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The Effects of Feedback Modality on Performance

Garrett D. Warrilow, Douglas A. Johnson, and Lauren M. Eagle

Department of Psychology, Western Michigan University, Kalamazoo, Michigan, USA

ABSTRACT

Giving employees information about their performance is a common method for employers seeking to improve or change performance. Today, internet- and computer-delivered feedback is often provided through e-mails, text messages, and video meetings. While feedback has continued to evolve both within and across organizations, little work has been done to assess how various modalities might impact its effectiveness. Understanding the effective delivery of feedback is important for supervisors looking to conduct evaluations with remote workers or simply save time as emerging technology presents new delivery options. This study explored and evaluated the relationship between the modality in which objective feedback is delivered, and the differential effects it produced on performance of a check entering task. This experiment was a laboratory study employing a between-group repeated measures design with random assignment to one of the following four experimental conditions; 1) no feedback, 2) computer-delivered feedback, 3) feedback via cell phone text message and, 4) feedback via face-to-face interaction. Results demonstrated the superiority of face-to-face feedback delivery and suggest interesting patterns for other feedback modalities.

KEYWORDS

Feedback; remote supervision; computer-delivered feedback; text message feedback; face-to-face feedback

Feedback has long remained one of the most common organizational approaches for improving employee performance, fostering learning and development, and enhancing job satisfaction across many business and industry settings (Andiola, 2014; Baker, Perreault, Reid, & Blanchard, 2013; Mulder & Ellinger, 2013; Park, Johnson, Moon, & Lee, 2019). Techniques for providing feedback can range from annual performance reviews in which a supervisor gives a summary of the worker's performance over the past year during a face-to-face meeting to more comprehensive methods such as providing information on an ongoing and real-time basis (e.g., supplying counters for units packed, widgets built, or similar tasks). Feedback is the most frequently used independent variable in the *Journal of Organizational Behavior Management*'s published works, accounting for 65%, 71%, and 68% of the studies published across the first three decades of publication (1977–2009;

CONTACT Douglas A. Johnson behavioranalyst@gmail.com Western Michigan University, Kalamazoo, MI 49019

Balcazar, Shupert, Daniels, Mawhinney, & Hopkins, 1989; Nolan, Jarema, & Austin, 1999; VanStelle et al., 2012).

It has frequently been recognized that feedback does not always lend itself to simple analyses when trying to pinpoint its behavioral function (Aljadeff-Abergel, Peterson, Wiskirchen, Hagen, & Cole, 2017; Slowiak & Lakowske, 2017). According to Peterson (1982), feedback can act as any other physical stimulus does and therefore can serve multiple functions. Depending on its temporal relation with behavior, feedback could be used as an antecedent for subsequent behavior or a consequence for prior behavior. Given the appropriate history, feedback could serve as a conditioned reinforcer, conditioned punisher, discriminative stimulus, or motivating operation (Johnson, 2013; McGee & Johnson, 2015). Feedback could also exert control over respondent behavior, for example, when feedback functions as a conditioned stimulus. For example, the presentation of feedback may immediately elicit feelings typically labeled as "anxiety," "anger," or "pride" (Choi, Johnson, Moon, & Oah, 2018). As is the case with other stimuli, it can change functions over time as well as serve multiple functions simultaneously. Due to the temporal gaps between feedback stimuli and behavior, many argue that verbal mediation is likely what explains many of the function-altering effects of feedback (Agnew & Redmon, 1992; Malott, 1992; Peterson, 1982).

Despite the volume of studies examining the effect of feedback, there is little consensus as to the typical mechanism under which feedback functions to change behavior; nor what variables in the feedback are necessary for it to be effective (Alvero, Bucklin, & Austin, 2001; Johnson, 2013). Put differently, while there is overwhelming research on the implementation of feedback, there remains an absence of research on both the functional and formal elements that make feedback optimally effective. Part of the difficulty in elucidating these issues may be that many previous studies have not differentiated the type and format of feedback used in the experiment. For example, Wilson, Boni, and Hogg (1997) describe their study as using corrective feedback, but a closer look at their methodology reveals that the managers delivered objective results, praise with performance improvement, *and* corrective feedback. Gerson (1978) termed his intervention "objective feedback", but since his "objective feedback" was presented as either positive (good performance) or negative (bad performance), this intervention was more fitting of what would be defined as evaluative feedback.

