally (Carless et al., 2011; Broadbent et al., 2018, Winstone & Nash, 2016), and it is widely recognised that assessment feedback is key for effective student progress (e.g. Ilgen & Davis, 2000). In addition, students who act upon their feedback tend to have better self-regulated learning and academic outcomes (Brown et al., 2016). However, a remaining challenge is to determine how students perceive their feedback, and to what extent they successfully engage with the feedback process (Winstone et al., 2017). Student satisfac-

tion with feedback is a persistent cause for concern in higher education where a pertinent example is the National Student Survey in which feedback satisfaction continues to rate lower than other areas covered by the survey (Office for Students, 3 July, 2019).

Assessment feedback has the potential to be useful and constructive to learning if appropriately acted upon, but this may depend on how it is delivered (Winstone et al., 2017) and how it is received and perceived by the student. Qualitative feedback verbally communicates to the student areas of strength in their work, areas in need of improvement and suggestions for how the student might improve in their future work. This type of feedback has the potential to elicit differing responses, reactions and perceptions in the recipient. For example, Baadte and Schnotz (2013) have reported that feedback can affect students' motivation and engagement. As a result, much research effort has been directed toward identifying an optimal

delivery method for feedback (Price et al., 2011; Winstone et al., 2016). Fundamental to the effectiveness of feedback are the assumptions that students will actively read; mentally process; and then act upon their feedback. However, low levels of engagement with feedback (such as collecting/cursorily reading) are commonly reported (e.g. Hounsell et al., 2007; Sinclair & Cleland, 2007). Price et al. (2011), report that, for some students, the grade alone is sufficient as a form of feedback, and that for some, a grade that meets their current self-expectation will actually reduce their motivation to attend to, and engage with, the written feedback.

Withholding assessment grades and releasing qualitative feedback first, has been investigated as a potential tool to improve student engagement with feedback (Irwin et al., 2013; Jackson & Marks, 2015; Lipnevich & Smith, 2009). However, to date, we found only one research report (Lipnevich & Smith, 2009) which has systematically addressed the impact that the grade awarded has on the receiver's response to feedback. Lipnevich and Smith (2009) used an authentic learning task to investigate the effects of feedback type, praise and grade on student performance. Lipnevich and Smith (2009) manipulated whether or not a grade was presented, and whether the presence of a grade had an impact on the effectiveness of the feedback. Overall, detailed feedback had the most beneficial effect on improvement. However, substantially lower improvement was observed when feedback had been coupled with a grade than with no grade given. The authors suggest that students' responses to the grade may impact their perception and processing of the feedback. This is very likely given the influence that emotions can have on cognitive processing (see Mueller, 2011 for review) and in educational assessment in particular (see Boud & Falchikov, 2007). In addition, the findings from Lipnevich and Smith (2009) indicate that receiving a grade directly impacts the student's response to their feedback, either due to a reallocation of cognitive resources, and/or their affective reaction.

Irwin et al. (2013) report a case study of adaptive grade release, which required students to engage with the written feedback and submit a written reflection about the feedback before their assignment grade was released. Withholding grades was associated with better engagement with the feedback, for example being able to remember the feedback for longer, and better target setting for future assignments. Similarly, Jackson and Marks (2016) reported an improvement in the quality of student work during a trial of withholding assessment marks and requiring reflective commentary on the written feedback. However, the authors also reported that grade withholding could result in negative affect, in particular, feelings of frustration and anxiety.

