The impact of ethical feedback on moral emotions and managerial behavior: a labor market experiment*

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We investigate the influence of ethical feedback on decision-makers' behavior, focusing on the role of emotions in mediating this relationship. We examine how emotions generated by ethical feedback impact subsequent decisions in a laboratory setting with incentivized tasks. We distinguish between the direct informational impact of feedback and its indirect impact mediated by emotions. This research is pioneering in linking emotions to ethical decisions in a controlled environment. The findings reveal that ethical feedback positively affects ethical behavior in an artificial labor market, whereby decision-makers set higher wages when they expect to receive ethical feedback. Surprisingly however, public feedback has a less positive effect than private feedback. We confirm that emotions mediate some of the impact of feedback on wages. We find that deciders adjust wages downward when good feedback generated positive emotions, while we expected that they would aim for maintenance of such positive emotions by maintaining wages. We discuss the need for robustness tests for theories of emotions as drivers of behavior and underscore the importance of examining deciders' intentions and their interpretations of public and private feedback.

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1. Introduction

Ethical feedback is information provided to individuals or organizations regarding the ethical aspects of their actions, decisions, or behaviors. We investigate how the feedback itself, and the emotions generated by ethical feedback, affect the behavior of decision makers. We do so by eliciting their experienced emotions when exposed to feedback, and relate those experienced emotions to their subsequent behavior in a setting that has an ethical component. We estimate the difference between the direct, informational impact of feedback and the indirect impact that is mediated by emotions. We also consider whether giving feedback privately vs. publicly changes its impact on emotions and on subsequent decisions. This is interesting because it informs whether ethical feedback systems can make decisions more ethical, and if so, whether public or private feedback is more effective.

As far as we know, our study is the first to link emotions and the resulting ethical decisions in a laboratory setting that allows us to expose deciders to a range of (real) feedback on their actions. Deciders in our experiment have to balance ethical and profit motives, as happens for managers in reality. The profit motive directly goes against ethical concerns, and thus induces emotional conflict. How deciders manage such a conflict is interesting as a robustness test for theories of emotions as a driver of behavior.

1.1. Context and motivation

Our study aims to foster a better understanding of feedback systems, their impact on the behavior of decision makers, and of the role of emotions in driving decisions. Our goal is to help inform strategies in communicating ethical concerns to managers.

The most direct inspiration and application for the present research are reputation mechanism used in online labor markets such as Amazon Turk or Upwork (Gandini et al., 2016)). Some of those let employers rate workers, others let workers rate employers. In the case of Amazon Turk, workers can leave feedback on employers outside the platform in independent communities such as MTurk Crowd.

Reputation systems are used by many other types of online marketplaces to rate satisfaction with both parties in a transaction, from selling goods to renting apartments, hiring service providers, or looking for romantic partners (Dellarocas, 2003).

Reputation mechanisms also exist for transactions outside of online marketplaces. Glassdoor for example lets workers rate their firms on a wide range of criteria.

Beyond labor conditions, and beyond direct feedback by workers, governmental and non-governmental organization gather and publish information on many different ethical aspects of business conduct, such as compliance with labor and environmental standards, tax regulation, levels of executive compensation, instances of corruption, or collaboration with authoritarian regimes. In terms of labor standards specifically, various interest groups exert pressure to reduce unethical labor practices in sweatshops (O'Rourke, 2003), enforce better working conditions, and obtain better salaries. Fair-trade labels promote ethical working conditions.

New and forthcoming regulations now mandate disclosure of corporate social and environmental policies. France has had a supply chain law since 2017, mandating certain stan-

dards for working conditions (Assemblée Nationale, 2017). Firms providing investment advice and portfolio management in the EU are obligated since 2022 to inquire whether clients want to invest sustainably (European Commission, 2021). An EU-wide supply chain law, including environmental and social standards, is expected to be implemented by June 2024 (European Parliament, 2023).

The goal of those different initiatives is to promote corporate social responsibility and business ethics. Those aspects of business involve different fields of research, such as philosophy, economics, psychology, politics and management (Garriga and Melé, 2004; Bénabou and Tirole, 2010; Tanner et al., 2019). They have been the subject of much empirical research, which deals with questions such as whether ethical conduct of business is profitable (Margolis et al., 2009), whether organized protests are effective in changing company behavior (Davidson et al., 1995), whether corporate disclosure should be mandatory (Farvaque et al., 2011), and whether stakeholders such as stockholders, consumers and employees really care about the ethics of a firm's business conduct (Creyer, 1997).

1.2. Indirect vs. direct effect of feedback

The effect of ethical information or feedback on business practices, including environmental, social and governance ("ESG") factors, has been mainly studied up to now in terms of their indirect effect, as mediated by demand from consumers. The literature has focused on the influence of ethical considerations on consumer purchasing decisions, the impact of corporate social responsibility initiatives on brand perception, and the relationship between ethical practices and consumer loyalty (Smith and Langford, 2009; Sen et al., 2016). In a related experimental study, Pigors and Rockenbach (2016) find that negative public feedback by workers changes consumers purchasing decisions and thereby firms' policies.

While the literature has focused on those indirect effects, field research suggests that, while consumer express ethical concerns in surveys (Creyer, 1997), disclosure of unethical conduct has little impact on consumer choice and willingness to pay, or on companies' reputation and profits (Carrigan and Attalla, 2001). But then, why do companies often change business conduct as a reaction to disclosed information (see Mitchell, Dan, 2015)? In this research, we consider whether this may be due to a direct impact on managers beyond how the information may be perceived by third parties (Rind and Bordia, 1995).

The direct impact of ethical feedback on managers has seldom been examined. This is probably because managers are generally assumed to be "rational" economic actors who are not influenced by such feedback beyond how it might be perceived by other stakeholders (including stockholders). Consumers on the other hand are more willingly assumed to be subject to ethical concerns in their purchasing decisions (Goldfarb et al., 2012).

However, managers are humans with emotions and ethical concerns too, and indeed firms often have programs to develop the emotional competence of their managers. Surveys of the attitudes of present and future managers suggest that ethical considerations do enter directly into their decision function (Velthouse and Kandogan, 2007). Emotions play a crucial role for decision making and interpersonal relations in organisations (Andrade and Ariely, 2009; Lerner et al., 2015), which is determined "largely within the sociocultural system" within which they occur (Averill, 1980). Not only are emotions triggered by social relations, but

expressing emotions in a social context also affects the outcome of relations between people (Morris and Keltner, 2000). For example, spending money on other people can increase happiness (Morris and Keltner, 2000), and expressing gratitude can affect payment decisions (in (Dunn et al., 2008), waiting staff who wrote a thank you note received higher tips).

This led us to focus in this paper on the direct impact of ethical feedback on the behavior of managers. We did so by excluding, through our experimental design, any impact of ethical feedback on managers' pay or on consumer demand. This is a main difference between our study and Pigors and Rockenbach (2016), where information such as wages paid or workers satisfaction is shown to consumers and consumers then decide whether to buy the firm's goods. In our experiment, we do not model the demand for products of the firms and the workers' feedback is only shown to managers. This allows us to abstract from the market-mediated impact of feedback. With our design, we can focus on the direct impact of feedback and of the resulting moral emotions on the ethical decisions of managers.

2. Research questions and literature

We have three main research questions in this paper: how ethical feedback affects managerial behavior, how emotions mediate the effect of this feedback on managers, and whether the impact of private and public feedback differ. We underline below the literature on the effect of feedback on moral decisions, how emotions enter decision making, and the difference in the impact of private and public feedback.

2.1. Feedback and ethical behavior

The effects of feedback on moral decisions has been investigated in the context of dictator games and of public good games (Goldfarb et al., 2012; Ellingsen and Johannesson, 2008; Masclet et al., 2003). Expectation of verbal feedback by others induces deciders (in the dictator game) and contributors (in the public good game) to give and contribute more. More closely related to our research, but from the point of view of consumers, Peloza et al. (2013) show that underlining a discrepancy between one's action and moral standards can induce shame, and the desire to avoid anticipated shame induces consumers to buy products with good ethical attributes.

Compared to treatments where managers receive no feedback, we therefore expect that disclosure of the moral judgment of one's action by the persons affected by that action leads individuals to behave more ethically (H5 in section 4). Indeed, some individuals are not naturally inclined to consider the consequences of their actions on others, or the moral standards that others apply to their action. Feedback may lead these individuals to align their actions to the moral norms made evident by that feedback.

2.2. Public and private feedback

The way feedback is given affects how it will be received (Hattie and Timperley, 2007). We vary the way feedback is given by having a treatment where the feedback is only anticipated

(no feedback is given but deciders have some information about how recipients will rate their behavior), is private (only the decider learns it), or is public (all participants in the experiment learn it).

By varying the extent to which a participant is exposed to feedback and observation by others, we vary the role of moral emotions such as guilt, embarrassment and shame (Tangney et al., 2007). Compared to private disclosure, our treatment with public disclosure is designed to underline the difference between thinking about the impact of one's action on others — as disclosed by private feedback — and thinking about how others will think about the impact of one's action. We expect public disclosure to generate different types of social emotions, such as feelings of embarrassment in addition to the more internalized (private) social emotions of guilt and shame.

We expect that private disclosure (directly from the person affected to the manager) enhances awareness of the ethical dimensions of the decider's conduct. Public disclosure should complement this effect by enhancing awareness how the decider's action is judged by others. This could lead to higher emotional arousal, which can change ethical conduct (Dulleck et al., 2016; Patil et al., 2014).[1]

From this literature, we expect that wages will be higher in treatments with public feedback than in treatments with private feedback (H5).

2.3. Feedback and emotions

Moral emotions such as shame, pride or feelings of guilt are important drivers of behaviors that have a moral component (Arli et al., 2016). Moral emotions are for example reflected into consumer purchase decisions (Arli et al., 2016), charitable donations (Andreoni et al., 2017) or the willingness to lie (Greenberg et al., 2014).

Ethical feedback, as delivered by a range of actors in different formats, can generate such moral emotions. Those emotions can be anticipated when making decisions and thus enter the thought process leading to ethical decisions (Lerner et al., 2023). People are generally motivated to avoid negative emotions and to maintain positive emotions, with individual differences occurring in both types of motivation (see, e.g., Carver and White, 1994). A driver of ethical behavior would therefore be to avoid negative emotions (Lindebaum et al., 2016) and to foster positive emotions (Hartmann et al., 2017). For example, Dulleck et al. (2016) show that people who display stronger emotions when faced with an ethical choice end up behaving more ethically. Indeed, Pfister and Böhm (2008) argue that one of the roles of emotions is to generate commitment concerning morally and socially significant decisions.