These discrepancies create a nebulous framework for understanding the aspects of feedback that impact the performance of interest. The imprecision associated with feedback has led some authors to call for research to analyze and identify the numerous components subsumed under the broad label of feedback (Johnson, 2013). For the current study, objective feedback will be defined as measurable data of participants' past performance (e.g., you

completed 231 tasks) lacking any evaluative language or gestures (e.g., without a thumbs up, saying good job, etc.).

Daniels and Bailey (2014) stated that for feedback to be effective, it should convey specific information about performance. Objective feedback provides the performer with specific information as to what contributes to desirable performance, as defined by management, and provides a value against which performance can be evaluated. Objective feedback has been the subject of many past research studies with varying conclusions regarding its effectiveness in isolation. In one early example by Chapanis (1964), participants spent hour-long sessions typing random digits into a teletype, an electromechanical typewriter that could send and receive typed messages through various communication channels. Participants in one experimental condition never received feedback on their performance. In the remaining three experimental conditions, participants received objective and individualized feedback on their performance in the form of a physical counter mounted above their workstation. In one of these feedback conditions, the counter kept a cumulative total of their progress across sessions. In the second feedback condition, the counter was reset to zero every session to provide a numerical summary specific to that session's progress, rather than cumulative progress across sessions. In the last feedback condition, the counter was reset, and participants were requested to write down their current total every 15 minutes. No significant differences between conditions were demonstrated. As such, Chapanis found that objective, individualized feedback in the *form of a physical counter* did not improve performance in comparison to no feedback.

Johnson, Dickinson, and Huitema (2008) examined feedback in a 2 × 2 factorial design. In their study, four separate conditions were utilized including, a) incentive pay without objective feedback, b) incentive pay with objective feedback, c) fixed pay without objective feedback, and d) fixed pay with objective feedback. Participants were asked to use keyboards to type in the dollar amounts of checks displayed in a data entry program on the computer. The participants' completion rate (checks per minute) and total checks completed were displayed via the computer screen and updated every 30 seconds throughout the session. While the monetary incentives proved to be effective in increasing the number and rate of entered checks, the conditions in which objective feedback was provided showed no significant difference compared to those conditions without feedback. The authors concluded that objective, individualized feedback in the *form of a computer display* did not improve performance in comparison to no feedback.

Crowell, Anderson, Abel, and Sergio (1988) tested the effects of task clarification, social praise, and objective feedback on bank teller-customer interactions. The experimenters posted anonymous individualized charts of mean scores for the tellers' transaction-interactions in a room accessible to employees only. Furthermore, the bank managers would verbally acknowledge this

objective feedback during daily meetings. However, they were instructed not to evaluate the performance of their employees (the praise condition was implemented later). These scores were based on 11 behaviors targeted and observed in each conversation the tellers had with customers over the previous week. Crowell et al. found a gradual increase in teller-customer interaction scores when objective feedback was used, resulting in a 6% increase in interaction quality overall. Additionally, Crowell et al. found that when feedback was removed, performance diminished but improved upon its reintroduction. As such, Crowell et al. found that objective, individualized feedback in the *form of data posted on a wall and face-to-face interactions* did improve performance in comparison to no feedback.

Johnson (2013) conducted a laboratory experiment at a large university examining the effects of objective feedback alone, evaluative feedback alone, combined evaluative and objective feedback, and a no feedback condition on the same data entry task as Johnson et al. (2008). In all three feedback conditions, the feedback about specific performance was personally delivered by the researcher during face-to-face conversations in a small private room. While participants in the no feedback condition saw a decline in performance, the evaluative alone, objective alone, and combined evaluative and objective feedback conditions each saw increases in performance at 85, 88 and 175 total checks completed respectively, translating to a 1.89, 1.95, and 3.89 checks per minute increase. Johnson found that objective, individualized feedback in the *form of face-to-face interactions* improved performance in comparison to no feedback.

