

# The (lack of) informational value of descriptive norms

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**Abstract:** Descriptive norms, which measure the prevalence of moral behavior ("contribution", in our context), powerfully influence individual choice. A likely mechanism is that descriptive norms can be informative about pertinent aspects of the situation, such as the costs and benefits of contribution. We study this informational value of descriptive norms in a novel experimental setting that exogenously manipulates both the relationship between descriptive norms and the public benefit to contribution and beliefs about the descriptive norm. We find that the information content of descriptive norms has minimal impact on behavior. The descriptive norm influences behavior by changing subjective moral beliefs and by enabling conditional cooperation, but both effects are dwarfed by pure conformity. This reveals a preference for conformity that is divorced from the material benefits to contribution. These findings have important implications for the design of social incentives.

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## 1. Introduction

Moral decision-making incorporates behavioral economic or psychological notions of social preferences into traditional economic cost-benefit analysis. But the actions of others are known to have a strong influence on moral choices as well, and the mechanism of such peer effects is unclear. It may comprise a social preference in itself, i.e. a preference for conformity or to avoid being seen as an outsider, or it may simply be to provide information about the cost-benefit calculation that the decision-maker faces. For example, someone who encounters an immaculately clean park may learn a number of things from the apparent descriptive norm of not littering. There may be a nearby trash can, or there may be a cleaning staff that is responsible for the grounds, or the preservation of the parkland may be particularly valuable to its users. The variety of things people may infer from naturally occurring situations makes it difficult to conclude that information transmission is an important source of peer effects, and this is made even more difficult by the fact that opinions about a behavior, costs and benefits of the behavior, and behavior itself, are all tightly correlated in most situations. This study isolates the learning channel using a carefully designed experiment that breaks these correlations.

We must first define our terminology. The idea of a “social norm” is defined in many ways by different authors, but we will use the following terminology.<sup>2</sup> *Injunctive norms* are personally-held beliefs about what ought to be done. *Injunctive expectations* are beliefs held by individuals about the personal injunctive norms held by other members of the relevant population. In a vast majority of studied contexts, including the ones used in this study, personal injunctive norms are shared and are commonly known to be shared, so that these first- and second-order beliefs can be referred to jointly as the injunctive norm (IN).

*Descriptive norms*, on the other hand, indicate how prevalent a moral behavior actually is in the relevant population. If individuals don't have perfect information about the descriptive norm (DN), *descriptive expectations* are more relevant to choice. These are individuals' beliefs about the descriptive norm. In some instances pluralistic ignorance

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<sup>2</sup> Following, e.g., Cialdini et al. (1991, 1990), Bicchieri (2006), and Krupka and Weber (2013).

can prevail, causing a gap between aggregated descriptive expectations and the DN, but if not, these two concepts can be referred to jointly as the DN.

The DN is known to be a powerful motivator. Correcting pluralistic ignorance with descriptive information is the basis of the “social norms approach” (see Berkowitz, 2004, for a review), which has been successfully employed to reduce drinking among college students (see also Kremer and Levy, 2008), teen drug use, unsafe driving, and other undesired behaviors. Evidence suggests the DN is in fact substantially more important to decision-making than the IN (Bicchieri and Xiao, 2009). This influence of the DN is the peer effect that we aim to deconstruct in this study. Unlike well-studied peer effects in other contexts (e.g. Andreoni et al., 2017; Bandiera et al., 2010; DellaVigna et al., 2012; Mas and Moretti, 2009, among countless others), it does not depend on actual interaction or observability of the decision maker or his/her choices. We use a one-shot, anonymous online context that has been shown not to preserve social image concerns (te Velde, 2018), ruling out any reputation-, image- or punishment-based channels of influence. This maximizes the relative importance of whatever information is provided by the DN. Identifying this channel rigorously then involves controlling what information is conveyed by the descriptive norm and isolating the influence of that information from other potential psychological explanations that remain despite social isolation.

One such explanation is that people have an actual preference for conformity or a desire to avoid being an outsider. The DN can then influence behavior by better enabling people to achieve these goals. This drive to conform has been strikingly demonstrated in countless situations (outside of moral decision-making) going back to Asch’s seminal experiments (beginning with Asch, 1951), even in anonymous scenarios (e.g. Goeree and Yariv, 2015). Relatedly, another possible explanation is conditional cooperation. While conformity in many studies of moral decision-making settings can be alternatively interpreted as conditional cooperation (e.g. Fischbacher et al., 2001), or vice versa, Bardsley and Sausgruber (2005) are able to decompose such peer effects in a public goods game into approximately 1/3 conformity and 2/3 conditional cooperation.

These results should not be interpreted as ruling out an informative influence of the DN, however. Existing laboratory studies are not well-designed to investigate informational influence because they present participants with very explicit information

about costs and benefits of all possibilities for all participants, minimizing ambiguity, and these payoff structures shut down any relationship between the DN and marginal payoffs. That is to say, the impact of an individual's decision(s) on any participant is independent of the DN, so that the DN does not provide any information relevant to the cost-benefit analysis the individual is undertaking. Without providing payoff-relevant information, the remaining influence of the DN is only to better enable conformity or conditional cooperation, or potentially to affect injunctive expectations. However, evidence from experiments outside of moral decision-making contexts indicate that information is indeed an important aspect of conformity. Baron et al. (1996) find that task difficulty amplifies conformity in the context of Asch situations (Asch, 1951), and in the economics literature, Bursztyn et al. (2014) show that observing peers' *intentions* influences choice even when those intentions are unable to affect behavior, thereby eliminating utility derived from conformity in outcomes. Decades of research in social preferences indicate that people are strongly concerned about others' outcomes in addition to their own, so it's only natural to expect that information relevant to social preferences would also be valuably conveyed by the DN.

In summary, field experiments studying the influence of the DN on moral decision-making are not well-equipped to identify the information channel because information is not well controlled, and existing lab paradigms are not well-equipped either because the DN does not reveal anything pertinent to the cost-benefit analysis underlying choice.<sup>3</sup> We therefore construct a new game setting in which information about the DN does directly inform participants about the costs and benefits relevant to decisions. If people pay close attention to the DN because of the information it carries, rather than because they want to conform or conditionally cooperate, the information transmitted should have a larger impact on behavior than the DN itself. We instead find that the implied concrete social benefits of contribution are much less important to choice than the direct conformity-inducing role of the DN. Indeed, even personal INs are influenced more by the DN than by the costs and benefits of contribution implied by the DN!

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<sup>3</sup> For example Irlenbusch et al. (2019) provide exogenously high or low descriptive information in a public goods game and find that this does influence later choices unless additional information enabling discounting of the signal is provided as well. But these results can only be attributed to a preference for conformity or conditional cooperation, because they do not provide any information about the game itself.

