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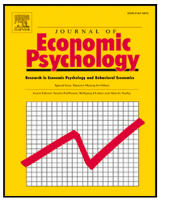

Brief report

Purely hedonic image concerns and audience size: Evidence from a charity dictator game☆

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ABSTRACT

We study whether image preferences in isolation from strategic considerations, namely *purely hedonic image concerns*, can motivate prosocial behavior and whether this audience effect is mediated by the number of observers. Answers to related questions from the extant experimental literature are often mixed or influenced by multiple mechanisms evoked by the context at hand or design employed. We employ an experiment involving a dictator game with a charity receiver and a binary choice with unambiguous social valence. Choices are observed by an anonymous, passive, and external audience whose size varies across treatments. Our simple experimental design allows us to isolate *purely hedonic image concerns* about appearing altruistic from strategic considerations and other confounding features of alternative designs. We find that donations rise by 10.2 percentage points on average when audiences are present, with every observer increasing the probability of donating by an estimated 2.12 percentage points. We provide evidence that the size of the audience also matters.

1. Introduction

Social image has been central to the evolution of human societies. Due to the adaptive value of upholding a good reputation, our well-being is affected by the opinions of others, including those of strangers whom we may never meet again. Following Bursztyn and Jensen (2017), we call these motivations *purely hedonic image concerns* to distinguish them from more instrumental reasons to care about our image. In turn, these motives shape our behavior as we try to project a desired image. Introspection suggests that the magnitude of this audience effect might depend on the number of observers, yet the empirical evidence on this is scarce. Moreover, the rise of social media has expanded the size of audiences while increasing the anonymity of both observers and those observed. These shifts call for a renewed study of whether and how observers can influence behavior in quasi-anonymous settings.

We employ an incentivized laboratory experiment involving a Charity Dictator Game with variable audience to address the following questions: (i) Can *purely hedonic image concerns* motivate prosocial behavior? (ii) Are audience effects increasing in the

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number of onlookers? We address question (i) by employing an unambiguous social context with an anonymous, external, and passive audience. Here, *anonymous* means that the identity of the audience is unknown to active players, *external* means that it has a fixed payoff regardless of the outcome of the interaction it observes, and *passive* means that it cannot communicate and is always inactive. Under these conditions, the audience influences the interaction only via the active player's desire to improve her image. The strength of this desire may then depend on the number of observers (Bénabou & Tirole, 2006). We address question (ii) by varying the audience size across treatments. Our main novelty comes from studying how the size of the audience shapes the magnitude of image concerns. This relationship is not obvious, for example Goette and Tripodi (2024) show theoretically how visibility may backfire for blood donations.

Our contribution stems from isolating and identifying *purely hedonic image concerns* as a mechanism for the effect of social influences on altruism in an unambiguous setting. To our knowledge, this is also the first study to exogenously manipulate the size of an audience, experimentally showing how image concerns can increase in the number of observers. We find that even for small audiences (of 2 or 7 people), the presence and number of observers influences prosocial behavior. On average, every audience member is associated with a 2.12 percentage points increase in the probability of donating from the baseline without audience.

This work relates to the literature on social image (see section 3.4 of Fehr and Charness (2023) for a summary). While a meta-analysis of the experimental evidence by Bradley et al. (2018) finds that observability often increases prosociality, it also highlights conflicting results which they attribute to the "inclusion or omission of theoretical design features". These can be the actual presence, anonymity, and role of observers or how observability is implemented. Relatedly, the review of field experiments on social image by Bursztyn and Jensen (2017) highlights how researchers may have overlooked the mechanisms behind the observability-prosociality link, such as what information agents wish to signal. We address these concerns through a simple design motivated by a theoretical framework aimed at isolating *purely hedonic image concerns* for appearing altruistic.

Observation can also have context-dependent consequences, as social environments often shape the signal stemming from an action. Attanasi et al. (2024) and Dufwenberg and Muren (2006) found that undergraduate Economics students behaved *less* prosocially when their choices were observed by fellow students. This surprising result may be due to the students' desire to appear smart or to conform to the "standard" predictions they have been exposed to during their Microeconomics classes. Alternatively, coplayers who are peers and classmates may inadvertently introduce competitive framings where players feel excused to behave selfishly (Dana et al., 2007). As argued by Bursztyn and Jensen (2017), introducing observability in different forms and settings may induce mixed or ambiguous signals, affecting the underlying mechanism. To isolate preferences for appearing altruistic from alternative image motives, our experiment employs a charity coplayer and a dichotomous choice, thereby inducing an unambiguous context where actions are a clear signal for altruism alone.