From this literature, we expect that good feedback will generate positive emotions, and conversely (H1 in section 4). We also expect that deciders will attempt to avoid the repetition of negative feedback, which generates negative emotions, by increasing wages, and will attempt to maintain good feedback, which generates positive emotions, by maintaining

[1] In Patil et al. (2014), a virtual reality confrontation with a hypothetical ethical dilemma increased emotional arousal and in turn made behavior more driven by the utilitarian aspects of a decision rather than by the procedure used to implement that decision — in the trolley problem, choosing to act to save more lives rather than choosing not to act in order to avoid responsibility.

wages (H2 and H3). We will attempt to separate the effect of feedback from the effect of resulting emotions on wages (H4)

Nonetheless, as Lerner et al. (2004) say, "it may be that emotions have little impact when real money is at stake". Feedback might be perceived simply as a source of information about what a situation or another person requires. Thus, some people might not react emotionally to feedback. For example, a negative feedback about working conditions may be seen as information about what is seen as the norm by workers, i.e. an information about the current state of the labor market. Feedback systems could also be seen as a way to better sustain cooperation, whereby bad feedback is used as a warning before deciding to stop cooperation. We try to avoid those alternative uses of feedback by telling norms in advance to managers (we inform them of the expectations of workers), and by matching workers with new managers every period. This allows us to focus our analysis on the mediation of feedback through emotions.

3. The experiment

We generate feedback and elicit emotions and subsequent behavior empirically by running a framed economic experiment that is inspired by the work of Pigors and Rockenbach (2016). Our experiment is designed to replicate a labor market, whereby managers hire workers, decide on their wage, and receive feedback from workers about their pay level. Wage setting and feedback are repeated over three periods, and we observe how pay evolves depending on feedback received and emotions displayed by managers.

This labor market is a setting with an ethical dimension, as wages can be seen as a moral decision about the proper way to share the surplus from a productive activity between those who participated in it, rather than the ethically neutral result of an equilibrium between demand and supply on a labor market.

In using the experimental method, we follow the empirical shift in economic research (Hamermesh, 2013; Angrist et al., 2017). The experimental method in economics consists in reproducing real economic conditions in a stylized form in the controlled environment of a laboratory. Participants are incentivized to maximize economic outcomes. Unlike responses in a survey, which present hypothetical scenarios, decisions in the laboratory affect real people and put participants in real situations with real consequences. Decisions elicited in the laboratory do therefore have some external validity, at least with regard to the mechanisms driving participants' decisions.

3.1. The labor market relation

We model the ethical situations by having two people work together to generate an economic surplus. One person, who we called the "counter" in the experiment, and whom we refer to as "worker" or "recipient" in this paper, counts the number of dots on a line on 5 successive occasions (e.g., seeing ……. they should report 10). All counting of dots was done by workers prior to being matched with managers.

A second person, who we called the "calculator" in the experiment, and whom we refer to as "manager" or "decider" in this paper, performs a simple arithmetic operation on the numbers counted by the worker (e.g. $10 - 2 \times 15/10 + 7$). If both do their job correctly, then a surplus of 7€ is generated.[2]

Before learning whether the surplus was successfully generated (i.e. counting and calculating was done correctly) the manager decides how the eventual surplus will be shared. The worker then gives feedback about the manager's decision.

The manager and the worker are thus playing a type of impunity game (Bolton and Zwick, 1995), which is an ultimatum game in which a rejection (a negative feedback) by the responder (worker) has no consequence in terms of payoffs for either the manager or the worker.

We vary whether the feedback is relayed to the manager, and whether the feedback is potentially observed by a third party. We abstract from other considerations by not allowing workers to avoid badly rated firms.

Participants payoffs are as follows:

- Managers (deciders) set wages w for their workers (recipients) and may receive feedback from recipients about the level of such wages. Only after setting the wage, managers learn whether the joint task was performed successfully. In case of success, managers receive the €7 surplus. In this case, the manager's profit is $7 - w$ in euros. In case of failure, the manager's profit is zero. In addition to this, managers received €5.

- If the joint task was performed successfully, workers (recipients) receive a wage w from the manager. Workers also know the total surplus generated. We elicit feedback from workers for different wage levels (see Section 3.2) and communicate either positive or negative feedback to the manager based on this elicitation and the wage paid by the manager. Workers learned whether the joint task was performed successfully when they got paid, whereby they received €3 in case of failure, and €3+w in case of success.

In each period workers are matched with a new manager, wages are set by managers and feedback is generated by worker. Feedback is transmitted to the respective managers. Managers do not see past feedback given by workers, and neither do workers see past feedback given to managers. Matching workers with a new manager each period, and not giving access to a feedback history, minimizes time-dependence of behavior other than through the effect of feedback on managers.

3.2. Feedback during the experiment

Rather than letting workers freely give verbal feedback, we elicit feedback on a pre-specified scale so as to have more control on the type of feedback given. Workers must give feedback. They cannot abstain. We use a pictorial representation of feedback as in treatment "face" in Pigors and Rockenbach (2016). Good feedback is shown as a thumb up sign with a green

[2]The joint task was completed successfully in 92.4% of all cases.

background, and bad feedback is shown as a thumb down sign with a red background (Figure 1).

Good feedback Bad feedback

Figure 1: Pictorial representation of good and bad feedback

Feedback is determined by using the strategy method (Selten, 1967). At the beginning of the experiment workers rate different levels of wages in a restricted way, whereby they chose whether they would give a positive or a negative feedback for each different integers between 0€ and 7€. Workers gave good feedback 40% of the time when wage was 2€, 83% when wage was 3€, and 96% when wage was 4€.[3]

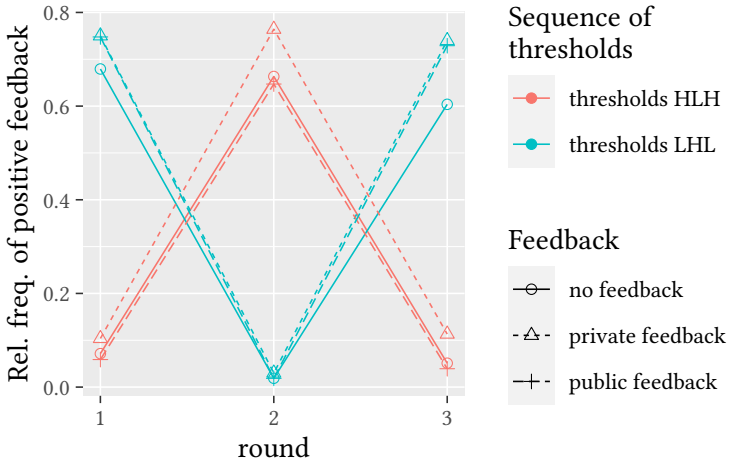
Based on the preliminary elicitation of feedback from workers, and in order to explain simply to deciders what to expect, we distinguished between workers with high expectations (type "H"), who give good feedback only if wage is more than 4€, and workers with low expectations (type "L") who give good feedback whenever the wage is more than 2€.

During the experiment managers met workers of type L and H in different alternating sequences, whereby we varied the order in which workers with low and high expectations met managers. In the case "thresholds HLH" managers were matched in round 1 with a worker of type H, in round 2 with a worker of type L, and in round 3 again with a worker of type H. In the case "thresholds LHL" managers were matched in round 1 with a worker of type L, in round 2 with a worker of type H, and in round 3 again with a worker of type H.

We informed managers about the distribution of workers' expectations in order to ensure common beliefs. In the case "thresholds HLH", they were told that most workers give positive feedback only if they receive 4€ or more. In the case "thresholds LHL", they were told that most workers give positive feedback as long as they receive more than €2. However, we did not inform them of the sequence of workers of different types in their treatment. Feedback in our experiment does not provide new information to managers. This makes it easier for us to focus our interpretation on the emotion-mediated effect of feedback.

Figure 2 shows the relative frequency of positive feedback for the different treatments. When thresholds for good feedback are low, relative frequency of positive feedback is high. When thresholds for good feedback are high, relative frequency of positive feedback is low.

[3]We told workers "It's worth giving a positive feedback anytime the calculator pays you something. This is because some calculators may decide not to pay you anything, so it makes sense to give good feedback to those who pay something." This recommendation aimed at having a sufficient number of workers who give good feedback even for low wage levels."



The vertical axis shows the relative frequency of positive feedback that corresponds to the manager's wage. In the treatments with feedback, managers receive exactly this feedback. In the treatment without feedback, managers might anticipate such a feedback, but they don't see this feedback.

Figure 2: Positive (real or anticipated) feedback over time.

3.3. Measure of emotions

We elicit self-reported subjective emotions after each round of feedback in our experiment. Self-reported perceptions from survey data differ from more immediate measures of emotions because they elicit beliefs about one's emotions. These beliefs are retrospective and reflect the person's self-concept, in our case, as an ethical agent (Robinson and Clore, 2002). This approach to measuring emotions has been used in economic research about well-being and happiness (Reyniers and Bhalla, 2013; Brandts et al., 2009; Blanchflower and Oswald, 2004; Alesina et al., 2004).

We let deciders rate their emotions directly after receiving feedback on a three dimensions scale. The dimensions are valence (from sad to happy), arousal (from calm to excited) and dominance (from powerless to powerful). Those dimensions are elicited using the Self-Assessment Manikin (SAM), which is "a non-verbal pictorial assessment technique that directly measures the valence, arousal, and dominance associated with a person's affective reaction to a wide variety of stimuli" (Bradley and Lang, 1994).

Participants received instructions on the meaning of those pictorial representations for each dimensions before being asked to report their emotions using this tool, whereby they clicked the button under the humanoid representation ("Manikin") that best represented their feeling on each dimension.

3.4. Public and private disclosure of feedback

We vary whether the feedback is not shown to the manager, is shown privately to the manager, or shown publicly to both the manager and other participants in the experiment. Our aim is to determine whether feedback affects deciders mainly because they feel guilty, due to their own moral sense, or because they feel shame, due to a concern with the judgment

of their action by third parties. This is a general question of broader interest for the field of ethical decision making.

We thus compare three treatments:

- Baseline "no disclosure": In the baseline treatment, deciders set wages but do not receive feedback by recipients (no disclosure).
- Treatment "private disclosure": In this treatment, deciders set wages and receive feedback during the experiment. The purpose of this treatment is to explore the role of internalized (private) social emotions such as shame and guilt in deciders' decisions.
- Treatment "public disclosure": In this treatment, feedback from recipients is communicated to deciders, as in the second treatment, but we tell recipients their feedback will be shown to other participants (workers and managers) along with a randomly generated names which we assigned to them at the beginning of the experiment, and which they were asked to note down for future reference.[4]

  The purpose of this treatment is to explore the role of more public social emotions such as embarrassment, in deciders' decisions.