The game we use is a non-linear public goods game that is carefully engineered so that the social benefit of contribution is either constant, increasing, or decreasing in the DN. At the same time, the net private cost of contribution is constant, thereby removing strategic uncertainty. We find similar results in both an initial test of this game and in a second higher stakes version. Then, in order to determine whether the strong influence of the DN in these games is due to a preference for conformity or simply because the DN enables conditional cooperation, we replicate our findings in a similar game in which the beneficiary of contributions is an external charity rather than the group members themselves. The direct influence of the DN remains strong, robust, and dwarfs the informational value, indicating that a majority of the influence is via conformity.

We can further investigate the psychological channels of influence of the DN by eliciting injunctive norms and injunctive expectations. We hold the IN constant as much as possible by making sure that the social benefit of contribution is always at least weakly positive, but of course the subjective injunctive importance people place on contribution may still vary. This introduces another avenue for the DN to have an informative effect, if it changes people's personal injunctive norms and/or injunctive expectations. In fact, personal IN and injunctive expectations are strongly influenced by the DN in two out of three experiments. However, even after controlling for the IN directly, the DN survives as a strong and robust factor in decision making. It in fact has a larger impact on the likelihood of contribution than the IN, and the IN is only partially determined by the DN, jointly implying that the information the DN provides about the IN is still dwarfed in importance by the motivation to conform. And in our third experiment, in which the IN is less ambiguous to begin with and the DN does not significantly affect it at all, this channel is negligible, and the direct effect of the DN remains strong.

These insights are critical for the development of modern theories of social preferences. Many models refer directly to the DN, in line with the established importance of this factor (e.g. Fershtman et al., 2011; Kuran and Sandholm, 2008; López-Pérez, 2008; Manski and Mayshar, 2003). Our results narrow down the mechanism behind this influence and suggest that conformity is not merely a result of social pressure or a rational response to information, which can guide the development of next-generation models that make more precise assertions about the contexts in which their predictions will apply. This literature is discussed further in section 4.3.

Our results also have clear implications for encouraging prosocial behavior. Of utmost importance is to convey that a prosocial cause is something that others are already rallying behind. This is a well-known lesson from existing experiments (Cialdini, 2003; Cialdini et al., 2006; Goldstein et al., 2008, among others) but our message goes a step further: this is true *even if* it conveys that the cause is not important to contribute to. In a temporary drought, we predict that water conservation will improve if it's well-known that most people are already conserving water, even if that conservation has already averted most of the crisis. We predict that messages of "record turnout" will be more effective at getting out the vote than messages about the importance of voting, even though record turnout implies record low marginal impact of voting. And we predict that charities should highlight their existing successes more than their aspirational projects, even though that may convey a lesser current need for donations.

While our experimental design is motivated by the need to exogenously unlink the informational value of the DN from its direct effect of enabling conformity, it also captures an economically important setting that has not been specifically studied before. These are situations in which the marginal social benefit to a morally prescribed action is initially large but sharply decreasing in the DN. A canonical example would be the bystander effect: Despite the fact only a single person is required to call 9-11 in an emergency, and additional helpers provide secondary assistance or can even hurt the situation through crowding, the DN conveyed by a lack of help seems to cause other observers to join in not helping. In the opposite scenario, the overwhelming influx of volunteers that sometimes occurs after well-publicized natural disasters may be due to a desire to conform to the crowd of other volunteers, even if the infrastructure of the location cannot handle any more people. Our results that show that conformity is a much more important motivation than outcome-based social preferences, which would encourage helping in the bystander situation and discourage it in the natural disaster. The conformity effect, moreover, can explain both phenomena simultaneously, unlike deindividuation, which is another common explanation for the bystander effect and would predict lack of help in either situation.

These results are discussed further in the context of relevant literatures in section 4. First, section 2 describes our experimental protocols and section 3 presents the results.

## 2. Procedures

We conducted three experiments that collectively reveal the functionality of the DN. This section describes the procedures for each experiment in turn, and the following section will present the collective results.

### 2.1 Experiment PG1

Our first experiment, Public Goods 1, uses three carefully constructed public goods games to exogenously link the DN to the marginal costs and benefits (public and

#### *A: Constant Marginal Public Benefit*

Number of IN Choices	Cost of Choosing IN	Group Prize	Group Prize (Per Person)	Total Points for Choice IN	Total Points for Choice OUT
0	0	0	0	-	90
1	135	225	45	0	135
2	135	450	90	45	180
3	135	675	135	90	225
4	135	900	180	135	270
5	135	1125	225	180	-

#### *B: Increasing Marginal Public Benefit*

Number of IN Choices	Cost of Choosing IN	Group Prize	Group Prize (Per Person)	Total Points for Choice IN	Total Points for Choice OUT
0	0	0	0	-	90
1	120	150	30	0	120
2	130	350	70	30	160
3	140	600	120	70	210
4	150	900	180	120	270
5	160	1250	250	180	-

#### *C: Decreasing Marginal Public Benefit*

Number of IN Choices	Cost of Choosing IN	Group Prize	Group Prize (Per Person)	Total Points for Choice IN	Total Points for Choice OUT
0	0	0	0	-	90
1	150	300	60	0	150
2	140	550	110	60	200
3	130	750	150	110	240
4	120	900	180	150	270
5	110	1000	200	180	-

Table 1: Game definitions of three variants of the 5-person public good game, in which the marginal public benefit to contribution is systematically related to the DN in one of three ways. The private cost of contribution is held constant at 90 points.

private) of moral/contributive behavior. In a standard linear public goods game there is a fixed cost of contribution and each contribution is multiplied by a fixed factor when added to the group pool. This pool is then divided among all group members, contributors or not. In our design, by allowing the cost of contribution and the multiplier to depend on the number of contributors, the private *net* cost of contribution can be kept constant while the marginal social benefit (the change in the total amount earned by all group members) can be either constant, increasing, or decreasing in the DN. Table 1 shows these game definitions, as presented to participants – contribution is referred to neutrally as “IN” versus “OUT”.

Due to the complex nature of these tables, participants were also provided with a javascript widget at every stage of the experiment, with which they could easily calculate potential game outcomes. This widget emphasized both individual and total group payments on equal footing in order to avoid experimenter demand effects. An example widget is shown in Figure 1.

The experiment consisted of two Phases. In Phase 1, we assigned subjects to one of three treatments: Constant, Increasing, or Decreasing (marginal public benefit), corresponding to the three games in Table 1. Choices allow us to measure baseline levels of cooperation in the absence of specific information about the DN. In Phase 2, we assign subjects to one of six treatments, the three from Phase 1 crossed with a second treatment dimension in which we provided (truthful) information about an outcome from a Phase 1 game in which the DN was either High (80% contribution) or Low (20% contribution).

