



Research article

A systematic review and meta-analysis: the effect of feedback on satisfaction with the outcome of task performance



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ABSTRACT

Background: Knowledge of how to improve consumer satisfaction with the outcome of co-production in services with high levels of interaction is important for achieving and maintaining a competitive advantage in the service industry.

Objectives: The aim of this paper is to review and meta-analyse research on the relationship between aspects of feedback to customers in interaction-intense encounters and the customer's satisfaction with the outcome.

Methods: We followed recommendations of the Cochrane Handbook for Systematic Review and Interventions to do a review and meta-analysis of relevant empirical research. From January 2018 to July 2018, we systematically searched PsycINFO, Business Source Complete, Science Direct and Web of Science for relevant studies.

Results: A total of six articles – consisting of 22 RCTs – were identified and included in the meta-analysis. Results indicate that feedback valence, with an effect size of 0.61 (0.43, 0.78), and feedback style, with an effect size of 0.82 (0.08, 1.57), have an impact on customers' satisfaction with the outcome of co-production. For feedback interventions, effect size -0.29 (-0.69, 0.11), and feedback medium, effect size 0.43 (-0.00, 0.86), the results are inconclusive.

Conclusions: The present study suggest that there is a significant relationship between satisfaction with the outcome of co-production and feedback style and valence. To satisfy customers, service providers should offer positive feedback. In order to extend our knowledge, more studies on the effect of different feedback styles on customers' satisfaction with the outcome of co-production are needed.

1. Introduction

In service industries high in customer-employee contact, the interaction between employees and customers may influence the customers' service experience. Understanding and managing interactions is thus an important task for service companies. Interactions may vary extensively and can take many forms. In this study, we focus on a particular element of the interactions – namely, the feedback provided by service providers in a customer co-production situation where the customer is performing production tasks. As customers seek more activity-based experiences, co-production is emerging as an important phenomenon (Arnould and Price, 1993; Chen and Chen, 2010; Engeset and Elvekrok, 2014; Pine and Gilmore, 1998; Zátori, 2016). Feedback from service employees to the active consumer/producer may have a profound influence on experiences through the production process as well as on the outcome and overall satisfaction of the customer.

In an expectancy/disconfirmation paradigm, customer satisfaction

refers to the degree to which a company's service offerings meet or exceed customers' expectations (Engeset and Elvekrok, 2014). Co-production relates to customers' participation in the service offering; for example, when customers participate in fitness classes, cooking classes, organized hiking, rafting and similar events, their activities become a part of service delivery.

Recent research has suggested that service providers can use feedback as a psychological intervention to influence customers' satisfaction with the production task and service experience (Kim et al., 2017; Kluger and DeNisi, 1996), implying that service companies aiming to improve customers' satisfaction with co-production should consider and manage feedback as an important element of their services. A better understanding of how feedback from the service provider drives customers' satisfaction with their task performance has the potential to help the service industry to design, customize and deliver meaningful experience-based products.

However, findings from research on feedback in co-production are

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inconclusive. While Hildebrand et al. (2013) found that feedback has a negative influence on customers' satisfaction with self-made outcomes, a more recent study (Furenes et al., 2017) found that feedback does not influence customers' satisfaction with their task performance. Consequently, a rigorous overview of how feedback drives customers' satisfaction with their task performance is needed.

The aim of the present study is to review the current literature on whether feedback can improve customers' satisfaction with their task performance. We perform a systematic review of relevant literature related to feedback interventions and satisfaction with task performance, followed by a meta-analysis to explore effect sizes (Moher et al., 2009). However, due to the lack of controlled and randomized trials on this topic, this meta-analysis is rather limited.

2. Feedback

Feedback refers to an action taken by an external agent or agents to deliver information about one or more aspects of one's task performance (Kluger and DeNisi, 1996). In the present review, we conceptualize feedback as an action taken by a purported expert (i.e., a service employee or a guide) to give information about aspects of customers' task performance.

In a service context, service providers sometimes give their customers feedback on their task performance (e.g., 'okay', 'fantastic', 'great', etc.). Such comments on customers' task performance are therefore an informal part of the communication. For example, an expert chef can make positive comments about the cooking class participants' task performance, or a fitness trainer can provide corrective information about how customers should have performed an aerobics task. Feedback is thus a way of delivering information about customers' task performance. Feedback is a complex phenomenon (Hattie and Timperley, 2007; Ilgen et al., 1979; Scheeler et al., 2004; Zhou, 1998). To gain more knowledge about how service employees should give feedback to improve customers' satisfaction with their task performance, it is useful to examine how different ways of giving feedback influence satisfaction.

Not surprisingly, there has been a considerable amount of research focusing on different ways of giving feedback and its effect on participants' satisfaction with their performance (Andiola, 2014; Anseel et al., 2011; Bryant et al., 2009; Dogan et al., 2012; Ilgen et al., 1979; Kluger and DeNisi, 1996). For example, several studies have suggested that feedback *valence* can influence participants' evaluation of their task performance (Barry et al., 2006; Bloom and Hautaluoma, 1987; Ham and Midden, 2010; Sansone, 1989; Zhou, 1998). Feedback valence refers to the positive or negative outcome of the comparison between an individual's task performance and situational criteria (Zhou, 1998). For example, positive feedback valence can signal that the individual's performance is better than expected, whereas negative valence may indicate that the performance is worse than expected.

