**The emergence of deviance:
Experiments testing the personal effects of violating a social norm**

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Data, materials, and online resources: The pre-registration, data, analysis codes, and online appendix can be found on the Open Science Framework (OSF): <https://osf.io/yextr/>

Abstract

Social norms are such powerful drivers of human behavior that people conform to social norms even when they would prefer to violate them or when conforming is not in their personal material interest. Researchers have theorized that in these cases, people conform to avoid the social and psychological costs of deviance (e.g., guilt, self-deprecation, punishment). Notwithstanding the possible costs, people do decide to violate norms. We conducted two randomized experiments ($N = 3,499$) to explore the behavioral and psychological consequences of deviating from norms. Participants played behavioral games governed by norms of cooperation, without a mechanism for players to punish one another. Participants assigned to the treatment condition, unlike those in the control condition, were offered a monetary incentive to deviate from a strong norm of cooperation in one round of the game. Violating this norm significantly increased their propensity to violate other social norms in new settings involving new groups and new games (with no incentive to deviate). Post-treatment survey data suggest that violating norms causes people to depreciate their expectation of the costs associated with violation, but does not lead them to update their views of the self. Together, these results challenge and inform traditional views of deviance as personality or a stable individual motivation or trait, and suggest that deviance can emerge from an experience of deviance at any point in one's life.

Keywords: social norms, deviance, norm violation, conformity

The emergence of deviance:

Experiments testing the personal effects of violating a social norm

Awareness of the influential power of social norms on human behavior has generated a great deal of research on the relationship between social norms and conformity. Social norms are defined as one's impressions of the desirable behavior or attitude within a particular group or social context (Miller & Prentice, 1996; Tankard & Paluck, 2016), and researchers have demonstrated that social norms often override people's material interests. For instance, norms of cooperation, reciprocity, and fairness (Falk & Fischbacher, 2006; Fehr & Schmidt, 1999; Fehr & Schurtenberger, 2018) lead individuals to share money with strangers instead of keeping it all for themselves (Engel, 2011), or reject deals that are advantageous to themselves but unfair to others (Camerer & Thaler, 1995). Another body of work has focused on the influence of social norms over individuals' personal preferences. For instance, interventions to alter perceptions of social norms have been successful at changing important behaviors where attitude or value-based interventions have been less successful, for example when reducing rates of conflict in schools (Paluck, Shepherd, & Aronow, 2016), energy consumption in neighborhoods (Allcott, 2011; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), drinking and drug use (Perkins, Meilman, Leichliter, Cashin, & Presley, 1999; Prentice & Miller, 1993), and increasing voter turnout (Gerber, Green, & Larimer, 2008).

Why do social norms have outsized influence on human behavior? Theories propose that people conform to avoid the social and psychological costs of violating social norms (Chang, Smith, Dufwenberg, & Sanfey, 2011; Cialdini & Goldstein, 2004; Fehr & Fischbacher, 2004; Schwartz, 1973).¹ Studies of the social costs of deviance have revealed that norm violators are often perceived and labeled negatively, marginalized, stigmatized, or punished by other people (Becker, 1963; Grattet, 2011; Jetten &

¹ Other frameworks, less relevant to the present research, have considered the possibility that humans have genetic predispositions to conform to social norms (Rand & Nowak, 2013), explored the expression of norms in the brain (Chang et al., 2011; Ruff, Ugazio, & Fehr, 2013), and argued for the function of conformity for the survival of the species (Nowak, 2006; Rand et al., 2014).

Hornsey, 2010). Studies of the psychological costs include the experience of negative affect such as guilt, shame, self-deprecation, or lower levels of self-esteem (Chang et al., 2011; Schwartz, 1973). The experience or the anticipation of negative social or psychological experiences are thought to drive future conformity to norms (Cialdini & Goldstein, 2004).

Notwithstanding the possible costs, individuals do decide to violate norms. In these instances, what are the actual costs of deviation? Researchers have uncovered patterns of punishment from observers who react to study participants' deviance (Fehr & Fischbacher, 2004; Fehr & Schurtenberger, 2018) and have documented the disruptive consequences of deviance for social groups (e.g., Erikson, 2005; Hornsey, 2006; Jetten & Hornsey, 2010; Moscovici, Avermaet, & Mugny, 1985). However, the personal consequences of deviance for the norm violator are not well understood. In particular, does an act of deviance embolden an individual to establish a future pattern of deviance? Or do the costs experienced when violating a norm provide a chilling effect on future deviance?