*You can use the following tool to see how each person's earnings depend on what each person does. Click the button to mark that person as choosing IN, and click again to mark them as choosing OUT.*

Click the buttons!	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Choosing IN?	No	Yes	No	Yes	No
Points	160	30	160	30	160
Total group points	540				

Figure 1: An example widget for PG1, provided to participants on every page of the experiment, with which they could easily calculate potential game outcomes.



Full experimental instructions are provided in the Online Appendix. The full experiment, in each treatment, consisted of up to 7 parts in the following order:

1. Game description and comprehension check: The game was described as a hypothetical interaction between five anonymous MTurk users. In addition to the payoff table (shown in Table 1) and widget (shown in Figure 1), the constant net private cost of contribution and the relationship between the number of contributors and the public benefit of contribution was emphasized in bold text. Participants were required to correctly answer four comprehension checks before proceeding.
2. Descriptive norm information: In Phase 2 treatments only, participants were told (truthfully) that in an earlier test of the game, either 1 out of 5 (20%) or 4 out of 5 (80%) participants had chosen to contribute. To ensure that this information did not disproportionately highlight the DN, we also described the game results in terms of the marginal benefits; for example in the DH treatment participants were told that “If one additional person had chosen IN, the prize per person would have gone up by 20 points. If one additional person had chosen OUT, the prize per person would have gone down by 30 points.”
3. Descriptive expectations elicitation: Participants were asked what percentage of all MTurk users will choose IN. This was incentivized for accuracy by granting a 10 cent bonus for guessing within 10% of the true fraction (within the same treatment).
4. Game: Participants chose IN or OUT in a real game, in which points were translated to bonus payments at a rate of 3 points = 1 cent.
5. Personal injunctive norm elicitation: Participants were asked to rate each option (IN and OUT) on a seven-point scale from “very morally inappropriate” to “very morally appropriate”.
6. Injunctive expectations elicitation: For each choice and each rating, participants were asked to guess the fraction of MTurk users who assigned that choice that rating. These were required to sum to 100% for each choice. Accuracy was incentivized by granting a 10 cent bonus for guessing within 10% of the true fraction for one randomly chosen rating per choice.
7. Demographic survey: Each participant was asked about their income bracket, age, gender, education, race, and political identity.

*A: Constant Marginal Public Benefit*

<b>Number of B Choices</b>	<b>Cost of Choosing B</b>	<b>Group Prize</b>	<b>Group Prize (Per Person)</b>	<b>Total Cents for Choice B</b>	<b>Total Cents for Choice A</b>
0	0	0	0	-	40
1	70	150	30	0	70
2	70	300	60	30	100
3	70	450	90	60	130
4	70	600	120	90	160
5	70	750	150	120	-

*B: Increasing Marginal Public Benefit*

<b>Number of B Choices</b>	<b>Cost of Choosing B</b>	<b>Group Prize</b>	<b>Group Prize (Per Person)</b>	<b>Total Cents for Choice B</b>	<b>Total Cents for Choice A</b>
0	0	0	0	-	40
1	50	50	10	0	50
2	60	150	30	10	70
3	75	325	65	30	105
4	95	600	120	65	160
5	120	1000	200	120	-

*C: Decreasing Marginal Public Benefit*

<b>Number of B Choices</b>	<b>Cost of Choosing B</b>	<b>Group Prize</b>	<b>Group Prize (Per Person)</b>	<b>Total Cents for Choice B</b>	<b>Total Cents for Choice A</b>
0	0	0	0	-	40
1	95	275	55	0	95
2	75	450	90	55	130
3	60	550	110	90	150
4	50	600	120	110	160
5	45	625	125	120	-

*Table 2: Game definitions of three variants of the 5-person public good game used in experiment PG2. All quantities are in cents.*

Part 2 served as a measure of each participants' descriptive expectations, and therefore also served as a manipulation check in Phase 2. Parts 3 and 4 comprise an injunctive norm elicitation mechanism inspired by the coordination game proposed by Krupka and Weber (2013), but adding in an unincentivized survey measure of personal injunctive norms so that guesses of those responses could be incentivized, rather than guesses of others' injunctive expectations. Additionally, the mechanism was expanded to elicit beliefs about the full distribution of personal norms instead of only the modal response. These two changes allow us to distinguish between personal norms and injunctive expectations and to pick up on heterogeneity if a clear consensus norm does not exist.

While all participants completed the norm elicitation parts after playing the game itself, evidence shows (and our initial pilot tests confirmed) that ordering does not substantially affect either behavior or elicited norms (D’Adda et al., 2016).

## 2.2 Experiment PG2

Experiment Public Goods 2 is a replication and extension of PG1. The primary motivation for this replication is to strengthen the value of information as much as possible, after the influence of information turned out to be smaller than expected in PG1. We also made several minor changes to the protocol described above to rule out potential framing effects and to verify that our results are robust to minor variation in implementation. Due to findings that in some situations cooperation is treated as the “default” action when the choice set is confusing (Burton-Chellew et al., 2016), we especially wanted to make sure the instructions were as simple and straightforward as possible and to remove any phrasing that could suggest that contribution should be the default choice. The complete implementation details are provided in the Online Appendix.

First, the options were described as “A” and “B” rather than “IN” and “OUT”. Second, we simplified the game presentation by omitting the tables shown in Table 2 and providing only the widget shown in Figure 2. Third, we described choices as “morally encouraged” or discouraged rather than “morally appropriate” or inappropriate. Fourth, we described all outcomes in terms of cents rather than points and increased the stakes in the game. Fifth, we amplified the increasing or decreasing relationship between the

*You can use the following tool to see how each person's earnings depend on what each person does. Click the buttons to change each person's choice between A and B.*






Click the buttons!	Alice	Bob	Carol	Dave	Eric
Choice					
Bonus (cents)	130	55	55	130	130
Total group payment (cents)	500				

Figure 2: An example widget for PG2, provided to participants on every page of the experiment, with which they could easily calculate potential game outcomes.

