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Comparative feedbacks under incomplete information☆

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ABSTRACT

Comparative feedbacks, that is personalized messages describing how one's behavior compares to that of relevant others, are currently widely used in order to change people's behaviors. Such feedbacks may induce recipients to update their beliefs about both reachable material outcomes and perceived self/social esteem. Both channels are very hard to disentangle in the field, which notably makes welfare analysis a very challenging task. This paper uses an online experiment that makes it possible to focus, within the considered setting, on the role of pure information on material outcomes. Despite an absence of normative pressure, comparative feedbacks are found to trigger comparable or even greater changes in behaviors than other kinds of informative and more accurate feedbacks. A possible explanation may be that comparative feedbacks more effectively conveyed to participants the idea that it should not be too difficult for them to reach a better outcome.

1. Introduction

Providing information about others' choices or outcomes – often referred to as "comparative feedbacks" – has been demonstrated to significantly impact (or "nudge") decision making (Thaler and Sunstein, 2008). Numerous utilities send such feedbacks to their customers in order to decrease their electricity, natural gas and/or water consumptions (Allcott and Mullainathan, 2010; Ferraro et al., 2014). Some of these programs have reached a very large scale.[1]

In many situations where comparative feedbacks are used, consumers do not have all the information they would need to take optimal decisions. This is typically the case for residential energy or water consumers, who very often lack either detailed and frequent information about their consumption, or the time needed to process such information (Kempton and Layne, 1994). In such settings, there are at least two distinct reasons why people may change their behavior after receiving a comparative feedback:

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[1] For instance, the company Opower tailors comparative feedbacks for more than 50 million consumers around the world.

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- **An informative channel**: agents will update their beliefs about *the way their choices map into outcomes* (monthly bill, daily comfort, etc.), that is the net utility they would derive privately from choosing a particular action.[2]
- **A normative channel**: agents will update their beliefs about *the way their choices map into self or social esteem*, that is how an external observer would assess their social "status" from their actions.

Both channels need not be orthogonal (Cialdini and Goldstein, 2004). For example, if esteem is derived from one's ability at a given task previously unknown to the agent, a comparative feedback may be at the same time informative (inference about the additional surplus I can hope to get if I increase effort) and normative (inference about how good I am at the task). Although acknowledged a while ago (Deutsch and Gerard, 1955), this duality remains poorly understood because of the difficulty to disentangle both channels in the field.[3]

In this paper, we design an online experiment which allows to focus, within a specific controlled environment, on the informative channel. Our setting indeed let little scope for social stigma or esteem, which is corroborated by the observation that comparative feedbacks had no measurable effect on participants' choices under complete information.

We study participants' response to different feedbacks under incomplete information. In addition to peer comparisons, two additional types of feedbacks are tested. The first one tells participants what would have been their outcome if they had made optimal choices. The second one warns outliers that the outcome they have reached is very far from the optimal outcome. Both these types of feedbacks leverage our knowledge of optimal behaviors, a feature made possible by the fact that we do observe participants' payoff function within the experiment.

We find that, although peer comparisons conveyed less accurate information, comparative feedbacks triggered comparable or even greater changes in behaviors than did the two other types of feedbacks. A possible explanation is that participants who received a comparative feedback exhibit an increased confidence in their ability to reach a better outcome. Indeed, in their answers to an incentivized question asked during the experiment, participants are slightly more prone to state that they could have reached a better outcome after having received a comparative feedback than after having received non-normative feedbacks. Different kinds of cognitive costs may explain this observation, notably the cost to internalize the feedbacks or participants' beliefs about the cognitive cost they would have to incur to change their behavior.

The paper is organized as follows. Section 2 provides some background and motivates the experimental set-up. Section 3 describes the experiment, the results are presented in Section 4 and are then discussed in Section 5. Section 6 concludes.

2. Literature review and motivation

While the influence that comparisons with peers can have on beliefs and choices has been discussed in the psychology literature as early as the 1950s (Asch, 1952; Festinger, 1954), the idea to leverage this influence for large scale applications only emerged a few decades later (Berkowitz, 2004; Cialdini and Goldstein, 2004).

A vast literature has experimented the use of comparative feedbacks in the field within different contexts: electricity and natural gas consumption (Midden et al., 1983; Schultz et al., 2007; Nolan et al., 2008; Allcott and Mullainathan, 2010; Allcott and Rogers, 2014; Allcott and Kessler, 2015; Byrne et al., 2016), water consumption (Ferraro and Price, 2013), savings choices (Beshears et al., 2011), etc. These studies have most often found such feedbacks to be effective at meeting the desired goal, although they sometimes note that peer comparisons have several limits.[4] For example, comparative feedbacks have been found to decrease the energy consumption of the average US household persistently by about 2% for electricity (Allcott and Mullainathan, 2010; Allcott and Rogers, 2014), and 0.7% for natural gas (Allcott and Kessler, 2015).

The reasons why consumers react to comparative feedbacks remain however very hard to precisely identify. Indeed, field experiments only observe easily measurable metrics (e.g. daily consumption) which only have a loose connection to the unknown utility functions of participants. As a consequence, field experiments usually lack the ability to make reliable welfare statements. To make things worse, comparative feedbacks may impose unobserved reputational costs and/or distort participants' choices.[5] To tackle these issues, Allcott and Kessler (2015) recently implemented a revealed preference approach, and notably found that a significant fraction of consumers are actually willing to pay positive amounts of money not to receive comparative feedbacks. While this work represents a big step forward, fully understanding the underlying mechanisms of participants' response to comparative feedbacks remains an open question.

In that perspective, lab experiments, thanks to the controlled environment they create, represent a useful and complementary approach. In particular, suitable designs may allow to focus on either the *normative channel* (update of agents' beliefs about the way their choices map into self or social esteem) or the *informative channel* (update of agents' beliefs about

[2] This channel supposes that agents can infer something from the average behavior in the population. For example some agents must be endowed with valuable private information.

[3] "*We do not yet know of a clean design to separate observational learning from the conformity effect*" (Cai et al., 2009, footnote [8]).

[4] Consumers initially behaving as desired may revert to a less "virtuous" behavior (boomerang effect, as in Schultz et al. (2007), Byrne et al. (2016)). Consumers at the other end of the distribution may develop strategies allowing them to ignore the feedbacks (excuses, discouragement, as in Beshears et al. (2011)). Finally, for a variety of reasons (Bayesian inference, morality, etc.), people may dismiss either the relevance (e.g. the sender of the feedback may lack credibility, as in Craig and Mccann, 1978; Roberts et al., 2004; Allcott, 2015) or the appropriateness (e.g. Ayres et al., 2009; Ferraro and Price, 2013; Costa and Kahn, 2013 report complaints from participants) of comparative feedbacks.

[5] In the framework by Bénabou and Tirole (2011) for example, peer pressure is modeled as a zero-sum game which ends up distorting people's choices.