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Gossip or confrontation? Sanctioning environmental norm violations and the reputation of punishers☆

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ABSTRACT

Prior research has shown that peer punishment can promote norm adherence, but people's perceptions of whether and how environmentally harmful behaviors should be sanctioned remain underexplored. Shedding light on this question is important because normative consensus regarding environmental behaviors varies considerably, from strong and widely shared norms to weak or absent norms. Study 1 documents this normative variation by mapping norm perceptions across 18 environmentally friendly and harmful behaviors. Studies 2 and 3 examine the perceived appropriateness of different informal sanctions (i.e., gossip, exclusion, and confrontation) against environmentally harmful behaviors seen as norm violations. Further, we test how these sanctions affect punishers' reputation across several dimensions (i.e., warmth, morality, competence, and aggressiveness), as well as third parties' decisions to trust punishers. Results conceptually replicate previous work in the environmental domain by showing that more severe environmental norm violations led to higher perceived appropriateness of informal sanctions. Extending previous work, we also found that (1) gossip was perceived as the most appropriate informal sanction for moderate violations, while confrontation was perceived as most appropriate for severe violations, and that (2) punishers who confronted environmental norm breakers received a more favorable reputation and greater trust compared to those who responded with gossip or exclusion. This research suggests that informal sanctions are appropriate methods for addressing environmental norm violations, and their reputational consequences depend on the type of sanction used.

Environmental protection represents a social dilemma where short–term self–interest often conflicts with longer–term collective interests (Gifford, 2011; Van Lange & Rand, 2022). Growing awareness of environmental issues has led to the documented effectiveness of environmental norms in domains such as energy consumption (Schultz, Estrada, Schmitt, Sokoloski, & Silva-Send, 2015) and fostering sustainable transportation (Kormos, Gifford, & Brown, 2015). In practice, however, the social dilemma of environmental protection persists across diverse environmentally relevant behaviors in our daily lives, ranging from low–cost actions like recycling household waste and reducing water consumption to high–cost behaviors such as reducing air travel or investing in household energy systems (Nielsen, Nicholas, Creutzig, Dietz, & Stern, 2021; Truelove, Carrico, Weber, Raimi, & Vandenbergh, 2014; Whitmarsh, 2009). When people witness such behaviors that harm the environment, they face a choice: should they intervene, and if so, how? Understanding how people respond to environmental norm violations through sanctioning behaviors has crucial implications for environmental protection and social cooperation.

Research has documented that people commonly respond to norm violations through various forms of sanctions (Balafoutas, Nikiforakis, & Rockenbach, 2014), and may do so directly, for example via confrontation, or more indirectly, via social exclusion or gossip (Molho, Tybur, Van Lange, & Balliet, 2020). Such direct and indirect sanctions are important for the maintenance of group order (Feinberg, Willer, & Schultz, 2014) and the safeguarding of collective interests (Eriksson et al., 2021). However, those who sanction others may face mixed social evaluations. They may be viewed as trustworthy advocates for collective interests (Barclay, 2006; Jordan, Hoffman, Bloom, & Rand, 2016;

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Raihani & Bshary, 2015) or as aggressive or selfish punishers (Constantino et al., 2022; Eriksson, Andersson, & Strimling, 2016; Raihani & Power, 2021).

Understanding the appropriateness and reputational consequences of sanctioning in the environmental domain is crucial, given that the stakes for collective welfare are especially high (Van Lange, Joireman, & Milinski, 2018). Indeed, a considerable proportion of citizens are not indifferent to violations like littering (Gangl, Walter, & Van Lange, 2022). And in the era of climate change, at least some people care about wasting clean water and might be ready to enforce this norm (Seyranian, Sinatra, & Polikoff, 2015). However, the environmental domain is of particular interest because, while some pro-environmental behaviors appear normative, others are characterized by ambiguous or conflicting norms—such as whether flying or taking the train is perceived as the normative choice. Such norm ambiguity may have important consequences for how enforcement is perceived and for the reputation of those who enforce. Therefore, the first goal of our research is to systematically document norm perceptions across a diverse range of environmental behaviors. By capturing this variation through a bottom-up, descriptive approach, we provide a foundational understanding of prevailing environmental norms, helping better understand public views on environmental behaviors across different domains.

1. Norm violations and informal sanctions

People often resort to informal sanctions (e.g., gossip, social exclusion, and confrontation) when facing norm violations (Molho et al., 2020). The flexibility of these sanctions enables their implementation across diverse social contexts, distinguishing them from formal regulations (Balliet, Mulder, & Van Lange, 2011). Existing studies have demonstrated that peer confrontation can reduce environmentally harmful behaviors (Steentjes, Kurz, Barreto, & Morton, 2017; Swim & Bloodhart, 2013) and that people often ostracize group members who violate norms that benefit collective interests (Rudert, Möring, Kenntemich, & Büttner, 2023). These findings highlight the potential effectiveness of informal sanctions as a useful mechanism for reducing norm violations also in the environmental domain.

Prior research has further proposed that the severity of norm violations may influence the perceived appropriateness of informal sanctions (Eriksson et al., 2021; Henrich et al., 2006; Molho et al., 2020). Research by Molho et al. (2020) reveals that as norm violations become more severe, people are more motivated to sanction them especially via gossip and social exclusion, rather than direct confrontation. Additionally, Eriksson et al. (2021) demonstrated that the perceived appropriateness of informal sanctions increases with the severity of norm violations, although cross–cultural variations exist in which sanctioning response is perceived as most appropriate. Our second goal was to conceptually replicate these findings in the environmental domain by testing the hypothesis that: *As the severity of environmental norm violations increases, informal sanctions will be perceived as more appropriate* (*Hypothesis 1*).

Furthermore, some informal sanctions may be perceived as more appropriate than others when addressing environmental norm violations. Prior research suggests gossip is rated as more appropriate than confrontation and social ostracism (Eriksson et al., 2021). This preference for gossip may stem from the perceived risk of retaliation associated with confrontation (Nikiforakis, 2008), as reputation–based approaches like gossip and exclusion can help avoid direct retaliation (Molho & Wu, 2021). However, compared to gossip, social exclusion may damage interaction opportunities and weaken social ties (Loschelder, Siepelmeyer, Fischer, & Rubel, 2019; Molho et al., 2020), so that the perceived costs for punishers of engaging in exclusion may be higher than those of gossip. Our third goal was to conceptually replicate these findings in the environmental domain by testing the hypothesis that: *Gossip will be perceived as a more appropriate sanction against environmental norm violations relative to exclusion and confrontation* (*Hypothesis 2*).

However, the preference for gossip over confrontation may not hold uniformly across all levels of violation severity. Eriksson, Andersson, and Strimling (2017) examined how various social factors influence evaluations of peer punishment using vignettes depicting norm violations across multiple domains (e.g., littering, taking excess cake, and line-jumping). They found that as violation severity increased, confrontation (i.e., reprimand in their study) was viewed as more appropriate, and that the negative reputational effect of showing anger disappeared for severe violations. However, these findings were based on a limited set of general social violations, with only one environmental behavior (i.e., littering). Our fourth goal was to conceptually replicate this finding using a much broader set of diverse environmentally harmful behaviors. We did not pre-register this prediction, but based on Eriksson et al. (2017), we tested the additional possibility that *Confrontation will be perceived as a more appropriate sanction, specifically when environmental norm violations are highly inappropriate.*

Moreover, environmental behaviors vary considerably in normative consensus, from universally condemned behaviors (e.g., littering) to contested domains where norms are still emerging (consumption choices, dietary patterns; Sparkman & Walton, 2017). This means that the relationship between violation severity and sanctioning appropriateness may be more variable when normative consensus is weak, requiring systematic investigation across diverse behaviors. Finally, enforcing norms in a domain characterized by such ambiguity may affect distinct reputational dimensions differently. Sanctioning an ambiguous environmental violation may signal moral commitment while simultaneously risking perceptions of excessive interference.

2. Reputation

Studies on the reputational consequences of sanctioning norm violations show mixed results. Some studies suggest that people gain reputational benefits by punishing free riders (Barclay, 2006; Jordan et al., 2016), while other studies show that punishers do not receive such benefits. For example, sometimes punishment may be viewed negatively when the punishers' actions are perceived as disproportionate to the violation (Eriksson et al., 2016). Punishers may suffer reputational costs when others attribute their punitive actions to selfish motivations rather than norm enforcement (Raihani & Bshary, 2015). However, these studies primarily examined punishers' reputations in generic prosocial contexts, typically using standardized economic games such as public goods games. Our research aims to focus on more specific and ecologically valid environmental scenarios.