Many studies also adopt audiences of coplayers or peers (participants involved in the same task) who may elicit other-regarding preferences, conformity, or be strategically relevant in subtle ways. For instance, players may be inequity-averse or feel guilty when their actions reduce the payoff of other players, including the audience. An audience of coplayers could also prompt players to behave so as to influence the behavior of others. For instance, by eliciting their reciprocity or by trying to reinforce or establish a social norm (De Cremer & Barker, 2003; Schram & Charness, 2015). Thus, we employ an external and passive audience and a charity coplayer to rule out any influence from these alternative preferences and strategic considerations. By doing so, we also contribute methodologically to the literature on using dictator games to study charitable giving (Cartwright & Thompson, 2023; Vranka & Houdek, 2024) and social image (for which they well-suited, see Zizzo (2013)).

How observability is introduced matters too. Actual observers may differ from passive or "perceived" ones (Bradley et al., 2018), and whether pictures or other identity information is shared with the observers may also influence the observability-prosociality link (as in Janas and Jordan (2024)). We employ actual observers and share alphanumeric IDs to induce *pseudo-observability* (Bradley et al., 2018). This is a conservative choice which ensures the strategic irrelevance of observers, also outside the laboratory.

Additionally, publicly revealing choices to all participants, as opposed to being individually observed by an external audience, exposes both audience and decision-maker to all choices, and may elicit more than just preferences for appearing altruistic. For instance, when publicly observed people tend to conform to the most common or socially appropriate conduct (Braghieri, 2024; Invernizzi et al., 2021), misreport private information (Ewers & Zimmermann, 2015), and are averse to standing out (Jones & Linardi, 2014; Raihani, 2014). We thus only reveal choices to a designated group of observers.

The rest of this work is as follows: Section 2 describes the experimental design; Section 3 presents the results; Section 4 concludes. The Online Appendix includes experimental materials, additional tables, robustness checks, and extensions.

2. Empirical framework

We study *purely hedonic image concerns* through a laboratory experiment involving human subjects playing a *Charity Dictator mini-Game with External Audience*, a Charity Dictator Game (Eckel & Grossman, 1996) modified to induce an unambiguous social context where actions are a clear signal for altruism. The experiment was carried out at the Bocconi Experimental Laboratory for the Social Sciences (BELSS) and was approved by Bocconi University's Ethics Committee Review board. The data were collected and handled in compliance with the European General Data Protection Regulation (GDPR, 2016/679). Design and analysis plan have been pre-registered on OSF and can be consulted at https://osf.io/yfhdp. Our data and codes for the replication are available at https://osf.io/s48ve.

2.1. Experimental design

We adopt a between-subjects design with three treatments, implemented at the level of an experimental session, where we manipulate the number of observers. The baseline treatment involves an active role, a charitable organization, and no audience. Active players can choose how to distribute a fixed endowment of €10 between themselves and the charity. Their choice is limited to an equal *share* of €5 each or *keep*ing €9 to leave the charity with €1. We employed neutral wording throughout the experiment by letting participant choose between "allocation" options. Compared to interactions with human co-players and a larger choice set, this setup implicitly presents a choice between an unambiguously more selfish action and an altruistic one – namely, a social dilemma. This binary contrast allows us to minimize the uncertainty over the prosocial valence of actions, reducing the noise around the signal resulting from a choice. While this may also matter for one's self-image (Grossman & Van der Weele, 2017; Ploner & Regner, 2013), these motives are constant across treatments and do not affect our estimates of audience effects.

Audience treatments. Our treatments consist in the introduction of a passive audience with no monetary stake in the outcome of the interaction. We employ two intensity levels for this treatment: one with an audience of 2 observers and another with 7. Regardless of what players do, all observers earn €7 and are inactive, making them irrelevant for both strategic and other-regarding considerations.