Perhaps because deviance is often exceptional and thus salient (Gilbert & Malone, 1995; Ross, 1977), or because those who deviate retrospectively report patterns of deviance in their life history (Gomila & Paluck, 2020), deviance has traditionally been considered a feature of human's personality or a stable individual motivation or trait (Bennett & Robinson, 2000; Bernberg, 1954; Briggs, Cheek, & Buss, 1980; Burger, 1987; DeBono, Shmueli, & Muraven, 2011; Diefendorff & Mehta, 2007; Di Palma & McClosky, 1970; Elms & Milgram, 1966; O'Neill & Hastings, 2011; Smith, Organ, & Near, 1983; Snyder, 1979). This view of deviance has led scholars to study the stable characteristics of *chronic* norm violators, such as "rebels" (Gino, 2018), "rule-breakers" (Gelfand, 2018), "non-conformists", (Grant, 2016), "outsiders" (Becker, 1963), or "trendsetters" (Bicchieri, 2017). This framework generally considers deviance as a stable trait that develops early in the life span. For instance, Gelfand (2018) argues that by growing up in a "loose" culture, individuals become "less attentive to social norms, more willing to take risks, more impulsive, and more comfortable with disorder and ambiguity"

([Gelfand, 2018](#), p. 166). Other arguments about the early origins of deviance include the idea that being last in birth order makes one more rebellious and unconventional compared with other siblings because of differences in child rearing across sibling order ([Grant, 2016](#), p. 154-155). In all cases, this framework suggests that certain individuals are more likely to violate norms than others, and that individuals who have often deviated in the past will keep deviating in future.

A plausible but rarely tested theory of norm deviation is that a pattern of deviance can emerge from an experience of deviance at any point in one's life. From this perspective, any given person might establish a deviant pattern given the right conditions. A research paradigm testing this idea asks: is deviance more of a socially constructed pattern than a personality trait? Theories of the self anticipate this possibility: after deviating from a social norm, people may update their self-perception by integrating deviance into their self-concept ([Swann Jr. & Bosson, 2010](#)). People's need for psychological and behavioral consistency ([Markus, 1977](#); [Ross, Lepper, & Ward, 2010](#); [Swann Jr. & Bosson, 2010](#)) would lead those perceiving themselves as deviant to be more likely to deviate in future.

By contrast, traditional theories of conformity that focus on the costs of deviance might predict that violating a norm reduces one's propensity to violate norms in future. Breaking a norm should come with social or psychological costs that discourage people from doing it again, such as anticipated guilt ([Chang et al., 2011](#)). However, these theories do not anticipate what will happen if people underestimate or overestimate the costs of deviation. What if individuals overestimate the costs of violating a norm, and discover it less painful than they anticipated? Conversely, what if individuals underestimate the costs, and find that the act of violation was worse than they feared? Taking into account both the anticipation of costs and the actual experience of costs should predict whether the costs of deviance are strong enough to prevent or produce more deviance in future.

The Present Research

In the present research, we ask whether a pattern of deviance can emerge from one experience of deviance and why. We aim to identify the causal effects of violating social norms on three main outcomes: i) individuals' behavioral choice to violate social norms again, ii) individuals' self-perception as a deviant, and iii) individuals' expectations of the costs of violating social norms. In the past, researchers who studied deviance typically compared the characteristics or outcomes of individuals who were already more or less likely to violate social norms (judged by some individual difference). Our study is, to the best of our knowledge, the first to focus on identifying the consequences of deviance in causal terms using experimental methods. This strategy can be challenging, researchers need a setting that allows them to randomly assign individuals to violate social norms, which is difficult to operationalize.

To study the causal effects of deviance, we conducted two randomized experiments with 3,499 participants (summing both sample sizes) who played a series of behavioral games. We assigned a random half of them to receive an incentive to violate a strong, explicit, and uniformly-followed social norm of cooperation.

Participants played for real money in the Public Goods game, in which cooperation to contribute money to a common pool results in the most evenly distributed money for all players. To make a norm of cooperation clear to all participants, the high rate of conformity to a cooperative norm was displayed on the screen during each game round. In the final round of one game, participants in the treatment condition (but not control condition) received a private message promising a monetary incentive to violate the social norm of cooperation of their group by contributing a sum far beneath the group norm (which would result in a greater monetary benefit to themselves on top of the incentive). We then observe: are participants induced to violate the cooperative norm more likely to break norms in future? After violating a social norm, do individuals update their expectations of the costs of deviance, their perception of the self as deviant, or both? To answer these questions, we compare control and treatment participants' post-treatment contributions

to different behavioral games (Public Goods game, Dictator Game, and Trust Game) with new groups and players, as well as their responses to survey questions.

