CONTEXT-DEPENDENT SOCIAL COMPARISON FEEDBACK

Shutong He, Institute for Environmental Studies, Vrije Universiteit Amsterdam, +31(6)18 94 55 20, shutong.he@vu.nl
Julia Blasch, Institute for Environmental Studies, Vrije Universiteit Amsterdam, julia.blasch@vu.nl
Peter Robinson, Institute for Environmental Studies, Vrije Universiteit Amsterdam, peter.robinson@vu.nl
Pieter van Beukering, Institute for Environmental Studies, Vrije Universiteit Amsterdam, pieter.van.beukering@vu.nl

Overview

There is growing evidence that social comparison feedback, i.e., feedback on own behaviour in comparison to peer behaviour, expressing social norms, can encourage prosocial behaviour. The power of social comparison feedback on household energy conservation has been tested by numerous field experiments in the recent decade (e.g. Allcott & Rogers, 2014). Yet, the impact and the effectiveness of this intervention are found to be context-dependent. Despite the difference in pre-treatment energy consumption across sites and countries (Andor et al., 2020), other contextual factors such as the local physical environment and culturally-related psychological characteristics may also contribute to the observed heterogeneous treatment effects. Although field experiments provide realistic estimations of the effects of an intervention, they are less able to elicit individual-level characteristics due to organisational difficulties. Online laboratory experiments are a less costly alternative to field experiments, and are especially useful for investigating mechanisms of interventions. Based on evidence from a modified dictator game, this study tested the heterogeneous effects of two interventions, i.e. social comparison feedback and tangible emissions feedback, with a specific focus on the moderating effects of the contextual externality level and psychological traits such as norm-following tendency and competitive tendency.

Methods

We conducted an online laboratory experiment based on a modified dictator game in December 2021. Participants (N=360) were recruited from the online crowdworking platform *Prolific* (Palan & Schitter, 2018). This experiment has been pre-registered (see http://web.archive.org/web/20220222124203/https:/aspredicted.org/ve2ia.pdf).

In the multi-round modified dictator game (Eckel & Grossman, 1998), we implemented a 2 x 3 between-subjects design, varying in the level of externalities (low vs. high), and type of feedback information, i.e. self-feedback, social comparison feedback, and tangible emissions feedback. Social comparison feedback compared own purchase in the previous round to others' purchases. Tangible emissions feedback, on top of the social comparison, additionally relates the carbon emissions due to participant's decision to a daily activity and nature. The first five rounds were baseline rounds, where all participants received self-feedback. Round 6 to 10 were treated rounds, where participants received one of the three types of feedback before making their decisions.

In the modified dictator game, participants took the role of the dictator, allocating their endowments to purchase a virtual product to gain individual benefits at the cost of the recipient's benefits. The recipient in our context was the global environment, represented by a bundle of carbon-offset projects. In each round, participants were given an endowment of 100 points to make the purchase decision and were also endowed with carbon offsets of 100 kg. Every unit of the purchase cost 1 point and brought an individual payoff of 2 points. Every unit of purchase created environmental costs of 0.5 kg in the low-externality treatment and of 1 kg in the high-externality treatment. In addition to the main decision task, we measured participants' norm-following tendency in a separate incentivised task (Kimbrough & Vostroknutov, 2018), and elicited competitiveness tendency and other individual characteristics through a survey questionnaire.

To analyse the quantity of purchase, we applied the random-effects double hurdle model, in which the first hurdle determines whether a participant is a "selfish" type, i.e. one who uses up the entire endowment to purchase the virtual product in all rounds to maximise individual benefits. Given the participant does not maximise his/her own payoff, the second hurdle estimates the purchase amount, to understand the extent to which he/she would conserve the environment. In the following, we will focus on interpreting the results of the second hurdle. Additionally, random-effects ordered probit models were used to understand behavioural responses, i.e. whether participants increase, reduce, or keep the same purchase amount, in each treated round after receiving the feedback.