In the treatment "no disclosure", deciders were notified that recipients would rate their wage but they would not see the feedback. In the treatment with private disclosure, they saw the feedback after every round. In the treatment with public disclosure, they were reminded the feedback would be seen by others by showing a pictorial representation of an eye above the feedback they received.

3.5. Post-experimental questionnaire

At the end of the experiment, we collected a number of control variables (Appendix G). The socio-demographic variables are age, gender, nationality, field of studies, living situation, financial situation, religiosity, and charitable activity.

In addition to those, we also collected:

WVS A measure of economic values from the World Value Survey (Haerpfer et al., 2022), which contrasts collectivist and individualist attitudes.

GASP A measure of guilt and shame proneness (Cohen et al., 2011), which gives insights into how individuals differ in their emotional responses to situations involving moral or social transgressions.

Big5 A short measure of personality along the Big Five in 15 questions (Rammstedt and John, 2007).

[4]Names were given to managers in every treatments. The names were made of random combinations of two basic sounds (such as AL, BU, SI, MO), leading to names such as SIRA, JOUL, or ORBU. The aim was to avoid names with possible cultural or emotional connotations, but still have names that can be pronounced.

HPRS A measure of reactance, as a determinant of how feedback is received (Dillard and Shen, 2005). The scale assesses various aspects of psychological reactance, such as feelings of resistance, anger, and opposition to perceived threats to one's freedom.

4. Hypotheses

Based on our literature review, we test hypotheses about the impact of feedback on emotions and the impact of emotions on wage setting. We also test differences across treatments. Further analysis considers how reactance and proneness to guilt and shame moderate our results. Our hypotheses were registered on the OSF registry at https://osf.io/q3bme.[5]

Our main hypotheses are as follow:

Feedback, emotions and wages

H1: Individuals will display positive affective reactions (+valence, +arousal, +dominance) in response to positive feedback, and negative affective reactions to negative feedback.

H1a: Intensity of affective reactions in response to feedback will be lower in the treatment with private disclosure than in the treatments with public disclosure.

H2: Negative affective reactions during the feedback stage will lead to higher wages in the next trial. Positive affective reactions during the feedback phase will lead to maintenance in wages.

H2a: Higher affective reactions lead to larger subsequent changes in wages.

H2b: Affective reactions and changes in wage will be more pronounced at the beginning of the experiment than at the end.

H3: Positive feedback lead to stable or higher wages in the next trial. Negative feedback lead to higher wages in the next trial.

H4: Both feedback and affective reaction to feedback play a role in the change in wage in the subsequent period.

Treatment effects

H5: The wage w that is paid to workers will be higher in the treatment with private feedback than with no feedback, and again higher with public disclosure.

H6: The wage w that is paid to worker will be higher in the treatment with high wage expectations than in the treatment with low wage expectations.

[5] We changed the ordering of hypotheses compared to the pre-registration, and include headers for different sections of the hypotheses.

Table 1: Frequency of observations for the different treatment combinations

threshold sequence	no feedback	private feedback	public feedback
thresholds HLH	98	106	102
thresholds LHL	106	100	107

5. Data collection and sample characteristics

The experiment was conducted online between August 2021 and May 2022 based on oTree (Chen et al., 2016). We recruited from pools of participants at the laboratory of the School of Economics of the University of Jena (Germany), at the laboratory of the Competence Center for Experimental Research at the Vienna University of Economics and Business (Austria), at the Faculty of Psychology of the University of Vienna (Austria), and at the Institute of Psychology at the University of Erlangen–Nuremberg (Germany). Participants were recruited with ORSEE (Greiner, 2015) in both Jena and at the Vienna University of Economics and Business, with Sona Systems (https://www.sona-systems.com/) at the University of Vienna, and by email in Erlangen-Nuremberg.

We recruited 636 participants in the role of managers between August 2021 and February 2022, of which 35 participants in Erlangen Nurnberg, 433 participants in Jena and 168 participants in Vienna. 17 of the participants in the role of managers failed an attention check. Only the remaining 619 are used in the following analysis. Among those, we had 87 participants of Austrian nationality, 429 participants of German nationality and 103 participants of unknown nationality.

We recruited 643 participants in the role of workers between August 2021 and May 2022, of which 277 participants in Jena and 366 participants in Vienna. We are not interested in the behavior of the workers because they are only needed to generate feedback and social incentive for the managers. Each worker is allocated one manager and is paid depending on the wage set by that manager in a randomly chosen period.

Table 1 shows the distribution of participants by feedback treatments and threshold sequences.

6. Results

In the following subsections we first investigate the link between feedback and emotions, and then how feedback and emotions affect wages. We finally estimate a mediation model to determine how far emotional response to wages drive wage, rather than feedback directly affecting wages through other pathways. We finally test treatment effects. In each section, we first present some descriptive statistics and then test our hypotheses with the help of formal models.

We use R version 4.3.2 (2023-10-31) (R Core Team, 2022) for the empirical analysis. We use `runjags` 2.2.2-1.1 (Denwood, 2016) to interface with `JAGS` 4.3.1 (Plummer, 2003).

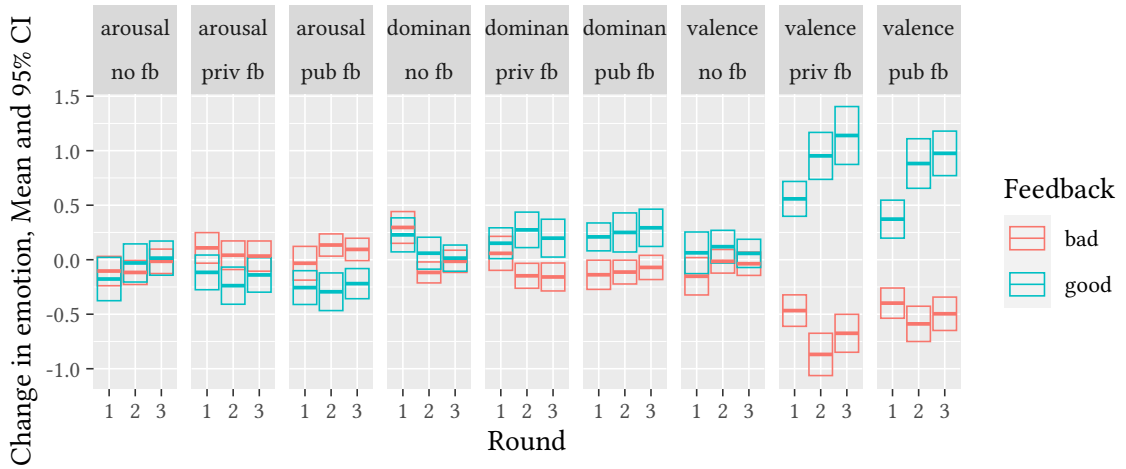
The data and analytic code are available at https://doi.org/10.17605/OSF.IO/6HFGC.

6.1. H1: Feedback and Emotions

6.1.1. Descriptives

According to H1 we expect that individuals react positively to positive feedback, and negatively to negative feedback. In our study we elicit valence (e.g. happiness), arousal (e.g. excitement) and dominance (e.g. feeling powerful). Figure 3 shows how those emotion dimensions vary depending on the feedback each period.

While already the anticipation of feedback might have an effect in the "no feedback" treatment, this effect seems to be very small. This indicates that any effect of feedback in other treatments is not due to an internal process but rather relates to feedback received. We do see effects of good and bad feedback for valence in the private and in the public feedback treatments. Valence seems to react clearly and positively to good feedback. Smaller effects can be observed with arousal, which increases slightly with bad feedback, and dominance, which increases slightly with good feedback.



The vertical axis shows changes in emotion dimensions conditional on the positive or negative feedback that corresponds to the manager's wage. In the treatments with feedback, managers receive exactly this feedback. In the treatment without feedback, managers might anticipate this feedback, but they don't see this feedback.

Figure 3: Emotion dimensions and feedback over time.

6.1.2. Model

In this section we use a formal model to better understand the relation between feedback $F_{i,t}$ and change in emotions $\Delta M_{i,m,t}$. The feedback $F_{i,t}$ is 0 in case of bad feedback, 1 in case of good feedback. $M_{i,m,t}$ takes values from 1 to 5. Participants are indexed by i, rounds are denoted with t, the emotion dimension is described as m. Since feedback $F_{i,t}$ for participant i in round t is endogenous, we use the (exogenous) threshold $T_{i,t}$ as an instrument for feedback $F_{i,t}$. $T_{i,t}$ was either H or L depending on the period and the specific threshold sequence used (see 3.2). Figure 2 shows the relation between thresholds and feedback.

Our dependent variable is $\Delta M_{i,m,t}$, which is the change in reported emotion m for participant i between time $t-1$ and t. Emotions may also be affected by controls (see below), modelled as a row vector $\boldsymbol{X}_i$. We demean $\Delta M_{i,m,t}$, $F_{i,t}$ and $\boldsymbol{X}_i$ and normalise their standard deviation.

Graphically, the stochastic process could be described as follows:

$$\boxed{T_{i,t}} \text{ —— } \boldsymbol{\theta} \text{ ⟶ } \boxed{F_{i,t}} \text{ —— } \boldsymbol{\gamma}^F \text{ ⟶ } \boxed{\Delta M_{i,m,t}} \text{ ⟵ } \boldsymbol{\gamma}^C \text{ —— } \boxed{\boldsymbol{X}_i}$$

The first stage equation we estimate is

$$P(F_{i,t}|T_{i,t}) = \Phi(\theta_0 + \theta_1 T_{i,t}) \tag{1}$$

where Φ is the distribution function of the normal distribution.[6] We model the effect of the instrumented feedback $\hat{F}_{i,t} = P(F_{i,t}|T_{i,t}) = \Phi(\theta_0 + \theta_1 T_{i,t})$ on $\Delta M_{i,m,t}$ as follows:

$$\Delta M_{i,m,t} \sim \Phi((1, \hat{F}_{i,t})\boldsymbol{\gamma}^F + \boldsymbol{X}_i\boldsymbol{\gamma}^C + \eta'_{i,m}, \tau'_m) \tag{2}$$

$\boldsymbol{\gamma}^F$ is a column vector. Its second component, γ_2^F, is the marginal effect of feedback on the emotion. $\eta'_{i,m}$ is the random effect for participant i. τ'_m is the precision of the distribution. To demonstrate robustness, we compare two different specifications for $\boldsymbol{X}$: Either no controls, or all available controls (see 3.5). In Figure 4 we show estimates for γ_2^F (plus 95% credible intervals).[7] Detailed results are provided in Appendix E.