Although there has been some interest in grade withholding there is little direct and systematic investigation of the possible priming effect of assessment grade on perception of the associated feedback. This is an important focus for feedback research as there is a growing awareness and interest in how academic emotions influence learning (Pekrun, 2011). Pekrun (2011) has proposed the potential effects of both positive and negative academic emotions on subsequent learning, motivation, attention and self-efficacy. For example, feeling pride in response to assessment feedback has been shown to trigger motivation for future learning in some cases and complacency, and a reduction in perceived effort, in others (see Kahu et al., 2015). More recently, Pitt and Norton (2017) examined students' reactions to feedback for examples of 'good' and 'bad' pieces of work they had completed. The authors highlighted that the student's response to their feedback was largely determined by their emotional maturity, and how the student perceived the work against their own internal expectation of performance. Overall, most of the interviewees adopted maladaptive strategies to feedback (avoidance, fear, annoyance) that accompanied a 'bad' grade, indicative of low emotional maturity (despite being final year undergraduates). Underperformance triggered feelings of moti-

vation to improve and learn from feedback in only a few of the students, in line with Pekrun's (2011) theory of academic emotions. Howell et al. (2018) evaluated students' responses to learner analytics messages in a quasi-experimental study depending on the hypothetical grade (Distinction/pass/fail) that was sent to them. As expected, higher grades were associated with more positive affect, and lowest grades with most negative affect. Although the study did not explicitly address the effect of such emotional reactions on perceptions of feedback, it would not be unreasonable to deduce that a very similar pattern would be observed.

The potential for grades exerting a negative priming effect on feedback perception is arguably a problematic outcome, especially for students who receive a low grade and so have an arguably greater need for improvement than those with a higher grade. Despite the interest in best practice for delivering feedback, it is surprising that the potential priming effect of the assessment grade on feedback perception has not, thus far, been investigated. Similar priming effects have been reported in research addressing evaluations of teaching where there is some evidence that the grade a student receives affects how they subsequently rate the quality of the teaching they have experienced (Arnold, 2009; Brockx et al., 2011).

The present study aims to use a controlled online experiment to explore whether undergraduate students' evaluations of neutrally worded, written assessment feedback is affected by the presence and value of a grade. It is predicted that the perception ratings students give for a piece of written feedback will differ significantly across three different conditions; (i) where no grade is shown; (ii) where a low academic grade is shown and (iii) where a high academic grade is shown.

Method

Participants

The study was conducted online between January and March 2019 and initially, $N=101$

undergraduate psychology students, in their first or second year of study from the University of Winchester participated. However, incomplete data from seven participants were removed and so $N=94$ participants were included within our analyses. The mean age of participants was 19.5 years $SD = 1.4$ ($N=91$ due to missing age data for $N=3$ participants). The final sample consisted of 20 males, 73 females and one participant who identified as non-binary. Participants were allocated to one of the three experimental conditions, on an alternating basis.

Design

A 3-way between groups design was used. The independent variable was 'Grade', which had 3 levels: High Grade (75 per cent) ($N = 33$), Low Grade (45 per cent) ($N = 31$) and No Grade (control group where no numerical grade was shown) ($N = 30$). The dependent variable was each participant's total score on a Feedback Perception scale that was designed specifically for use in the present study. The scale consisted of seven items, each rated on a 9-point Likert scale. The items were worded as follows: (i) 'How happy would you be receiving the feedback?'; (ii) 'How positive or negative was the feedback in your opinion?'; (iii) 'How useful was the feedback?'; (iv) 'How confident would the feedback make you feel?'; (v) 'How anxious would the feedback make you feel?' (This item was reverse coded before analysis); (vi) 'How helpful was the written feedback?' and (vii) 'How likely would you be to use the written feedback to help you in a future assignment?'. The minimum possible total score was 7 and the maximum possible score was 63; where a higher score indicated a more positive perception of the feedback the participant had been asked to read. Cronbach's Alpha for the Feedback perception Scale was .815 indicating a high and acceptable degree of internal consistency.

Materials

A short piece of written assignment feedback was created for use in the present study. The feedback was written by the lead researcher who is a university psychology lecturer with seven years' experience of providing higher education students with written feedback. The feedback was intended to contain only neutral statements about a fictitious essay, consisting of both evaluative comments and feedforward guidance. A second university psychology lecturer, with eight years' experience of giving written feedback to undergraduates, reviewed an initial draft of the statement and suggested edits. From this, a final 210 word version of the feedback statement was made (see Appendix A).