In both studies, we find evidence of the power of social norms, even though the games lack a mechanism by which players can punish one another for deviance. More than 75% of participants followed the cooperative group norm prior to the deviance treatment; moreover, 35% of participants who were randomly assigned a monetary incentive to violate the norm refused to do so. Participants who refused the treatment were conforming to a norm even though they knew that: i) their deviance would be rewarded by a monetary bonus, ii) they would make more money in that round of the game by contributing less to the common pool, iii) their deviance could not be punished by other players, and iv) they would not play any more rounds of the Public Goods game with those particular players. This finding highlights how, even though our game manipulation is subtle, the game created a strong norm that players were reluctant to violate.

Critically, we next find evidence that breaking one social norm causes a repeat pattern of norm deviance. Both experimental studies show that being randomly assigned to violate a social norm causes people to violate norms in other situations with different people and incentives. They also show that individuals randomly assigned to violate norms depreciate their expectation of the costs of breaking norms in future. However, we find no evidence that violating norms in this context causes individuals to update their self-perception. This study constitutes the first causal evidence of the emergence of deviance from one experience of social norm violation. Granted, these results may not apply to all acts of deviance, given design features including a lack of inter-player punishment and incentives to deviate: we explore extensions of this game and potential boundaries on our findings in the discussion.

Method

Overview of the design

In both Study 1 and Study 2² participants first played multiple rounds of the Public Goods game with three separate groups (G1, G2, and G3) of four players in total (Figure 1). We used this game to measure and experimentally manipulate participants' inclination to deviate from clearly advertised norms of cooperation.

Participants were kept blind to the fact that their game partners were bots who always conformed to the social norm by making contributions aligned with the advertised group norm. This design feature ensured that no participants witnessed norm violations from other players, and that the advertised group norm was reinforced by the behavior of the other players.

At the last round of the Public Goods game played with their first group, participants assigned to the treatment condition received a private message promising a monetary incentive of 50 Monetary Units (MUs) to violate the group norm by making a particularly low contribution of 10 MUs (when the norm was to contribute 98 MUs out of an endowment of 100 MUs received at the beginning of the round; Figure 1). To control for the additional resources and the experience of receiving a private message regarding special treatment, control condition participants were simply offered to “accept a bonus” by clicking a specific button displayed on the screen. Following this experimental treatment round, participants entered into two new groups, playing two rounds of the Public Goods game each with the new players. After this, they played a one-shot Dictator Game and a one-shot Trust Game, again with new players (Figure 1).

We use the following rounds of the Public Goods game (with new groups), the Dictator Game, and the Trust Game to explore the impact of the incentive to deviate on participants' propensity to violate new norms in different settings. In particular, behavior in the Dictator Game is understood as a measure of adherence to fairness norms (Whitt & Wilson, 2007), and the Trust game as a measure of adherence to trust

² Participants who took part in Study 1 were not able to sign up for Study 2.

norms (Berg, Dickhaut, & McCabe, 1995). Finally, participants completed a short survey, in which we measured their perception of the costs of violating social norms, their perception of the self as deviant, and demographics.

Figure 1. Description of the studies. In Studies 1 and 2, participants played the Public Goods game with 3 different groups of players and advertised norms. They played 3 rounds with the first group, 2 rounds with the second group, and 2 rounds with the third group. Before playing the last round with the first group, half of all participants were randomly assigned to an experimental condition that incentivized them to violate the norm of Group 1 at round 3. After playing all seven rounds of the Public Goods game, participants played the Dictator Game with a new player, and in Study 2 only, participants also played the Trust Game with a new player.

Pre-treatment setup

Public Goods game. At the beginning of each round of the Public Goods game, players received 100 Monetary Units (MUs), and could choose to cooperate or defect by making low vs. high contributions to a common pool. The total amount contributed by all four players was then multiplied by 1.6 and evenly redistributed to all players. The maximum payoff for the group is when all players contribute the maximum amount (i.e., 100 MUs). However, conditional on other players making large contributions, making a low contribution increases the payoff of a single player.³

Mobile and settled players The objective of these studies was to explore violations of clearly established social norms. For this reason, participants were told that the game involved two different types of players: “mobile” and “settled” players. They learned that mobile players moved from group to group every few rounds, whereas settled players kept playing with the same group the entire time. All participants were assigned to be mobile players, and joined groups composed of settled players (bots) only.

Norm advertisement. To make the norm of each group clear to all participants, we provided them with explicit normative information. The instructions explained that different groups had developed different collective strategies, that is, the typical contribution were different in different groups. When they joined a new group and before making their contribution decisions, participants were explicitly told about: i) the typical contribution in the group, ii) the minimum contribution made in the past N rounds in their group, in which N is a number varying between 65 and 130. For instance, participants were told that G1’s (settled) players typically contributed 98 MUs, G2’s (settled) players typically contributed 94 MUs, and G3 (settled) players typically contributed 50 MUs (Figure 1).