Although objective and individualized feedback were used across all the studies mentioned above and all involved tasks representative of the workplace, the effects of feedback were not uniform. Half of these studies cited above found the feedback to be effective in improving performance, whereas half of the studies found the feedback to be ineffective. This parallels the findings from literature reviews of feedback, which have found feedback in isolation to be inconsistently effective (Alvero et al., 2001; Mulder & Ellinger, 2013). Such inconsistency suggests that a source of uncontrolled variance is operating across these different studies examining the same phenomena. One potential source of variability is the form through which feedback is delivered. Across the above studies, a variety of methods such as visible counters, displays on computer screens, public wall postings, and personal interactions were used to deliver feedback. These differences may have been a contributing factor for the mixed results regarding feedback implementation.

Research participants have extensive histories with idiosyncratic and common cultural contingencies that may interact with different forms of feedback. This collection of experiences likely involve authority figures from occupational, educational, and family settings who readily have potent sources of reinforcement and punishment at their disposal. It is reasonable to speculate

that, generally speaking, when authority figures show an interest (e.g., spend time observing, etc.) in an individual's specific performance, additional consequences will be provided by authority figures based upon the observed performance. Supervisors start observing behavior of individual employee performance to determine if rewards or discipline are warranted, teachers start observing the behavior of individual student performance to determine if praise or correction is needed, parents start paying attention to observing the performance of their children to provide either admonition or affection, and so forth. One result of these culture-wide contingencies is that many, if not most, participants bring a common experience to experiments. When the authority figure is paying attention, related evaluation and consequences will be forthcoming. Potentially, rules derived from such a history may mean that any form of feedback that requires the attention of an authority figure may be more effective than feedback that is automated.

It is important to understand the potential effects that the mode of feedback delivery has on performance, especially as modern technology expands the potential options for delivering feedback. Traditional forms of feedback delivery, such as print media and face-to-face interactions remain, but the rapid development of the internet and computer technology has opened a host of new options. These new modes for expressing feedback include, but are not limited to, computer displays, e-mail correspondence, text messages, video conferencing, and social media communications. Furthermore, many companies have begun employing remote workers, and events such as the COVID-19 pandemic will likely spur on this trend (Buscaglia, 2020; Fisher, 2020; Ortutay, 2020). It is important to see what is gained and what is lost when supervision is provided remotely. It is possible that different modes of feedback delivery will have different effects on performance. While feedback has continued to develop within organizations and research studies, little has been done to assess its delivery through various modalities and modern technology options. Therefore, the current study employed alternative modes for delivering feedback to compare their differential impact on performance.

Method

Participants and setting

This study took place in a laboratory setting at midwestern university. Participants were recruited via flyers posted around the university as well as via in-person classroom presentations. A total of 102 participants completed the study in its entirely and were distributed as follows: (a) no feedback ($n = 23$), (b) feedback via face-to-face interaction ($n = 21$), (c) computer-delivered feedback ($n = 30$), and (d) cell phone text message feedback ($n = 28$). Ninety participants agreed to provide demographic information. Of those participants, the ages ranged from 18 to

41 years of age, averaging 20 years old with a standard deviation of 2.81 years. When asked what ethnicity the participants primarily identified themselves as, 66% responded as White or Caucasian, 13% as Black or African American, 6% as Asian, 4% as Hispanic, 4% as multiracial, 2% as Indian, 1% as Palestinian American, 1% as Filipino, 1% as Sikh, or 1% as Native American. In the experimental space there were four computers, each having an adjustable chair, separated by cubicle walls. There were no windows in the laboratory room and the door to the laboratory was closed during the experimental sessions to assure subjects had a reasonable degree of privacy. The researcher was located behind a cubicle wall that did not allow them a direct view of the participants' actions but would permit them to hear if participants were discussing details related to the experiment itself (none did during observation).

Experimental task

The experimental task was a check-proofing task, similar to the job of a proof operator at a bank and used in many other studies on feedback (Johnson, 2013; Johnson et al., 2008; McGee, Dickinson, Huitema, & Culig, 2006; Slowiak, Dickinson, & Huitema, 2011). A computer program developed using Visual Basic displayed a graphic of a check with randomly generated dollar amounts between 10.00 USD and 999.99. USD The participant entered the value using the keypad and pressed the "Enter" key or used the mouse to click "Next Check" at which point another check appeared for the participant to enter. No signal would be provided during the session to indicate whether the dollar amount was entered correctly or not. The computer continued to present checks until the experimenter or research assistant entered the room, stopped the subject where they were, and ended the session.