Furthermore, divergent results on the reputational consequences of punishment may be due to different evaluative dimensions. When studies measure trustworthiness, punishers are often seen as members of the prosocial group and are perceived as more trustworthy (Jordan et al., 2016; Li et al., 2018). Conversely, when studies focus on the hostile or aggressive dimension, those who use harsh sanctions are often negatively evaluated and seen as angry or hostile (Eriksson et al., 2016). Here, we aim to integrate these disparate findings by examining punishers' reputations across multiple evaluative dimensions simultaneously. In addition to the trust dimension, we measure punishers' reputations based on key dimensions of person perception and traits evaluated in norm enforcement research (Eriksson et al., 2016; Fiske, Cuddy, Glick, & Xu, 2002; Leach, Ellemers, & Barreto, 2007), including warmth, morality, competence, and aggressiveness.

These dimensions capture theoretically distinct aspects of how people evaluate punishers. For example, the warmth-competence framework (Fiske et al., 2002) is associated with the classic distinction between perceived intentions (warmth) and perceived ability (competence). Sanctioning behavior may create a trade-off between these dimensions, as effective norm enforcement might signal competence but reduce perceived warmth. Morality specifically taps into whether the punishers are viewed as principled and fair—a critical dimension for legitimizing punishment (Goodwin, 2015). Aggressiveness captures

concerns about excessive or hostile enforcement (Eriksson et al., 2016), which may undermine punishers' reputation despite maintaining norms. Finally, trust integrates these evaluations into a behavioral prediction: would observers be willing to cooperate with this punisher in the future? By measuring across these dimensions, we can identify whether informal sanctions that target norm violations nevertheless damage punishers' reputation, or whether certain sanction types avoid these reputational costs.

Different types of informal sanctions elicit different reputational consequences. As a more indirect approach, gossip may elicit fewer negative reactions compared to direct confrontation. Gossip serves not only to disseminate information but also promotes cooperation by revealing social norms within groups and forming expectations about others' behaviors (Dores Cruz, Nieper, Testori, Martinescu, & Beersma, 2021). Similar to gossip, exclusion can also be used to promote group cooperation (Feinberg et al., 2014). For example, Rudert et al. (2023) found that most exclusion decisions of group members are aimed at achieving group goals. In contrast, confrontation often triggers perceptions of hostility (Nikiforakis, 2008) and leads to more negative impressions, with confronters being perceived as aggressive and self–interested (Eriksson et al., 2016). These findings indicate that gossip may lead to better reputations rather than social exclusion and confrontation. Therefore, our fifth goal was to test the novel hypothesis that *Punishers will receive better reputations when using gossip compared to social exclusion and confrontation* (*Hypothesis 3*).

3. Research overview and hypotheses

The current research includes three studies. Study 1 documented norm perceptions across six domains of environmental behaviors, establishing which behaviors are clearly perceived as norm violations and which ones are normatively ambiguous. Building on these findings, Studies 2 and 3 examined the relationship between the severity of environmental norm violations and the appropriateness of informal sanctions (gossip, social exclusion, and confrontation), as well as the punishers' reputations.

In Study 1, we conducted a descriptive study to provide validated environmental scenarios. Beyond its methodological function, this descriptive approach also holds independent value by documenting lay perceptions of environmental norms (see Hofmann & Grigoryan, 2023, on the value of descriptive research). We developed a comprehensive scenario pool tapping both environmentally friendly and harmful behaviors. Then, we measured four types of outcomes (Bicchieri, 2005; Cialdini, Reno, & Kallgren, 1990): (1) own adherence: personal compliance with environmental behaviors; (2) personal norms: own perceptions of the appropriateness of environmental behaviors; (3) descriptive norms: empirical expectations of how many others adhere to environmental behaviors; and (4) injunctive norms: normative expectations of how many others consider it appropriate to engage in environmental behaviors.

Study 2 aimed to examine the impact of the severity of norm violations on the perceived appropriateness of informal sanctions while further assessing the generalizability of the scenario pool by using the same 22 scenarios in a different country—the UK (compared to the Netherlands in Study 1). In Study 3, we further used a mixed experimental design to manipulate the norm violation severity and sanction types, followed by measuring the appropriateness of informal sanctions and punishers' reputations. We hypothesized that (1) as the severity of environmental norm violations increases, informal sanctions will be perceived as more appropriate; (2) gossip will be perceived as a more appropriate sanction against environmental norm violations relative to exclusion and confrontation; and (3) that punishers will receive better reputations when using gossip compared to social exclusion and confrontation. While we did not include directional hypotheses in our pre-registration (see Open Practices), the hypotheses listed above are well-founded in the literature and represent conceptual replications of previous findings in the environmental domain.

Overall, our research makes several contributions: (a) systematically documenting norm perceptions across diverse environmental behaviors, revealing variation in normative consensus, (b) testing whether established patterns regarding the relationship between violation severity and sanctioning appropriateness (Eriksson et al., 2017, 2021) and the preference for gossip as a sanction (Eriksson et al., 2021) generalize to the environmental domain, and (c) providing a novel and comprehensive assessment of punishers' reputations across multiple dimensions (warmth, morality, competence, aggressiveness, and trust), grounded in the literature on impression formation (Fiske & Tamir, 2025), moral judgment (Vaz, Mata, & Critcher, 2026), and trust and cooperation (Van Lange, 2025).

4. Study 1

4.1. Method

4.1.1. Participants

Participants were recruited via Prolific in July 2024 and received £2.25 for their participation. Since Study 1 focused on people's perceptions of environmental norm violations, we made no a priori assumptions about the response distribution. Consistent with previous research (Eriksson, Strimling, & Vartanova, 2023; Vartanova, Eriksson, Hazin, & Strimling, 2021), we aimed to collect 100 ratings per behavior to capture variation. After considering questionnaire length and potential exclusions, we collected data from 250 participants in the Netherlands. Ten participants were excluded for failing attention checks. Thus, the final sample consisted of 240 participants, including 133 males, 105 females, one non-binary/third-gender participant, and one participant who preferred not to state their gender ($M_{age} = 31.31$, $SD_{age} = 10.04$). Based on Monte Carlo sensitivity analysis (MacCallum, Widaman, Zhang, & Hong, 1999), this sample size provided 80% power to detect a primary factor loading $\lambda = 0.55$ in an exploratory factor analysis ($\alpha = 0.05$), which can be interpreted as a moderate effect size. Most participants identified themselves as middle class (72.08%) or high class (25.42%), and 2.50% identified themselves as low social class.

4.1.2. Materials and procedure

Scenario Pool. Following Cialdini and Jacobson (2021), we developed a comprehensive pool of diverse environmental behaviors. Their review of 58 articles published since 2017 categorized environmental behaviors into five domains: eco–consumer, energy conservation, reduction/reuse/recycling, sustainable food, and water conservation. Furthermore, reducing meat consumption and transportation (e.g., replacing cars with bicycles) had the greatest impact on reducing personal GHG emissions (Chevance et al., 2023). These findings aligned with Constantino et al. (2022), who suggested that dietary habits, food waste, and air travel consistently top the lists in terms of their contribution to carbon emissions and environmental degradation. This literature-based approach ensured our scenarios represented theoretically important environmental domains rather than being tailored to any specific national context.

From the six behavioral domains identified in our literature review, we selected 18 norm violations (2–4 per domain) by prioritizing those that (a) appear frequently in recent pro-environmental research, and (b) represent major contributors to individual carbon footprints (e.g., diet, fast fashion, transportation; Chevance et al., 2023; Constantino et al., 2022). For example, within the "eco-friendly consumer" domain, we selected specific norm violations including not consuming green products and not adopting smart energy devices. To facilitate participants' understanding of norm violation scenarios and minimize demand effects, we then used bidirectional framings (environmentally friendly and harmful) with specific behavioral descriptions for 18 norm violations. For example, the norm violation of "not consuming green products" was rephrased in bidirectional behaviors: (1) *Environmentally harmful*: "*Using*

a paper or plastic cup" and (2) *Environmentally friendly:* "*Using a private water bottle*". These specific descriptions enabled a comprehensive measurement of behavioral perceptions. The final scenario pool included 36 environmental behaviors (see Table 1).