DN and MB in relevant treatments; while not shown to participants, the game

<b>Name:</b>	<b>Alice</b>	<b>Bob</b>	<b>Carol</b>	<b>Dave</b>	<b>Eric</b>
<b>Click to choose!</b>	<b>A</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>A</b>
<b>Earnings (cents):</b>	<b>40</b>	<b>20</b>	<b>20</b>	<b>40</b>	<b>40</b>
<b>Donation (cents):</b>	<b>40</b>	<b>+</b>	<b>30</b>	<b>=</b>	<b>70</b>
	<b>Donated</b>		<b>Matching</b>		<b>Total</b>
	<b>Earnings</b>		<b>Funds</b>		<b>Donation</b>

Figure 3: An example widget for the Charity experiment, provided to participants on every page of the experiment, with which they could easily calculate potential game outcomes.

definitions are shown in Table 2. Sixth, in Phase 2 treatments, we added a statement specifically informing participants that all members of their group were receiving the same information about a previous game result. And seventh, we moved the descriptive expectations elicitation to after the game (swapping parts 3 and 4 in the PG1 protocol above) in order not to disproportionately highlight the DN before participants made their choices.

To further simplify the protocol and to ensure the best quality data from the MTurk subject pool in the wake of the “bot scare” in mid-2018, we made several additional modifications. First, we required participants to have a 98% approval rate on MTurk (rather than 95%) and also added a captcha to the first page of the survey. Second, we used a 5 point scale for the IN elicitation instead of 7 points. Third, we changed our belief elicitation mechanisms: Rather than asking people to guess the percentage of participants who made a given choice, we asked them to categorize 100 average participants and paid a fraction of a cent per correctly categorized individual. Fourth, we elicited beliefs both about descriptive expectations and about average earnings. Since these two quantities are directly related, this allows us to verify whether beliefs are well-formed and accurately elicited.

### 2.3 Charity Experiment

Finally, in order to distinguish the influence of the DN on conditional cooperation versus moral behavior more generally, we repeat the PG2 experiment but with the modification that all contributions are donated to the United Way rather than being divided among the group. The marginal public benefits were identical to experiment PG2, but the constant private cost of contribution was reduced to 20 cents instead of 40

in order to still have close to half of people contributing at baseline.<sup>4</sup> The variation in marginal public benefit is created through matching funds added to the contributions from group members; the game is presented via a javascript widget as shown in Figure 3.

The experiment protocol is also nearly identical to experiment PG2 with two small exceptions. Because average earnings are a much more straightforward conversion from the average number of B choices compared to in PG1 and PG2, rather than eliciting beliefs about earnings we elicited beliefs about average total donations. And because the public benefit of contributing is related to the DN through matching funds, information about the DN in Phase 2 was accompanied with the implication for matching funds rather than total group earnings.

### 3. Results

After excluding 30 submissions from duplicate IP addresses and rejecting 22 submissions from likely bots that failed the captchas that we added to PG2 and Charity, we recruited a total of 1,430 Amazon Mechanical Turk users in the United States.

Replication data is available online (te Velde and Louis, 2019). Users were restricted from participating more than once. Treatments were assigned sequentially by arrival time and groups of 5 were also formed in order of arrival time.

Median time to complete the study was 8 minutes 50 seconds in PG1, 10:50 in PG2, and 11:22 in Charity. The median payment was \$1.07 in PG1, \$2.13 in PG2, and \$1.55 in Charity, which consisted of a 50 or 60 cent base payment plus a bonus payment based on the results from the game and from all incentivized belief elicitation questions. Participants received this bonus payment after the completion of the experiment, along with a detailed description of outcomes.

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<sup>4</sup> In an earlier experiment, we kept the constant private cost of contribution equal to PG2 as well, but found that the baseline levels of contribution were too low. This undermined the DN message in Phase 2, because a low signal did not affect expectations and a high signal was seen as implausibly high for many participants, although it was reported truthfully from (unusual) Phase 1 games. The experimental protocol and data from this experiment is therefore omitted for brevity but is available by request.

Figure 4 shows that our descriptive norm manipulation in Phase 2 successfully affected descriptive expectations in all three experiments. Analysis focuses on Phase 2 treatments only, but including Phase 1 data under the assumption that a lack of DN information exogenously generates intermediate descriptive expectations does not change our conclusions.

Contribution rates qualitatively followed the expected patterns. As shown in Figure 5, baseline contribution rates (in red) without any DN information provided did not substantially differ in the three game variants in any of the experiments. But DN information, and the information about the marginal (public) benefit (MB) implied by

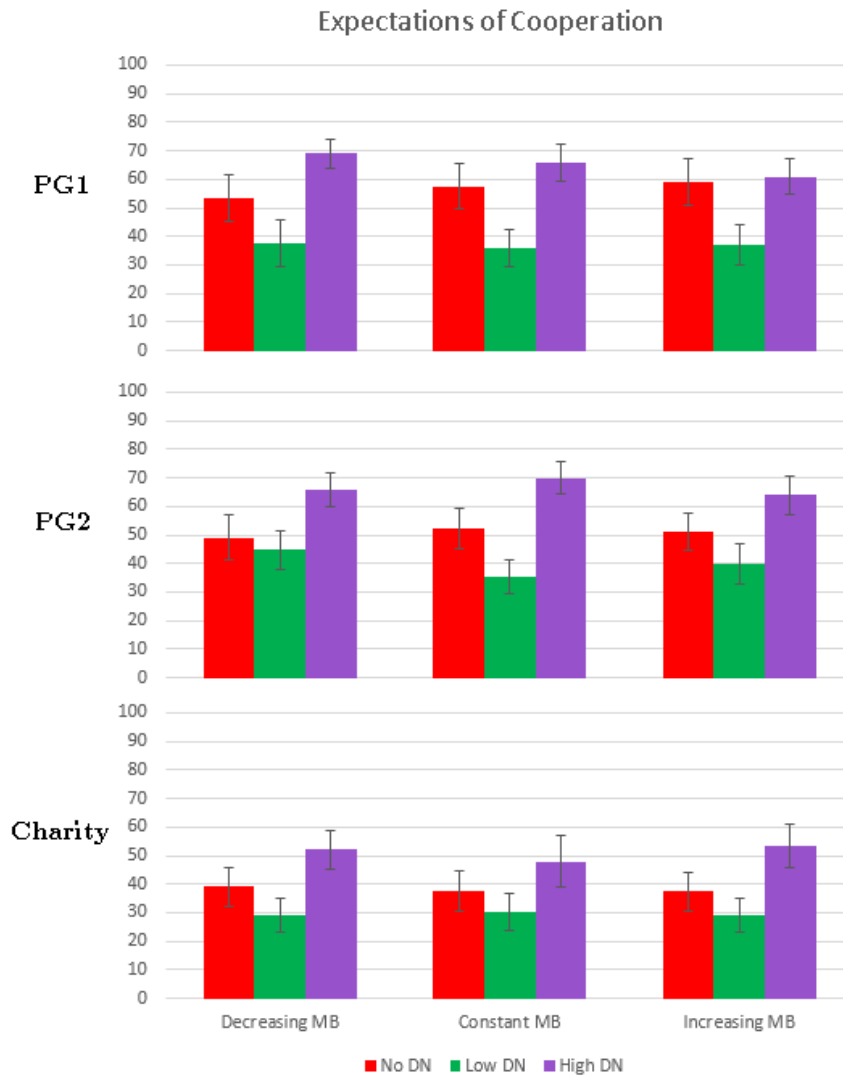


Figure 4: Descriptive expectations, i.e. the incentivized guess of what fraction of other participants would choose to contribute in the game. Error bars denote 95% confidence intervals.

that DN information, did affect contribution rates in the expected directions. In the Constant MB treatments, the DN conveys no material information and therefore the only influence is to increase contribution rates in the CH treatment relative to the CL treatment. In the Increasing MB treatments, a high DN communicates a high MB from cooperation, which amplifies the power of the DN; conversely in the Decreasing MB treatments, the high DN conveys a low expected MB from contribution, which counteracts the power of the DN. On net, in all three games there is a much larger gap between high and low DN treatments when the MB is increasing in the DN than when it is decreasing.