Experimental design, measures, and analysis

This study utilized a between-group repeated measures design with random assignment to the following four experimental conditions; 1) no feedback, 2) computer-delivered feedback, 3) feedback via cell phone text message and, 4) feedback via face-to-face interaction. The main dependent measure was the mean number of checks completed correctly per session. Data collected were evaluated by completing a one-factor ANCOVA on performance during experimental conditions and utilizing baseline performance mean as covariate measures.

Experimental conditions

Baseline sessions

During the first session, participants were told it was an introductory session, had the experimental task explained to them, and had any questions answered

until they fully understood the task. The subject was told of the importance of attempting to enter as many checks as possible until the experimenter returned to end the session. There was no additional training beyond the verbal explanation of how the task worked. The participants then completed the check entering task for 45 consecutive minutes. When the participant came back for their second scheduled session they were asked if they had any questions, again reminded of the importance of entering as many checks as possible, and then allowed to engage in the check entering task for 45 minutes.

General procedures

In each of the experimental conditions, participants completed five 45-minute sessions in which they engaged in the experimental task. Before the beginning of each session, participants were reminded that they should do the best they can for the duration of the time. After the conclusion of each session, feedback was given (except for those in the no feedback condition) following the procedures of the experimental condition to which they were assigned.

Feedback via face-to-face interaction

At the end of the participant's second baseline session, the experimenter terminated the session and had the subject sit in another room for a few minutes. Once the subject left the room the experimenter collected the performance data. After the data were gathered the experimenter joined the subject in the other room and vocally stated how many total checks the participant entered and the total correct checks entered with a statement such as, "You entered ____ total checks during today's session with ___ total checks entered correctly." Participants could ask questions and comment on this feedback; however, the experimenter did not solicit any specific response. The experimenters made every effort to use an even tone with minimal body language (e.g., a flat affect with minimal gestures) to ensure no evaluative components were included in the feedback delivered. If any participants asked for an assessment of their performance, the experimenter replied that they could not say (in practice, participant behavior never required the implementation of this procedure). This process was repeated for the five remaining sessions.

Computer-delivered feedback

Participants received the same feedback information regarding their total checks entered and the rate of checks completed as the face-to-face condition, however it was provided via the computer instead of vocally from the experimenter. At the conclusion of the 45-minute session the computer program automatically generated a message which stated, "Number of checks completed: ### (the number they completed)." Under this was the statement "Number of checks completed correctly: ### (the number they entered

correctly was be displayed)." Under this line the statement, "Check completion rate: ## (with the rate in checks per minute the subject completed displayed)." When the experimenter entered the room he or she asked, "Did the program tell you how you did?" and sought some form of acknowledgment (e.g., a head nod, an "ok" hand signal or thumbs up, a verbal response "yes" or "yeah", etc.) but no additional information was solicited. The participants could ask questions about the feedback. The experimenters answered those questions with an even tone and flat affect to eliminate any possible evaluative components being included in the feedback. If the participant asked if his or her total checks entered and/or rate was "good," the experimenter replied that they were not allowed to say. This process was repeated for the five remaining sessions.

Cell phone text message feedback

In this condition, participants received feedback via a text message sent from the experimenter. At the conclusion of the second baseline session and each experimental session, the experimenters informed the participants that they would send them a text from their phone number (they told the subjects the phone number from which to expect the text) within the next two to five minutes with how many cumulative checks and the number of checks completed correctly during the day's session. The text message read, "You entered _____ total checks during today's session with ___ total checks entered correctly." This message was sent after two minutes and within five minutes of the participant leaving the sight of the experimenter. This process was repeated for the five remaining sessions.

No feedback

Participants in this condition received no feedback about their performance at the conclusion of each session.

Debriefing

After participants completed all experimental conditions, they were asked to fill out a post-experiment survey, which asked them to rate questions related to the challenge of the task, interest in the task, reaction to feedback, experimental purpose, and more on a Likert scale. These questions also included an option to explain their rating in an open-ended response. Following their completion of the survey, the experiment's purpose was briefly explained to participants and they were thanked for their participation.

Results

In order to demonstrate the initial gains, total gains, and gains within the experimental sessions, Table 1 displays the differences in terms of percentage

Table 1. Percentage of performance improvement for the average checks correctly completed.