Scenario Perceptions. We measured own adherence, personal norms, descriptive norms, and injunctive norms regarding each environmental behavior (Bicchieri, 2005, 2016; Eriksson et al., 2023; White, Smith, Terry, Greenslade, & McKimmie, 2009). For own adherence and personal norms, participants were asked to indicate "*Whether you typically engage in … (Yes or no)*" and indicate "*Whether you disapprove of … (Yes or no)*." For descriptive and injunctive norms, participants were asked to indicate "*What percentage of people in your community do you think… (0% = No one; 100% = Everyone)*" and indicate "*What percentage of people in your community do you think disapprove of … (0% = No one; 100% = Everyone)*." For analysis, these percentage responses were linearly recoded to a 0–10 scale (0% = 0, 10% = 1, 20% = 2, …, 100% = 10) to facilitate statistical modeling. This means that every participant was asked to complete 144 ratings. Questions from the four categories were randomized within separate sections (see Supplementary Material 1.1 for a full list of scenarios).

Notably, in the sections measuring personal and injunctive norms, our goal was to ask participants about their *disapproval of norm violations*. Therefore, we rephrased the 18 environmentally friendly behaviors to instead represent *failures* to engage in pro–environmental behavior. For example, the "private bottle" behavior was rephrased as "*I disapprove of NOT bringing one's own water bottle in class or at work*" for personal norms, and "*What percentage of people in your community disapprove of NOT bringing one's own water bottle in class or at work?*" for injunctive norms.

Table 1
Environmental norm violations and bidirectional framings.

Behavioral domain	Norm violations	Bidirectional framings	
		Environmentally Friendly	Environmentally Harmful
Eco–friendly consumer	Environmentally unfriendly purchases	Plastic–free groceries	Pre–packaged vegetables
	Not purchase eco–friendly apparel	Second–hand clothes	Fast fashion clothes
	Not adopt smart energy devices	Auto light switch	Conventional electric heater
	Not consume green products	Private bottle	Paper/ plastic cup
Energy conservation	Not turn off the lights	Lights off	Lights left on
	Not care the energy consumption	Energy monitors	Constant heater on
	Not use energy–efficient light bulbs	LED bulbs	Incandescent bulbs
Reduction/ reuse/ recycling	Not use reusable plastic products	Reusable plastic containers	Disposable plastic dishes and cutlery
	Not sort and recycle behaviors	Sort glass and paper	Throw old clothes
	Litter	Pick and put garbage into bins	Put garbage next to full bins
Food/plants	Not purchase organic food	Organic eggs	Non–organic fruits
	Not promote sustainably food/ plants	Sustainable seafood	Flowers instead of plants
	Waste food	Leftovers into other meals	Throw expired but not moldy food
	Not be a vegan	Plant–based diet	Meat consumption
Water	Waste water	Turn off tap	Longer shower
Transportation	Not use public transportation	Public transportation	Private car
	Not use electric vehicles	Electric cars	Petrol cars
	Air travel	Train travel	Air travel

Attention Checks. We included two questions to check participants' attentiveness: (1) "*This is an attention check, please choose no*" (in the personal norms section), and (2) "*This is an attention check, please choose 40%*" (in the injunctive norms section). Participants who failed either of the two attention checks were excluded.

Demographic Information. Participants provided demographic information (gender, age, and social class) and were debriefed. Social class was assessed using the MacArthur scale of subjective social status (1 = lowest, 10 = highest; Adler, Epel, Castellazzo, & Ickovics, 2000). Participants were categorized as low social class (scores 1–3), middle social class (scores 4–7), and high social class (scores 8–10) based on their MacArthur scale responses. These variables were not included as covariates in our main analyses, as we focus on violation characteristics rather than demographic moderators.

4.1.3. Analyses

Following our preregistered plan, we conducted descriptive analyses of our four key variables (own adherence, personal norms, descriptive norms, and injunctive norms) and analyzed correlations between own adherence and descriptive norms, as well as between personal norms and injunctive norms. Our subsequent analyses were tailored to the nature of the data. For the descriptive and injunctive norms (continuous variables), we conducted the Exploratory Factor Analysis (EFA). For own adherence and personal norms (binary variables), we implemented Item Response Theory (IRT) instead of the preregistered EFA, as EFA is not appropriate for binary data. Additionally, we conducted an exploratory linear mixed model (LMM) to supplement the correlation analyses.

4.2. Results

4.2.1. Bidirectional framing

We reverse−coded ratings of environmentally harmful behaviors in *own adherence* and *descriptive norms* such that responses always reflected adherence to pro–environmental behaviors. All subsequent analyses were conducted using these reversed scores. Then we tested the impact of bidirectional framings (friendly vs. harmful) on own adherence and descriptive norms by using a mixed logistic regression and a linear mixed model separately. This analysis allowed us to examine whether people report different adherence and perceptions of pro−environmental behaviors based on whether they are asked about *engaging in* versus *failing to engage in* environmentally friendly actions. The effect of framing was not statistically significant for own adherence ($b = 0.10$, $SE = 0.42$, $z = 0.24$, $p = .809$) or descriptive norms ($b = 0.48$, $SE = 0.43$, $t\,(34.00) = 1.13$, $p = .267$), suggesting that response patterns were consistent regardless of behavior framings.

4.2.2. Distribution of adherence and norms

Our scenario pool successfully captured both common and relatively rare environmental behaviors. For own adherence, we observed high adherence rates of over 70% for 12 items, such as turning off lights (96.25%). In contrast, adherence rates for seven items remained under 30%, such as electric car usage (13.75%). For personal norms, only three behaviors were disapproved by more than 70% of the participants, i.e., not turning off lights (85.00%) and the water tap (81.67%), and not using separate bins when recycling (77.92%). 21 environmentally harmful behaviors were disapproved by less than 30% of the people, such as not using an electric car (14.58%) (see Supplementary Material 1.2).

For descriptive norms (see Fig. 1A), we observed that daily pro–environmental behaviors like turning off lights and taps were perceived as most common in daily life ($Mdn = 7.0$ to 8.0), while behaviors such as using electric cars and picking up litter were perceived as less prevalent ($Mdn = 2.0$ to 3.0). For injunctive norms (see Fig. 1B), participants most strongly *disapproved* of failures to perform basic pro–environmental actions (e.g., NOT turning off lights and water taps;