In all nine games, however, contribution rates are higher in the high DN than low DN treatment, indicating that the inclination to conform outweighs the importance of the

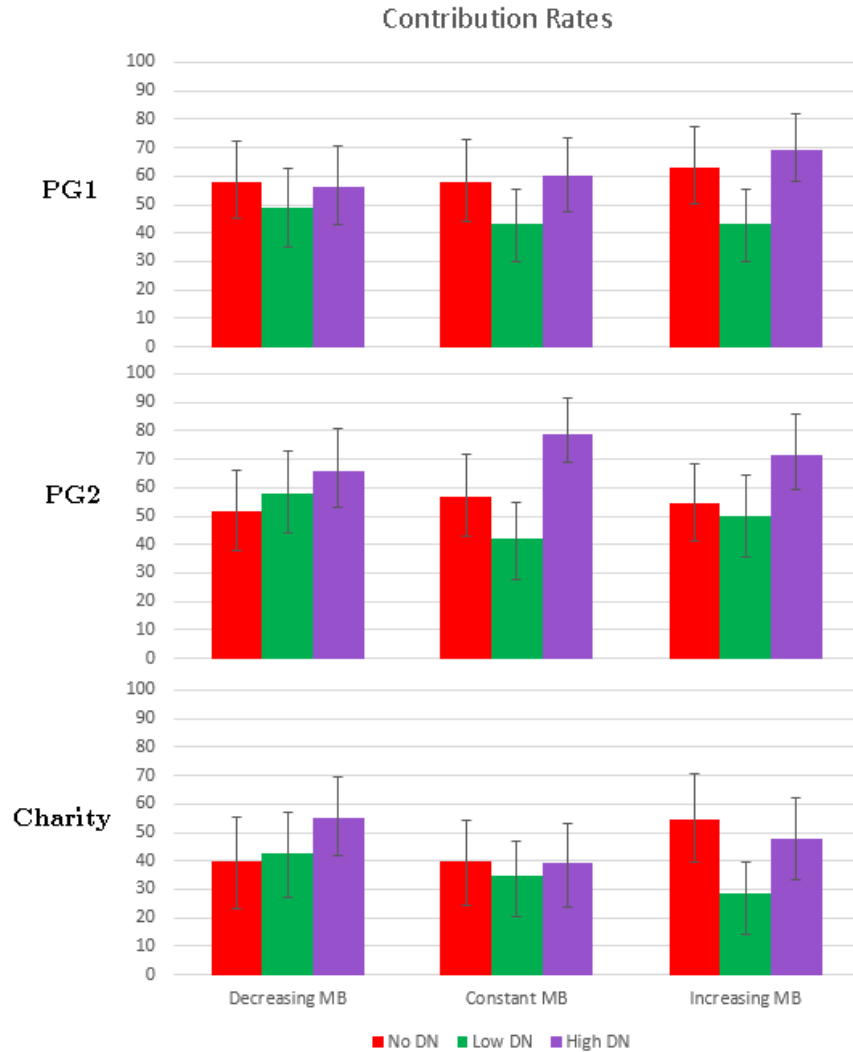


Figure 5: Contribution rates by treatment. Error bars denote binomial 95% confidence intervals.

Contributed?						
	PG1		PG2		Charity	
<b>High DN</b>	<b>0.429</b>	<b>0.447</b>	<b>0.601</b>	<b>0.600</b>	<b>0.341</b>	<b>0.323</b>
	(0.133)**	(0.138)**	(0.148)***	(0.153)***	(0.145)*	(0.151)*
	[0.166]	[0.169]	[0.220]	[0.213]	[0.131]	[0.119]
<b>Marginal Benefit</b>	<b>0.122</b>	<b>0.126</b>	<b>0.091</b>	<b>0.067</b>	<b>0.039</b>	<b>0.008</b>
	(0.082)	(0.085)	(0.093)	(0.096)	(0.089)	(0.092)
	[0.047]	[0.048]	[0.033]	[0.024]	[0.015]	[0.003]
<b>N</b>	<b>365</b>	<b>352</b>	<b>310</b>	<b>302</b>	<b>307</b>	<b>299</b>
<b>Controls?</b>	<b>N</b>	<b>Y</b>	<b>N</b>	<b>Y</b>	<b>N</b>	<b>Y</b>

Table 3: Probit regressions of contribution rates. Robust standard errors are shown in parentheses and marginal effects are shown in square brackets. Statistical significance is shown at 10%(\*), 5%(\*\*), and 1%(\*\*\*) levels. Controls are demographics measures of age, gender, race, education level, and income.

material information conveyed by the DN. The regression analysis of contribution rates confirms that the influence of the DN itself, rather than the material implications that can be learned from the DN, has a much stronger and larger influence on contribution rates.

Result 1: The direct influence of the DN on contribution rates is large and robust, and dwarfs the indirect informational effect.

Table 3 shows that DN information has a strongly significant and a large impact on contribution rates: “High DN” is an indicator variables for corresponding treatments; “Marginal Benefit” is a categorical variable equal to 0 in Constant MB treatments, 1 when the DN information implies a high MB (In the IH and DL treatments) and -1 when it implies a low MB (in IL and DH treatments). Demographic controls include indicators for gender, categorical variables for age, income, and education brackets, race indicators, and a political left-/right-leaning Likert measure.

In PG1 the DN has a large and statistically significant impact on contribution rates. The marginal benefit of contribution, on the other hand, has a much smaller impact on contribution rates that does not quite reach statistical significant in these regression specifications. As this was the first experiment conducted, we were concerned that this null result simply reflected small stakes and/or an insufficiently strong relationship between the DN and MB. PG2 was designed to replicate PG1 while investigating that possibility further. As described in section 2, the stakes were raised substantially: average



payments doubled from PG1 to PG2 and average hourly wages in PG2 were almost \$12, dramatically higher than what is typically available to Mturk workers. The relationship between DN and MB was also amplified to the extent that the 5<sup>th</sup> person contributing in any group created *zero* marginal benefit.

