# The Impact of Audience Size on Image Concerns: Evidence from a Dictator Game

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## Abstract

Can the mere presence of noninteractive observers motivate prosocial behavior? Are audience effects monotonic in the number of onlookers? The empirical literature provides mixed findings to these questions. We address them through clean experimental evidence from a modified dictator game involving an external, noninteractive audience of variable size. The simplicity of our design allows us to isolate audience effects from confounding features of experimental designs (the methodological moderators in Bradley et al., 2018).

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# Introduction

Do we behave more morally when we are being observed? The impact of observation on behaviour is one of the earliest questions in philosophical and then scientific inquiry. In Plato's *Republic,* Glaucon tells Socrates the tale of the Ring of Gyges which, by granting invisibility to those who wear it, challenges the morality of men by allowing them to defy laws and social norms whilst avoiding punishments and bad reputation. Socrates replies that the virtuous man is him who chooses not to wear the ring, spelling out the glaring moral intuition that moral behaviour should stem from intrinsic motives, rather than image concerns. Yet, most of us are not so virtuous, and Glaucon's insight that observability induces prosocial behaviour seems vindicated by empirical evidence: when more socially exposed, individuals tend to donate more to charities (Cañigueral & Hamilton, 2019) and churches (Soetevent, 2003), work harder for public goods (Filiz-Ozbay & Ozbay, 2014), become more productive (Falk & Ichino, 2006) and trustworthy in the eyes of others (Tadelis, 2007), are less likely to lie (Abeler et al., 2019; Dufwenberg & Dufwenberg, 2018; Fischbacher & Föllmi-Heusi, 2013) and are more likely to vote at elections (Gerber et al., 2008).

These effects of observability on prosocial behavior could stem from fear of punishment and retorsion, loss of social value as a partner for cooperative endeavors, or simply from an innate preference for being perceived as 'good', irrespective of potential future interactions. If good reputations have value *per se*, then inducing observability could help incentivize prosocial behavior in a range of social contexts where people have one-off, quasi-anonymous interactions. Understanding whether passive observation from noninteractive audiences can induce altruism then becomes crucial to learn about the role of moralistic emotions in decision-making and to assess the sort of evolutionary purpose they served.

Moreover, as a group of individuals, an audience may have features which interact with image concerns. For instance, the number of observers and characteristics and beliefs about what is appropriate to do in each context may shape the reputation one wishes to attain or the feature one may want to signal (d'Adda et al., 2020).

In this study, we use a simple experimental design to unequivocally investigate the following questions:

1. *Can the mere presence of anonymous, external noninteractive observers motivate prosocial behavior?*
2. *Are audience effects monotonic in the number of onlookers?*

These questions are not entirely novel, but the existing literature offers contrasting results, often polluted by confounding features of the experimental design employed or more subtle forms of social influence than exposure to a noninteractive, external audience (Bradley et al., 2018).

Indeed, the behavioural effects of a social presence were the subject of the very earliest experiment in Social Psychology: in 1898 Norman Triplett showed that children's performance in a bike race improved when competing against a counterpart as opposed to racing against the clock (Triplett, 1898). But not all social influences are alike. Zajonc (1965) crucially distinguished *social facilitation* between *audience effects*, coming from the presence of passive spectators, and *co-action effects*, arising from the presence of other individuals engaging in the same activity – the latter are better known in the Economics literature as *peer effects*. Subsequently, experimental evidence on social facilitation further showed that a watching audience influence students' performance in verbal tasks to a larger extent than the mere presence of others who are neither coactors nor observers (Cottrell et al., 1968). This pointed to the differential effects induced by the awareness of observers as active, watching agents, as opposed effects resulting by the mere presence of non-watching individuals.