The graph shows estimates (and 95% credible intervals) for γ_2^F from Equation (2) for the different feedback conditions. Detailed results are shown in Section E in the appendix.

Figure 4: Effect of a positive feedback on change of emotions.

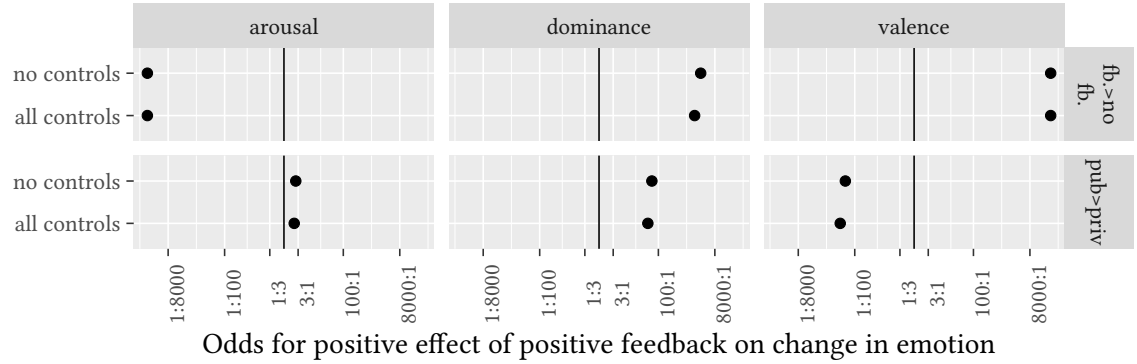
6.1.3. Results

In the treatment with no feedback, participants could still anticipate feedback and react to their anticipation. We see however, that in treatments with no feedback, emotional reaction

[6] Since the feedback can only take two values, positive or negative, there are many equivalent specifications for the first stage equation.

[7] For regression coefficients we assume throughout the paper a normal prior with mean zero and precision 10^{-4}. For precision parameters we assume as a prior a Gamma distribution with shape and rate of 10^{-2}.

to possibly anticipated feedback is small. In the treatments with explicit feedback, the reaction to feedback is, for all emotions, substantially stronger. Valence, thus the feeling of happiness versus sadness, seems to be more affected by feedback than arousal (i.e., feeling excited) or dominance (i.e., feeling powerful).



The top part of the graph shows odds for γ_2^F from Equation (2) being larger in the condition with feedback than without. The bottom part of the graph shows odds for γ_2^F being larger in the condition with public feedback than with private feedback.

Figure 5: Odds for a positive impact of positive feedback on change of emotions.

Figure 5 shows the corresponding odds. The top part of Figure 5 shows odds for the comparison of treatments with feedback with treatments without. We find "very strong" evidence that a good feedback has a positive effect on change of valence. We also find "very strong" evidence that a good feedback has a negative effect on change of arousal. Finally, we have "very strong" evidence that a good feedback has a positive effect on change of dominance.[8] Thus, after a positive feedback our participants feel happier, less excited and more powerful. Hypothesis H1 is therefore verified for valence and dominance, while a good feedback actually appears to lead to lower arousal.

In the bottom part of Figure 5 we compare public with private feedback. For valence we find "very strong" evidence that good public feedback has a less positive effect on change of valence than good private feedback. For arousal we find "only anecdotal" evidence that good public feedback has a more positive effect on change of arousal than good private feedback. For dominance we find "strong" evidence that good public feedback has a more positive effect on change of dominance than good private feedback. Thus, positive feedback has a stronger positive effect on dominance when it is public, but a weaker positive effect on valence. Hypothesis H1a is therefore verified for dominance, while a good public feedback actually has a lower impact on valence than a good private feedback.

In other words, public feedback has more of an impact on one's "standing" (dominance), whereas private feedback has more of an impact on one's internal state (happy/sad). This can be related to dominance being a more social component of emotions, associated with

[8] We follow the terminology suggested by Kass and Raftery (1995): odds $\in [1:1, 2.72:1]$: only anecdotal evidence, odds $\in [2.72:1, 20.1:1]$: positive evidence, odds $\in [20.1:1, 148:1]$: strong evidence, odds $\in [148:1, \infty:1]$: very strong evidence.

social interactions and hierarchies, which are public, while happiness is a more subjective emotional state, a personal experience that is more private.

6.2. H2: Emotions and wages

According to H2, changes in emotion dimensions when confronted with feedback lead to changes in wages, whereby negative changes lead to higher wages and positive changes lead to stable wages.

6.2.1. Descriptives

Figure 6 shows the change in wages $W_{i,t+1} - W_{i,t}$ as a function of the prior change in emotion $M_{m,i,t} - M_{m,i,t-1}$. While changes in arousal and dominance seems to have only a small effect on wages, positive changes in valence seem to have a clear negative effect on wage.

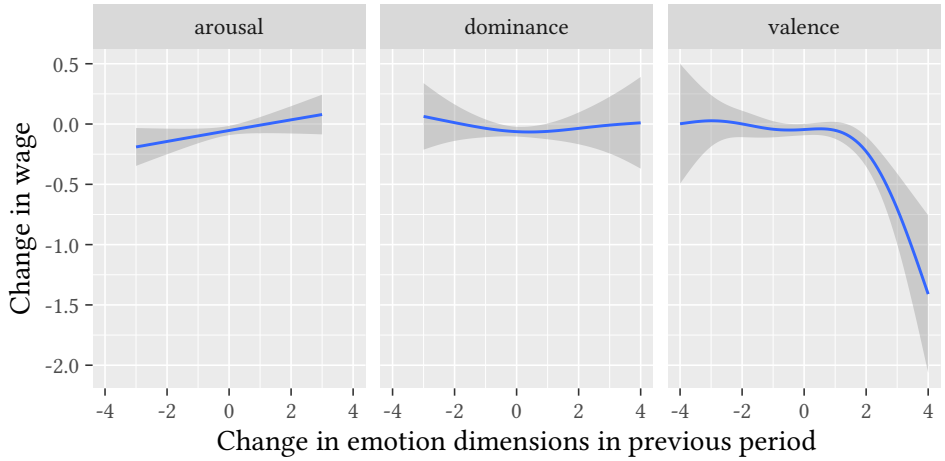


Figure 6: Change in wage due to change in emotion.

6.2.2. Model

To test H2 formally, we explain the change of the wage from one period to the next as a linear function of positive and negative changes in reported emotions over time.

$$W_{i,t} - W_{i,t-1} = \beta_0 + \left(\sum_{m \in E} \beta_{m+} \max(0, (M_{i,m,t-1} - M_{i,m,t-2})) + \right.$$
$$\left. + \beta_{m-} \min(0, (M_{i,m,t-1} - M_{i,m,t-2})) \right) + \epsilon_{i,t} \tag{3}$$

In Equation (3), $W_{i,t}$ is the wage of participant i in round t, E is the set of emotions we measure {valence, arousal, dominance}, $m \in E$ is the respective emotion. β_{m+} and β_{m-} measure the impact of positive respectively negative changes to emotions. Estimation results are shown in column OLS in Table 2.

Table 2: Changes in wage due to past changes in emotions (H2)

	OLS (3)	IV+	IV-
(Intercept)	-0.047 (0.042)	-0.045 (0.043)	-0.121 (0.045)**
arousal+	-0.044 (0.074)		
arousal-	0.028 (0.068)		
dominance+	0.068 (0.078)		
dominance-	-0.113 (0.074)		
valence+	-0.138 (0.054)*	-0.121 (0.100)	
valence-	0.023 (0.045)		-0.104 (0.087)
Num.Obs.	619	619	619

Since emotions might be endogenous, Table 2 also shows results of an IV regression where we instrument the (positive or negative) change in valence with the change in feedback.

Since we use only a single instrument, we cannot control for more than a single dimension of emotion in the IV estimations.

6.2.3. Results

In line with Figure 6, we find that an increase in valence (valence+) has a negative impact on wages. This is significant for our OLS estimation. The effect is, however, no longer significant in the IV estimation. An increase in dominance has a positive effect on wages, and a decrease has a negative effect, but this effect is not significant.

Overall, we do not find any significant influence of negative affective reactions after feedback. Thus, we find no support for H2. Indeed, decreases in valence lead to no change in wage in the next trial, and increases in valence during the feedback stage lead to a decrease in wage in the next trial.

This contradicts our original expectation that deciders would aim for maintaining positive changes in emotions by maintaining wages, and for repairing negative changes in emotions by increasing wages.

Appendices A and B test H2b which relates to the decay in affective reactions and their effect on wages over successive rounds of the experiment. Arousal and dominance seem to vary less with time, while valence appears to vary more. We also find indications that the effect of affective reactions on wages decreases over rounds.

6.3. H3: Feedback and wages

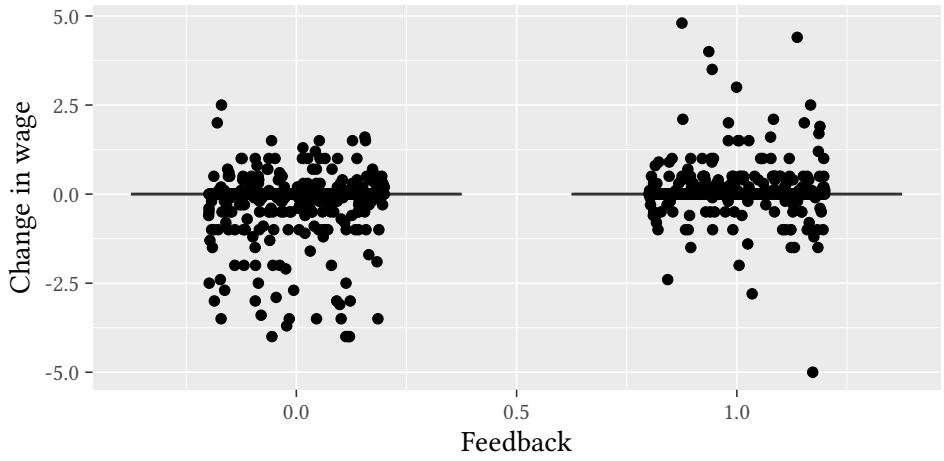
In this section, we test H3 about the effect of feedback on wages. This section helps us move from the effect of feedback on emotions and of emotions on wages to consider the overall effect of feedback on wages. We will then test H4 with a mediation model.