³ In the case of *repeated* Public Goods games (ie., when players play multiple rounds together), defecting is often not in one’s best material interest: when a player defects, the perceived equilibrium changes, and other players usually start defecting too in subsequent rounds. However, defecting in the last round is always in one’s best material interest, as long as the players know that they will never interact with each other again. In our studies, players are always told whether the round that they are about to play is the last round.

Deception. Unknowingly to participants, they played all games with fictitious players whose contributions were preset to be consistently aligned with the group norm. This feature of the study allowed us to ensure that participants were exposed to conformity only. To prevent participants from suspecting deception, we made bots' behaviors look like human behavior. For instance, participants would sometimes have to wait up to 30 seconds until other players (bots) made their contribution decisions in the Public Goods game.

Experimental round of the Public Goods game

Before playing their final round of the Public Goods game with Group 1 (G1), participants were randomly assigned to either the control or treatment condition. Participants assigned to the treatment condition were told that they were selected for “the low-contribution deal”: they would receive a 50 MU bonus if they accepted to make a particularly low contribution of 10 MUs at their last round with G1. The participants who accepted the low-contribution deal (compliers) were then forced to make a 10 MU contribution at this round. To control for the possible effect of being offered a deal with extra money, participants in the control condition were also offered a bonus, but were never asked to make a low contribution with G1.

Outcome measures

Post-treatment rounds of the Public Goods game. After playing the experimental treatment or control round with G1, participants played 2 rounds of the Public Goods game with G2, and 2 rounds with G3. We moved participants to a different group right after the treatment round to ensure that at any post-treatment rounds, participants had the same perception of the equilibrium of their current group independently of their assignment to an experimental condition. In other words, because they moved to a new group, participants' expectations of the contributions of their group's players was independent of the amount that they contributed in the previous round. For this reason, any average difference between treatment and control

participants cannot be attributed to a change in one's expectations of other players' contributions.

Dictator Game. After playing the Public Goods game with these three groups, participants played a one-shot Dictator Game. In the Dictator Game, all participants were paired with a new player, endowed with 100 Monetary Units, and offered to share some of this endowment with their new game partner. Put differently, participants were all assigned to be the “giver”, and never assigned to be the “receiver”.

Identification of compliance in the control condition. Participants assigned to the treatment condition were not forced to accept the incentive to deviate. Those who refused the incentive to deviate (i.e., “non-compliers”) represent 35% of the treatment group from each study. To account for noncompliance, we conducted: i) an intent-to-treat (ITT) analysis, which allows us to identify the causal effects of being assigned to an incentive to deviate ([Gerber & Green, 2012](#)), and ii) an instrumental variable (IV) analysis, which allows us to identify the causal effects of deviating after accepting the incentive to deviate ([Angrist & Pischke, 2009](#)). To aid the ITT analysis, we directly measured noncompliance within the control group as well, with a question placed in an additional round of public goods games for control group participants that incentivizes to deviate from the group norm in a fashion identical to the treatment group.

In Study 1 (but not Study 2), after playing the Dictator game participants from the control group were led to believe that they would play the Public Goods game again with a new group (G4), which had the same advertised norm as G1 (98 MU average contribution). Immediately after they joined G4, participants from the control condition were offered the same incentive to deviate of 50 MUs as treatment participants received with G1. Right after making their decision to accept or refuse this incentive to deviate, participants were told that the game was canceled because a player from G4 had left the study, and were directed to the survey questions. This procedure allowed us to successfully identify the control participant who would have complied to the treatment, and directly compare their post-treatment decisions to treatment

condition compliers (Figure 3).

Trust Game. In Study 2 (but not in Study 1), participants also played a one-shot version of the Trust Game with two successive players. In the Trust Game, participants were paired with another player (bot) and assigned to the role of the “receiver”. In this context, participants always started a game with 0 MUs. The other player, commonly referred to as the sender, started with an endowment of 100 MUs. The first mover is always the sender, who decides how much of their endowment to send to the receiver. This amount is tripled and sent to the receiver, who then decide how much of this amount to send back to the sender. In this game, if the sender believes that the receiver is not trustworthy, the maximum payoff is to not send any MUs to the receiver. Like in the Public Goods game, participants were informed about the norm. A message indicating the typical behavior of senders and receivers (i.e., the norm) was displayed on the screen: participants were told that senders typically send between 65 and 75 MUs, and receivers typically send between 85 and 95 MUs back.

Perceptions of the costs of violating norms: Hypothetical Trust game deal. To compare the price of deviance for treatment and control participants, we asked: how large a monetary incentive would have to be for participants to violate a norm. At the end of Study 2, we asked participants: “if we were to offer you a low-reciprocation deal, what is the minimum number of MUs that you would need to accept the deal?”