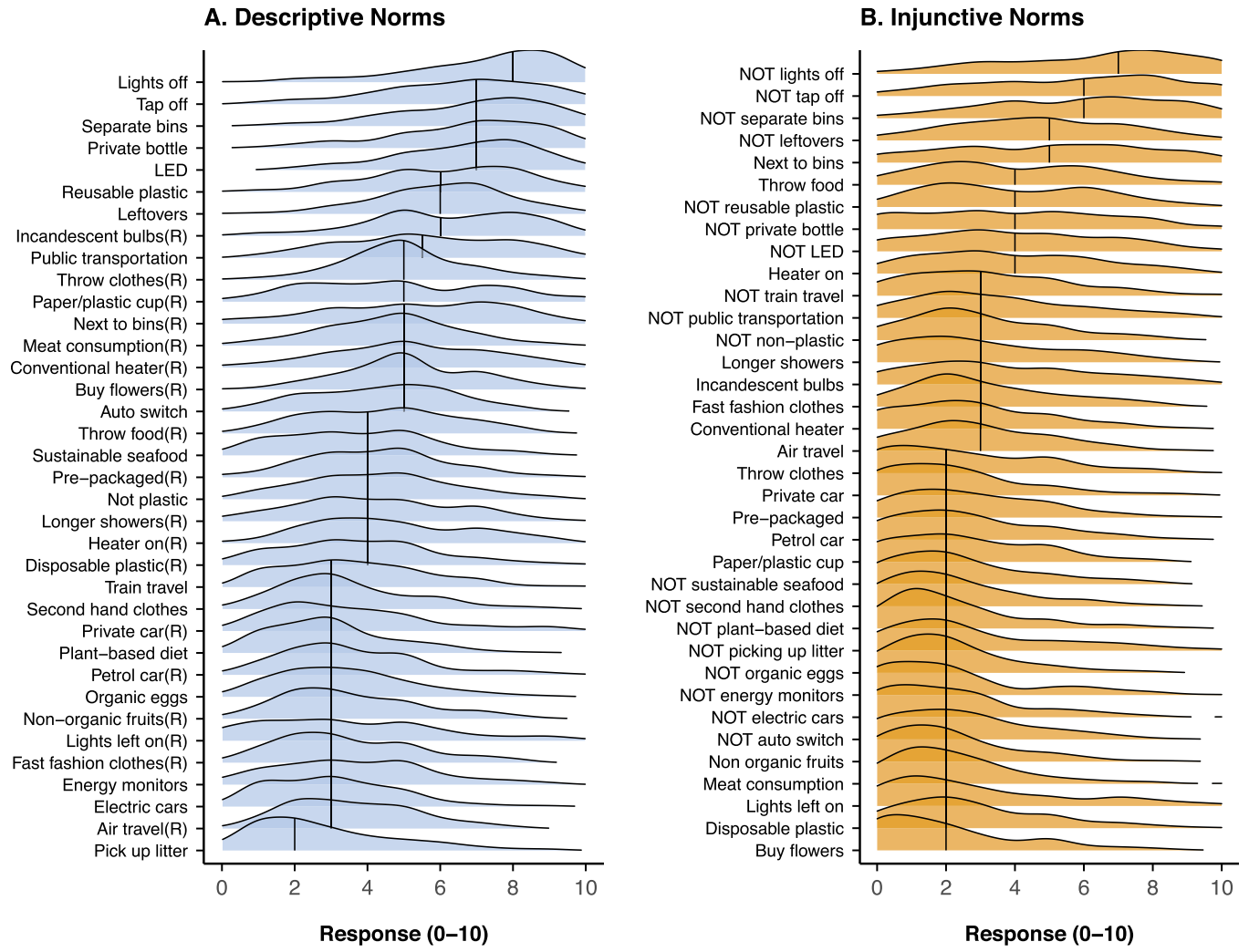

Fig. 1. Distribution of descriptive norms and injunctive norms. Note: Descriptive and injunctive norm responses (0%–100%) were recoded to a 0–10 scale. The black vertical lines represent median values. (R) indicates reverse–coded behaviors.

Mdn = 6.0 to 7.0), while the disapproval of lifestyle choices such as meat consumption was relatively lower (*Mdn* = 2.0).

4.2.3. Relationship between four types of norms

Using a linear mixed model including random effects for participants and scenarios, we examined how own adherence predicted descriptive norms. The analysis revealed a significant positive relationship (b = 1.44, SE = 0.05, t (8637.18) = 30.38, $p < .001$), suggesting that individuals who adhered to environmental behaviors tended to perceive these behaviors as more prevalent among others. Additionally, we used the same type of model to investigate the relationship between personal norms and injunctive norms. Results showed that personal norms were positively related to the injunctive norms (b = 1.47, SE = 0.05, t (8543.88) = 29.89, $p < .001$). This finding suggests that participants who personally disapproved of environmentally harmful behaviors also perceived higher social disapproval of these behaviors in their community.

4.2.4. Item response analyses

We used the two–parameter logistic (2PL) latent trait model separately for own adherence and personal norms. IRT quantifies the difficulty (i.e., level of environmental consciousness needed to engage in a behavior) and discriminability (i.e., how well a behavior distinguishes between individuals with different levels of commitment) for each behavior. Results showed a wide range of item difficulty for own adherence (−5.85 to 4.06) and personal norms (−2.21 to 2.54), indicating that these items contain broad difficulty levels that can comprehensively measure individual differences. For example, buying second–hand clothes (b = 3.29) was more difficult than using private bottles (b = −3.30), meaning that second–hand clothing purchases require higher environmental consciousness than using reusable water bottles. For discrimination, most items had good discrimination in two sections ($a > 0.5$), such as turning off lights (a = 1.88) for own adherence, and not following a plant–based diet (a = 2.10) for personal norms. These findings suggest that these items can effectively distinguish individuals with different environmental behaviors and personal norms (see Supplementary Material 1.3).

4.2.5. Exploratory factor analysis

Exploratory factor analyses revealed four–factor structures for both descriptive and injunctive norms. Model fit was acceptable for descriptive norms (RMSEA = 0.04, TLI = 0.82) and for injunctive norms (RMSEA = 0.05, TLI = 0.91). Detailed results are included in Supplementary Material 1.4.

4.3. Discussion

Study 1 captured behaviors that differ in a number of ways, such as the behavioral domains as well as how common or appropriate they are in society, and importantly, they were systematically evaluated in terms

of own adherence and descriptive norm, and between personal norms and injunctive norms. The findings provide important information about the norm strength and consensus that are relevant to examining how they relate to the perceived appropriateness of informal social sanctions, which we examine in Studies 2 and 3.

5. Study 2

5.1. Method

5.1.1. Participants

We recruited participants via Prolific in November 2024. Participants were assigned to read two scenarios out of a pool of 22 norm violation scenarios (here, in the environmental domain). To ensure sufficient statistical power and enhance generalizability across stimuli, we aimed to have each scenario evaluated by at least 40 participants (Molho, Tybur, Güler, Balliet, & Hofmann, 2017). Anticipating that some participants would be excluded for failing attention checks, we recruited 500 participants. Respondents were paid £0.45 for participating, with an average completion time of 3.5 min.

We excluded 26 participants for failing to respond correctly to the attention checks. The final sample consisted of 474 participants, including 163 males, 309 females, one non-binary/third-gender participant, and one participant who preferred not to state their gender (M_{age} = 41.47, SD_{age} = 13.13). Due to data exclusions, two norm violation scenarios were read by 39 participants. Sensitivity power analysis using the SimR package (Green & MacLeod, 2016) revealed that the sample provided 80% power to detect interaction effects of 0.07 (α = 0.05) between the sanction type and norm violation severity. Most participants identified themselves as middle class (81.01%) or low class (10.13%), while only 8.86% identified themselves as high social class.

5.1.2. Procedure

Participants were randomly assigned to read two of the 22 scenarios describing environmental norm violations. For each scenario, participants first evaluated the (in)appropriateness of the norm−violating behaviors described in the scenarios. They were then presented with four responses to the norm violation in randomized order, including doing nothing and three types of informal sanctions (gossip, exclusion, and confrontation). Participants rated the appropriateness of each response in addressing the norm violation. Between the two scenario sets, participants completed an attention check question. Finally, we collected demographic information (age, gender, and social class).

5.1.3. Materials

Scenario Pool. Based on the scenario pool from Study 1, we selected 22 scenarios of real−life environmental behaviors. Because Study 2 examined the appropriateness of punishers' sanction responses to environmental norm violations, we excluded 14 scenarios that could not be realistically observed (e.g., using traditional light bulbs). To balance the number of environmentally friendly and harmful behaviors, we selected 11 behaviors each from Study 1. However, as Study 2 primarily investigates the perceived appropriateness of informal sanctions in response to environmental norm violations, all 22 behaviors were rewritten to be more detailed and vivid descriptions of environmentally harmful scenarios. Finally, to enhance the realism of the scenarios and reduce repetitiveness, we chose gender−neutral names (such as Alex and Jamie) for scenario creation and ensured that names did not repeat across randomly presented situations (see Supplementary Material 2.1).

Informal Sanctions. We presented participants with different responses to norm violations using adapted materials from Eriksson et al. (2021). Following each of the environmental scenarios, we presented participants with four responses in randomized order: (1) *Doing nothing*: Imagine that […] does nothing about […]'s behavior. (2) *Gossip*: Imagine that […] talks about […]'s behavior to someone else and comments that […]'s choice is not environmentally friendly. (3) *Exclusion*: Imagine that […] decides to make a point of avoiding future interactions with […] because their choice was not environmentally friendly. (4) *Confrontation*: Imagine […] immediately jumps in to confront […] and tells […] that this is not an environmentally friendly choice.

Appropriateness Rating. Every norm violation scenario and the corresponding informal sanctions were followed by an appropriateness rating: "How appropriate was it/ would it be […] to react in this way?" (Eriksson et al., 2021). Items were rated on an 11 − point response scale (−5 = completely inappropriate, 0 = neutral, 5 = completely appropriate). We reverse-coded this measure so that higher scores indicate greater inappropriateness. This measure used a direct rating approach to capture the same construct as the injunctive norms in Study 1 (i.e., disapproval of the behavior). For clarity, we use the term "*norm violation severity*" to refer to this construct throughout Studies 2 and 3.

Attention Check and Demographics. We included one question to check participants' attentiveness ("*This is an attention check, please choose 3*") between two violation scenarios. At the end of the survey, participants provided demographic information (gender, age, and social class) and were debriefed.

5.1.4. Analyses

We reversed the score of appropriateness of norm violations first to ensure that higher scores consistently indicate greater norm violation *inappropriateness* (i.e., norm violation severity), facilitating the interpretation of our results. To investigate the relationship between norm violation severity and the perceived appropriateness of informal sanctions, we conducted descriptive analyses and added Pearson correlation analyses.