Figure 7 shows the change in wages $W_{i,t+1} - W_{i,t}$ as a function of feedback $F_{i,t}$. We find that good feedback appears to have a positive effect on wages while bad feedback has a negative

Table 3: Changes in wage due to feedback (H3)

	OLS	IV
(Intercept)	-0.132 (0.024)***	-0.092 (0.136)
feedback	0.205 (0.040)***	0.095 (0.365)
Num.Obs.	1238	1238

effect.



Note: Jitter was added to avoid overlapping symbols.

Figure 7: Change in wage due to feedback last period.

We fit a simple linear regression model of wages as a function of feedback last period, and then an instrumental variable regression model where the instrumental variable is the threshold (H or L) in each round (see 3.2). This is to address potential endogeneity issues and obtain consistent parameter estimates.

The linear model confirms that bad feedback is associated with lower wages (negative intercept), while good feedback leads to more positive changes in wages. However, the effects are not significant in the model with instruments.

6.4. H4: How far do emotions mediate feedback?

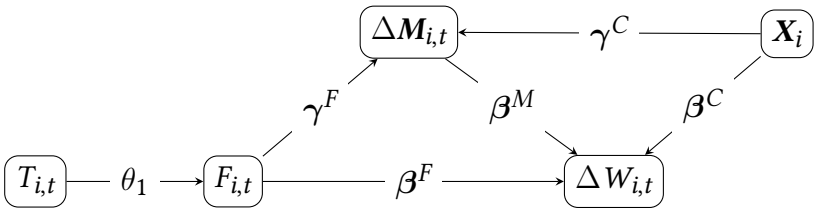
6.4.1. Model

We test H4 about the combined effect of feedback, emotion and wages with the help of a formal model.

In our study, positive or negative feedback $F_{i,t}$ may have a direct effect on changes in wage $\Delta W_{i,t}$. Furthermore, feedback $F_{i,t}$ may have, through change in emotions $\Delta M_{i,m,t}$, an indirect

effect on changes in wage $\Delta W_{i,t}$. In this section we attempt to disentangle the direct and the indirect effect of feedback on wages.

Graphically, the stochastic process could be described as follows:



As in Equation (1), we again instrument feedback $F_{i,t}$ with the thresholds $T_{i,t}$. We again follow Equation (2) to model how changes in emotions $\Delta M_{i,m,t}$ react to feedback feedback $F_{i,t}$. To demonstrate robustness, we compare two sets of control variables $\boldsymbol{X}_i$. Either we consider the case of all available controls, including GASP, HPRS, Big Five and several sociodemographic variables (see subsection 3.5), or we use a simple model where $\boldsymbol{X}_i$ contains just the constant. We also model the direct effect of the instrumented feedback $F_{i,t}$ on the measurement of changes in wage, $\Delta W_{i,t}$, set by participant i at time t, as follows:

$$\Delta W_{i,t} \sim \Phi((1, \hat{F}_{i,t})\boldsymbol{\beta}^F + \Delta \boldsymbol{M}_{i,t}^\top \boldsymbol{\beta}^M + \boldsymbol{X}_i \boldsymbol{\beta}^C + \eta_i, \tau_D) \tag{4}$$

$\boldsymbol{\beta}^F$ is a column vector. Its second component, β_2^F, is the marginal effect of feedback on wage. $\Delta \boldsymbol{M}_{i,t}^\top$ is a row vector with one element for each mediator variable, following Equation (2). $\boldsymbol{\beta}^M$ is a column vector, its components each denoting the marginal effect of an emotion on wage. The random effect for participant i is η_i. The precision of the distribution is τ_D. From Equation (2) and (4), the average direct effect of feedback on wage is

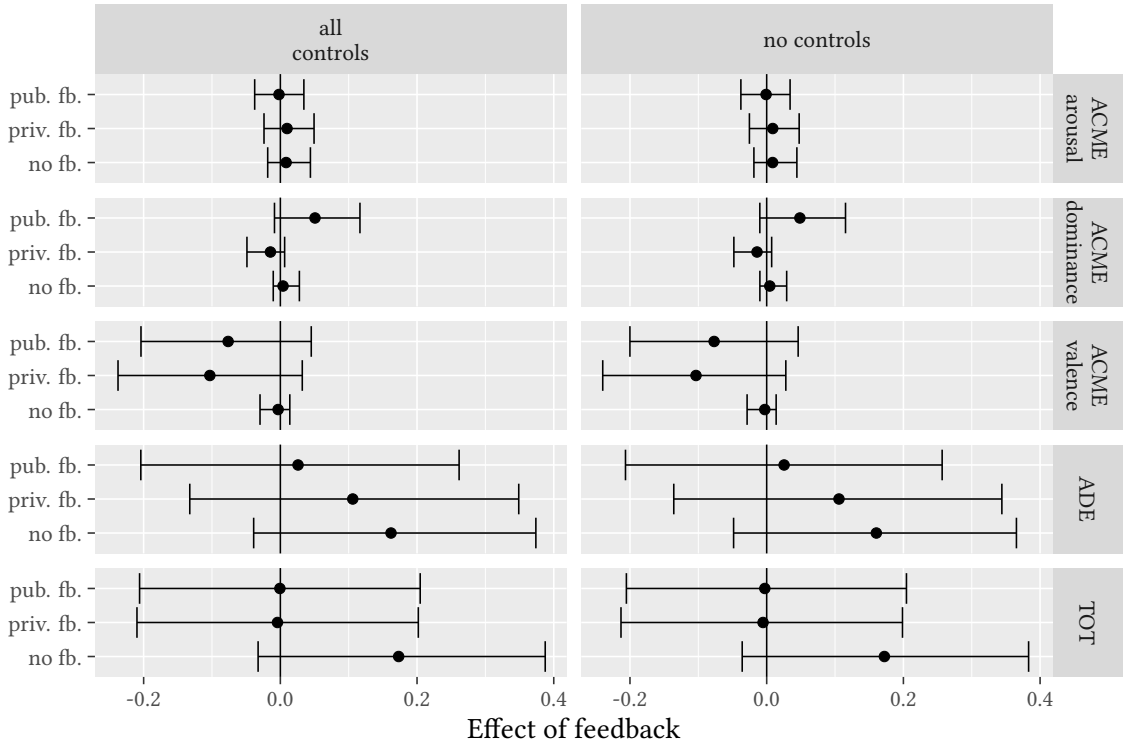
$$ADE = \beta_2^F . \tag{5}$$

The average causal mediated effects of feedback through mediator m on wage is

$$ACME_m = \gamma_m^F \beta_m^M . \tag{6}$$

The total effect of feedback on wage is then

$$TOT = ADE + \sum_m ACME_m . \tag{7}$$



The graph shows for the different feedback conditions estimates for the parameters from Equations (5) - (7) and their 95% credible interval. Detailed results are shown in Section F in the appendix.

Figure 8: Direct and mediated effect of feedback for different parameters of the mediation model.

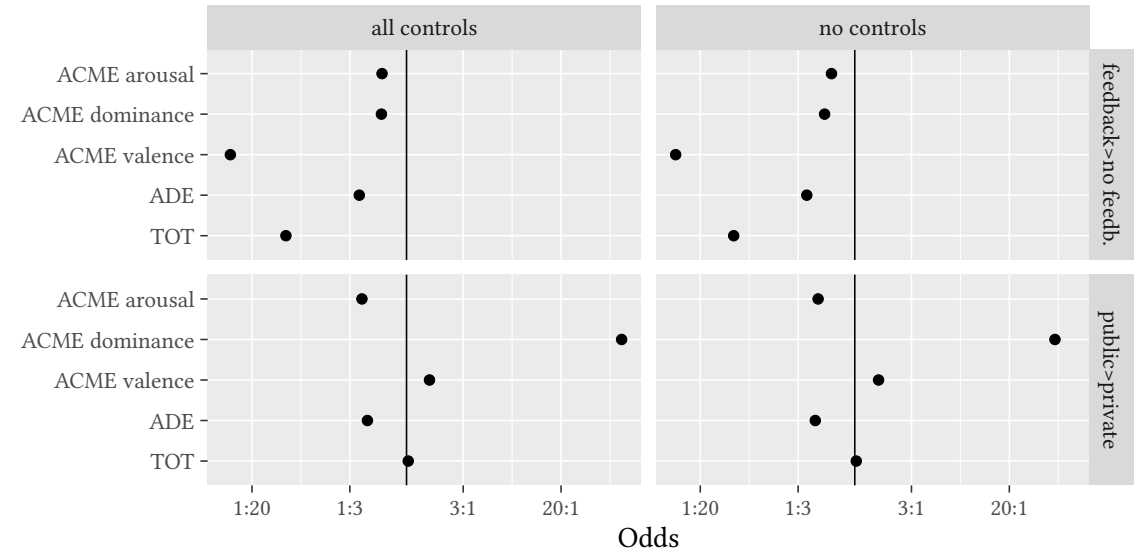


Figure 9: Odds for a positive effect of feedback on different parameters of the mediation model.

Figure 8 shows estimation results and 95% credible intervals. The top part of Figure 9 extends Figure 8, showing for the same estimation results the odds that feedback has a positive effect. Detailed results are provided in Appendix F.

6.4.2. Results

We find that positive feedback has a modest positive average direct effect (ADE) on wage. Note this includes the effect of anticipated feedback. Indeed, in the "no feedback" condition, the ADE is larger.

We do find "strong" evidence that good feedback has through valence a negative effect on change of wages . Valence acts as a suppressor. In contrast, we find "only anecdotal" evidence that good feedback has through dominance a negative effect on change of wages . We also find "only anecdotal" evidence that good feedback has through arousal a negative effect on change of wages . The direct effect itself is only small. We find "only anecdotal" evidence that good feedback has a negative effect on change of wages . The direct (positive) effect of feedback and the suppression effect through valence seem to cancel each other out. As a result, the total effect of feedback on wage is rather small.