Identity questions. Participants were also asked to answer a total of 9 questions about their perception of the self as a norm violator. These questions were on a scale from 1 to 7 (1 = strongly disagree, 7 = strongly agree) and included: “I see myself as someone who stands out of the crowd”, “I see myself as a bit of a deviant”, or “I see myself as someone who doesn’t like to follow social conventions”.

Analytic strategy

For each outcome, we use two analytic strategies, which we preregistered on the Open Science Framework (OSF)⁴. Statistical significance is robust to both analytic strategies. First, we report intent-to-treat (ITT) effects, estimated using linear regression (OLS). This analysis yields an estimate of the effect of being incentivized to violate a social norm on the outcome of interest, which are more conservative than the results of the Instrumental Variable analysis.

The main model can be written:

$$y_i = \beta_0 + \tau Z_i + \epsilon_i \quad (1)$$

in which y_i is the outcome for the i 'th participant, τ is the intent-to-treat effect, Z_i is a treatment assignment indicator for the i 'th participant, and ϵ_i is an error term. In Study 1, we include gender (X_i) into the model to correct for covariate imbalance between the treatment and control conditions. (Angrist & Pischke, 2009). The conclusions of these analyses are the same regardless of the presence of covariates in the model.

All the findings reported in the results section are robust to the following model:

$$y_i = \beta_0 + \tau Z_i + X_i \beta + \epsilon_i \quad (2)$$

in which y_i is the outcome for the i 'th participant, τ is the intent-to-treat effect, Z_i is a treatment assignment indicator for the i 'th participant, X_i is a vector of preregistered covariates, β is a vector of covariate effects, and ϵ_i is an error term.

In addition, because a share of the treatment condition participants refused to comply to the treatment, we also report estimates of the treatment on treated effect (TOT) using instrumental variable (IV) regression analysis. The results of the IV analysis is illustrated in Figure 3 and Figure 4b, which compare i) the treatment

⁴ Preregistration files can be found on the following link: <https://osf.io/yextr/> We also posted the data and code onto this repository.

condition compliers (incentivized to deviate with G1c) to the control condition participants who would have complied to the treatment (incentivized to deviate with G4), ii) the treatment condition non-compliers to the control condition participants who would not have complied to the treatment.

Results

Description of the sample

A total of 3,499 U.S. residents from the online participant pool Prolific participated in Study 1 or Study 2. Control and treatment participants across studies were comparable on all demographic variables except for gender. Specifically, the treatment condition included fewer women than control (Table 1). This imbalance is entirely driven by a randomly-generated gender imbalance between conditions in Study 1 (Appendix A: Table S1 and Table S2). As preregistered, we control for covariates that are not equally represented across conditions in the regression analyses; inclusion and exclusion of this covariate in Study 1 analyses does not impact the statistical or substantive significance of the experimental treatment.

Table 1
Description of the sample

	Range	All participants	Control	Treatment	Difference	P-value
Gender	0-1	0.47	0.48	0.45	-0.03	0.05
Age	18-81	34.00	33.61	34.08	0.47	0.25
Income	1-5	2.59	2.57	2.60	0.03	0.46
White	0-1	0.74	0.74	0.74	0.00	0.81
Black	0-1	0.07	0.07	0.08	0.01	0.15
Asian	0-1	0.08	0.08	0.08	0.00	0.99
Hispanic	0-1	0.06	0.06	0.07	0.00	0.55
Experience wt games	1-4	1.55	1.54	1.56	0.02	0.48
Pre-treatment contribution 1	0-100	88.90	89.31	88.49	-0.82	0.3
Pre-treatment contribution 2	0-100	88.26	88.86	87.65	-1.21	0.15

Note: Table 1 displays descriptive statistics for the entire pool of participants that took part in either Study 1 (N = 1,439) or Study 2 (N = 2,060). The total list includes the average value of preregistered covariates and pre-treatment contributions to the Public Goods game for the entire sample and for each experimental condition. The difference in means between the treatment and control condition are listed along with the p-values from separate t-tests for these differences in means.

Pre-treatment contributions

The results reveal that most participants followed the advertised norm of cooperation of their Public Goods game group pre-treatment. In the two rounds that preceded the treatment incentive to deviate with G1, the median contribution to the common pool across the two studies was 97 MUs, with an average contribution of 89 MUs. Further explorations of levels of cooperation in the first two rounds of the Public Goods game revealed that 75% of the participants contributed more than 90 MUs. As displayed in Table 1, before the treatment incentive to deviate, participants from the treatment and control conditions made comparable contributions to the common pool in both studies.

Noncompliance to treatment

In the final round with G1, treatment participants received their incentive to deviate from the highly cooperative norm. In both studies, 35% of the participants who received the incentive to deviate decided to not comply: on average, these non-compliers donated 95 MUs in this round, compared to the average donation of 10 MUs among those who complied to the treatment (Figure 3).