Next, we implemented linear mixed models (LMMs) to examine how norm violation severity and informal sanction type predicted informal sanction appropriateness. While the pre-registration specified regression analyses, we used LMMs to appropriately account for the repeated-measures data (see Supplementary Material 2.4 for regression results, which yield consistent results). In addition, our preregistration mentioned exploring the effects of gender and social class on informal sanctions. Given that these results are not central to the main goals of our study, we report them in the Supplementary Material 2.5. The models were initially fitted with norm violation severity as the predictor, followed by including an interaction term (norm violation severity × informal sanction types) in the second model, and adding demographic variables as control variables in the third model. In all models, we included random intercepts for participants.

5.2. Results

5.2.1. Distribution

We explored participants' ratings of the severity of environmental norm violations (see Fig. 2). This analysis again revealed that our scenario pool captured a wide range of environmental norm violations with varying severity. While behaviors such as direct resource waste behaviors (e.g., not turning off lights) were perceived as severe norm violations (Mdn = 3.00), other consumption choices, such as buying flowers and eating meat, were rated as relatively less severe violations and were, on average, not perceived negatively by participants (Mdn = −5.0 to −4.0).

We also examined participants' ratings of the appropriateness of different informal sanctions. The descriptive analysis of informal sanctions revealed that doing nothing was perceived as most appropriate (M = 2.23, SD = 2.61), while exclusion was rated as most inappropriate (M = −2.58, SD = 2.47). Gossip (M = −1.46, SD = 2.79) and confrontation (M = −1.71, SD = 2.86) showed moderate levels of perceived appropriateness.

5.2.2. Associations between violation severity and appropriateness ratings

We used Pearson correlation to examine the relationship between norm violation severity and sanction appropriateness. The results

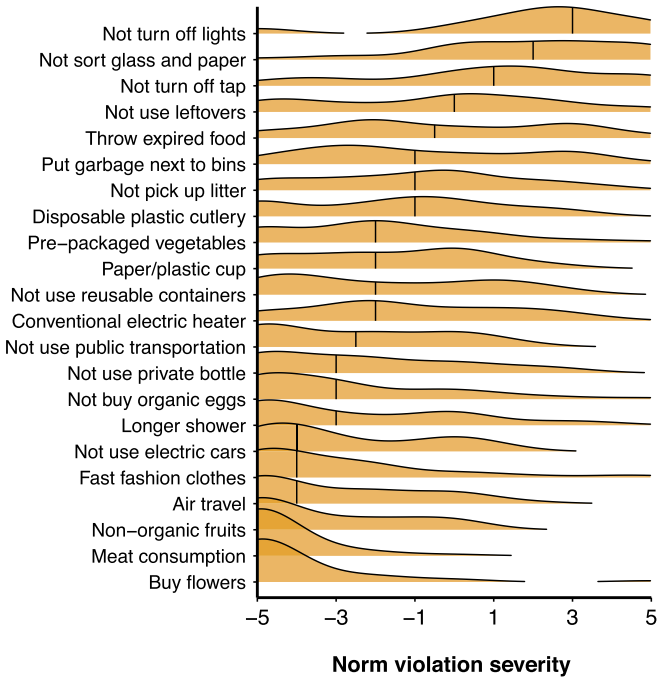

Fig. 2. Distribution of the norm violation severity. Note: −5 = completely appropriate, 5 = completely inappropriate. The black vertical lines represent median values, which are displayed for visual clarity due to skewed distributions. Mean values were included in Supplementary Material 2.2.

showed that the more participants perceived norm violations as severe, the more they thought that informal sanctions were appropriate. This pattern was observed across all three types of informal sanctions: gossip (r (946) = 0.23, 95% CI [0.17, 0.29], $p < .001$), exclusion (r (946) = 0.12, 95% CI [0.06, 0.18], $p < .001$), and confrontation (r (946) = 0.50, 95% CI [0.45, 0.54], $p < .001$). Consistent with this pattern of results, there was a negative correlation between the perceived severity of norm violations and the appropriateness of doing nothing (r (946) = −0.57, 95% CI [−0.62, −0.53], $p < .001$).

5.2.3. Interaction model

Comparing Models 1 and 2 revealed that adding the interaction term in Model 2 significantly improved model fit, $\chi^2(3) = 783.48$, $p < .001$. However, the comparison between Models 2 and 3 was not statistically significant, $\chi^2(5) = 2.99$, $p = .701$, suggesting that including control variables (gender, age and social class) did not further improve the model fit. Therefore, we report detailed results from Model 2 below.

Model 2 included norm violation severity, sanction type (using sum coding with the grand mean as reference), and the norm violation severity × sanction type interaction as predictors and ratings of sanction appropriateness as the dependent variable. The interaction between norm violation severity and sanction type was statistically significant (F (3,3311) = 293.99, $\eta_p^2 = 0.21$, $p < .001$). As norm violations became more severe, the appropriateness ratings for different sanctions showed systematic changes (see Fig. 3). Norm violation severity showed a positive association with the appropriateness of confrontation ($b = 1.40$, 95% CI [1.24, 1.55], t (3774) = 17.84, $p < .001$), indicating that confronting norm violators was rated as increasingly appropriate for more severe norm violations. Similarly, norm violation severity was positively related to appropriateness ratings for both gossip ($b = 0.62$, 95% CI [0.46, 0.77], t (3774) = 7.86, $p < .001$) and exclusion ($b = 0.28$, 95% CI [0.12, 0.43], t (3774) = 3.54, $p < .001$), albeit these relations were weaker. In contrast, norm violation severity was strongly and negatively related to appropriateness perceptions of doing nothing ($b = −1.53$, 95% CI [−1.68, −1.37], t (3774) = −19.52, $p < .001$), suggesting that doing nothing was rated as increasingly inappropriate as norm violations became more severe. Detailed results of the simple effect were included in Supplementary Material 2.3.

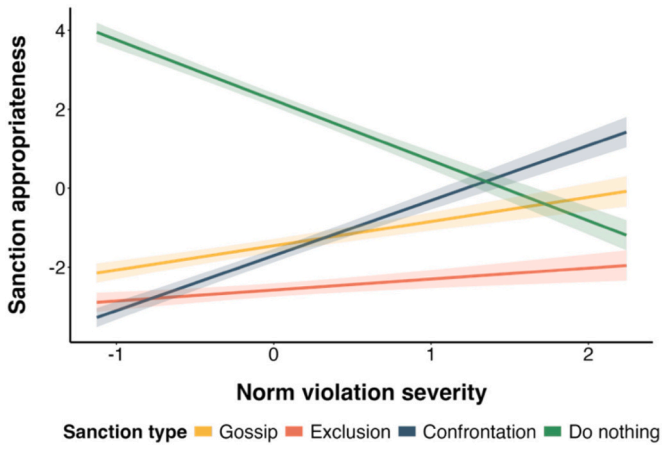

Fig. 3. The marginal effects of standardized norm violation severity on predicted appropriateness of sanctions across four responses. Note: Shaded areas represent 95% confidence intervals.

5.3. Discussion

Consistent with previous research (Eriksson et al., 2021), we found that the appropriateness of informal sanctions increased progressively with the increasing inappropriateness of norm violations. Gossip was perceived as the most appropriate informal sanction, except for doing nothing. In addition, as norm violations became more inappropriate, the appropriateness of confrontation surpassed that of gossip. Study 3 further examines how engaging in different informal sanctions shapes punishers' reputations.

6. Study 3

6.1. Method

6.1.1. Participants

Data collection was conducted via Prolific in November 2024. The sample size was again determined with the goal of obtaining at least 40 participants assigned to evaluate each scenario. To control the potential effects of identifying actors via names versus representing them in more abstract terms, we created parallel questionnaires using both specific names (e.g., Alex and Jamie) and abstract terms (e.g., A and B) while maintaining the same content across versions. We recruited 1000 Dutch participants to complete the survey for £1.05 per person, with an average completion time of 7 min.

Based on a scenario comprehension check, nine participants were excluded due to incorrect understanding of the scenarios. The specific name version consisted of 499 participants, including 251 males, 238 females, seven non-binary/third-gender participants, and three participants who preferred not to state their gender (M_{age} = 31.22, SD_{age} = 9.76). In this version, most participants identified themselves as middle class (70.94%) or high class (22.65%), while 6.41% identified themselves as low class. For the abstract term version, there were 492 valid responses, including 242 males, 243 females, and seven non-binary/third-gender participants (M_{age} = 29.91, SD_{age} = 8.83). Similarly, most participants in this version identified themselves as middle class (73.78%) or high class (21.75%), with 4.47% identifying themselves as low class. A sensitivity power analysis using a summary–statistics–based approach (Murayama, Usami, & Sakaki, 2022) indicated that our study (N = 991) had 80% power to detect interaction effects with $r = 0.12$.