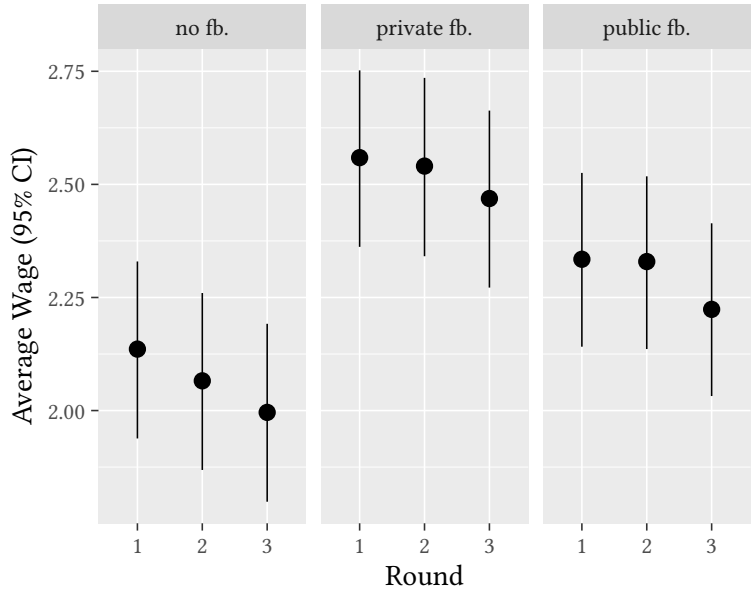
An exception to this is the "no feedback" treatment where the anticipated feedback effect seems to prevail. In treatments without feedback, the total effect of anticipated good feedback is positive because the direct effect of feedback is not reduced as in treatment with feedback by the emotion mediated reduction in wage when feedback is good.

The bottom part of of Figure 9 shows the odds that public feedback has a more positive effect on wages than private feedback. With the exception of dominance, the type of the feedback, public or private does not seem to have a strong influence. However, we find "strong" evidence that good public feedback has through dominance a more positive effect on change of wages than private feedback.

The results of the mediation analysis explain why the total effect of positive feedback on wages is not significantly different from zero (subsection 6.3), even though we found that it increased valence (especially in the private feedback treatment) and dominance (especially in the public feedback treatment) (subsection 6.1). This is because increases in valence are related to lower wages (subsection 6.2). We do confirm that as a result, the average causal mediated effect of valence is negative in both public and private treatment. We add to this that the average causal mediated effect of dominance is positive in the public treatment.

6.5. H5: Wages and treatments

According to H5, we expect that wages will be lower in the treatment with no feedback, as workers can't reward generous employers. In the treatments with explicit feedback, workers can at least show their satisfaction or dissatisfaction with a wage. Anticipating this feedback, employers should set higher wages. Feedback is more visible in the case of public feedback. In this case wages should be higher than in the case of private feedback.



The graph shows for the different feedback conditions the average wage and their 95% credible interval over time.

Figure 10: Wages over time, by treatment

Figure 10 shows means and 95% credible intervals for wages in the different rounds and for the different treatments. In all treatments wages tend to decrease over time. The differences in average levels of wages across treatments are apparent from the first period onward, meaning that they are not the result of how feedback affects wages over time.

We estimate a Bayesian linear mixed-effects model with fixed effects of the treatments and subject-specific random effects. We find that the odds that wages are smaller in the treatment with no feedback than in the treatments with feedback are 1080:1. We have, hence, "very strong" evidence that average wages with private or public feedback are larger than those with no feedback.

More surprisingly, the odds that wages are larger in the treatment with private feedback than in the treatment with public feedback are 21:1.

We have, hence, "strong" evidence that average wages with private feedback are larger than those with public feedback.

We report our test of H6 in Appendix C. We find that as expected higher wage expectations are related to higher wages.

7. Discussion

We found that wages were higher when feedback was given than when no feedback was given. Unlike expected, wages were higher with private than with public feedback.

The finding that wages were larger with private than with public feedback was unexpected as we hypothesized public feedback to have stronger effects on wages. Taking this finding

together with the finding on emotions it might be that negative private feedback allows to save face whereas negative public feedback is perceived as "a slap in the face" or as a intrusion on one's ego (leading to lower feelings of dominance). Thus, negative public feedback might be perceived as a punishment and an attempt at reduction of freedom which can cause reactance and thus non-conformity to requests. Alternatively, once negative feedback has been revealed publicly, the damage might appear to be done, as the manager has already "lost face". This might make it seem useless to increase salaries.

Positive feedback was related to increases in valence and dominance and reductions in arousal. Increases in valence were related to lower wages in the subsequent trial. The indirect, emotions mediated impact of positive feedback was thus negative. This was compensated by positive direct effects, so the total effect of positive feedback on wages was not significantly different from zero.

The finding that increases in valence were related to lower wages in the subsequent trial was unexpected. It contradicts for example Rind and Bordia (1995) whereby expression of gratitude led to increased payments of waiting staff. However, the finding can be interpreted in line with a study on negotiations that showed that negotiators conceded more to an opponent who expressed anger than one who expressed happiness (van Kleef et al., 2004). The authors suggest that this may be related to negotiators tracking the opponents limit though emotion perception. In the current study, deciders may also have used feedback to do "limit tracking", i.e. they may have tried to find the minimum wage that still obtains positive feedback by decreasing wage whenever they got positive feedback until they got negative feedback.

The results of the experiment could thus argue for a view linking emotions with cognition, similar to an appraisal theory framework (Scherer, 1999; Moors et al., 2013). An initial emotion response would produce thought, which then leads to a decision, which is thus not necessarily motivated by the emotion. The emotion would simply have signaled the need for additional attention (Lerner et al., 2015).

Another reason why deciders did not apparently aim for maintenance of positive emotions is that deciders who were setting wages low knew this was likely to get them bad feedback. Receiving good feedback was therefore a surprise, which thus generated a particularly strong and positive emotional response. This fits with neuroscientific studies investigating reward processing. These studies show that neural processing of reward is relative (Tremblay and Schultz, 1999; Isoda, 2021). If the expectation is high but the reward lower than expected, this is considered negative and neural responses change accordingly. As a consequence, the positive emotional reactions to good feedback may be mainly those of deciders whose intent was not to get good feedback. This could explain why those emotions did not translate in the expected way into decisions. We would need more insights into the interaction of emotions with the expectations of deciders and their intentions in order to investigate this possibility further.

8. Conclusion

We confirmed in this paper the positive impact of feedback systems on ethical behavior in the context of an artificial labor market. The expectation of receiving feedback about wage levels led managers in our experiment to set higher wages. However, public feedback had a less positive effect on wages than private feedback while we expected that its public nature would make it more potent. We discussed the way that public feedback may be perceived as more forceful and punitive than private feedback, and thus may induce less good will from deciders.

We also confirmed that feedback does induce affective reactions, in the expected way with increases in valence and dominance when receiving good feedback, and in an unexpected way with decreases in arousal when receiving good feedback. We confirmed that emotions mediate some of the effect of feedback on decisions. Increases in dominance were related to increases in wages when feedback was public. Unexpectedly, increases in valence were related to decreases in wages under both private and public feedback. This contradicted our expectation that deciders would aim to maintain positive emotional states, and thus react to good feedback by maintaining wages. We discussed alternative ways in which emotional states may relate to decisions, in particular whether emotional responses may generate subsequent thought of a more strategic nature. Namely, while unexpectedly good feedback may have generated positive emotions, it may also have resulted in decreases in wages as the goal of the decider was not to obtain good feedback in the first place.

Further work on the topic could therefore focus on eliciting the intentions and expectations of the deciders when making their decisions. We would also need to investigate further differences in the interpretation and reaction to feedback depending on whether it is made publicly or in private.

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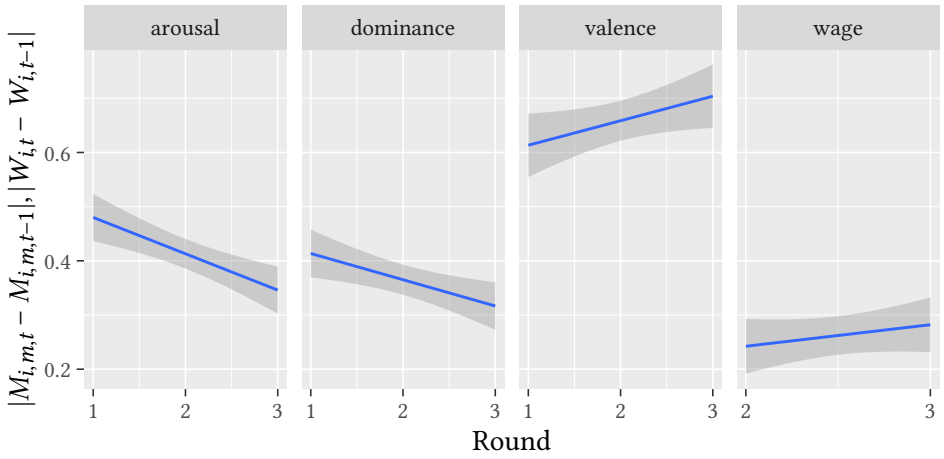
Appendix

A. Decay of emotions and wages

According to H2b we expect emotions and changes in wage to be more pronounced at the beginning of the experiment than at the end. Figure 11 provides an overview.



The vertical axis shows for emotion dimensions the change in emotion $|M_{i,m,t} - M_{i,m,t-1}|$ and for the wage the change in the wage $|W_{i,t} - W_{i,t-1}|$. Since we elicit emotions four times during the experiment, we can report three changes. Since wages are paid only three times, we report only for two rounds changes of the wage.

Figure 11: Changes in emotion and wage over time.

Indeed, changes in arousal and dominance seem to decrease during the experiment. Changes in valence and wage seem to increase over time.

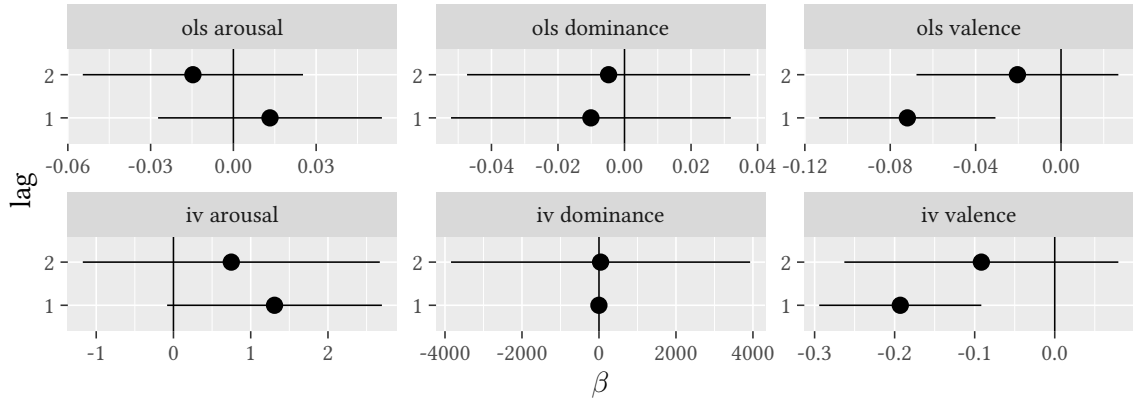


Figure 12: Decay (impact of lagged emotion on changes in wages).