Effect of deviance incentive on violations of subsequent norms in different settings

Figure 2 and Figure 3 show the average contribution of participants from each condition in the subsequent rounds of their new Public Goods games (see also Appendix B). The intent-to-treat analysis reveals that the incentive to deviate causally increased participants' propensity to violate social norms in subsequent Public Goods games featuring different groups, group norms, and players. Compared to participants assigned to the control condition, participants who received the incentive to deviate with Group 1 violated the norms of both Group 2 and Group 3 at higher rates. Specifically, participants from the treatment condition contributed 78.60 MUs on average, which is significantly less than the average contribution of 82.40 MUs made by the participants

from the control condition. This difference of 3.80 MUs represents a 4.5% decrease in contributions and is statistically significant ($SE = 1.52$, $p < .01$; Figure 2). Similarly, participants from the treatment condition contributed less than the participants from the control condition with their third group. Although all participants were informed that the norm with Group 3 was to contribute 50 MUs, participants from the treatment condition contributed 46.81 MUs on average, whereas participants from the control condition contributed 51.15 MUs on average. This statistically significant difference of 4.34 MUs ($SE = 1.35$, $p = 0.001$; Figure 2) represents a 8.5% decrease in contributions due to random assignment to the incentive to deviate.

Figure 2. Average contributions in the Public Goods game. This figure illustrates the difference in average contributions of treatment and control participants in the Public Goods game at each round. Pre-treatment, participants randomly assigned to treatment and control condition made comparable contributions to the common pool. Post-treatment, however, participants who received the incentive to deviate violated norms at higher rates. They made significantly lower contributions to the common pool than participants in the control condition at every post-treatment round. Each of these differences in means represents the intent-to-treat effect, that is, the causal effect of being randomly assigned to receiving the incentive to deviate.

For the intent-to-treat analysis, we identify treatment compliers and control compliers, who are the participants who were randomly assigned to receive an incentive to deviate (treatment, at the end of Game 1, and control, in a final additional Public Goods game) and treatment and control non-compliers, who refused the incentive to deviate when it was offered at those times. Figure 3 shows that control and treatment non-compliers (76% and 66% of their groups, respectively) are similar in their relatively high and norm-conforming contributions to the Public Goods game pre-treatment, whereas control and treatment non-compliers were also comparable prior to treatment in their significantly lower and less norm-conforming contributions prior to treatment. This figure shows the broad comparability of our two groups of compliers and non-compliers in treatment and control; it also illustrates how individual differences play a role in responses to normative information. The ITT analysis using these groups, based on random assignment to treatment and control, does not require the comparability of compliers in each condition in order to show the causal effect of the invitation to deviate on the treatment participants who accepted it in the third round of Group 1.

Consistent with the ITT analysis, the IV analysis also reveals a significant effect of the invitation to deviate, among treatment participants who accepted it (the TOT): the effect represents a 7 to 12% average decrease in contributions to the common pool after participants had deviated one time (Figure 3). Specifically, the analyses reveal that complying to the treatment decreased participants' contributions to the common pool by 5.68 MUs with Group 2 ($SE = 2.27$, $p = 0.01$) and 6.56 MUs with Group 3 ($SE = 2.00$, $p = 0.001$), on average⁵. The impact of the incentive to deviate on future deviations was not driven by a group of participants who learned to give the same low amount each time (10 MUs), nor by a group of outliers who simply adjusted their playing strategy to include low amounts each time (close to 10 MUs; see Appendix D).

⁵ These estimates were derived from a pre-registered instrumental variable analysis strategy, described in the method section. The results of the instrumental variable analysis are equivalent to direct comparisons of the contributions of treatment and control compliers.

Figure 3. Illustration of the treatment on the treated effect on Public Goods game contributions. This figure illustrates the treatment on the treated effect (TOT) for each post-treatment round, that is, the causal effect of taking up the treatment on one's contributions to the common pool in the Public Goods game. As displayed by the blue lines, we found no difference between the contributions of treatment non-compliers and control non-compliers (those who refused an incentive to deviate in a later round), pre- and post-treatment. As depicted by the red shades, we found a statistically significant difference between treatment and control compliers (those who accepted an incentive to deviate in a later round) at each post-treatment round.

Effect of treatment incentive to deviate on future violations of norms of fairness and reciprocation

The results from participants' play in subsequent behavioral games reveal that the treatment incentive to deviate also increased participants' violation of different social norms of fairness and reciprocity in entirely new settings with different rules and players. The extension of their deviant behavior to these new settings also argues against a simple learning explanation for our previous findings, that the players violated norms because they were taught by experimenters how to earn the most money in one particular (Public Goods) game.