6.1.2. Procedure

We began by selecting eight norm violation scenarios based on the inappropriateness ratings (i.e., injunctive norm) of Study 1. Each participant was randomly assigned to read one of the eight scenarios, followed by a scenario comprehension check with two chances provided. After completing the check, participants rated the appropriateness of the scenario. They then responded to three sets of questions. Each set comprised an appropriateness rating of informal sanctions (gossip, exclusion, or confrontation), 13 questions regarding reputation (warmth, morality, aggressiveness and competence), and a hypothetical trust game.

6.1.3. Materials

Scenario Pool. Based on the inappropriateness ratings from Study 1, we classified environmental norm violation scenarios into four conditions (*high*, *medium*, *low*, and *no consensus*). To ensure the robustness of our results, we selected two scenarios for each condition, while taking care to ensure that these scenarios could be plausibly observed in daily life: (1) *High norm violation severity*: (NOT) turning off lights and (NOT) turning off the tap; (2) *Medium norm violation severity*: air travel and purchasing fast fashion clothes; (3) *Low norm violation severity*: buying flowers and (NOT) using electric cars; (4) *No consensus*: throwing away expired but not moldy food and (NOT) using reusable plastic containers. All eight scenarios were rewritten with more detailed and vivid descriptions to ensure better understanding (see Supplementary Material 3.1).

To increase participants' immersion in the described scenarios, we assigned different names to all characters and specified their relationships. In the abstract version, these names were replaced with A, B, C, and D, respectively. The relationship between the violators and punishers was described as either colleagues or classmates, that is, relationship partners of intermediate closeness.

Informal Sanctions. We presented participants with different responses to norm violations, using similar but more detailed statements compared to Study 2. To illustrate the three informal sanctions, we used the scenario of someone *(NOT) turning off lights* (replaced content is underlined): (1) Gossip: *The next day, Jamie is chatting with someone else and mentions, "Yesterday, I saw Robin leave the office without turning off the lights. I didn't say anything at the time, but this choice is not environmentally friendly."* (2) Exclusion: *The next day, Taylor decides to take some distance and avoid interacting with Robin, because Robin's choice was not environmentally friendly.* (3) Confrontation: *At that moment, Elliot runs out and stops Robin, saying, "You're wasting electricity by leaving the office without turning off the lights. That's not a very environmentally friendly choice."*

Appropriateness Rating. Every norm violation scenario and the corresponding informal sanctions were each followed by an appropriateness rating measured as in Study 2.

Reputation Scale. We combined several relevant scales to measure the reputation of punishers (Dhaliwal, Patil, & Cushman, 2021; Eriksson et al., 2016; Goodwin, Piazza, & Rozin, 2014; McManus, Kleiman-Weiner, & Young, 2020). Specifically, participants were asked to indicate their impressions across four theoretically relevant dimensions: (1) *warmth* (items: warm, good−natured, tolerant, sincere; Cronbach's α =0.83 and 0.78 for specific and abstract version), (2) *aggressiveness* (items: angry, aggressive; Cronbach's α = 0.71 and 0.73 for specific and abstract version), (3) *morality* (items: moral cooperative; Cronbach's α = 0.67 and 0.60 for specific and abstract version), and (4) *competence* (items: competent, confident, independent, competitive, intelligent; Cronbach's α =0.76 and 0.76 for specific and abstract version). The reliability analysis of all data showed high internal consistency across all dimensions, with Cronbach's α of 0.81 for warmth, 0.72 for aggressiveness, 0.63 for morality, and 0.77 for competence.

Trust. Trust was measured by using a modified hypothetical trust game (Wu, Balliet, & Van Lange, 2016). Participants were instructed to imagine an interaction with the punisher, where both players started with 50 points (£0.1 per point). Participants could transfer any number of their points to the punisher (ranging from 0 to 50 points). These transferred points were tripled before reaching the punisher, who could then decide how many points to return to the participant. As this study focused on the trust of third parties, we only measured participants' transfer decisions.

Comprehension Checks and Demographics. We included a comprehension check with three response options to validate participants' understanding of the norm violation scenarios, with two chances provided. At the end of the survey, participants provided demographic information (gender, age, and social class) and were debriefed.

6.1.4. Analyses

Prior to the main analysis, we reversed the norm violation appropriateness score to ensure that higher scores consistently indicate greater norm violation severity as in Study 2. The main analysis proceeded in several stages. First, we conducted two analyses that were not pre-registered: (1) a methodological validation comparing differences between specific and abstract versions of the norm violation scenarios, and (2) correlations between the four reputation dimensions to understand their relationships (see Supplementary Material 3.5).

Then, as pre-registered, we conducted descriptive analyses for all variables and used linear mixed models to examine how norm violation severity (*IV*) and sanction type (*IV*) influence informal sanction appropriateness (*DV*). The preregistered exploratory analyses examining the effects of gender and social class are reported separately in Supplementary Material 3.3, as they were not central to our main research goals. In all models, we included participants as random intercepts. The models were initially fitted with norm violation severity and informal sanction type as the predictors, followed by including an interaction term (norm violation severity × sanction type) in the second model and adding age, gender, and social class as control variables in the third model. We conducted LMM analyses (as in pre-registration) for each dependent variable (warmth, aggressiveness, morality, competence, and trust), with norm violation severity (*IV*) and sanction type (*IV*) as predictors, along with their interaction term (norm violation severity × sanction type).

6.2. Results

6.2.1. Version effect

We tested for differences between the specific and abstract versions. The main effects of the version were significant for trust ($p < .001$) and competence ($p = .035$) but not for other dependent variables ($ps > 0.05$) (see Supplementary Material 3.4). Participants reported higher trust and competence ratings in the specific version compared to the abstract version. Although some interaction effects were significant, we combined the data for subsequent analyses as these differences did not affect our main conclusions.

6.2.2. Norm violation severity

The ratings of norm violation severity validate our initial scenario categorization. High−severity scenarios were rated as the most inappropriate ($M = 1.32$, $SD = 2.27$), followed by medium−severity ($M = -0.53$, $SD = 2.89$) and no−consensus scenarios ($M = -1.46$, $SD = 2.73$), while low−severity scenarios received the lowest inappropriateness rating ($M = -3.51$, $SD = 1.95$).

6.2.3. Sanction appropriateness

Comparing Models 1 and 2 revealed that adding the interaction term in Model 2 significantly improved model fit, $\chi^2(6) = 85.90$, $p < .001$. However, the comparison between Models 2 and 3 was not statistically significant, $\chi^2(5) = 9.46$, $p = .092$, suggesting that including control variables (gender, age and social class) did not further improve the model fit. Therefore, we report detailed results from Model 2 below.

We examined the interaction between norm violation severity (no consensus, high, medium, and low) and informal sanctions (using sum

coding with the grand mean as reference) in predicting perceived sanctions appropriateness (see Fig. 4). Results revealed significant main effects of both norm violation severity (F (3, 987) = 6.39, $\eta_p^2 = 0.02$, $p <$ .001) and sanction types (F (2, 10893) = 8079.44, $\eta_p^2 = 0.60$, $p <$ .001). The interaction effect was also statistically significant (F (6, 10893) = 14.36, $\eta_p^2 = 0.01$, $p <$ .001). Detailed results of the simple effect were included in Supplementary Material 3.7.

We also conducted a supplementary analysis treating norm violation severity as a continuous variable. The pattern of results remained consistent with the categorical analysis, including the significant interaction effect ($p <$ .001). Full results are reported in the Supplementary Materials 3.8.

6.2.4. Impressions

Warmth. Results revealed significant main effects of both norm violation severity (F (3, 987) = 3.31, $\eta_p^2 = 0.01$, p = .020) and sanction type (F (2, 1974) = 1544.12, $\eta_p^2 = 0.61$, $p <$ .001) on the ratings of warmth. The interaction effect of norm violation severity × sanction type was also statistically significant (F (6, 1974) = 2.56, $\eta_p^2 = 0.01$, p = .018). Simple effects analysis revealed that across the four levels of norm violation severity, individuals perceived those who engage in confrontation as the warmest (see Fig. 5A). Further, pairwise comparisons indicated that, at each level of norm violation severity, all pairwise differences between the three sanctions were significant ($ps <$ 0.001) (see Supplementary Material 3.9 for simple effects on all dimensions).