B. Time: Decay of emotions and wages

According to H2b we also expect the effect of early emotions to be maintained over time (low decay rate). To investigate this hypothesis, we estimate the effect of emotions in the first and in the second round both on changes in wages in the third round. We estimate

$$W_{i,t} - W_{i,t-1} = \beta_0 + \beta_1 M_{i,m,t-l} + \epsilon_{i,t} \tag{8}$$

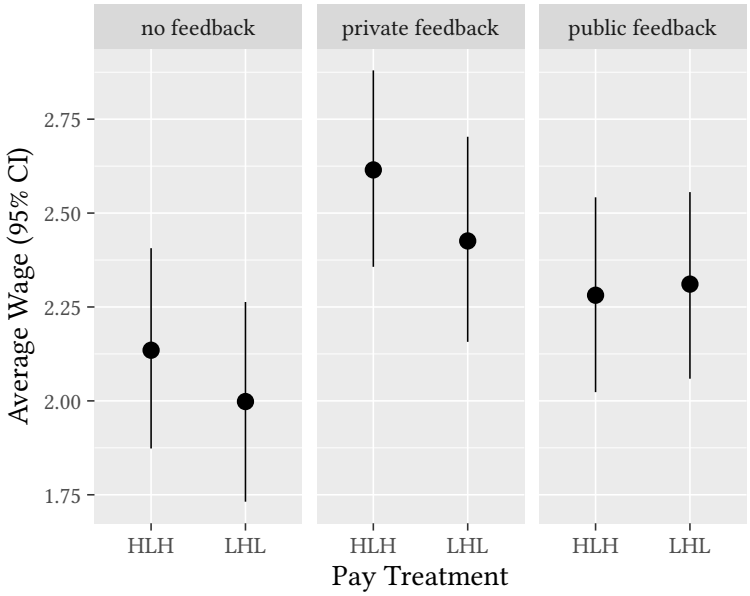
where the emotion m of participant i at time t is $M_{i,m,t}$ and the lag $l \in \{1, 2\}$ (i.e. one or two period lag).

We use both OLS and an IV estimator with feedback as an instrument for the regressor. Figure 12 shows estimation results.

Valence is the only emotion which shows a significant effect from the second round to wages in the third round. We do find an impact of valence on decay. The effect from the first round to wages in the third round is clearly smaller.

C. Low and high expectations

According to H6, wages should be higher in treatments with high expectations (HLH) than in treatments with low expectations (LHL).



The graph shows for the different feedback conditions the average wage and their 95% credible interval for the two different wage expectations treatments.

Figure 13: Wages depending on wage expectations.

Figure 13 shows means and 95% credible intervals for wages depending on wage expectations for the different treatments. Wages tend to be higher in the treatment with high expectations, except in the treatment with public feedback.

The odds that wages are lower in the treatment LHL than in the treatment HLH are 3.81:1. We have, hence, "positive" evidence that average wages under high expectations are larger than those under low expectations.

D. Reactance and proneness to guilt and shame

In our study we elicit a number of control variables, some of which might interact with the effects that we have discussed in the previous section. Here we look at the HPRS measure for reactance (Dillard and Shen, 2005) and the GASP measure for guilt and shame proneness (Cohen et al., 2011).

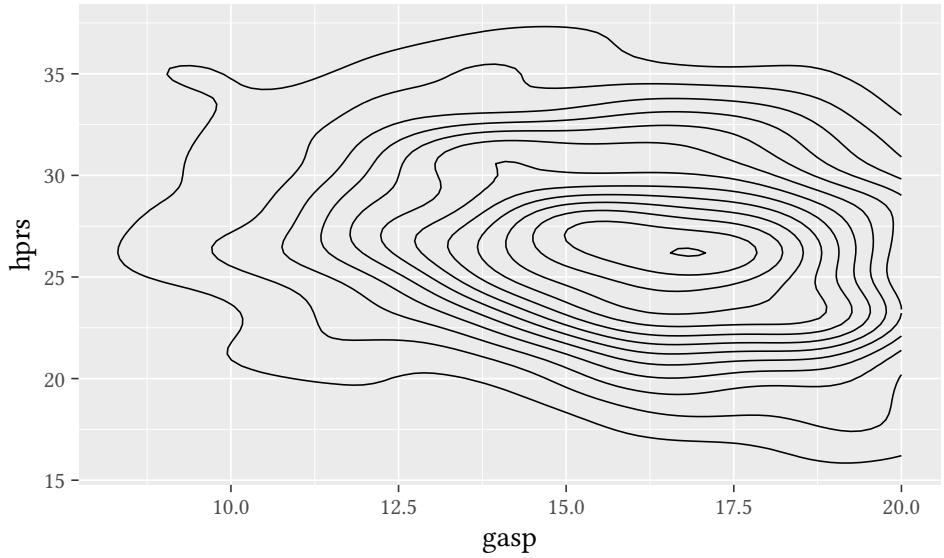
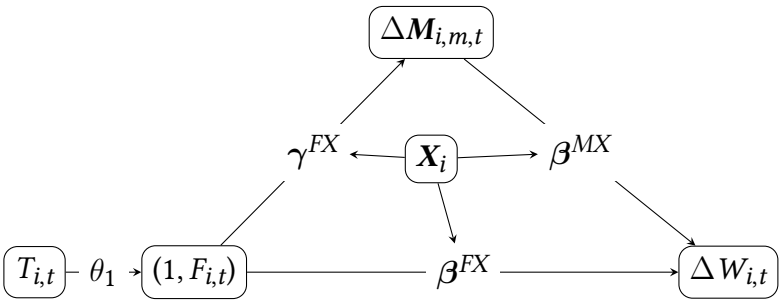


Figure 14: Joint distribution of GASP and HPRS.

Figure 14 shows the joint distribution of the two measures. To better understand whether these measures have an influence on the above results, we estimate a model where direct and indirect effects of feedback and of our mediator may interact with the measure.

Graphically, the stochastic process could be described as follows:



Here $(1, F_{i,t})$ is a vector containing a constant and the feedback received by individual i in round t. Here we assume that valence plays the role of a mediator $\boldsymbol{M}_{i,m,t}$. Measures for GASP and HPRS of individual i are represented as a vector $\boldsymbol{X}_i$ (including a constant). The matrix $\boldsymbol{\gamma}^{FX}$ describes the interaction between feedback $F_{i,t}$ and measures for GASP and HPRS, $\boldsymbol{X}_i$, on the mediator $\Delta M_{i,m,t}$. The matrix $\boldsymbol{\beta}^{MX}$ describes the interaction between the mediator $\boldsymbol{\Delta} M_{i,m,t}$ and the measures $\boldsymbol{X}_i$ on the outcome $\Delta W_{i,t}$, i.e. on wage. The matrix $\boldsymbol{\beta}^{FX}$ describes the interaction between the direct effect feedback $F_{i,t}$ and the measures $\boldsymbol{X}_i$ on the outcome $\Delta W_{i,t}$.

More formally, we extend Equations (2) and (4) as follows:

$$\Delta M_{i,m,t} \sim \Phi((1, \hat{F}_{i,t})\boldsymbol{\gamma}^{FX}\boldsymbol{X}_i + \eta'_{i,m}, \tau'_m) \tag{9}$$

$$\Delta W_{i,t} \sim \Phi((1, \hat{F}_{i,t})\boldsymbol{\beta}^{FX}\boldsymbol{X}_i + \Delta\boldsymbol{M}_{i,t}^{\top}\boldsymbol{\beta}^{MX}\boldsymbol{X}_i + \eta_i, \tau_D) \tag{10}$$

If the first component of $\boldsymbol{X}_i$ is the constant, we can calculate the size of interaction i for the mediated effect as

$$ACMI_i = (\gamma_{2,i}^{FX})^{\top}\beta_1^{MX} + (\gamma_{2,1}^{FX})^{\top}\beta_i^{MX}. \tag{11}$$

The size of interaction i for the direct effect is simply

$$ADE_i = \beta_{2,i}^{FX}. \tag{12}$$

Estimation results for different measures as interaction terms are shown in Figure 15.

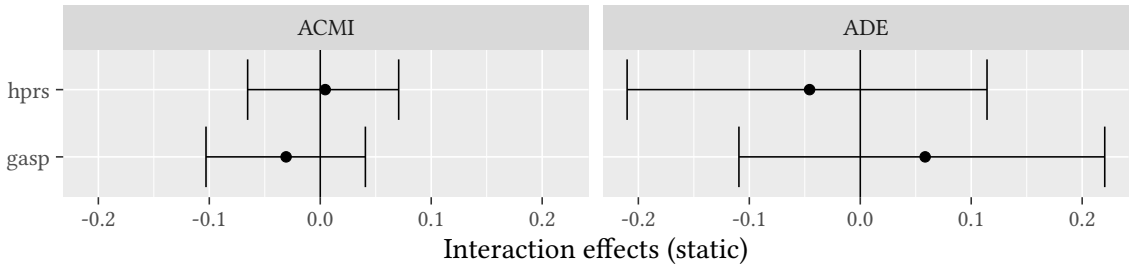


Figure 15: Interactions of direct and valence mediated effects of feedback.

E. Estimation results for Equation (2)

An overview of these results is shown in Figure 4. Odds are provided in Figure 5.