However, the effects induced by observability from different types of audiences on behaviour – including those induced by peers, strategically relevant coplayers, or active, communicative audiences – are still often regarded as similar when studying audience effects and image concerns. This induces both theoretical and methodological confounders especially in designs assessing the impact of observability on prosocial behaviour (Bradley et al., 2018). In particular, if the subject of scientific inquiry are image concerns, more active and communicative audiences may confound results through verbal or nonverbal cues which may influence beliefs and expectations which elicit other valanced emotions such as guilt (Attanasi et al., 2019) or trust (Charness & Dufwenberg, 2006). An audience of coplayers may instead induce *peer effects* (Falk & Ichino, 2006) or behave as to indirectly influence the behaviour of others – for instance by trying to comply or establish a social norm (De Cremer & Barker, 2003) – or because of reciprocity (Rabin, 1993). Publicly revealing actions, as opposed to being individually observed by an audience, my further confound results as people tend to conform (both positively and negatively) to the most common or socially appropriate conduct when publicly observed (Andersson et al., 2020). These effects may differ from social image concerns about unobservable traits, yet manipulations studying the link between observability and altruism often fail to distinguish between the two (Andersson et al., 2020). Similarly, assigning monitoring roles to players may shape norms and expectations (as in Izuma et al., 2011) possibly inducing experimenter-demand effects by allowing subjects to presume what's being studied (Zizzo, 2010). Finally, the context where the social interaction takes place along with features of the observing audience or of the interactive task at hand may influence the reference group to which one wants to conform (Bernheim, 1994) or the sort of reputation valued by subjects (Attanasi et al., 2017)[3].

[3]In their experiment, Attanasi and his colleagues found that graduate students playing a public good game contribute significantly less when their actions and photos were shared with future participants from younger cohorts. The authors still attribute this behaviour to image concerns, positing that students wish to not be perceived as "suckers". In this case, audience characteristics (i.e., age) or the social environment may shape what students wanted to signal. Possibly, individuals manage their reputation in the eyes of different audiences strategically (Emler, 1990).

Consequently, experiments which study the effects of observability on prosocial behaviour often focus on different forms of social influence and reach apparently conflicting results (Bradley et al., 2018).

In order to minimize the risk of misattributing our results, we borrow Hamilton & Lind (2016)'s stark definition of *audience effects* as behavioural changes "caused by being observed by another person, or the belief that one is being observed [...] This requires [...] some level of awareness that the other is watching, that is, awareness of the perceptual state of the other". Accordingly, in our experimental design we try to cleanly induce observability in the most unconfounded way possibly by simply sharing terminal information about actions after they have been played, along with indirect identity information such as IDs (pseudo-observability), to anonymous, external audiences without strategic links with players.

In inducing observability in this way to study social-image concerns, we follow the methodology in Regner (2021), but our work significantly differs by his in relevant methodological and theoretical ways. First, in our experiment roles are preassigned and fixed, while Regner (2021) lets players rotate across all roles in 3 stages of the same game (Regner, 2021). While results where announced after at the end of the experiment, letting players subject play multiple roles may still confound the results. Second, we reduce the Dictator Game to a mini-Dictator Game, allowing Dictators to choose only between an unambiguously selfish and a fair allocation, with the benefit of diminishing the uncertainty around the social valence of the transfers. Finally, we study how image concerns may vary with the number of observers.

We also neatly define image concerns as concerns about "others' (terminal) beliefs about […] imperfectly observed *bad/good traits*", following Battigalli & Dufwenberg (2020) and consistently with both theories of impure altruism (Andreoni, 1990) and image signalling theories (Benabou & Tirole, 2006). Our model remains general, by simply extending the utility formulation from Battigalli and Dufwenberg to multiple players and allowing for heterogeneity in the individual parameters, meaning that one could care more about the opinion of some coplayers than others.

The extension to multiple players allows us make predictions and to investigate an understudied feature of image concerns: how the emotional valence of reputations varies with the number of observers holding some belief. Within our framework, if observers do affect behaviour, then the number of (identical) passive onlookers should be a relevant determinant of the resulting impact of audiences on prosocial behaviour.

Therefore, we develop and implement an experimental design to answer two nested questions on social influence in economic games through a mini-Dictator Game with external audience. The first is whether audience effects can induce prosocial behavior through image concerns. The second one is whether audience effects depend on the number of passive observers (the audience size).

Our main contribution then strands from pairing a clean definition of audience effects and image concerns with a stark experimental design with a minimal, neat manipulation, aimed at minimizing potential confounders and granting internal validity to our identification. We also test a *placebo task* based on a coordination game to assess the robustness of our findings. We thus provide novel and reliable evidence on size-dependent image concerns, and propose and test a related model within the existing theoretical framework from Battigalli & Dufwenberg (2020).

Providing reliable evidence on how a minimal intervention such as pseudo-observability from an external, noninteractive audience can induce prosocial behavior (and on how the audience's size mediates this effect) may then help design methodologically cleaner experiments. Our findings also have everyday implications in management practice, public policy, education, or social media discourse and could help incentivize prosocial behaviour on the international arena by informing on the effectiveness of punishment strategies such as the UN blame & shame policy.

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