Other studies have suggested that feedback *style* may affect participants' perception of their task performance (Zhou, 1998). In the literature, some researchers use both feedback style (Zhou, 1998) and feedback type (Anseel et al., 2011; Burgers et al., 2015) when trying to explain the way feedback is delivered. In the present study, style refers to the way feedback is delivered (Zhou, 1998). For example, feedback given as information may have a different effect on participants than feedback as evaluation. Feedback given as information can be seen as useful in guiding customer's task performance. On the other hand, evaluative feedback can be interpreted as playing a strong role in regulating customers' task performance.

Previous research has also found that the feedback *medium* can influence participants' task performance (Cox et al., 2011; Ilgen et al., 1979; Scheeler et al., 2004; Waung and Highhouse, 1997). Feedback medium refers to the way feedback is delivered (e.g., direct/face-to-face or indirect/written) (Cox et al., 2011; Waung and Highhouse, 1997).

In the present literature review, we have considered feedback as information related to valence, style and medium, and we focus on studies

that investigate feedback in relation to tasks.

Following Kluger and DeNisi (1996), we recognize that feedback may be related to a wide range of tasks, such as test performance, memory tasks, physical tasks, attendance behaviour, compliance with regulations, and so forth. In a service context, the Kluger and De Nisi conceptualization excludes several tasks (e.g., gambling and increasing productivity). In a service context, tasks relevant for feedback intervention include novel tasks (Assaker and Hallak, 2013; Dabholkar and Bagozzi, 2002; Quan and Wang, 2004), creative and/or problem-solving tasks (Dahl and Moreau, 2007; de Bloom et al., 2014; Tan et al., 2014), and voluntary tasks (Franke and Schreier, 2010; Füller et al., 2011). These criteria are designed to include studies involving feedback interventions that influence participants' satisfaction with their performance in tasks characterized as novel, creative or involving problem solving. Our main goal is to provide an overview of findings on how feedback affects customers' satisfaction with the outcome of co-production.

3. Methods

3.1. Literature search

The method outlined by the *Cochrane Handbook for Systematic Review and Interventions* was applied to perform a meta-analysis of primary empirical research examining feedback interventions and satisfaction with task performance (Borenstein et al., 2011; Higgins et al., 2011). A systematic review is ought to be a robust and sensible summary of research (Furunes, 2019). To identify empirical peer-reviewed articles in English published through July 2018, we searched the following databases: PsycINFO, Business Source Complete, Science Direct and Web of Science. The databases were selected based on whether they covered a broad range of research within business, psychology and social science. To identify relevant articles in the databases, we searched for the following words: 'feedback', 'performance', and 'satisfaction' in abstracts, titles and keyword. Table 1 gives an overview of the timeline for the literature search.

We followed the PRISMA 2009 statement (Moher et al., 2009) to increase the probability of identifying accurate results from relevant databases. A systematic and well-defined literature search strategy was developed (see Figs. 1 and 2).

Assisted by a librarian specializing in electronic search techniques, the first author performed the initial electronic database search. In each of the included studies, the purpose was to identify key predictors of satisfaction with task performance. The included papers described randomized controlled trials/experiments (RCTs) in which the study subjects participated in co-production and received feedback from an expert on aspects of their task execution.

Table 1
Timeline.

Action	Articles	Date
Literature search by first author and one librarian	<i>Business Source Complete</i> = 380 <i>PsycInfo</i> = 75 <i>Science Direct</i> = 78 <i>Web of Science</i> = 379	January 2018
Initial screening by first author	57 articles	March 2018
Control of 9 randomly selected articles to check if they met the inclusion and exclusion criteria by 3. 4. and 5. Author.	51 articles	April 2018
Alert running.	<i>Business Source Complete</i> = 0 <i>PsycInfo</i> = 0 <i>Science Direct</i> = 0 <i>Web of Science</i> = 0	March to July 2018