Condition	Percentage Gain: Final Baseline to First Experimental	Percentage Gain: First Baseline to Final Experimental	Percentage Gain: First Experimental to Final Experimental
Feedback via Face-to-Face Interaction	11.1%	23.4%	5.3%
Computer Delivered Feedback	6.7%	15.8%	3.4%
Cell Phone Text Message Feedback	4.7%	13.7%	8.9%
No Feedback	2.9%	5.6%	0.1%

gains for the mean number of checks correctly entered (a) between the final baseline condition and the initial experimental condition, (b) between the first baseline session and the final experimental session, and (c) between the first experimental session and the final experimental session for all four conditions. Results show improvements for all conditions, with the greatest initial and final gains for the face-to-face feedback condition and comparable gains for the other two feedback conditions. Figure 1 demonstrates this pattern across the baseline and experimental sessions. A one-factor analysis of covariance was conducted using the mean performance during baseline sessions as the covariate and the mean performance during experimental sessions as the dependent measure. The analysis found a statistically significant difference between groups for the number of checks correctly completed (p =.05). Tukey pairwise comparisons indicated a significant difference between the face-to-face interaction condition and the no feedback condition (p = .04). No other significant differences were obtained. Effect size calculations for the number of

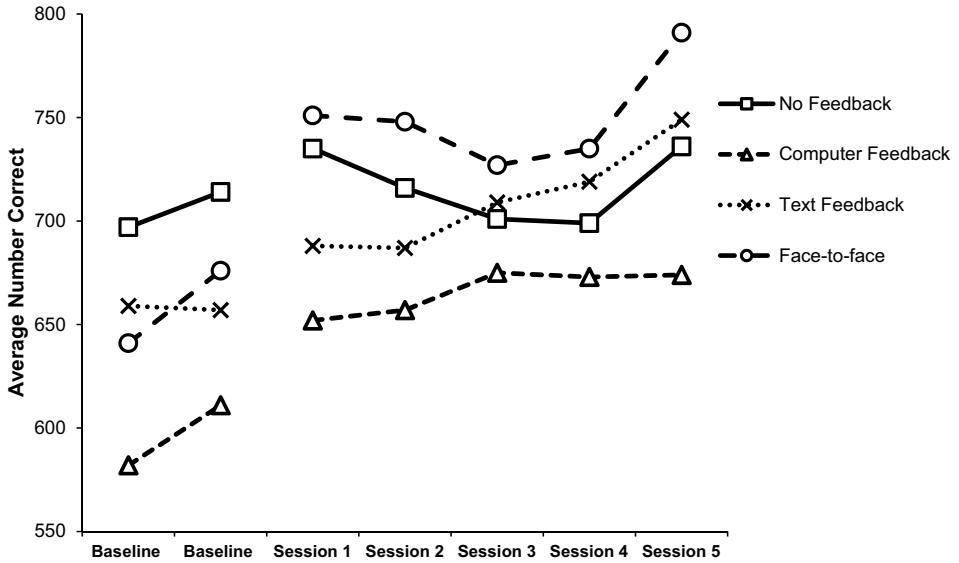

Figure 1. Average number of checks correctly completed over time.

checks correctly completed indicated a η_p^2 of .08 for the overall group differences and a η_p^2 of .07 for the pairwise comparison between the face-to-face interaction condition and the no feedback condition. One-factor analyses of covariance were also conducted using the mean percentage correct and mean time off task and no significant differences were found (p = .07 for percentage correct and p = .60 for time off task). The mean percentage correct during the experimental session was 96.7% (SD = 6.1%) for no feedback, 98.4% (SD = 1.6%) for computer-delivered feedback, 98.7% (SD = 0.9%) for text message feedback, and 98.4% (SD = 0.6%) for face-to-face feedback. No statistically significant differences were found for any of the questions on the post-experimental survey.