Procedure

The study was advertised on an online psychology department participant pool portal. Those who indicated an interest in completing the online study were presented with an information sheet and consent form and then, if they wished to continue, asked to indicate their consent electronically. Participants were initially asked two basic demographic questions; their age in years and the gender with which they most closely associated (Male/Female/Non-Binary). Next, they were given the following instructions on screen: 'Imagine you have received the following feedback from an assignment at University' and were then presented with the neutral feedback stimulus.

In addition, depending on which experimental group participants were assigned to, the feedback stimulus also contained underneath the text either (i) a High grade of 75 per cent; (ii) a Low grade of 45 per cent or, (iii) for the No Grade control group, no visible grade was displayed with the feedback. After reading the feedback, participants were then asked to respond to the seven perception questions and were provided with debriefing information.

Results

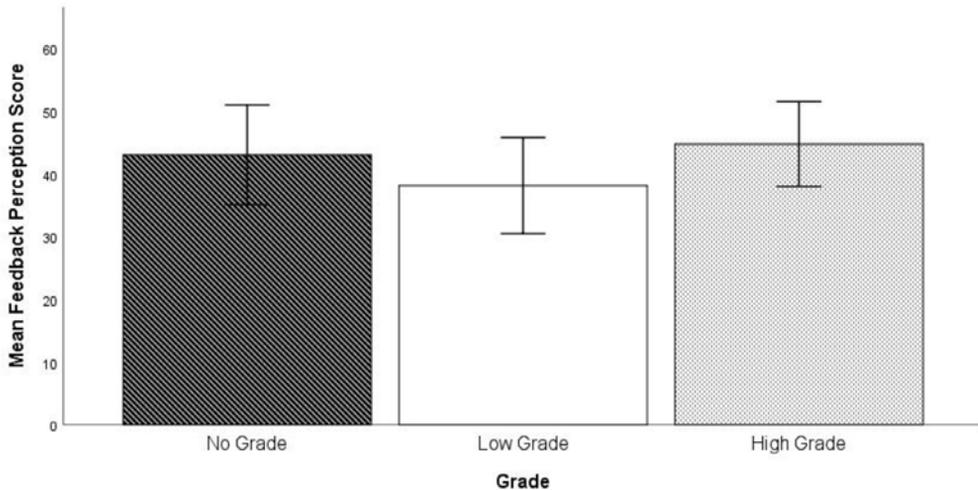
To test the research Hypothesis, a one-way ANOVA was conducted with Grade as the

independent variable with three levels: (None, Low, High). The total scores each participant scored on the Feedback Perception scale were used as the dependent variable. The Levene's test was non-significant ($p = .911$) indicating that the error variance was equal across all groups. A significant main effect was found for Grade $F(2,91) = 6.69, p = .002, \eta p^2 = .13$.

The significant main effect of grade on Feedback Perception scale score was followed up using Bonferroni corrected pairwise comparisons (See Figure 1). The mean score for the High Grade condition ($M = 44.82, SD = 6.8$) was significantly higher than for the Low Grade condition ($M = 38.19, SD = 7.7, MD = 6.62, SE = 1.87, p = .002, d = .93$), but not significantly different from the No Grade condition ($M = 43.1, SD = 8, MD = 1.72, p = 1$). Mean scores for the No Grade condition were significantly higher than for the Low Grade condition ($MD = 4.9, SE = 1.91, p = .036, d = .64$). These findings all supported the research hypothesis that the presence of a higher grade mediates a more positive perception of the written feedback.