PRISMA 2009 Flow Diagram

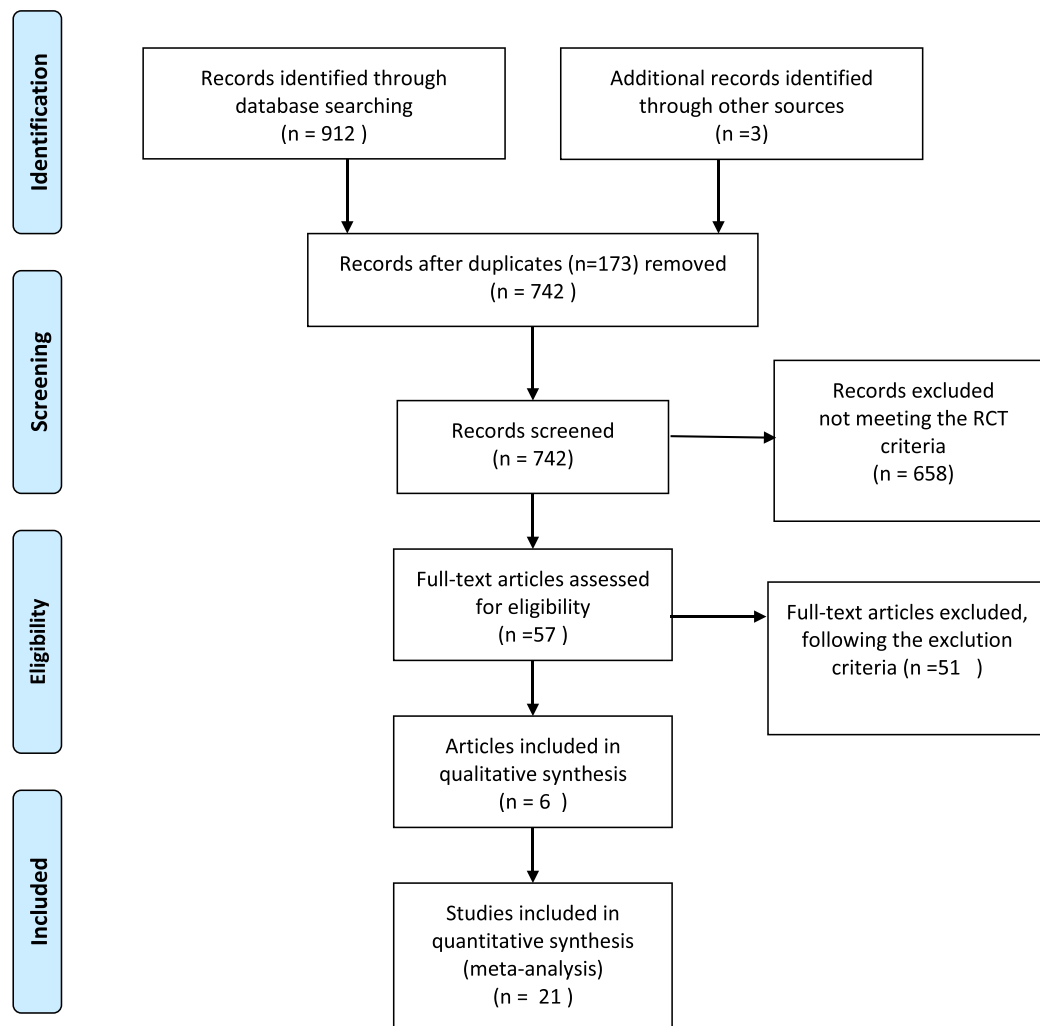


Fig. 1. PRISMA 2009 flow diagram.

3.2. Study selection

The inclusion and exclusion criteria were outlined by first, third, fourth and fifth author (see Table 1). After the initial screening, 57 articles were included to meet the inclusion criteria (i.e., RTC, feedback given after task performance, and feedback given on creative and problem-solving tasks).

The first author then read all identified RCT articles (57) to check whether they met the inclusion and exclusion principles. To validate the exclusion, a random selection of nine articles was distributed to the third, fourth and fifth authors for blind and independent evaluation. There was full agreement among evaluators and the first author ($k = 1$). Fifty-one articles were subsequently excluded (see Table 1). Additionally, all studies not reporting M and SD were eliminated, as they lacked the necessary information to be included in a meta-analysis.

3.3. Assessment of reporting bias

After the first author reviewed all 51 three authors to control the selection process reviewed manuscripts, a random selection of 9 articles

(17%). We assessed the quality of the sample of this study according to the recommendations of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins and Green, 2005). In total, six publications were included in the meta-analysis (Burgers et al., 2015; De Muynck et al., 2017; DeNisi et al., 1983; Furenes et al., 2018; Furenes et al., 2017; Seevers et al., 2014), consisting of 22 (single) RCTs for inclusion in the meta-analysis.

Most of the included studies (Table 2) had some methodological limitations (e.g., missing information on sample sizes, mean (M) and standard deviation (SD)).

When evaluation of risk of bias was missing, we attempted to contact the authors. In most cases, we were not successful; however, for Furenes et al. (2017), we received information about the sample size for each intervention. For the remaining studies (Burgers et al., 2015; De Muynck et al., 2017; DeNisi et al., 1983; Seevers et al., 2014), we split the samples into intervention groups based on the randomization principle (Higgins et al., 2011). We addressed and reported the methodical risk of bias included in studies in accordance with the Cochrane Collaboration's tool for assessing the risk of bias in randomized trials (Higgins et al., 2011). The criteria for assessing the risk of bias are described in Table 3. An



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	7
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	7
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	7 and 8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	7
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	8 and 9
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	10
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	8 and 9
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	10
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	8 and 9
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	9
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	11
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	12
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	12
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	15
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	15

Fig. 2. PRISMA checklist.

overview of the included studies is shown in Table 4. Assessing risk of bias in individual studies is shown in Table 4.

3.4. Data variables

To assess the effect of feedback on satisfaction, it is important to ensure that the variable that measures satisfaction is the same among the included studies. Therefore, we identified all studies measuring satisfaction with task performance on a valid seven-point Likert scale ($N = 22$).

For each feedback intervention, we classified the style of feedback control used (Table 5). We classified the style of the control group as a

nonspecific or specific control. The nonspecific control was classified as all feedback interventions, whereas the specific control was classified as four feedback interventions: feedback, valence, style or medium. Using this classification, we were able to combine an overall measure of the effect of feedback on satisfaction, as well as to separate the effects on satisfaction into feedback, valence, style and medium.

We scanned all studies for reported M and SD to give a quantitative estimate of the effect of the intervention and the associated 95% CI.

We calculated the relative differences in change scores (i.e., the change from baseline in the treatment group minus the change in nonspecific or specific control group) to display outcome data. We used the relative difference in change scores to estimate the direction and

Table 2
Overview of exclusion criteria for studies.