E.1. No controls

	Lower95	Median	Upper95	SSeff	psrf
intercept no feedback on dominance	-0.1362	-0.0142	0.1063	40000	1.0001
intercept no feedback on valence	-0.1186	-0.0126	0.0960	40854	1.0001
intercept no feedback on arousal	-0.2040	-0.0793	0.0411	40693	1.0000
effect of no feedback on dominance	-0.1152	0.1255	0.3720	40000	1.0000
effect of no feedback on valence	-0.1559	0.0637	0.2728	40847	1.0000
effect of no feedback on arousal	-0.1158	0.1306	0.3714	40000	1.0000
intercept private feedback on dominance	-0.2948	-0.1779	-0.0553	37704	1.0000
intercept private feedback on valence	-0.8819	-0.7705	-0.6570	26548	1.0000
intercept private feedback on arousal	0.1410	0.2623	0.3826	38421	1.0000
effect of private feedback on dominance	0.1986	0.4488	0.6876	38917	1.0000
effect of private feedback on valence	1.8143	2.0510	2.2959	21855	1.0001
effect of private feedback on arousal	-0.8753	-0.6246	-0.3794	38371	1.0000
intercept public feedback on dominance	-0.4562	-0.3348	-0.2151	36934	1.0000
intercept public feedback on valence	-0.7469	-0.6378	-0.5267	28504	1.0000
intercept public feedback on arousal	0.0802	0.2007	0.3209	40127	1.0000
effect of public feedback on dominance	0.5746	0.8166	1.0644	35798	1.0000
effect of public feedback on valence	1.4301	1.6511	1.8924	25661	1.0001
effect of public feedback on arousal	-0.7675	-0.5234	-0.2833	37595	1.0000

E.2. All controls

	Lower95	Median	Upper95	SSeff	psrf
intercept no feedback on dominance	-0.1334	-0.0126	0.1107	38645	1.0000
intercept no feedback on valence	-0.1213	-0.0132	0.0956	40000	1.0000
intercept no feedback on arousal	-0.2014	-0.0800	0.0441	40870	1.0001
effect of no feedback on dominance	-0.1194	0.1267	0.3691	38346	1.0000
effect of no feedback on valence	-0.1613	0.0619	0.2761	40470	1.0000
effect of no feedback on arousal	-0.1146	0.1278	0.3751	40082	1.0000
intercept private feedback on dominance	-0.3021	-0.1788	-0.0614	40000	1.0000
intercept private feedback on valence	-0.8821	-0.7688	-0.6579	27272	1.0001
intercept private feedback on arousal	0.1447	0.2623	0.3888	39258	1.0000
effect of private feedback on dominance	0.2122	0.4530	0.7022	39639	1.0000
effect of private feedback on valence	1.8242	2.0607	2.3044	22327	1.0002
effect of private feedback on arousal	-0.8617	-0.6082	-0.3657	38559	1.0001
intercept public feedback on dominance	-0.4522	-0.3313	-0.2076	37934	1.0000
intercept public feedback on valence	-0.7482	-0.6375	-0.5265	31643	1.0001
intercept public feedback on arousal	0.0749	0.1948	0.3175	40000	1.0001
effect of public feedback on dominance	0.5542	0.8036	1.0460	36573	1.0001
effect of public feedback on valence	1.4166	1.6414	1.8772	26399	1.0002
effect of public feedback on arousal	-0.7560	-0.5202	-0.2696	39629	1.0001

F. Estimation results for Equation (5)-(7)

An overview of these results is shown in Figure 8. Odds are provided in Figure 9.

F.1. No controls

	Lower95	Median	Upper95	SSeff	psrf
ADE no feedback	-0.0484	0.1604	0.3654	40000	1.0000
ADE private feedback	-0.1359	0.1058	0.3441	39126	1.0000
ADE public feedback	-0.2066	0.0255	0.2567	39714	1.0001
ACME no feedback on valence	-0.0287	-0.0028	0.0139	40000	1.0000
ACME no feedback on arousal	-0.0187	0.0086	0.0442	40000	1.0000
ACME no feedback on dominance	-0.0100	0.0045	0.0292	39259	1.0001
ACME private feedback on valence	-0.2399	-0.1034	0.0280	39365	1.0000
ACME private feedback on arousal	-0.0253	0.0088	0.0475	40000	1.0000
ACME private feedback on dominance	-0.0480	-0.0141	0.0073	40321	1.0000
ACME public feedback on valence	-0.2001	-0.0769	0.0460	38813	1.0001
ACME public feedback on arousal	-0.0377	-0.0009	0.0342	40000	1.0000
ACME public feedback on dominance	-0.0100	0.0486	0.1153	40259	1.0000
TOT no feedback	-0.0358	0.1722	0.3832	40000	1.0000
TOT private feedback	-0.2132	-0.0053	0.1987	38871	1.0000
TOT public feedback	-0.2052	-0.0027	0.2045	39349	1.0001

F.2. All controls

	Lower95	Median	Upper95	SSeff	psrf
ADE no feedback	-0.0390	0.1619	0.3738	38730	1.0001
ADE private feedback	-0.1325	0.1059	0.3488	40343	1.0000
ADE public feedback	-0.2041	0.0259	0.2615	39909	1.0000
ACME no feedback on valence	-0.0297	-0.0032	0.0138	39696	1.0002
ACME no feedback on arousal	-0.0185	0.0084	0.0440	40000	1.0000
ACME no feedback on dominance	-0.0104	0.0039	0.0279	40000	1.0001
ACME private feedback on valence	-0.2375	-0.1031	0.0321	39539	1.0001
ACME private feedback on arousal	-0.0239	0.0098	0.0493	40000	1.0000
ACME private feedback on dominance	-0.0489	-0.0145	0.0063	40000	1.0001
ACME public feedback on valence	-0.2039	-0.0764	0.0452	40317	1.0000
ACME public feedback on arousal	-0.0376	-0.0020	0.0344	40000	1.0001
ACME public feedback on dominance	-0.0086	0.0507	0.1165	39625	1.0001
TOT no feedback	-0.0325	0.1731	0.3875	39173	1.0001
TOT private feedback	-0.2097	-0.0042	0.2019	40833	1.0000
TOT public feedback	-0.2059	-0.0006	0.2046	39503	1.0001

G. Variables collected

- IDE: (String) A name randomly assigned to participants.

Assignment to treatments

- Treatment: (Integer) Either no, private or public feedback
- Pay Treatment: (Integer) Either HLH or LHL

Control questions

- Will you receive feedback from the counters about what you paid them? (Choices: Yes, No)
- Will you receive feedback from the counters about what you paid them? (Choices: Yes, No)
- Will other participants in the experiment see the feedback you received? (Choices: Yes, No)
- Choose the correct option: (Choices: Most counters are already satisfied with 2€ or more, Most counters are only satisfied with 4€ or more)
- What is your ID in this experiment? Please write in uppercase letters.

Decisions in each period

- Pay: (Currency) What the participant pays counters, shown as a slider from 0 to 7 with no preset, in steps of 0.1.
- Feedback: (Integer) Either good or bad feedback
- Valence: How sad or happy do you feel? (Choices: 1 to 5, from sad to happy, shown with Manikins)
- Arousal: How calm or excited do you feel? (Choices: 1 to 5, from calm to excited, shown with Manikins)
- Dominance: How powerless or powerful do you feel? (Choices: 1 to 5, from powerless to powerful, shown with Manikins)

Shame and guilt (at the end of experiment)

- Shame: How would you feel if others observed your behavior in this experiment? (Choices: Rather proud, Somewhat proud, Neither proud nor ashamed, Somewhat ashamed, Rather ashamed)
- Guilt: How justified do you feel about your own behavior in this experiment? (Choices: Completely right, Right, Neither right nor wrong, Wrong, Completely wrong)

Feedback questionnaire

- 1. Demand: - What do you think the experiment was about?
- 2. Difficulty: - Was it difficult for you to understand what you had to do in this experiment? - (Choices: Yes, No)
- 3. Problems: Did you have any difficulties during the experiment? (Choices: Yes, No)
- 4. Problems2: If yes, what difficulties? (Max 100 characters)
- 5. Experience: Approximately how many experiments have you participated in before? (Choices: I have never participated in an experiment before, 1 to 5, More than 5)

Socio-economic survey

- Age: How old are you? Please type in.
- Gender: What is your gender? (Choices: Male, Female, Other, Prefer not to say)
- Housing: What is your housing situation? (Choices: I live with my parents and/or other family members, I live alone, I live in a shared flat, I live with my partner and/or children)
- Concerned: Are you concerned about being able to cover your living expenses in the next six months? (Choices: Yes, No)
- Better: Do you believe you are financially better off than other people in your age group? (Choices: Yes, No)
- German: Do you have German citizenship? (Choices: Yes, No)
- Austrian: Do you have Austrian citizenship? (Choices: Yes, No)
- Study: Are you currently enrolled in a study program? (Choices: Yes, No)
- Economics: What have you studied or are you currently studying? (Choices: Economics, Psychology, Other)

- God: How important is God in your life? (Choices: Not at all important, Not important, Important, Very important)
- Charity: Are you active in or do you donate to charitable organizations? (Choices: Yes, No)

Opinion and personality survey

- WVS: Now we want you to give us your opinion on various topics. For each of the rows, 1 means you completely agree with the statement on the left; 4 means that you totally agree with the statement on the right. If your views fall somewhere in between, you can choose 2 if you more agree with the statement on the left, or 3 if you more agree with the statement on the right.
  - Income differences must be greater for individual performance to be more rewarding.
  - Enterprises should be more in private ownership.
  - The state should take more responsibility to ensure that everyone is doing well.
  - With this question, we want to test if you are attentive. Please choose answer option one.
  - In the long run, hard work usually leads to a better life.
  - People become rich only at the expense of others.
  - Competition is good. Competition stimulates people to work hard and develop new ideas.
- GASP: This questionnaire describes situations that people might encounter in everyday life, followed by common reactions to these situations. As you read the scenarios, try to put yourself in that situation. Then indicate how likely it is that you would react in the way described. (Choices: 1 to 4, from very unlikely to very likely)
  - You received too much change and decide to keep it.
  - You have a guilty conscience if you break the law.
  - At a party, you secretly cover up a red wine stain you caused on a carpet.
  - You feel bad due to a lie that remains undetected.
  - Out of frustration, you secretly damage the copier at your workplace.
- HPRS: To what extent do the following statements correspond to your personality? (Choices: 1 to 4, from does not correspond at all to corresponds exactly)
  - Regulations trigger resistance in me.
  - I find it stimulating to contradict others.
  - When something is prohibited, I usually think, "That's exactly what I'll do."

  - I consider advice from others as interference.
  - I get frustrated when I am unable to make free and independent decisions.
  - It irritates me when someone points out things that are obvious to me.
  - I get angry when my freedom of choice is restricted.
  - Advice and recommendations usually prompt me to do exactly the opposite.
  - I resist attempts by others to influence me.
  - It makes me angry when another person is held up as an example for me.
  - When someone forces me to do something, I want to do the opposite.
- Big Five: What kind of personality are you? (Choices: 1 to 4, from does not correspond at all to corresponds exactly)
  - I am someone who works thoroughly.
  - I am someone who is communicative, talkative.
  - I am someone who is sometimes a bit rough with others.
  - I am someone who is original, brings in new ideas.
  - I am someone who often worries.
  - I am someone who can forgive.
  - I am someone who is rather lazy.
  - I am someone who can come out of their shell, sociable.
  - I am someone who appreciates artistic, aesthetic experiences.
  - I am someone who effectively and efficiently completes tasks.
  - I am someone who becomes easily nervous.
  - I am someone who is reserved.
  - I am someone who treats others considerately and kindly.
  - I am someone who has a vivid imagination.
  - I am someone who is relaxed, can cope well with stress