Results

In baseline rounds, the high-externality treatment leads to lower purchase amounts (b = -7.41, p = 0.05). Baseline purchase in the three feedback treatments is not significantly different.

As shown in Table 1, overall, the tangible emissions feedback reduced purchase amount by 6 units (b = -6.013, p = 0.016) compared to self-feedback. In the low-externality context, social comparison feedback leads to 7-unit fewer purchases compared to self-feedback. Furthermore, indicating carbon emissions in tangible forms can reduce purchase by 9 units. Yet, the average treatment effects of these two types of feedback do not significantly differ from each other (χ^2 (1) = 0.34, p = 0.56). Contrary to our expectation, in the high-externality context, social comparison feedback leads to even more purchases whereas tangible emissions feedback does not affect the purchase amount.

Table 1. Average treatment effects

Second hurdle	Full sample (N = 3600)		LOW (N=1800)		HIGH (N=1800)	
DV: purchase amount	Coef.	Std. err.	Coef.	Std. err.	Coef.	Std. err.
Social comparison * treated	0.049	(2.509)	-7.015*	(3.679)	6.572*	(3.388)
Tangible emissions * treated	-6.013**	(2.494)	-9.083**	(3.584)	-2.747	(3.445)

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. The main effects of treatments, individual traits, and demographics are controlled.

For the role of individual psychological traits, we interacted the two-way interaction further with norm-following tendency and competitiveness tendency, respectively. Results show that both norm-following tendency and competitiveness tendency moderate the effect of tangible emissions feedback (b = -8.017***, p = 0.009; -4.089*, p = 0.098). However, we do not find evidence of the moderating effects on social comparison feedback (b = -3.928, p = 0.193; b = -3.896, p = 0.119).

To better understand the observed distinction in different externality contexts, we investigate the behavioural responses, i.e. whether one decides to increase, decrease, or remain at the same purchase level, while accounting for different types of feedback, i.e. whether one's purchase is less than (positive feedback), more than (negative feedback), or equal to (neutral feedback) the others. In the low-externality context, the behavioural rebound is the weakest, and the purchase reduction probability in response to negative tangible emissions is the highest compared to all other feedback situations. In the high-externality context, the prominent behavioural rebound with positive social comparison feedback may explain the increase in the purchase. Moreover, we found that individual's competitiveness tendency, climate change concerns, and loss aversion propensity all encourage purchase reduction when one receives negative feedback. Nevertheless, these individual traits only have an effect in the low-externality context.

Conclusions

This study investigated the heterogeneous treatment effects of social comparison feedback in an online laboratory experiment, focusing on the moderating effects of externality level as an environmental factor and culturally-influenced personal traits. We find that, overall, relating the carbon emissions to daily activity and nature, i.e. the tangible emissions feedback, can increase the effectiveness of social comparison feedback. Also, we demonstrate a remarkable role of different externality levels, representing the environmental context, in both treatment effects and behavioural patterns. Furthermore, both conformity and competitiveness can boost the effect of social comparison feedback with tangible emissions information. Insights from this study can improve the understanding of social comparison feedback across sites and populations, thus facilitating the design of interventions in the future.

References

Allcott, H., & Rogers, T. (2014). The short-run and long-run effects of behavioral interventions: Experimental evidence from energy conservation. *American Economic Review, 104(10)*, 3003-37.

Andor, M. A., Gerster, A., Peters, J., & Schmidt, C. M. (2020). Social norms and energy conservation beyond the US. *Journal of Environmental Economics and Management, 103*, 102351.

Eckel, C. C. & Grossman, P. J. (1998). Are women less selfish than men?: Evidence from dictator experiments.*The Economic Journal, 108(448),* 726–735.

Kimbrough, E. O. and Vostroknutov, A. (2018). A portable method of eliciting respect for social norms. *Economics Letters, 168*:147–150.

Palan, S., & Schitter, C. (2018). Prolific. ac—A subject pool for online experiments. *Journal of Behavioral and Experimental Finance, 17*, 22-27.