<u>51 Articles for Full-text retrieval</u>
Exclusion:
<ul style="list-style-type: none"> • Satisfaction as a function of money, gaming, risk or choice (Alder and Ambrose, 2005; Azmat and Iriberrri, 2016; Graen, 1969; Klein, 1997; Moore and Klein, 2008; Shikdar and Das, 2003). • Satisfaction with expected performance (Ilgen, 1971; Ilgen and Gunn, 1976). • Feedback as a part of multicomponent intervention such as personal aspects of the feedback giver or feedback receiver (Casas-Arce, Lourenço, & MartiÑez-Jerez, 2017; Hildebrand et al., 2013; LaPlante and Ambady, 2002; Monzani et al., 2015; Stake, 1982; Tziner and Latham, 1989). • Time-series feedback (Harris et al., 1993; Nesbit and Burton, 2006; Sedikides et al., 2016). • No task performance (Nemeroff and Cosentino, 1979). • Repeated task performance. • Delayed feedback interventions. (DiBerardinis, 1978). • Satisfaction as a part of work quantity or quality (Das, 1986; McAfee and Quarstein, 1995; Orpen, 1979). • Not in English (Erdemli et al., 2007). • Feedback intervention on children (Mouratidis et al., 2008; Susanne Narciss, Koerndle and Dresel, 2011; Viciano et al., 2007). • Survey (Merriman, 2017; Roberts and Reed, 1996). • Invalid measure of satisfaction (Bachrach et al., 2001; Hagger et al., 2015; S. Kim, Choi and Verma, 2017; Kluger et al., 1994).

Table 3
Overview of excluded criteria for RCTs.

<u>6 Articles for Methodological retrieval for meta-analysis:</u>
Exclusion:
<ul style="list-style-type: none"> • Lack of Report Mean and/or Standard Deviation. (Campbell et al., 1986; Liden et al., 1988; Luffarelli et al., 2016; Schul and Schiff, 1995) • Used 11. Point Likert scale (Dempsey and Kauffman, 2017) • Used 10. Point Likert scale (S. Narciss, 2004) • No randomization (Druskat and Wolff, 1999; Eikenhout and Austin, 2004; J. S. Kim, 1984; J. S. Kim and Hamner, 1976; Koch, 1979; S. S. Lam, Yik and Schaubroeck, 2002; Nouri and Kyj, 2008; Payne et al., 2009; Waldersee and Luthans, 1994; Wilk and Redmon, 1998). • No Between-subjects measure (S. S. K. Lam and Schaubroeck, 1999; Latham and Seijts, 1997).

approximate magnitude of the effect for all outcomes.

3.5. Statistical analysis

The effect size of feedback on satisfaction with task performance is reported as standardized mean difference. Effect size estimates of feedback were calculated using a random-effects meta-analysis (Borenstein et al., 2017), first for all 22 included studies combined and then for the four subgroups among feedback interventions: feedback, valence, style and medium. Effect size estimates are reported with 95% confidence intervals (CI). All the tests were two-tailed, and statistical significance was indicated by $p < 0.05$. The data were analysed using R 3.3 (Viechtbauer, 2010).

4. Results

A total of 742 articles were initially retrieved through the systematic literature search. Of these, 685 studies (92%) were excluded for not following the inclusion criteria (Table 6). An additional 45 (6%) were then excluded due to the exclusion criteria (Table 2), and an additional six (1%) were excluded from further analyses due to methodological exclusion criteria (Table 3). Thus, of the 742 articles initially retrieved, a final total of six (1%) were included in the meta-analysis.

The six included articles contain 22 single experiments with a total of 899 participants. A forest plot for all studies combined indicates a positive effect of feedback (Fig. 3).

Table 4
Assessing risk of bias in individual studies.

Bias	Judgement	Support for judgement
Burgers et al. (2015):		
Selection bias (random assignment)	Unclear	Randomization checks show that randomization of participants was successful. <i>Authors do not explain explicit how they randomised participants. However, they refer to post-hoc randomization checks for gender, age and education between experimental conditions. Lack of manipulation check.</i>
Performance bias (manipulation checks)	High	
Detection bias (valid outcome measurement)	Low	Satisfaction with perceived autonomy was measured on a 5-item scale based on Ryan et al. (2006). Alpha = 0.71. Satisfaction with perceived competence was measured on a 5-item scale based on Vos et al. (2011); alpha = 0.96. <i>Use of valid measurements. Do not report attrition.</i>
Attrition bias (incomplete outcome data)	Unclear	
Reporting bias (selective reporting)	Low	<i>Report mean and SD.</i>
Other bias	Unclear	<i>Outcome data on descriptive, comparative and evaluative satisfaction with autonomy and competence.</i>
DeNisi et al. (1983):		
Selection bias (random assignment)	Low	Randomly assigned to either positive or negative peer rating. <i>Participants were randomly assigned to the treatment groups.</i>
Performance bias (manipulation checks)	Low	Subjects were asked to recall the average peer rating that they had received following the first task, as a form of manipulation check. All were able to recall their average rating within .1 of a point. Discussions with subjects during debriefing indicated that they did believe the feedback received. Satisfaction on four-item scale; alpha = 0.84. <i>Self-developed scale without previous validation. Do not report attrition.</i>
Detection bias (valid outcome measurement)	High*	
Attrition bias (incomplete outcome data)	Unclear	
Reporting bias (selective reporting)	Low	<i>Report n, mean and SD.</i>
Other bias	Unclear	<i>Peer rating may influence satisfaction.</i>
De Muyne et al. (2017):		
Selection bias (random assignment)	Low	Participants were randomly assigned to one of four experimental conditions. <i>Participants were randomly assigned.</i>
Performance bias (manipulation checks)	Low/ unclear*	An ANOVA indicated that participants receiving positive feedback reported that the experimenter was more positive while giving feedback ($M = 4.45$) compared to participants receiving negative feedback ($M = 2.81$). <i>Manipulation check refers to feedback giver. Therefore, it is unclear if it is feedback valence or the feedback giver influencing how participants perceived the feedback.</i> Satisfaction was measured using the Perceived Competence Scale; alpha = 0.78. <i>Use of valid measurements. Do not report attrition.</i>
Detection bias (valid outcome measurement)	Low	
Attrition bias (incomplete outcome data)	Unclear	
Reporting bias (selective reporting)	Low	<i>Report mean and SD.</i>
Other bias	Unclear	<i>Measure trait competence and need satisfaction.</i>