Dictator Game. As displayed in Figures 4a and 4b, both the intent-to-treat and the instrumental variable analyses reveal that incentivizing and successfully inducing participants to deviate from a norm of cooperation in the Public Goods game increased participants' rates of violation of an implicit (i.e., not advertised) norm of fairness in the Dictator Game. Participants from the treatment condition sent an average amount of 37.81 MUs to their partner, which is significantly lower than the average 41.18 MUs that control condition participants sent to their partner (averaging across compliers and non-compliers). This difference of 3.37 MUs is statistically significant ($SE = 1.36$, $p = .01$) and represents an 8% decrease in real money donated due to the experimental incentive to deviate.

Trust Game. As displayed in Figure 4c, participants who received the incentive to deviate during the Public Goods game also violated a norm of reciprocity (which was prominently advertised) at higher rates than the participants from the control condition who never received the incentive to deviate. Specifically, whereas participants assigned to the control condition sent 77.05 MUs back to the sender, participants from the treatment condition sent 74.32 MUs back (averaging across compliers and non-compliers). This effect of 2.73 MUs represents a 3.5% decrease in reciprocity and is marginally significant in the conservative ITT analysis ($SE = 1.59$, $p = 0.09$).

Perceptions of the costs of violating norms. At the end of the study, both treatment and control participants were asked to imagine that they were offered a monetary incentive (in MUs) to violate a strong norm of reciprocity in a hypothetical Trust Game. Participants were asked for the price of their deviance: how large this monetary incentive would have to be for them to violate the norm.

On average, participants who received the treatment incentive to deviate during the Public Goods game estimated that they would need a lower monetary incentive to violate a norm of reciprocity in the Trust Game than those who never received an incentive to deviate. This suggests that inducing participants to violate a norm depreciated their expectation of the cost of violating a social norm. Specifically, participants from the treatment condition estimated that they would need a 258 MU

bonus and control participants estimated 288, a 30 MU difference, in order to violate a social norm in the context of this hypothetical Trust Game. The difference between control and treatment estimates of the cost of deviating from a norm was statistically significant ($SE = 15.00$, $p = .04$; Figure 4d).

Self-perception as a deviant. The results suggest no effect of the treatment incentive to deviate on participants' perception of the self, among all treatment participants and among compliers to the treatment.

Figure 4. Causal effect of the incentive to deviate in different games. **Fig. 4a** illustrates the difference in average donation between treatment and control participants in the Dictator Game. This difference in means represents the intent-to-treat effect—the causal effect of being assigned to the treatment incentive to deviate (in a previous Public Goods game) on deviation from the Dictator game’s implicit (non-advertised) norm of fairness. **Fig. 4b** illustrates the treatment on treated effect (TOT), that is, the causal effect of complying to the treatment incentive to deviate in the previous Public Goods game on behavior in the Dictator game. Here we found no difference between the donations of treatment and control non-compliers (in blue) and a statistically significant difference between the donations of treatment and control compliers (in red). **Fig. 4c** illustrates the difference between treatment and control participants’ reciprocation levels in the Trust Game (Study 2). This figure suggests that the previous treatment incentive to deviate made participants more likely to violate the Trust game’s explicitly-advertised norm of reciprocation. The difference between the two experimental conditions is marginally significant. Finally, **Fig. 4d** illustrates the difference in treatment and control participants’ perceptions of the costs of violating social norms. Specifically, this figure displays participants’ average estimate of the amount that they would require as an incentive to violate a norm of reciprocation in a hypothetical Trust Game.

Discussion

The results of these experiments ($N = 3,499$) reveal that inducing people to violate a social norm increased their propensity to violate the norm again, and to violate different social norms in new settings with new players and groups. Traditional theories of deviance have considered the tendency to conform or deviate as a personality trait or individual difference (e.g., [Becker, 1963](#); [Bennett & Robinson, 2000](#); [DeBono et al., 2011](#); [Gino, 2018](#); [Gomila & Paluck, 2020](#); [Snyder, 1979](#)). Consistent with this literature, our evidence shows that a minority of individuals cannot be induced to deviate, even under favorable conditions of “no punishment” from group members and real monetary reward. However, we also find that the majority of individuals can be induced to deviate under these circumstances, and that this experience results in a behavioral pattern of deviation over a period of time, in response to new types of norms. This finding that social experience causally impacts an individual’s tendency to deviate represents a new finding in the norms and deviance literature.

Why do individuals who deviated from one norm do so again? The experimental results suggest one psychological mechanism explaining the emergence of a pattern of deviance. Violating a social norm caused individuals to depreciate their perception of the costs of deviance. When asked how large of a monetary incentive they would need to violate a norm of reciprocity, participants who previously had been incentivized to deviate required a significantly lower amount of incentive than those who were not. We did not find support for a psychological mechanism involving the self –treatment participants did not consider themselves to be “deviants” to a greater extent than control participants, even after they deviated on average more across several different behavioral games.