Next, exploratory analyses were conducted examining possible effects of the independent variable Grade on the participants' responses for each of the seven individual items in the Feedback Perception scale. A one-way between subjects MANOVA was conducted using the participants' ratings on the seven perception questions as seven separate dependent variables. Table 1 shows the mean ratings and standard deviations for all three experimental groups across all seven perception questions. The Box's M test was non-significant ($p = .471$) and therefore covariance matrices were assumed equal. The Levene's tests for all seven perception questions were non-significant indicating that the error variance was equal across all groups. At the multivariate level the MANOVA showed a significant main effect of the Grade variable Wilks' $\lambda = .69, F(14,170) = 2.51, p = .003, \eta p^2 = .17$.

Figure 1: Mean Feedback perception scores provided by $N=94$ student raters all of whom read an identically worded piece of neutral academic feedback and were asked to imagine they had received this feedback for a recent assignment and then respond to seven Feedback perception questions, each scored on a 9 point Likert scale. Scores are shown as a function of whether the student also saw displayed underneath the feedback either (i) a High Grade (75%); (ii) a Low Grade (45%) or (iii) No Grade (Control condition where no visible grade was displayed underneath the text). A higher score indicates a more positive perception of the feedback.



At the Univariate level, a significant main effect was found for the feedback condition for how happy participants would be to receive the feedback (Question i), $F(2,91) = 9.07$, $p < .001$, $\eta p^2 = .17$. Bonferroni post hoc comparisons revealed that the mean happiness rating for the High Grade condition ($M = 6.42$, $SD = 1.71$) was significantly higher than for the Low Grade condition ($M = 4.52$, $SD = 2.00$, $MD = 1.91$, $SE = .46$, $p < 0.001$, $d = 1.04$) and the mean happiness rating for the No Grade condition ($M = 5.90$, $SD = 1.81$) was also significantly higher than for the Low Grade condition ($M = 4.52$, $SD = 2.00$, $MD = 1.38$, $SE = .47$, $p = .013$, $d = .74$). The pairwise comparison between the High Grade and No Grade conditions was non-significant ($p = .79$).

A second Univariate main effect was found for how confident participants would feel after reading the feedback (Question iv), $F(2,91) = 8.01$, $p = .001$, $\eta p^2 = .15$. Bonferroni post hoc comparisons revealed that the

mean confidence rating for the High Grade condition ($M = 5.79$, $SD = 1.62$) was significantly higher than for the Low Grade condition ($M = 4.39$, $SD = 1.73$, $MD = 1.40$, $SE = .40$, $p = .002$, $d = .85$) and that the mean confidence rating for the No Grade condition ($M = 5.77$, $SD = 1.38$) was also significantly higher than for the Low Grade condition ($M = 4.39$, $SD = 1.73$, $MD = 1.38$, $SE = .41$, $p = .003$, $d = .9$). The pairwise comparison between mean confidence ratings for the High Grade and No Grade conditions was non-significant ($p = 1$).

A third Univariate significant main effect was found for how likely students would be to use the feedback to improve their marks on future assignments (Question vii), $F(2,91) = 3.63$, $p = .03$, $\eta p^2 = .07$. Bonferroni post hoc comparisons found only one significant difference between conditions. The mean Likelihood rating for the High Grade condition ($M = 7.30$, $SD = 1.05$) was significantly greater than the mean rating for the Low

Table 1: Feedback perception scores provided by student raters who read an identically worded paragraph of neutral academic feedback and were asked to (i) imagine they had received this feedback for a recent assignment and (ii) respond to seven Feedback perception questions, each scored on a 9 point Likert scale. Mean Perception Scores are shown per question and as a function of whether the student also saw, displayed underneath the feedback, either (i) a High Grade (75%); (ii) a Low Grade (45%) or (iii) No Grade (Control condition). A higher score indicates a more positive response to the question.