(continued on next page)

Table 4 (continued)

Bias	Judgement	Support for judgement
		<i>Measure trait competence may not be the same as measure competence.</i>
Furenes et al. (2017): Selection bias (random assignment)	Low	Participants were randomly assigned to one of four conditions. <i>Participants were randomly assigned.</i>
Performance bias (manipulation checks)	High/Low*	The results indicated that those who received positive feedback (M = 6.54, SD = 0.84) perceived that feedback significant differently compared to those who received mid-scale feedback (M = 4.12, SD = 1.42). <i>Experiment 1: manipulation check of face-to-face feedback is lacking.</i> <i>Experiment 2: Manipulation check of positive vs. neutral feedback is reported.</i>
Detection bias (valid outcome measurement)	Unclear	Satisfaction was measured using 2 items adapted to the specific task from Homburg et al. (2005) . <i>Use only 2 items of a valid scale.</i>
Attrition bias (incomplete outcome data)	Unclear	<i>Do not report attrition.</i>
Reporting bias (selective reporting)	Low*	Experiment 1: do not report n. Experiment 2: report n, mean and SD. <i>We received n in experiment 1 from the authors.</i>
Other bias	Unclear	<i>Experiment 1 was done in a real world setting; therefore, satisfaction with the outcome could be influenced by participants' satisfaction with the festival.</i>
Seevers et al. (2014): Selection bias (random assignment)	Low	Each participant was randomly presented with one of four possible scenarios. <i>Participants were randomly assigned.</i>
Performance bias (manipulation checks)	Low	As intended, participants in the positive feedback condition responded more favourably to this item than did those in the negative feedback condition (MPOS = 5.52 versus MNEG = 2.20; $p < .001$). <i>Manipulation check of feedback valence.</i>
Detection bias (valid outcome measurement)	Low	Satisfaction was measured with items based on guidance from prior research on perceptions of satisfaction. Alpha = 0.91. <i>Use of valid measurements.</i>
Attrition bias (incomplete outcome data)	Unclear	<i>Do not report attrition.</i>
Reporting bias (selective reporting)	Low	<i>Report mean and SD.</i>
Other bias	Unclear	<i>Use of scenario may influence the outcome variable.</i>
Furenes et al., (2018): Selection bias (random assignment)	Low	We randomly assigned all participants. <i>Participants were randomly assigned.</i>
Performance bias (manipulation checks)	Low	Differences ($t(52) = -7.14, p < 0.001$) between the positive (n = 27, M = 6.33, SD = 0.78) and the neutral face-to-face feedback groups (n = 27, M = 4.26, SD = 1.29). To control for the manipulation of positive feedback, we asked the participants to select the statement that best explained whether the feedback was on "how good I am," "effort in the task," or the "taste of the juice". <i>Manipulation check of positive feedback.</i>
Detection bias (valid outcome measurement)	Low	Satisfaction was measured using 4 items adapted to the specific task from Homburg et al. (2005) . Experiment 1 Alpha = 0.89 Experiment 2 Alpha = 0.89. <i>Use of valid measurement.</i>
	Low *	

Table 4 (continued)

Bias	Judgement	Support for judgement
Attrition bias (incomplete outcome data)		Report attrition in experiment 2 but not in experiment 1.
Reporting bias (selective reporting)	Low	<i>Report n, mean and SD.</i>
Other bias	Unclear	<i>Feedback giver tasted the outcome in all interventions. Feedback givers tasting of the outcome could have influenced level of satisfaction.</i>

Performing random effects meta-analysis shows that, overall, receiving feedback increases intervention rate satisfaction with outcomes, with an effect size of 0.54 (0.32, 0.77). To estimate satisfaction with outcomes among the four different feedback interventions, we ran four individual subgroup analyses. A total of 13 experiments (59%) addressed satisfaction with task performance as influenced by feedback valence, five experiments (23%) explored the effect of feedback style on satisfaction with task performance, three experiments (14%) explored satisfaction with task performance influenced by feedback intervention, and only one experiment (4%) explored satisfaction with task performance as a consequence of feedback medium. I^2 values were 70.52%, 90.99% and 37.40% for valence, style and satisfaction, respectively. Corresponding forest plots for all four sub-groups are shown in Fig. 4.

Performing random effects mixed models for each of the four subgroups, the effect size of feedback valence interventions was 0.61 (0.43, 0.78). The effect size of feedback style interventions was 0.82 (0.08, 1.57). The effect size of feedback intervention on satisfaction with task performance was -0.29 (-0.69, 0.11). Finally, the effect size of feedback medium on satisfaction with task performance was 0.43 (-0.00, 0.86).