In sessions where the audience is present, Dictators' allocation choices, along with their alphanumeric ID, are shared with a group of either 2 or 7 passive participants in the laboratory. Any other subject-specific details, such as their name or cubicle number, are not shared with the audience. This induces what Bradley et al. (2018) defined as *pseudo-observability*. Similarly, active players only know the audience's size, but lack any knowledge about other characteristics of the observers. All subjects are made aware of this information structure. This minimal manipulation takes a conservative approach to observability while ensuring that observers are truly strategically irrelevant, also outside the laboratory.

Procedures. The experiment took place in April and October 2023 and involved 270 students from Bocconi University. It was programmed and administered using oTree (Chen et al., 2016) and participants were recruited through the BELSS's SONA recruitment system. The experiment lasted less than 30 min and subjects earned either €5, €7, or €9. Payments were carried out via Amazon gift cards. Instructions were read aloud and then displayed on all monitors. Following the decision-making phase, participants completed a brief questionnaire on their basic demographic characteristics.

The experiment consisted of a total of 10 sessions within which all participants were assigned to the same treatment. Roles were assigned randomly. It was conducted over three days, each featuring all 3 treatments of which we varied the timing (morning, noon, or afternoon). Out of the total 270 subjects involved, 236 played the active role while 34 played as observers. The baseline treatment without audience was played by 81 active players. The one with an audience of 2 involved 75 active players, while the treatment with an audience of 7 involved 80 active players.

To avoid confounding our result with idiosyncratic preferences over specific charities, subjects played 5 rounds under an absolute stranger matching protocol involving all 5 charitable organizations. That is, their donation choice involved a different charity every round, but they were unaware of which charity they were interacting with at any given moment. One round was selected for payments, preserving the high stakes of the choice. Such repetition with randomized payment scheme does not significantly affect behavior in Dictator Games (Umer, 2023).

This repetition also helps to reduce the noisiness which characterizes experimental data (Hey, 2001), producing more accurate estimates in a panel-data framework for a given sample size. Subjects assigned to the audience role observed all choice outcomes after every round, while active players were not informed about the choices of other participants. Active players were informed about the number of subjects observing their allocation decision both in the instructions and through the decision interface. To avoid nudging participants in the baseline treatment towards selfish behavior, they were not explicitly told that they were *not* being observed.

Finally, to further prevent interference from personal preferences over charitable causes or controversies surrounding prominent organizations, we selected a group of five minor charities as recipients for the donations. They operate in the area of healthcare, elderly care, support for people with disabilities, and youth promotion and engagement.

Theoretical background: Concerns about good traits. The experimental design is driven by a simple adaptation of the model for image concerns as "*opinions about good/bad traits*" in Battigalli and Dufwenberg (2022) to a dichotomous donation choice observed by an anonymous and strategically irrelevant audience. Here, agents are assumed to care about others' expectations of their intrinsic motivation to donate to the charity, a desirable private trait. Since we isolated this preference from instrumental incentives, agents have *purely hedonic* preferences for "good" reputations.

Then, acknowledging their actions as signals for the desirable private trait, even selfish participants may donate – provided that they care enough about others' opinion of them to pay a monetary cost to improve their image. Finally, if this image reward is additive over multiple observers, *ceteris paribus* the incentive to *share* is increasing in their number, yielding *size-dependent image concerns*.

2.2. Testable hypotheses

A participant chooses between *sharing* a €10 endowment equally with a charity or *keeping* €9 to only donate €1. This dichotomous choice may be observed by an Audience of variable size and is unambiguously a reliable signal for altruism. Choices then induce a trade-off between a monetary payoff and a better image. We posit the following hypotheses:

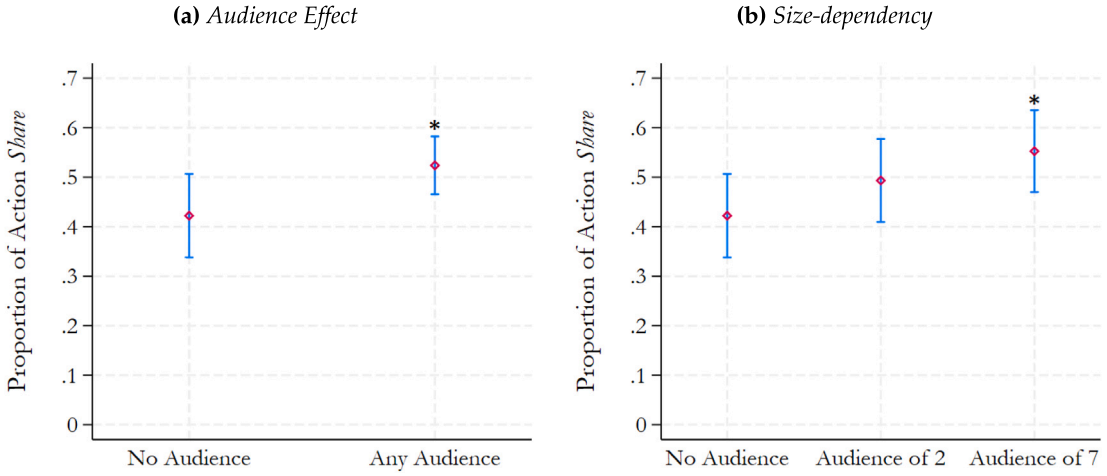

Fig. 1. Frequency of action *share* by treatment. *Note*: 95% Confidence Intervals computed on individual averages across all rounds. Stars report the statistical significance of a ttest on the equality of the mean relative to the No Audience group. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Hypothesis 1. The proportion of participants choosing to *share* is larger when an Audience is present.

Hypothesis 2. The proportion of participants choosing to *share* is larger in groups observed by a larger audience.

We refer to Hypothesis 1 as *audience effects* under *purely hedonic image concerns*, while to Hypothesis 2 as *size-dependent image concerns*, which is the main novelty of this work.

3. Results

We report our results both grouping the two audience treatments under an "Any Audience" category, to test Hypothesis 1 on *purely hedonic image concerns*, or keeping all treatments separate to test *size-dependency* from Hypothesis 2. When performing t-tests or plotting confidence intervals on means by treatment group, these are always computed using the dataset collapsed to the average choice across all 5 rounds by participant (so, using one data-point per subject). We also assume equal variances throughout, as the variance of the donation choice is not statistically different for all the pairwise comparisons between groups, see Table B.2 of the Online Appendix.

3.1. Preliminary analysis

Using simple means-comparisons, we found solid evidence in favor of *Audience Effects* and qualitative evidence on *size-dependency*. Fig. 1 reports the frequency of action *share* by treatment assignment. From Panel (a) notice how from 0.422 in sessions without an audience, this fraction rises to 0.524 when some audience was present. This difference amounts to a 10.2 percentage points (p.p.), or 24.2%, increase and is significant at the 5% level (p-value of 0.048 on the two-sided hypothesis test). This is consistent with Hypothesis 1 on *purely hedonic image concerns*.

In line with Hypothesis 2 on *size-dependency*, Panel (b) of Fig. 1 shows an increasing trend in the number of observers. Notably, this ranking across treatments is consistent within all 5 rounds, as reported in Section D.2 of the Online Appendix. Moreover, when comparing treatment groups separately, only the Audience of 7 is significantly different from the No Audience (+13 p.p., p-value of 0.030). For the Audience of 2, this difference is insignificant (+5.9 p.p., p-value of 0.236). The two audience treatments are not statistically distinguishable (+7.1 p.p. rise from 2 to 7 observers, p-value of 0.319). Yet, since conceptually the number of observers is a numerical variable, in Section 3.2 we study it as such within a Probit regression framework.

Gender heterogeneity. These group comparisons are even starker when we disaggregate average choices by participants' self-reported gender, the main determinant of a subject's donation decision in our experiment: on average, across all treatments men donated 19 p.p. less than women did, making the latter 1.5 times more likely to *share*. This difference is significant at the 0.1% level using a two sided t-test on individual-level averages (p-value < 0.001). This is consistent with the findings from Bilén et al.'s (2021) meta-analysis of Dictator Games, which shows that women tend to share more than men and that this gap widens when the recipient is a charity. Bilén et al. (2021) discuss this gender differential in light of the finding by Falk et al. (2018) that women are more generous than men and suggest that a charity coplayer might make choices more related to altruism. In our experiment this gender difference may be intensified by the selection of charities focused on caring for the elderly, young, or impaired – areas where gendered social categories assign a greater responsibility to women. This could create an identity cost for women who deviate from