Discussion

The results indicated that the face-to-face feedback condition improved performance relative to the no feedback condition for the number of correct checks entered, which was statistically significant. The no feedback group had a negligible gain of 5.6% mean checks correctly entered between the first baseline session and the last experimental session, as contrasted with the performance gain of 23.4% mean checks correctly entered for face-to-face feedback on the same measure. The face-to-face feedback condition showed the largest increase in initial performance (11.1%) upon the introduction of the experimental variables compared to other experimental conditions. Viewing the performance metrics graphically also reveals interesting differences in patterns between conditions. Both the no feedback and computer-delivered feedback groups showed stable trends in performance across experimental sessions, with a slight decrease in performance for the no feedback condition and a very gradual increase for the computer-delivered feedback condition. Both text message feedback and face-to-face feedback groups showed moderate increases in performance across experimental sessions. In summary, the face-to-face feedback condition had the greatest change in level, an increasing trend across experimental sessions, and was the only feedback condition to show a statistically significant difference relative to the no feedback condition. This finding aligns with previous studies conducted by Crowell et al. (1988) and Johnson (2013).

The computer-delivered feedback condition had the second highest performance gains, both when considering the initial gains and final gains. Relative to the no feedback condition, computer-delivered feedback had a 3.8% higher initial gain and a 10.2% higher final gain in performance. These differences suggest a possible contradiction with the findings of Chapanis (1964) and Johnson et al. (2008). However, this conclusion should be interpreted with caution because there was not a statistically significant difference between the computer-delivered feedback and no feedback conditions.

Much like Kaufman, Codding, Markus, Tryon, and Kyse (2013) found, the highest level of performance immediately following the introduction of feedback was in the face-to-face interaction group. Conversely, the no feedback, text message feedback and computer feedback groups were all within 3.8% performance improvement of each other for gains on the first experimental sessions (i.e., second ranked computer feedback contrasted against lowest ranked no feedback), the face-to-face feedback group outperformed the next highest by 4.4% (i.e., first ranked face-to-face versus second ranked computer feedback) and outperformed the lowest by 8.2% (i.e., first ranked face-to-face versus lowest ranked no feedback). In other words, the face-to-face group outperformed the second highest, the computer feedback group, by a large margin relative to other experimental comparisons.

The computer feedback and text message feedback conditions appear to mirror each other. Both the computer and text message feedback groups demonstrated similar results in correct checks entered when comparing gains between baseline and experimental sessions, although text message feedback group showed a greater increase in trend across experimental sessions.

It is interesting to consider the response patterns of the groups within the context of Michael's (1993) statement regarding generalization occurring on a gradient directly correlated with the similarity between the original stimulus (i.e., face-to-face feedback from a past authority figure) and the novel stimulus (in this case, feedback from an electronic source or an experimenter directly). The face-to-face group showed an immediate improvement followed by moderate increases in performance across experimental sessions (albeit with decreases in a few sessions). The computer feedback group had a more moderate initial increase and demonstrated only a minor increase across experimental sessions. The text message group, which would fall somewhere between face-to-face feedback (most similar to past feedback from authority figures) and computer feedback (least similar to past feedback from authority figures) on the stimulus continuum, demonstrated a blend, or a response pattern that would fall on the gradient Michael referred to, of these two. The text message group was the lowest of the feedback groups in terms of contrasting performance between baseline and experimental sessions, but had the greatest increasing trend within experimental sessions. The text message feedback group was the only condition to show consistent increases across the last four experimental sessions. It is assumed that many participants in the study brought a common experience to this experiment – namely that when a supervisor is attending to their performance, evaluation and consequences will likely follow. In this study, no evaluation was presented through the feedback, nor consequences for improvements or decreases in performance. This may explain some of the response patterns observed. For example, when the feedback was delivered via face-to-face interaction, performance

substantially exceeded the other groups, perhaps as a result of generalization from the previously paired feedback-consequence/evaluation relation.

The consistent gains across experimental sessions for the text message group might be attributed to a potential confound for this condition: with the text messages the participants had a easily accessible record of how they had been doing and could thus generate goals or establish verbal rules to perform better than last time. Although the participants could potentially also generate a record (i.e., they could simply later write down what the experimenter or computer screen told them), the text messages would facilitate such a record with much greater ease. During debriefing, one participant's response to how often they looked at the feedback illustrates this idea, "I would always look at the number of checks I entered correctly, and I would calculate the number of checks I entered incorrectly. I would then, when the next session would finish, check my number of correct checks entered, and I would often compare it to the weeks before. Since it was all in the same text and easy to compare."