5. Discussion and implications

In services that allow customers to perform tasks themselves, informal communication, such as comments and feedback from employees, can affect how satisfied these customers are with the service provided. To improve customers' satisfaction with service offerings, it is therefore important to know how service employees can deliver feedback that improves these customers' satisfaction with their task performance. Furthermore, it is also important to know what kind of feedback employees should provide in order to maximize customer satisfaction with the service offerings.

This systematic review and meta-analysis involving 22 experiments found that feedback interventions have a positive effect on participants' satisfaction with their execution of the task. Different ways of giving feedback may influence customers' satisfaction with their task performance differently.

These findings raise an interesting question: Should service employees give feedback to satisfy their customers? In this meta-analysis, there are only three studies comparing feedback with no feedback interventions. The analyses in this paper are based on three minor studies indicating that feedback does not have a positive effect on satisfaction. However, because there are so few studies including control groups (no feedback at all), we cannot draw any conclusions on feedback's influence on customers' satisfaction with their task performance. Therefore, it is important to look at what kind of feedback intervention can increase customer satisfaction.

Another relevant question is whether feedback valence can improve customers' satisfaction. This meta-analysis finds that feedback valence has a significant positive effect on participants' satisfaction with their task performance. Based on the narrow confidence interval, we can see that there is a small difference between the included studies. This means that the studies included are quite consistent in their results.

Table 5
Overview of included studies.

Reference	Study	Task	Subjects	N	Intervention	Satisfaction	Theoretical framework
(Burgers et al., 2015)	1	Online game	students	157	Valence	Competence	Self-Determination theory
	2	Online game	Students	157	Valence	Competence	Self-Determination theory
	3	Online game	Students	157	Valence	Competence	Self-Determination theory
	4	Online game	Students	157	Valence	Autonomy	Self-Determination theory
	5	Online game	Students	157	Valence	Autonomy	Self-Determination theory
	6	Online game	Students	157	Valence	Autonomy	Self-Determination theory
(DeNisi et al., 1983)		Map a route	Students	143	Valence	Performance	Consistency theory
(De Muynck et al., 2017)	1	Tennis	Athletes	120	Valence	Competence	Self-Determination theory
	2	Tennis	Athletes	120	Valence	Autonomy	Self-Determination theory
	3	Tennis	Athletes	120	Style	Competence	Self-Determination theory
	4	Tennis	Athletes	120	Style	Autonomy	Self-Determination theory
Furenes et al., (2017)	1	Mix juice	Visitors	132	Feedback	Performance	Self-Presentation theory
	2	Mix juice	Students	84	Medium	Performance	Self-Presentation theory
	3	Mix juice	Students	104	Valence	Performance	Self-Presentation theory
(SeEVERS et al., 2014)	1	Scenario based task	Students	192	Valence	Feedback	Mixed: Feedback intervention theory, Cognitive self- evaluation theory and Goal
	2	Scenario based task	Students	192	Valence	Feedback	Mixed: Feedback intervention theory, Cognitive self-evaluation theory and Goal theory
Furenes et al., (2018)	1	Mix juice	Students	54	Valence	Performance	Self-Presentation theory
	2	Mix juice	Students	37	Feedback	Performance	Self-Presentation theory
	3	Mix juice	Students	37	Feedback	Performance	Self-Presentation theory
	4	Mix juice	Students	47	Style	Performance	Self-Presentation theory
	5	Mix juice	Students	44	Style	Performance	Self-Presentation theory
	6	Mix juice	Students	51	Style	Performance	Self-Presentation theory

Table 6
Inclusion and exclusion criteria.

742 Articles for Title and Abstract screening for full-text retrieval

Inclusion:

- Articles published in English.
- Articles in peer-reviewed journals.
- Randomized and controlled trials.
- Measure of satisfaction with task performance after feedback.

Exclusion:

- Unpublished dissertations, reviews or research notes.
- Repeated feedback.

Drawing on the notion that all the included studies compared positive to negative feedback, we conclude that positive feedback has a significant effect on satisfaction with task performance. In the feedback literature, previous studies suggest that when giving positive feedback, the positive valence may create positive emotions that the feedback receiver transfers to perception of his or her task performance (Hattie and Timperley, 2007; Ilgen et al., 1979; Kluger and DeNisi, 1996). The explanation is that positive feedback is more pleasant than negative feedback. In sum, we argue that service employees should strive to give positive feedback on customers' task performance to give them a more satisfying experience. Moreover, with this significant finding, we can argue that there is no need for further studies on feedback valence to confirm that feedback valence influences customers' satisfaction with task performance.

Can feedback media increase customers' satisfaction with co-production? In this meta-analysis, there is only one study on the effect of feedback medium on satisfaction with the task. In any case, this study is based on so few participants that we cannot draw any conclusions. Thus, further studies are needed in order to answer this question.

Can feedback style increase customers' satisfaction? The results of the analysis show that feedback style has a significant effect on satisfaction with the task. However, we see that there is variation among the studies

included in this meta-analysis. To gain more knowledge regarding what style is the most beneficial for improving customers' satisfaction in co-production, we need further randomized and controlled studies focusing on the effect of feedback style on satisfaction with task execution.