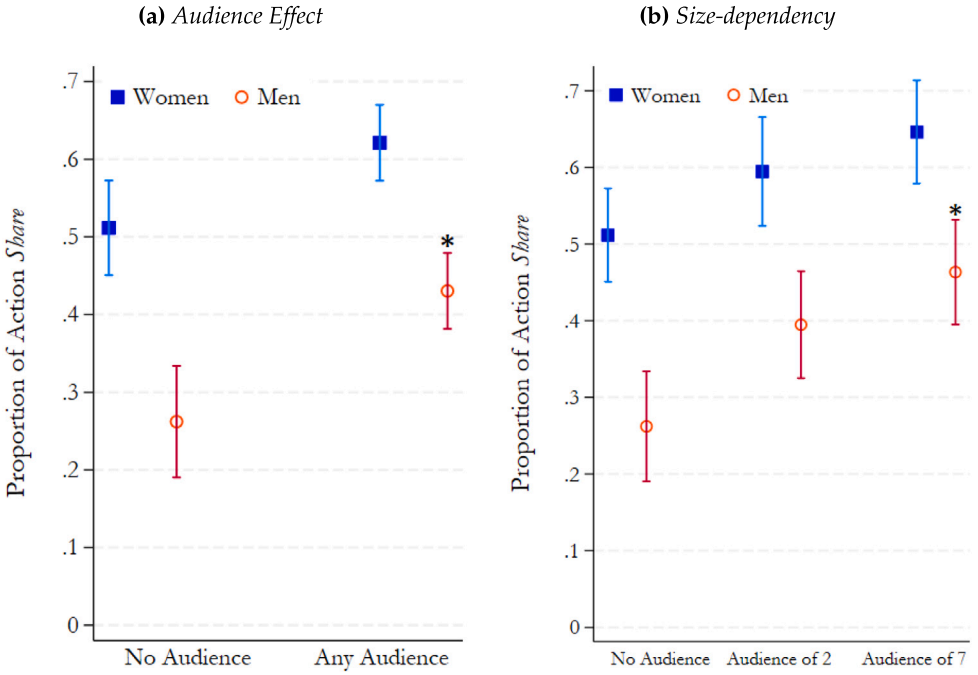

Fig. 2. Frequency of action *share* by gender and treatment. *Note*: 95% Confidence Intervals computed on individual averages across all rounds. Stars report the statistical significance of a ttest on the equality of the mean relative to the No Audience group. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

socially prescribed behavior, even when choices are private (Akerlof & Kranton, 2000). Gendered expectations, which are present in dictator games (Austermann et al., 2024), may also play a role.

Because the gender composition of the samples is not well balanced across treatments (difference significant at the 5% level for the Audience of 7 vs. No Audience, see Table B.1 of the Online Appendix), these differences could confound the preliminary results observed from a simple test of means-comparison. Notably, because there are more men than women in treated sessions, this imbalance makes it *more* difficult to find evidence in favor of audience effects before conditioning on the participants' gender, favoring the null of no treatment effects. Thus, in Section 3.2 we estimate treatment effects conditioning for gender within a Probit regression framework.

Fig. 2 outlines the difference in the proportion choice *share* between men and women. From panel (a) we note that only men experience a significant increase in the fraction of *shares* when an audience is introduced. While the higher baseline share of donations for women is in line with the extant literature, we do not find that women tend to respond more to social cues and image concerns. This is in line with some previous results (Buser et al., 2021; Dufwenberg & Muren, 2006) but in contrast with others (Croson & Gneezy, 2009; DellaVigna et al., 2013), showing how results on this matter are highly inconsistent and should be interpreted with caution. Panel (b) shows that the increasing trend in the audience's size from Fig. 1 is preserved within genders: the frequency of *shares* rises as the audience gets larger.

3.2. Regression analysis

We study the dichotomous choice in the Charity Dictator mini-Game in a nonlinear probabilistic framework by estimating a Probit regression in the number of observers. Since participants played 5 rounds, we employ a random-effects estimator to control for unobserved heterogeneity at the individual level and heteroskedasticity-consistent standard errors clustered at the individual level to allow for serial-correlation between individual choices across rounds (Cameron & Miller, 2015).

Table 1 shows the marginal effects derived from the estimates of the Probit regression under different specifications, where our main variable of interest, "Audience Size", stands for the number of observers. Its estimated impact on the probability of *sharing* is positive and significant at the 5% level across all specifications.