Morality. The pattern for ratings of morality was similar to that for ratings of warmth (see Fig. 5B). Results revealed significant main effects of both norm violation severity (F (3, 987) = 3.43, $\eta_p^2 = 0.01$, p = .017) and sanction type (F (2, 1974) = 1116.95, $\eta_p^2 = 0.53$, $p <$ .001). The interaction effect was also statistically significant (F (6, 1974) = 9.88, η_p^2 = 0.03, $p <$ .001).

Competence. We observed a slightly different pattern for ratings of competence compared to warmth and morality (see Fig. 5C). There was a significant main effect of sanction type (F (2, 1974) = 654.89, η_p^2 = 0.40, $p <$ .001). However, the main effect of norm violation severity was not significant, F (3, 987) = 1.21, $\eta_p^2 = 0.01$, p = .303. The interaction effect was statistically significant (F (6, 1974) = 5.66, $\eta_p^2 = 0.02$, $p <$ .001).

Aggressiveness. We observed a different pattern for ratings of aggressiveness compared to warmth and morality (see Fig. 5D). The main effect of sanction type was significant, F (2, 1974) = 584.73, η_p^2 = 0.37, $p <$ .001, while the main effect of norm violation severity was not significant, F (3, 987) = 1.40, $\eta_p^2 = 0.01$, p = .241. Additionally, the interaction effect was statistically significant (F (6, 1974) = 3.81, η_p^2 = 0.01, $p <$ .001).

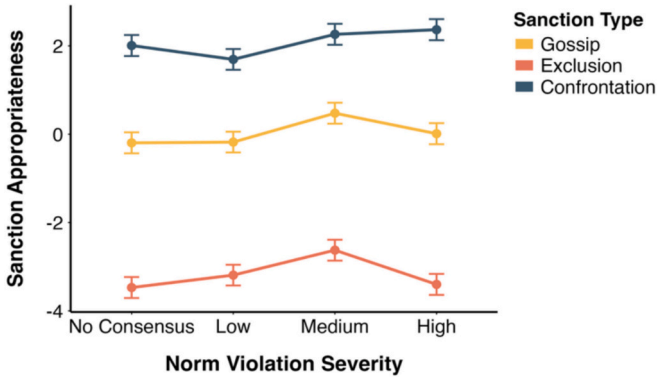

Fig. 4. Estimated marginal means of sanction appropriateness by sanction type and norm violation severity. Note: Error bars represent 95% confidence intervals.

6.2.5. Trust

Results revealed a significant main effect of sanction type, F (2, 10893) = 3881.63, $\eta_p^2 = 0.42$, $p <$ .001, and a significant interaction between norm violation severity and sanction type, F (6, 10893) = 29.83, $\eta_p^2 = 0.02$, $p <$ .001. However, the main effect of norm violation severity was not significant, F (3, 987) = 1.05, $\eta_p^2 = 0.003$, p = .371. Simple effects analysis revealed that across all levels of norm violation severity, individuals exhibited the highest trust toward those who engage in confrontation, the lowest trust toward those who exclude, and moderate levels of trust toward gossipers. Pairwise comparisons showed that at all four levels of norm violation severity, the three sanctions significantly differed from each other ($ps <$ 0.001).

6.3. Discussion

Study 3 examined the effects of norm violation severity and sanction type on sanction appropriateness, as well as punishers' reputations. The results further demonstrated that confrontation was perceived as a better approach for severe norm violations. In addition, people trusted those who used verbal confrontation more than those who used gossip or exclusion, and perceived them as warmer, more competent, and more moral, while also viewing them as less aggressive.

7. General discussion

Informal sanctions are often posited as an effective mechanism for maintaining social norms across various domains (Eriksson et al., 2021). However, the understanding of how these informal sanctions operate specifically in response to environmental norm violations is lacking. This gap raises crucial questions: Are these informal sanctions against environmental violations perceived as appropriate? Do those who enforce environmental norms face reputational benefits or costs? Answering these questions in the environmental context is particularly relevant given the widespread consequences of environmental violations.

7.1. Environmental scenario Pool

We developed a novel environmental scenario pool covering six domains: eco–friendly consumer, energy conservation, reduction/reuse/recycling, food/ plants, water, and transportation (Chevance et al., 2023; Cialdini & Jacobson, 2021; Constantino et al., 2022). Additionally, we examined people's perceptions of environmental norm violations across four dimensions (i.e., own adherence, personal norms, descriptive and injunctive norms). By systematically documenting these perceptions, our work provides a foundational descriptive understanding of prevailing environmental norms (for more on this descriptive approach, see Hofmann & Grigoryan, 2023), which is essential for contextualizing subsequent discussions on their enforcement and the reputation impact of informal sanctions.

More broadly, capturing perceptions via this descriptive method can be a promising avenue for researchers and policymakers to better understand public views on environmental behaviors across different domains, potentially bridging the gap between scientific priorities and social reality (Weber, 2018; Van Lange & Hunckelba, 2021). To give some concrete examples from our study, while reducing air travel and meat consumption are among the most useful actions to reduce one's environmental impact, they are not consistently perceived as clear norm violations by the public. Similarly, there was a lack of social consensus regarding some environmentally harmful behaviors (e.g., fast fashion shopping), and other violations received little attention in social contexts (e.g., flower purchases).

The patterns we observed in severity ratings further illuminate this complexity. Behaviors classified as high-severity (in Study 3) based on Study 1 (e.g., not turning off lights, not turning off the tap) received relatively moderate inappropriateness ratings in Studies 2 and 3. We

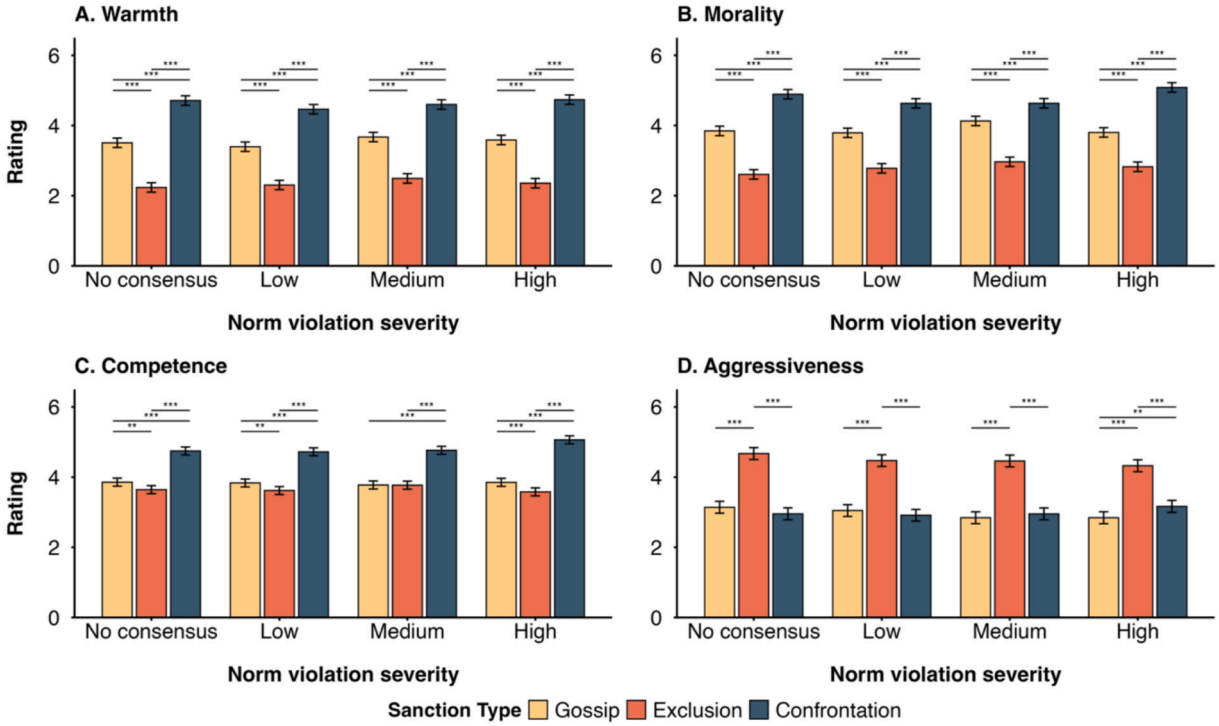

Fig. 5. Estimated marginal means of impressions for three sanction types across different levels of norm violation severity. Note: Error bars represent 95% confidence intervals.

believe this reflects the everyday nature of environmental violations people encounter, which typically involve mundane choices rather than substantial transgressions. Interestingly, objective environmental impact did not straightforwardly predict perceived severity: lower-impact behaviors, such as leaving lights on, were sometimes perceived as more inappropriate than higher-impact behaviors like flying. This pattern aligns with the "low-cost hypothesis" (Diekmann & Preisendörfer, 2003): when behaviors require minimal effort to avoid, people may hold stronger expectations for compliance. Conversely, high-cost behaviors, such as forgoing air travel, are understood to face substantial practical constraints, leading to more lenient evaluations despite greater ecological consequences.