Regarding customers' satisfaction with their task performance, our review indicates that various aspects of satisfaction are important. In line with previous research, people's experience of autonomy during task performance is seen as essential for their satisfaction (Burgers et al., 2015; Hagger et al., 2015; Zhou, 1998). We also see that perceived competence (Burgers et al., 2015; De Muynck et al., 2017) is likewise a vital part of satisfaction (Burgers et al., 2015; Hagger et al., 2015; Sansone, 1986; Stone and Stone, 1985). In addition, customers' experiences with the outcome (e.g., the product, service, task, etc.) are important aspects of satisfaction (Furenes et al., 2017; Hildebrand et al., 2013). Therefore, further studies exploring the effect of feedback in such creative, novel and problem solving tasks on people's satisfaction with autonomy, expertise, products and services are needed. However, this systematic review and meta-analysis extends our knowledge on how feedback works in the relatively new theoretical field of co-production.

When it comes to how service managers should design and deliver feedback to improve customers' service experiences in co-production, the result of this meta-analysis suggests that they should deliver positive feedback referring to task performance to improve customers' satisfaction with the service provided. According to our results, it seems important that service management must design tasks that contributes to pleasant experiences for the customers. Findings from this meta-analysis may also have implications for other types of service management. As we see an increase in online services, our findings may contribute to how service management should design feedback on web-based service. One example could be in chat functions where feedback occurs digitally in services where robots communicate with the customers during their task performance.

5.1. Limitations

The results of the analysis in this study must be interpreted carefully due to the small numbers in the feedback, feedback style and feedback medium interventions. This review did not consider a number of other

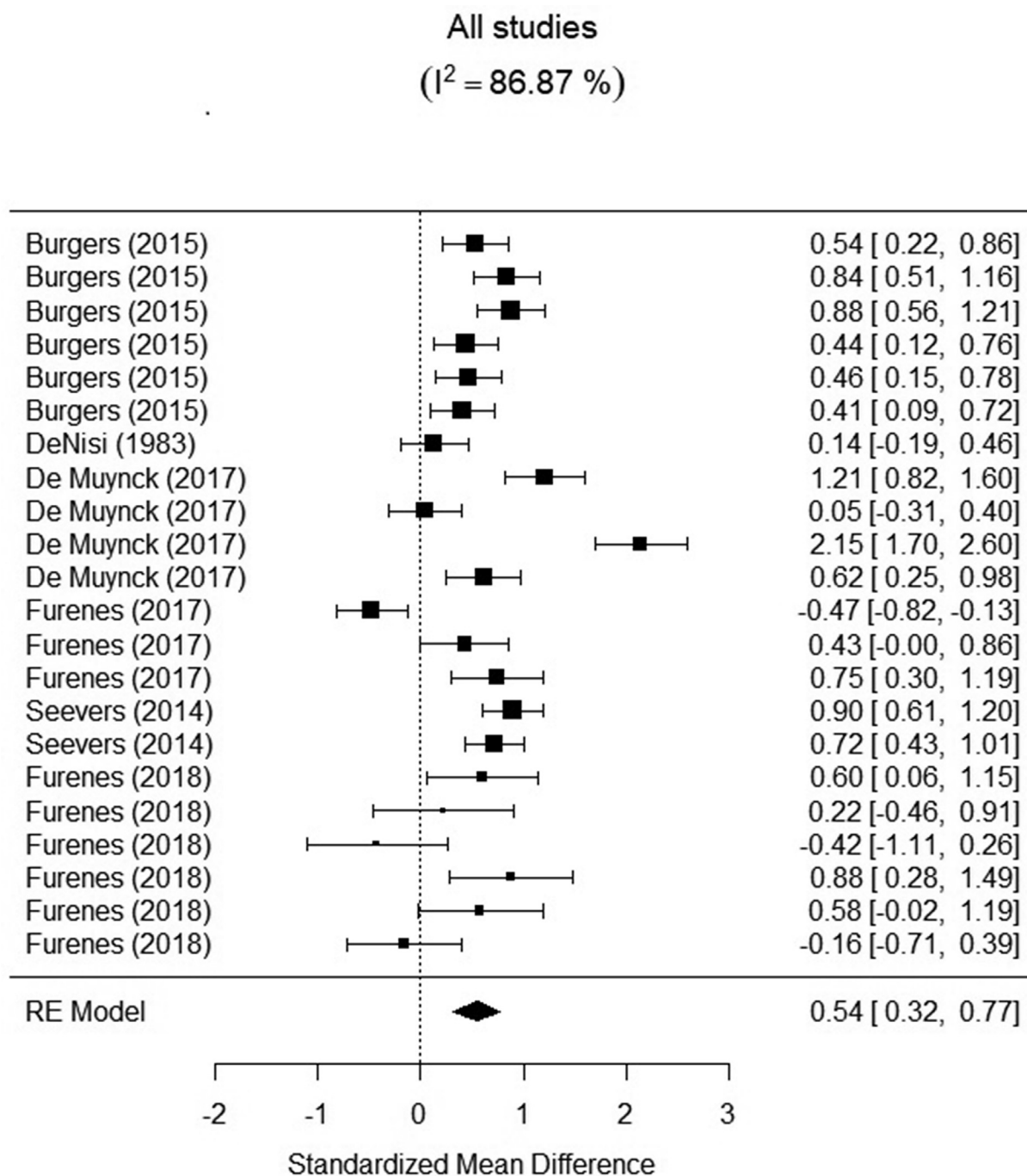


Fig. 3. Forest plot for all studies.