	Grade Seen					
	No Grade (N=30)		Low Grade (N=31)		High Grade (N=33)	
Feedback Perception Question	M	SD	M	SD	M	SD
How happy would you be receiving the feedback?	5.9	1.8	4.52	2	6.42	1.7
How positive or negative was the feedback in your opinion?	5.67	1.3	5.03	1.6	5.55	1.5
How useful was the feedback?	6.5	1.6	6.39	1.5	7.03	1.1
How confident would the feedback make you feel?	5.77	1.4	4.39	1.7	5.79	1.6
How anxious would the feedback make you feel?*	4.2	1.8	4.77	2.1	4.21	1.7
How helpful was the written feedback?	6.33	1.5	6.29	1.5	6.94	1.2
How likely would you be to use the written feedback to help you in a future assignment?	7.13	1.4	6.35	1.91	7.3	1.1

Grade condition ($M = 6.35$, $SD = 1.91$, $MD = .95$, $SE = .37$, $p = .038$, $d = .63$). Pairwise comparisons were non-significant between the High Grade and No Grade conditions ($p = 1.0$) and non-significant between the Low Grade and No Grade conditions ($p = .13$).

Lastly, there was no main effect of the feedback condition for Question ii: how positive or negative the participants perceived the feedback to be, $F(2,91) = 1.68$, $p = .19$; Question iii: how useful participants perceived the feedback to be, $F(2,91) = 1.94$, $p = .15$; Question v: how anxious the feedback made participants feel, $F(2,91) = .95$, $p = .39$; or Question vi: how helpful the students perceived the feedback to be $F(2,91) = 2.13$, $p = .13$.

Discussion

The present study examined whether university students' perceptions of a single piece of neutrally worded assignment feedback could be affected by the presence, absence, and numerical value of a grade. We predicted that self-reported feedback perception scores would be significantly more positive for conditions where the feedback had a grade of 75 (High Grade) and the condition where No Grade was shown; compared to the feedback scores for those students who saw a mark of 45 (Low Grade). These predictions were supported. In addition, our results indicated that perceptions of the feedback were equally positive when compared between the High Grade group and the No Grade group. This pattern of results

mirrors those found by Arnold, (2009) and Brockx et al., (2011) with respect to perceptions of teaching quality. In those studies, the grade received mediated students' perceptions of teaching quality, whereas, in the present study, the grade affected the perception of assignment feedback.

Additional exploratory analyses, conducted at an individual question level, revealed that two questions we asked which related to emotional responses to the feedback; i.e. how happy and how confident the students felt after reading the feedback, showed that students rated themselves significantly happier and more confident after reading the feedback and seeing a grade of 75, or when seeing no grade, compared to the students who saw a grade of 45. This association between a high grade and a positive emotional response relating to the feedback was expected and is in keeping with the findings of Howell et al. (2018). It is particularly notable that seeing no grade also resulted in positive emotional responses which were comparable to those who saw a high grade. The association between seeing a high grade and positive perception of feedback is expected, but the finding that the response to the feedback was also more positive when no grade was seen supports an argument that it may be better to provide students with their written feedback before allowing them to see their grade. However, before this could be recommended, some additional research is needed to explore whether any potential post-grade change in feedback perception occurs. That is, whether a student who held an initially positive view of their feedback would perceive it more negatively if the mark they subsequently saw was low.

Importantly, whether the student believed they would make future use of the feedback was also associated with the grade received. For the feedforward question which related to the students' self-predicted functional response ('How likely would you be to use the written feedback to help you in a future assignment?') the High Grade group indicated they would be more likely than the Low Grade group to use the feedback in writing

a future assignment. However, students who did not see a grade with the feedback were neither more nor less likely to say they would use the feedback in future than the students who saw a high or low grade. This pattern of findings is consistent with predictions based on Pekrun (2011) and Pitt and Norton (2017). Although the relationship between the emotional response to the grade and the functional response is complex, the typical association is that positive reactions lead to more functional use of feedback, though in some cases pride can also result in complacency and less effort in future assignments (Kahu et al., 2015); whereas negative responses are more likely to result in avoidance, anger and frustration, and lower engagement for future assignments (Pitt & Norton, 2017). Further work will be necessary to better understand the relationship between feedback perception and a student's emotional and functional responses. To better quantify students' responses to feedback it would be useful to develop a feedback perception measure which elaborates on aspects of both emotional and functional responses to feedback. Such a measure could build upon the adaptation of the Student Conception of Feedback Inventory (Student Conceptions of Feedback Questionnaire-II (SCoF-II; Irving & Peterson, 2006)) to university students used in Brown et al. (2016). However, it would be important to also include items related to emotional responses to the existing items which are targeted largely at functional responses.