7.2. *Informal sanctions and reputation*

Our findings provide clear answers to the proposed research questions and offer several key insights. Consistent with Hypothesis 1, a key finding is that as environmental violations were perceived as more inappropriate, using informal sanctions was perceived as more appropriate. This finding conceptually replicates the fundamental severity-appropriateness relationship (Eriksson et al., 2017, 2021). Our studies confirmed this pattern across environmental behaviors spanning the full range of normative consensus, from highly disapproved behaviors such as not turning off lights to more ambiguous ones such as eating meat. This extension is meaningful because it shows that the severity–appropriateness link is robust across the heterogeneous normative landscape in the environmental domain.

Among the sanctions that could be used to respond to environmental violations, people perceived gossip to be the most appropriate, supporting Hypothesis 2. This preference for indirect sanctions conceptually replicates research on norm violations in cross-cultural contexts, which shows that gossip is a commonly appropriate response to norm violations (Eriksson et al., 2021). Its high level of appropriateness underscores its role as a flexible and low–risk mechanism for social regulation (Feinberg et al.,2014), especially relevant when the costs of direct confrontation are high and when environmental violations involve diffuse rather than personal harm.

Third, while gossip serves as a stable and appropriate sanctioning strategy, the picture becomes more complex with confrontation, especially as the severity of the violation increases. Our results indicate that confrontation becomes increasingly appropriate for severe environmental violations, not supporting Hypothesis 3. This finding conceptually replicates Eriksson et al.'s (2017) demonstration that confrontation appropriateness increases with violation severity when examining general social violations. However, this result contrasts with previous findings (Molho et al., 2020) that people were more willing to gossip instead of using confrontation when facing severe violations in daily life. This inconsistency can be explained by considering the distinction between what people find appropriate and what they actually do. People may believe severe violations warrant confrontation while being unwilling to act due to retaliation risks (Molho et al., 2020). Furthermore, the distinct nature of environmental norm violations involves diffuse harm affecting collective welfare rather than direct harm to individuals (Georgiou & Van Lange, 2024; Weber, 2015). Because such violations transgress broadly shared societal values about collective welfare, severe environmental violations may be viewed as more objectively wrong, thereby legitimizing more direct responses like confrontation as proportionate and necessary signals of disapproval.

Furthermore, our examination of punisher reputation across multiple dimensions revealed broadly positive evaluations of confronters, which contrasts with previous research in which confronters were often perceived negatively (Eriksson et al., 2016). The methodological approach of our scenarios likely contributed to this finding, as our studies used neutral phrasing to describe confrontation, instead of any wording suggestive of anger-proneness (i.e., "making an angry remark"; Eriksson et al., 2016). Given this neutral framing, confronters were perceived rather positively in our study, and this extended across reputational dimensions potentially indicating a halo effect (Nisbett & Wilson, 1977). These positive evaluations are consistent with research suggesting that punishers are evaluated positively when their actions are attributed to prosocial rather than competitive motives (Raihani & Bshary, 2015; Redhead, Dhaliwal, & Cheng, 2021). The neutral

confrontation may have been readily attributed to cooperative motives in environmental contexts, thereby yielding positive reputational consequences. Finally, the inclusion of trust measures further demonstrated that these broadly positive perceptions can translate into a greater willingness to form cooperative relationships with such enforcers.

7.3. Implications and limitations

Beyond conceptually replicating previous findings, our research examined sanctioning processes across environmental behaviors that vary considerably in normative consensus. Some behaviors, such as littering, involve concrete consequences at the local level and elicit strong normative agreement. Others, such as flying, present social dilemmas with diffuse and delayed consequences and weaker normative consensus (Panizza & Vostroknutov, 2025; Van Lange et al., 2018). This normative heterogeneity is consequential for informal sanctioning: many environmental behaviors are not yet widely perceived as norm violations, meaning that the preconditions for informal sanctions to be seen as appropriate are not yet in place. However, for behaviors where norms are sufficiently established, our results show that as violations become more severe, non-aggressive confrontation is perceived as increasingly appropriate and is associated with positive reputational evaluations across multiple dimensions. Methodologically, examining multiple environmental behaviors and reputation dimensions simultaneously allowed us to capture variation across these factors that enriches our understanding of sanctioning processes.

The current research carries significant implications for understanding public engagement with environmental issues. We found that many environmental behaviors, such as reducing air travel, lack the normative consensus that would render informal sanctioning appropriate. As noted earlier, it is possible that behaviors with abstract consequences yield less normative consensus than those with concrete consequences that we can see and sometimes experience – in other words, the psychological distance of climate-relevant behaviors can undermine consensus (Van Lange & Huckelba, 2021). For informal sanctions to function as an effective norm enforcement mechanism, the underlying norms need first be sufficiently established. Research on dynamic norms suggests a promising pathway: communicating information about emerging behavioral trends (e.g., that an increasing number of people are reducing their meat consumption) can promote sustainable behavior adoption even when these behaviors are not yet the prevailing norm (Sparkman, Howe, & Walton, 2021; Sparkman & Walton, 2017). As such norms gain strength, the sanctioning mechanisms documented in the present research may play a more prominent role in reinforcing these emerging norms.

While our research offers valuable insights, it also carries some limitations. First, we relied on hypothetical scenarios of environmental norm violations to assess perceptions of the appropriateness of informal sanctions. For future explorations of reactions to environmental behaviors in everyday life, alternative methods such as experience sampling methods may be useful (Kesenheimer & Greitemeyer, 2022; Prinzing, 2024). Furthermore, considering our findings on the perceived appropriateness of informal sanctions, future research could explore the effectiveness of meta-norm interventions on environmental norm violations, such as informing people that many others are willing to intervene against environmental violations or that many others consider it appropriate to do so. Dynamic norm interventions may be complemented by such meta-norm interventions that highlight the social support for environmental norm enforcement. Finally, our studies relied on samples from two Western societies (the Netherlands and the UK). The broader cultural context is essential when considering the scope of our findings. Cross–cultural research has documented differences in punishment and meta–norms across countries (Eriksson et al., 2021), suggesting that the appropriateness of environmental norm enforcement strategies may vary with specific societal values, something that we were not able to capture.

8. Conclusion

This research examined the negative relationship between environmental norm violations and informal sanctions through a comprehensive scenario pool of environmental behaviors. Study 2 revealed that gossip was generally perceived as the most appropriate sanctioning response, while Study 3 demonstrated that confrontation became increasingly appropriate as violation severity increased, with confronters receiving better reputations than those using gossip or exclusion. These findings suggest that effective environmental protection may benefit from appropriate informal enforcement strategies that balance addressing norm violations while minimizing reputational costs for punishers.

9. Open practices

All studies were preregistered on AsPredicted (Study 1: https://aspredicted.org/wsss-x56b.pdf; Studies 2 and 3: https://aspredicted.org/kxq8-765f.pdf). These preregistrations were completed prior to running the research and examining the data, and specified our methods, dependent variables, sample size, exclusion criteria, and data analysis strategy, but not specific directional hypotheses. Our hypotheses were theoretically derived from existing literature (see Introduction). For all studies, we reported the sample size determination, any data exclusions, all manipulations and measures. All materials, data, and analyses are available through the Open Science Framework (https://osf.io/5ewjq/). This research was approved by the IRB of Vrije Universiteit Amsterdam. Across studies, all participants provided informed consent.

CRediT authorship contribution statement

Xiyan Song: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Catherine Molho:** Writing – review & editing, Supervision, Resources, Methodology, Funding acquisition, Conceptualization. **Paul A.M. Van Lange:** Writing – review & editing, Supervision, Methodology, Conceptualization.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could influence the work reported in this paper.

Data availability

All materials, data, and analyses are available through the Open Science Framework

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