Despite these changes, the effect of the MB information conveyed in PG2 was even weaker than in PG1 and nowhere near statistically significant. The direct impact of the DN, however, was even larger and stronger.

In the charity variant, the MB informational content of the DN has virtually no discernible impact on contribution rates at all, despite the fact that the relationship between DN and MB was exaggerated even further in this experiment (the first contributor induced a 900% matching donation while the last contributor induced no matching donation at all). The direct effect of the DN is again large and statistically significant, but smaller in magnitude than in PG1 and PG2. This allows us to infer our second result, discussed below.

**Result 2: Conformity is a more important channel of influence for the DN than conditional cooperation.**

In PG1 and PG2, the DN can influence behavior both through sheer conformity and via conditional cooperation – if participants are willing to cooperate in a mutually beneficial interaction only if enough others do their part as well, then the DN provides information that enables them to make that decision. In order to discern whether this operates by catering to people’s desire to conform, or by enabling successful conditional cooperation, the Charity experiment takes away the cooperative nature of the game by making the beneficiary of contributions an external charity. The coefficient on the DN indicator variables are indeed smaller in Charity than in PG1 and PG2, but still sizeable and statistically significant in all regression specifications. The magnitudes of the effects suggest that more than half of the influence of the DN is through enabling conformity rather than through enabling conditional cooperation.<sup>5</sup>

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<sup>5</sup> Note that this one-shot game means that conditional cooperation does not entail actual reciprocity, in the sense of contributing in response to other group members’ previous cooperation. Our results therefore do not contradict Romano and Balliet (2017), who find that reciprocity outweighs conformity.

Result 3: Personal injunctive norms are strongly influenced by descriptive expectations.

A third channel of influence for the DN is via personal injunctive norms and injunctive expectations. Because we elicited injunctive norms and expectations as well, we are able to determine the role of descriptive expectations, and the actual costs and benefits of contribution, in forming personal injunctive views on the moral imperative to cooperate.

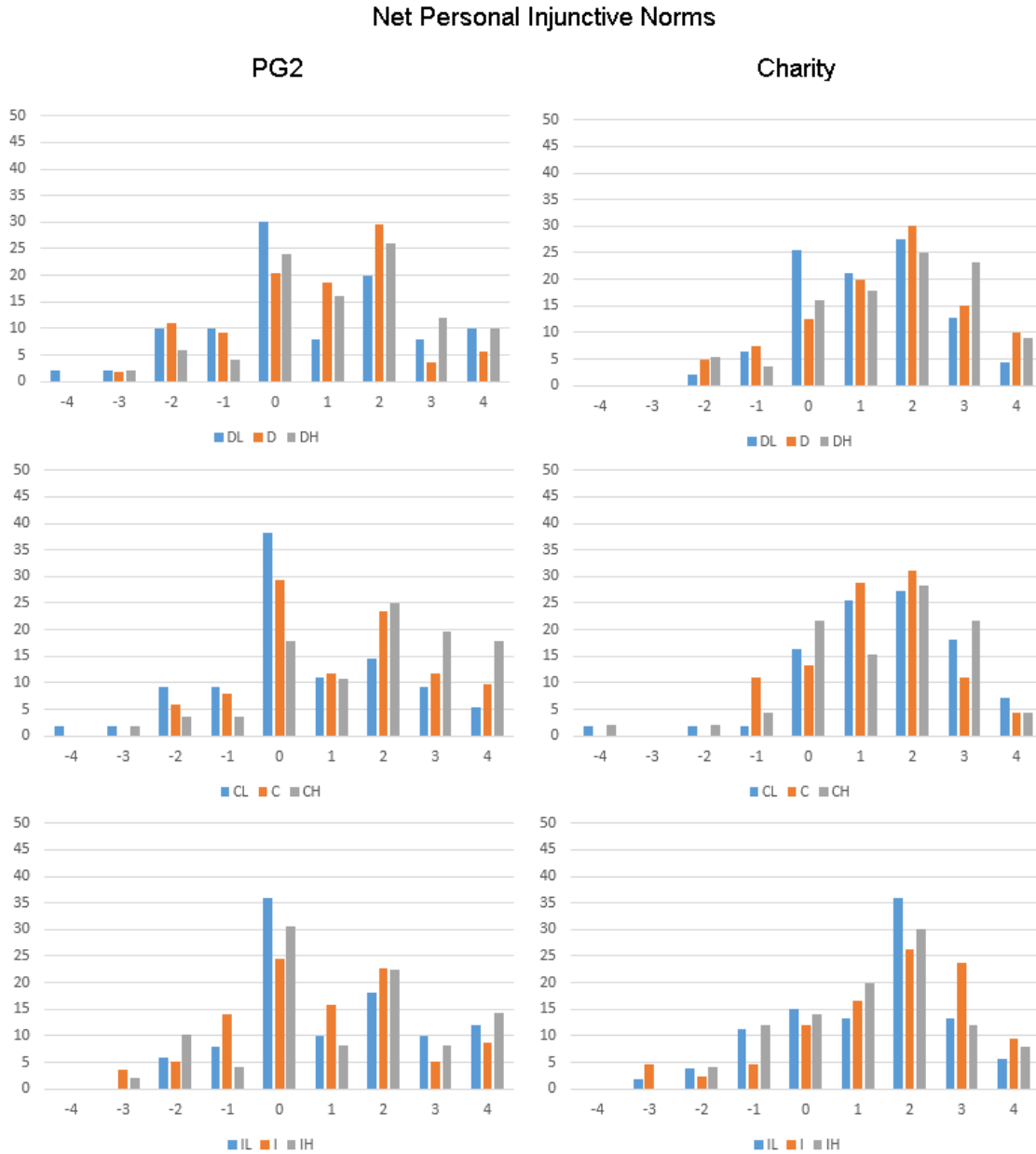


Figure 6: Histograms of net injunctive ratings; i.e. the rating from 1-5 of the morality of contributing minus the rating of not contributing, in the PG2 and Charity experiments. Quantities are in percentages.

While it is entirely expected that participants based their behavior and injunctive *expectations* on the DN, we find that they also base their own personal moral views more on observing others' behavior than on the social implications of their choices. This effect is strong and robust in PG1 and PG2 but much weaker and insignificant in the Charity experiment, possibly because the charitable framing causes participants to have clearer moral opinions from the start.