Despite the clear pattern of findings presented in this study it is necessary to acknowledge some limitations. Most importantly, this study utilises a hypothetical feedback scenario in which the student has no personal investment. As discussed in Pitt and Norton (2017), it is important to consider students' individual perception of their performance and the associated emotional response to the grade and the feedback. It is necessary to acknowledge that each student has their own expectation and perception of what constitutes a high/low grade for them

given their typical academic performance. We also acknowledge that factors such as assessment type, feedback style, as well as individual differences, e.g. whether the student is a deep or surface learner, may also mediate perceptions of feedback and could be examined within future studies. Nonetheless, the pattern of results obtained, even where students had no personal investment suggests that in a real assessment scenario, our findings would be strengthened.

A second potential limitation is that the nature of the feedback used in this study was necessarily neutral, and so may have been considered vague or unhelpful in an assessment context. For this reason, the measure of how likely students might be to act upon the feedback in the present study may be lower than it would be for feedback which gives a more meaningful evaluation of individual students' work. This limitation may also explain the null results for the questionnaire items relating to helpfulness/usefulness, positive/negative and anxiety inducement. Finally, the questionnaire used focused heavily on the students' situational response to the feedback, with only one question considering self-regulation and future learning. In future work the research design should seek to incorporate more authentic written feedback, as well as expanding the focus on how students are likely to implement the feedback in their future work. In a larger scale study, the type of course should also be considered, as responses to feedback may differ across courses and possibly further between vocational and non-vocational training or students in their final year of study compared to first or second year students.

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Summary

To the best of our knowledge, the present study provides the first experimental evidence that, at least some aspects of how positively or negatively students perceive written feedback are mediated by the presence and numerical value of the grade that is received for the assignment. We acknowledge that the neutral nature of the feedback used and the low level of personal investment the participants had in the hypothetical assignment scenario constrains the interpretation of our findings with respect to perceptions of feedback utility. However, our main hypothesis was supported providing findings in an area that is not yet well researched and this study therefore makes an important early contribution. We suggest that further studies are conducted within a higher education context to examine this grade-priming effect under more ecologically valid conditions. That is, if the priming effect of seeing a grade persists in situations where the student has a genuine emotional investment in the feedback and grade they have received. The findings address a gap in the literature on assessment feedback practices and can provide an important contribution towards planning initiatives. These could include withholding grades and developing guidance for students to build their resilience in dealing with, and acting upon, feedback constructively.

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Appendix A

'In general the writing was clear and concise but there were also a few grammatical errors. Consider asking a friend or family member to proof read your final draft as they may spot some minor errors that you missed. The structure of the essay was mostly logical, but where you discussed the two sides of the theoretical argument it became a little difficult to follow. I suggest that in future essays you could address this by perhaps starting with describing all the 'for' arguments and then moving on to discussing the 'against' arguments or vice versa. This makes it easier for the reader to follow the flow of the overall points being made. Some sections of the essay were appropriately referenced using mostly peer-reviewed literature. In future you could improve upon this by citing, where possible, multiple sources to support each of your arguments, especially where this provides evidence of having read wider than the lecture material. Your citations, in the main, conformed to the correct APA formatting conventions, although there were one or two which did not. The essay ended with a concise, easy to follow summary of the main points you had made throughout and I would definitely advise doing something similar to this in your next essay.'