Particular features of the behavioral games used in these experiments may explain why we found that individuals depreciated the perceived costs of deviance but did not change their self-perception. In these games, we did not allow other players to punish deviants, either with social or monetary sanctioning through messages or fines. Although this design mirrors a large proportion of everyday acts of deviance, which go

unpunished, it stands in contrast to many behavioral game paradigms aimed at testing the evolution of norms, which feature punishment (Fehr & Fischbacher, 2004; Fehr & Gächter, 2000; Fehr & Schurtenberger, 2018). In our context, it is perhaps unsurprising that treatment individuals depreciated the anticipated costs of deviation. They found deviation to be a rewarding monetary experience, and possibly also found that it wasn't as difficult a psychological experience as they may have originally anticipated. Note, however, that no treatment participant offered to deviate for free –participants who anticipated a monetary payoff for deviating in the face of no punishment still required on average 258 MUs to deviate from a group norm. The absence of punishment in this game may limit the generality of our findings, but this feature usefully shows how psychologically compelling norms can be, even when violation of the norms results in material gain and zero social sanctioning.

The lack of punishment in our experimental games may also help to explain why we did not find that norm deviance led participants to update their perception of the self as a “deviant.” Participants did not receive negative social feedback from other players for deviating from the norm. Theories of the looking-glass self (Cooley, 1922; McIntyre, 2013) would predict that if other group members had ostracised them or otherwise called attention to their wrongdoing, norm violators may have updated their perception of the self as deviants, and this self-perception may have also driven future deviance. In our game, the incentive to deviate, paired with the lack of punishment, may have given participants sufficient external justification for their behavior, preventing them from generating justifications based on the self.

We find that individual differences matter for deviation, but also that experience with a single act of deviation can cause a behavioral pattern that is suggestive of an individual difference. Both the self-monitoring scale (Snyder, 1979) measured at the end of Study 1 and the deviant identity index measured at the end of Study 2 were strong and statistically significant predictors of participants' decision to accept the incentive to violate the group social norm. Specifically, being a low self-monitor or perceiving one's identity as deviant was associated with increased levels of norm violations in the Public

Goods game ($\beta_{sm} = 3.45, SE = 0.99, p < .001, \beta_{id} = -3.87, SE = 0.64, p < .001$). Taken together, the correlation between individual differences and acts of deviance on the one hand, and the causal impact of participants' randomly-incentivized experiences with deviance on future acts of deviance on the other hand are consistent with accounts of the malleability of personality traits across the life span (Damian, Spengler, Sutu, & Roberts, 2019). The present research indicates that individuals may be more or less inclined to conform or deviate, but that experiences can causally shape or re-shape these personal inclinations.

Although this research focuses on the consequences of violating norms, participants' behavior in both studies highlighted the power of social norms for producing conformity –even norms that belong to groups of strangers and that are not policed by social or monetary punishment. In this context, the great majority of participants conformed to the advertised and implicit (non-advertised) social norms at every round, and around 35% of participants from the treatment condition refused to violate their group norm in exchange for real money. This result contributes to a large body of work establishing social norms as powerful drivers of human behavior, and suggests the existence of a particular type of robust norm conformers, who are more relatively more reluctant to violate social norms compared to other people. Researchers may further investigate how these high-conformers react to more appealing offers to violate norms.

This experimental paradigm offers many possible permutations that can test the boundaries of these effects in future research. As already discussed, future research can include punishment in the game, as a way to investigate whether self-perceptions may change more and perceptions of costs may increase when players punish deviant teammates. Additionally, deviance could be randomly invited through non-monetary incentives. The type of deviance that we model may parallel real world deviant acts like corruption that are fueled by monetary rewards. Other acts of deviance are based on principle rather than material gain, such as extreme acts of activism on behalf of an oppressed group. Future research could attempt to examine the emergence of patterns

of deviance borne of deviance motivated by principle as opposed to material interest.

Finally, future research should also explore the behavioral consequences of norm violations in more naturalistic and psychologically meaningful settings such as the workplace, political movements, or classrooms, in which social norms may be personally more meaningful and violations more personally consequential. Are costs of violating the norms of meaningful groups or settings simply too high for most people, or does the personal relevance of the context mean that individuals overestimate the cost of deviation? In these settings, norm deviation may result in a lower likelihood to deviate again, given the high personal costs, or it may also help establish a pattern of deviance if individuals discover that reactions to deviance weren't as negative as they feared. In this way, field studies could usefully extend the experimental manipulations introduced here to study dissent, defiance, and behavioral deviance in people's everyday life.

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