Table 4 shows the regression analysis. In all four regressions, the DN is strongly and significantly predictive of personal injunctive beliefs, whereas the MB has a much smaller, and never significant, impact on beliefs. A corresponding table with the incentivized measure of injunctive expectations is omitted for brevity because it looks extremely similar to Table 4; indeed, the correlation coefficient between personal injunctive norms and injunctive expectations is 0.51.

Looking at the full distribution of ratings reveals more. Figure 6 shows the distribution of

Net Injunctive Ratings?						
	PG1		PG2		Charity	
<b>High DN</b>	<b>0.721</b>	<b>0.737</b>	<b>0.625</b>	<b>0.597</b>	<b>0.098</b>	<b>0.068</b>
	(0.203)***	(0.205)***	(0.205)***	(0.209)***	(0.176)	(0.171)
<b>Marginal</b>	<b>0.028</b>	<b>0.046</b>	<b>-0.134</b>	<b>-0.144</b>	<b>-0.080</b>	<b>-0.075</b>
<b>Benefit</b>	(0.129)	(0.130)	(0.129)	(0.131)	(0.107)	(0.107)
<b>Constant</b>	<b>0.861</b>	<b>0.864</b>	<b>0.729</b>	<b>0.754</b>	<b>1.319</b>	<b>1.338</b>
	(0.138)***	(0.139)***	(0.145)***	(0.145)***	(0.121)***	(0.119)**
						*
<b>N</b>	<b>365</b>	<b>352</b>	<b>310</b>	<b>302</b>	<b>307</b>	<b>299</b>

Table 4: OLS regressions of net injunctive ratings, i.e. the difference between the rating of moral appropriateness of contributing minus the rating of not contributing, on a 5- or 7-point Likert scale. Robust standard errors are shown in parentheses and statistical significance is denoted at the 10%(\*), 5%(\*\*), and 1%(\*\*\*) level.

net personal injunctive ratings (rating of contributing minus the rating of not contributing) by treatment in experiments PG2 and Charity, broken down by game. PG1 is similar to PG2 but uses a 7-point Likert scale rather than 5, so it is not directly comparable. As shown by the regressions in Table 4, these distributions move to right when high descriptive information is provided. Strikingly, however, the modal net rating in all treatments is exactly 0 in PG2. This is not the case in the Charity experiment, further supporting the idea that personal injunctive norms are not as well-formed in the PG experiments, thereby potentially allowing a larger role for the DN to inform the IN.

Result 4: The total influence of the DN goes beyond its influence on personal injunctive norms and injunctive expectations.

The strong impact of the DN on INs, in addition to its impact on choice, raises the question of whether the impact on choice is exclusively explained by the indirect channel via INs at least in the PG games. Table 5 shows that choice, while strongly predicted by personal injunctive norms, is still additionally significantly predicted by the DN even after controlling for those injunctive norms. The magnitude of this effect is changed very little in the Charity experiment, in which the DN did not strongly affect personal INs, but the magnitude of the High DN coefficient in PG1 and PG2 is reduced relative to Table 3. This

	<b>Contributed?</b>		
	PG1	PG2	Charity
Net Rating	0.264 (0.047)*** [0.090]	0.284 (0.045)*** [0.090]	0.172 (0.052)*** [0.062]
High DN	0.305 (0.144)** [0.104]	0.500 (0.160)*** [0.158]	0.314 (0.152)** [0.112]
Marginal Benefit	0.127 (0.088) [0.043]	0.128 (0.099) [0.040]	0.022 (0.094) [0.008]
<i>N</i>	352	302	299
Controls?	Y	Y	Y

Table 5: Probit regressions of contribution rates, controlling for personal injunctive norms ("Net Rating"). Robust standard errors are shown in parentheses and marginal effects in square brackets. Statistical significant is denoted at 10%(\*), 5%(\*\*), and 1%(\*\*\*) levels.

indicates that in situations in which personal INs are not strongly formed prior to entering the choice context, part of the influence of the DN is to inform those opinions and beliefs. But this is far from being the majority of the power of the DN.

It is worth noting that this strong effect of the DN on personal INs in PG1 and PG2 relative to the Charity experiment also means that part the difference in the effect of the DN on behavior between the PG games and the Charity game could be not because of conditional cooperation, but because of this indirect influence of INs. Because conditional cooperation is primarily a useful strategy to follow in repeated games, it would not be surprising if it plays little role in any of these one-shot, highly anonymous online games in which the game structure is designed such that the payment from contributing is always

a constant amount less than the payment from not contributing, completely independent from others' behavior.

## 4. Discussion

The results presented above relate to several different literatures and also raise new questions. In this section we will discuss each of these in turn.

### *4.1 The social norms approach*

The social norms approach from social psychology emphasizes that descriptive expectations have to be wrong in order for descriptive information to influence behavior, and so focuses efforts in situations in which expectations are wrong even on aggregate, i.e. when there exists "pluralistic ignorance". While not the focus of our investigation, this condition is implicitly built into our experimental design for identification purposes: in order to be sure that the descriptive information we provide moves expectations in the intended direction, at least for most people, we provide descriptive information that is either substantially lower or higher than the true average behavior over the full population.

The large effect of conformity relative to conditional cooperation is consistent with the social norms approach literature which finds large effects in non-cooperative contexts. For just a few of many examples, Baumgartner et al., (2011) finds a robust causal influence of the DN on adolescents' risky sexual behavior online, Buunk and Bakker (1995) find a strong influence of the DN on sexual infidelity, and college students with persistently incorrect beliefs about their peers' drinking behavior are shown to be influenced by corrected descriptive information across a number of studies (Borsari and Carey, 2001; Borsari and Carey, 2003; Lewis and Neighbors, 2006). This has recently entered the mainstream economics literature as well; Bursztyn et al. (2018) find that correcting beliefs about personal norms of female labor market participation have persistent effects on actual female labor market participation in Saudi Arabia. Each of these settings have very little interdependence between people in terms of personal utility from alternative choices, indicating little role for conditional cooperation. However, because INs and DNs and the costs and benefits of choices are naturally closely linked, these studies are not able to determine whether the power of the DN comes from its informational value (knowing few

college students binge drink teaches me that it's not likely to be a worthwhile pastime), conformity (I don't want to stand out as the only binge drinker in my dormitory), or indirectly via the IN (knowing few college students binge drink is more reliable indication of people's true injunctive views than cheap talk). This disambiguation is the purpose of this study.