factors that may contribute to low satisfaction with outcomes. The characteristics of the feedback giver as well as the feedback receiver may possibly account for some influence on the effect of feedback interventions on satisfaction with task performance. Selection bias, missing cases, and reporting bias in publishing may not be representative of real feedback situations in a co-production context. In addition, the lack of control groups means that the findings must be interpreted with caution. Either way, there is a great need for studies that manipulate different feedback styles with control groups to say something about which feedback style service employees should use to increase their customers'

satisfaction. In any case, we may not fully understand how feedback works. Separating the message from the sender and receiver may help us gain more knowledge about how service providers can use feedback to satisfy customers when they participate in co-production. The present meta-analysis is not within health- and social care research areas and was not registered online while it was in the planning stage. This of course increases the probability of an unplanned duplication, and does not allow a verification that review methods were carried out as planned. However, we did follow the suggested PRISMA protocol, thus offering some opportunities for close scrutiny and validation.

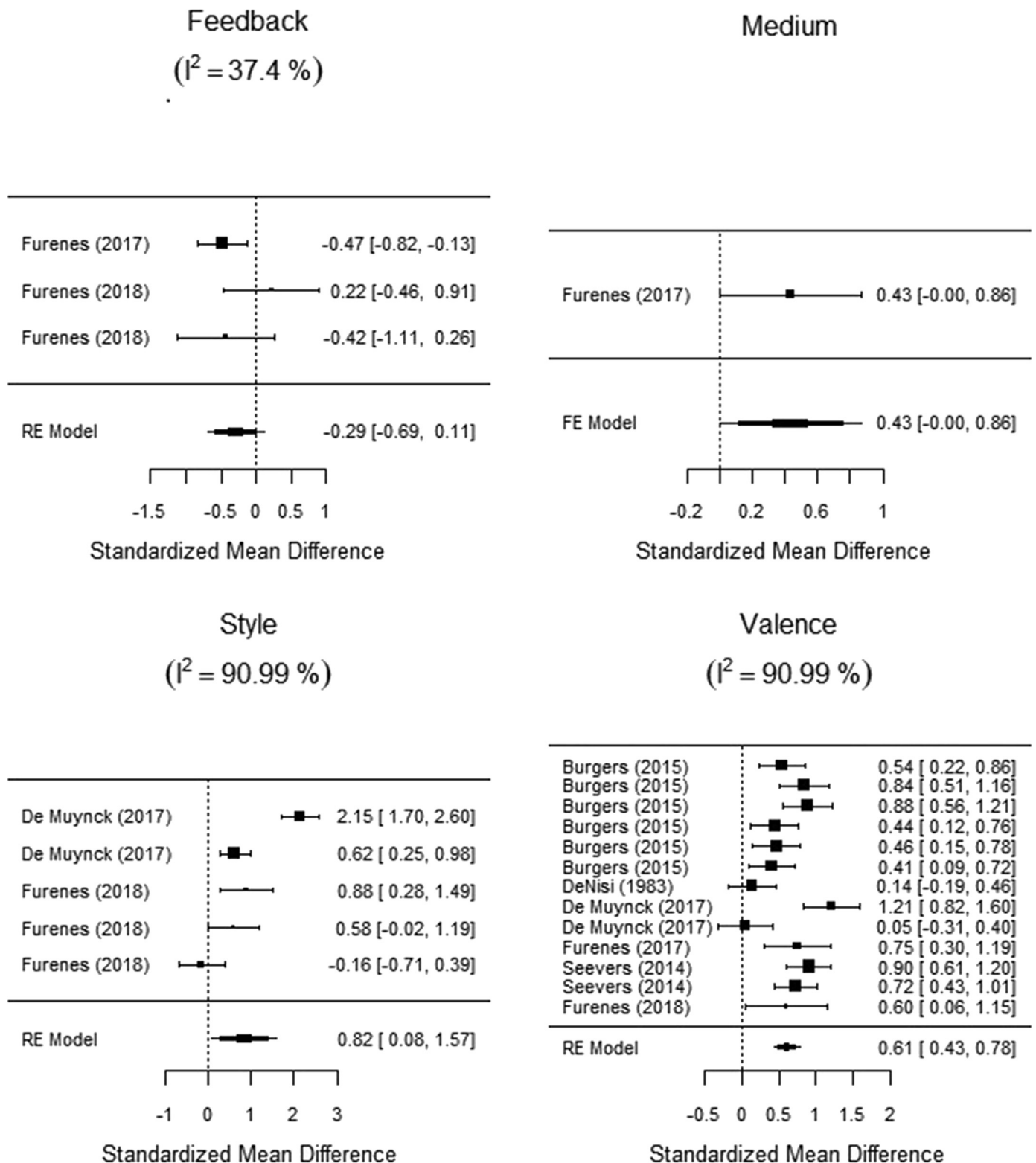


Fig. 4. Forest plot for all groups.

6. Conclusions

The results of this review suggest that there is a significant effect of satisfaction with the outcome of co-production related to feedback style and valence. Feedback medium studies are rare, and the results are therefore inconclusive. To satisfy their customers, service providers

should offer positive comments on their task performance. While feedback style seems to matter, what style is the most valuable when trying to satisfy customers is unknown. More randomized controlled studies on different feedback intervention styles are needed in order to gain more knowledge on how to improve customers' satisfaction with co-production.

Declarations

Author contribution statement

M. I. Furenes: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

J. Røislien: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

O. Gjerald, T. Furunes, O. Torvald: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The authors declare no conflict of interest.

Additional information

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