Because there was no written feedback in the face-to-face condition, the participants had to recall two pieces of three-digit data between sessions, which could be as long as a week apart and similar to prior feedback. For example, if a participant entered 715 checks total and 705 correctly this week, it may prove difficult to recall and differentiate whether he or she improved when told they entered 718 total checks with 708 correct during the next session, not to mention across several sessions in which her or she may perform in the mid-700s for both total checks entered and correct checks entered. Subjects unable to recall whether their performance improved may again encounter an extinction contingency if they do not realize their results have improved, the putative conditioned reinforcer. If one considers the feedback as a motivating operation, failure to contact the reinforcing properties of the feedback (signs of improvement) will fail to have an evocative effect on behaviors that lead to increased performance, and thus will fail to increase the effectiveness of said feedback. An ongoing record thus may evoke further performance increase, as evidenced by the participant who expressed, " … I tried to make it a challenge each time to try and complete more checks than previously as well as to try and not enter any wrong."

There were several factors which may have limited this study's ability to draw clear conclusions for the effects of feedback's modality on performance. This study was designed to approximate work conditions. Therefore, participants could be off-task while the "supervisor" was not watching them. However, there were a fair number of participants who were on their phones for extended periods of time, talked with other participants, and even streamed movies and TV shows during their sessions. While allowing this to take place helps justify the experiments external validity, it may represent a threat to the experiment's internal validity.

In order to clarify and develop scientific evidence for the effects of various characteristics of feedback, objective feedback was the only type of feedback examined in this study. As noted above, it is possible that the lack of formal evaluation or consequence for performance on the task may have led to decreases and differential performance. Therefore, future research should evaluate these modalities with evaluative feedback, to determine if different patterns of responses are yielded. The results of Johnson (2013) suggests that adding an evaluative component can have large effects in comparison to receiving only objective or only evaluative feedback.

While this study used face-to-face interactions, text messages, and computer pop-ups to deliver feedback, additional modalities for feedback delivery are available. It would be interesting to continue the evaluation of modalities falling on the continuum between face-to-face and computer feedback, such as live-video feedback, previously recorded video feedback, or e-mails.

Because it is possible that the responding demonstrated was a result of verbal mediation and goal-setting engaged in by the participants, it would also useful to experimentally manipulate and examine the effects of formally and informally established goals. For example, the record of feedback available in the text message condition may have facilitated goal-setting by the participants and sustained more consistent performance increases (as opposed to the face-to-face condition, which had inconsistent, although superior overall, effects). It would be worthwhile to investigate whether adding an ongoing record could enhance the effects of face-to-face feedback.

There is a need for both field and laboratory research to continue examining feedback, particularly regarding the details for feedback implementation rather than just feedback in general. Field research is necessary to extrapolate what is known to benefit consumers and to verify that findings hold across settings. For example, the current study would suggest caution is warranted for supervisors who assume that any form of feedback will be sufficient. If all feedback is seen as equal, then automated or e-mail feedback might be tempting to utilize as either a time-saving measure or as a strategy for interacting with remote workers. However, this study found that these feedback modalities would be less effective and that managers would do well to invest in face-to-face meetings, or at least use feedback methods with greater social presence (such as video conferencing) when direct contact is not possible. Further laboratory research is necessary, despite decades of research dedicated to the topic, because feedback is an omnibus term capturing many definitions, forms, delivery methods/agents, and social dynamics. In practice, this means that there are often many potential confounds, which are difficult to tease out against the multitude of organizational initiatives, policies, and procedures all operating at the same time. Laboratory research can help separate such processes out from one another and make the operation of independent variables such as feedback more obvious.

In conclusion, it appears there is a significant effect on performance when comparing those who receive face-to-face objective feedback to those who receive no feedback at all, whereas objective feedback through text message and computer-delivered modalities did not produce significant effects. In the future, it would be worthwhile to continue to explore the relationship between modality of feedback delivery and effects on performance. Providing additional evidence for the specific response patterns observed in this experiment, as well as evaluating additional feedback practices that are becoming more and more common in the workplace, would be useful for those in scientific community looking to explain past and contradictory findings, as well as those in applied settings looking to get the most out of feedback.

Disclosure statement

No potential conflict of interest was reported by the authors.

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