#### *4.2 The psychological link between INs and DNs*

The focus theory of normative conduct (FTNC) (Cialdini et al., 1990, 1991; for an overview see Cialdini, 2012) proposes that DNs and INs operate through distinct psychological channels. DNs are said to inform individuals of which choice might be most effective while INs instead influence behavior by indicating the route to social acceptance. On the other hand, other authors argue that INs and DNs are so closely intertwined mentally that we may not even process or remember them distinctly (Eriksson et al., 2012). Others point out that Cialdini's dichotomy is not so black-and-white in the first place because part of what makes a behavior prudent is that it is socially accepted (Eriksson and Strimling, 2015). Our results speak to this debate. First, we find that the DN does influence injunctive expectations strongly in the PG1 and PG2 experiments, in line with Eriksson et al.'s claims. On the other hand, this does not persist in the Charity experiment in which people enter the game with stronger moral views, which suggests that the close association between the DN and IN may be a heuristic involved in learning about moral behavior rather than a persistent conflation of the two concepts; this view is in fact supported by the authors themselves (Eriksson and Strimling, 2015).

In support of Cialdini et al.'s view, the DN does appear to have a distinct influence on behavior above and beyond either INs or injunctive expectations. However, the informational channel suggested by the FTNC is clearly dwarfed by a direct desire to conform. If the DN is attractive because it (usually) indicates effective choices, this must be such a deeply subconscious impulse that it dominates clear objective information to the contrary, which renders this explanation only semantically different from a preference for conformity. Or, if "effective" actions are those that conform due to costs of punishment or social exclusion/judgment, this is again effectively the same as a preference for conformity in our context and is in fact contrary to the FTNC proposition that the IN, not the DN, provides information about how to avoid those costs.

Neither Cialdini et al. nor Eriksson et al. make claims about the role or determination of personal injunctive norms in their respective models of normative influence. Based on our finding that the DN strongly influences both personal INs and injunctive expectations to an equal degree, at least in the PG games, this is clearly an omission that requires further research to address.

### *4.3 Models of moral behavior*

Economic models of moral behavior fall in several rough categories that have in common a general agnosticism about the psychological processes generating utility from moral behavior or disutility from failure to live up to one's own or others' moral standards. Because of this agnosticism, it is usually possible to interpret the basic approach of the norm models as consistent with our findings. However, some are more explicit about the role of descriptive norms directly.

Several models define social image as a cost of moral deviation that is an increasing function of the strength and extent of moral *beliefs* in a population. That is, social image is associated with injunctive normative expectations. Akerlof (1980), Carvalho (2013), and the model of approval in (te Velde, 2019) fall in this category. In our data, injunctive expectations are highly correlated with personal injunctive norms and both are strongly predictive of behavior, so this is not an unreasonable approach. However, even if a substantial share of the influence of the DN does operate via informing injunctive expectations, our Result 4 indicates that the DN influences behavior above and beyond its effect via INs. Whether this desire to conform to the DN more closely resembles an inherent psychological preference, or an image concern based on the notion that audiences judge actions relative to typical actions in addition to or instead of relative to INs, remains to be studied. Because this experiment is in a highly anonymous online context in which social pressure is known to be a weak influence (te Velde, 2018), the former seems more likely; image concerns in this environment must manifest as internalized social image concerns, self-image concerns, and/or beliefs-based altruism.

Perhaps a step closer to our results, Bursztyn et al. (2017) models social image as the observer's inference of the likelihood that s/he shares personal INs with the actor. Similarly, the literature on identity models the utility from following prescribed behavior specific to the group that the actor identifies with (Akerlof and Kranton, 2005, 2002, 2000;

Benjamin et al., 2010; Chang et al., 2017). If MTurk users identify with other MTurk users, they may interpret the DN as an indication of prescribed group behavior and be driven towards the DN more than they would be if they merely used the DN to inform their own injunctive views.

Another line of literature models moral behavior as a signaling game. Andreoni and Bernheim (2009), Grossman (2015), Ellingsen and Johannesson (2011), Bénabou and Tirole (2006), Ellingsen and Johannesson (2008), Seabright (2009), and the respect model of te Velde (2019) all define social image as the inference that observers draw about the weight actors put on doing the right thing. This approach may be successful for understanding behavior in situations with more social pressure, but it does not take into account the power of the DN as established in our results.

Closest to our results is the approach of modeling social pressure as explicitly relative to the DN (Fershtman et al., 2011; López-Pérez, 2008; Michaeli and Spiro, 2015, 2017; Traxler, 2010). Some models of behavior change or norm evolution also assume that the DN is the center of gravity (Bose et al., 2017; Centola et al., 2005; Granovetter, 1978; Lindbeck, 1997; Manski and Mayshar, 2003). And in accordance with our finding that personal injunctive norms and expectations closely track the DN, several models assume the beliefs themselves track the DN in addition to behavior (Kuran and Sandholm, 2008; Calabuig et al., 2018; Kincaid, 2004).

#### *4.4 The bystander effect*

While the design of our studies was with the goal of identifying the separate influence of conformity versus informational content of descriptive norms, the design also captures an economically interesting setting that has not been studied. Situations in which the marginal social benefit to moral behavior is sharply decreasing in the descriptive norm (voting, e.g.) exist in the real world and these settings pose unique challenges. The bystander effect is a particularly poignant example. A common explanation for the bystander effect is deindividuation or diffusion of responsibility (Darley and Latané, 1968). It has also been suggested that the FTNC explains the bystander effect because descriptive information that is conveyed when one witnesses someone in need but with no one helping would, according to that theory, inform future observers that helping is not the prudent choice. This explanation would also predict that help would attract further



help. Yet the fact that the bystander effect occurs even in clearly tragic circumstances in which minimal help would be of great value makes this explanation intuitively unsatisfying.

Our findings, on the other hand, suggest a conformity-based explanation. This suggests that unhelpful bystanders are driven more by a desire to fit in with the crowd via imitation than by the consequences of action. This implies that observers will be more willing to help after several others are already helping, even though there is little to be done at that point and additional help may in fact be harmful (if too many people try to call 9-11 and the phone lines are jammed, e.g.). This is contrary to the deindividuation explanation. The focus theory of normative conduct also predicts that helpers will attract more helpers, but this explanation could be distinguished from conformity by varying the ambiguity of the necessity to help, at any given level of the DN. This promises to be a fruitful and impactful avenue for future research.

## 5. Conclusion

We study a carefully-designed novel experimental paradigm that allows the instrumental value of descriptive information to be disambiguated from the direct effect of conformity or conditional cooperation or the indirect effect via learning about injunctive norms. We find that the informational value of descriptive norms, which provide guidance towards effective choices, is minimal compared to the strong effect of enabling conformity. Part of this effect may occur via the channel of informing injunctive norms and injunctive expectations, but this does not occur in all settings and does not account for most of the effect. Enabling conditional cooperation is also an important role of the DN, but less powerful than enabling conformity for its own sake rather than to collectively ensure group well-being.

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