Since gender is the main predictor of a participant's choice and it is slightly unbalanced across treatments, we adopt column (2), where the analysis is only conditioned on gender, as our main specification. There, compared to column (1), both significance and magnitude of the estimate for Audience Size increase. The estimated marginal impact of each observer on the probability of playing *share* is a 2.1 p.p. increase (a 5.0% rise from the baseline of 0.422 without observers). Saturating the model with the number of previous experiments and year and field of study leaves the estimate on Audience Size reassuringly unchanged in magnitude and significance (see column 4). Finally, these results are robust to including round-fixed effects (column 5) to account for the possibility that observers induce differential trends over time.

Table 1
Probit random-effects estimator.

	(1)	(2)	(3)	(4)	(5)
	Dependent variable: choose action *Share*				
Audience size	0.0176*	0.0212**	0.0197*	0.0190*	0.0190*
	(0.0081)	(0.0078)	(0.0078)	(0.0079)	(0.0079)
Man		−0.2080***	−0.2086***	−0.2106***	−0.2106***
		(0.0436)	(0.0434)	(0.0453)	(0.0453)
# of experiments			0.0143	0.0096	0.0096
			(0.0090)	(0.0094)	(0.0094)
Year of study				0.0295	0.0294
				(0.0181)	(0.0181)
Field of study controls	No	No	No	Yes	Yes
Round FE	No	No	No	No	Yes
Observations	1180	1180	1180	1180	1180
# of individuals	236	236	236	236	236
Avg. share in control	0.4222	0.4222	0.4222	0.4222	0.4222

Note: Marginal effects at mean. Robust standard errors clustered at the individual level in parentheses.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

In Section D.1 of the Online Appendix we reproduce this estimation using treatment dummies (see Table D.1). There, after controlling for gender, (see column 7), only the treatment with 7 observers is statistically different from the group with no observers (p-value of 0.004), while the audience of 2 is not (p-value of 0.071). The presence of an audience of any size significantly increases the probability of *sharing* (p-value of 0.006, see column 2).

Overall, we interpret this as evidence that *purely hedonic image concerns* are an important human drive. Even for small audiences and mild forms of observability, beyond the presence of an audience, we also find preliminary evidence that the *number* of observers shapes the magnitude of image concerns.

Robustness. Section C of the Online Appendix shows that the results presented are highly consistent across alternative model specifications. All pairwise comparisons between the treatment groups reported are robust to adopting using the Mann–Whitney–Wilcoxon test instead of a two-sided t-test, see Table C.1. Our main findings from the regression analysis are robust to adopting a Logistic regression (Table C.2), a linear probability model (Table C.3), using an OLS estimator on the cross-sectional dataset of average choices over the 5 rounds for each individual (Table C.4), and clustering standard errors at the level of the experimental session (see Table C.5).

4. Conclusions

In this work, we explored *purely hedonic image concerns* for appearing altruistic in the context of a passive, external, and anonymous audience of variable size. Through an experiment employing a Dictator Game with dichotomous choice, a charity recipient, and an audience, we provided and discussed novel evidence on the topic. We found that an anonymous, external, and passive audience increases the proportion of individuals who share their endowment with a charity by 10.2 p.p. (around 24.2%), thereby promoting prosocial behavior exclusively via *purely hedonic image concerns*. We also observed an increasing pattern between the likelihood of sharing the endowment with the charity and the size of an audience of either 0, 2, or 7 observers. According to our main specification, every additional observer increased the probability of sharing with the charity by an average of 2.1 p.p. (or 5.0%) within this interval. Together, these results support our thesis on *size-dependent image concerns* among the audiences tested in the experiment.

This work gains special relevance in the context of online charity campaigns. As viral content increases the size of a quasi-anonymous audience, our results may also help explain the effectiveness of charity fundraising on online or on social media (Fazio et al., 2023; Van der Linden, 2017; Zylbersztejn et al., 2024). We also highlighted the role of *purely hedonic image concerns* and how alternative mechanisms may shape the observability-prosociality link, especially in light of conflicting results (e.g., Agerström et al. 2016, Meyer and Tripodi 2021) and evidence of crowding-out (Ariely et al., 2009; Goette & Tripodi, 2020, 2024; Müller & Rau, 2020).

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.joep.2025.102798.

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