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Perceived social norm and behavior quickly adjusted to legal changes during the COVID-19 pandemic

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Exploring the joint dynamics of laws and social norms helps understand when social norms are sticky or adaptive. Using the example of the social and physical distancing measures introduced to contain the COVID-19 pandemic in 2020, we studied whether introducing, and then lifting, distancing regulations led individuals to quickly change their habits, not only by modifying the monetary incentives of rule violators but also by shifting the individuals’ perception of the appropriateness of social encounters. We conducted an online incentivized experiment in France, where we elicited the same participants’ perceived norm and social distancing behavior every week for three months. We find that both norm perception and behavior shifted as soon as the government introduced or removed social distancing measures. This effect was fast acting and long lasting, a result that highlights the importance of the expressive power of the law for norm formation and behavior.

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1. Introduction

The understanding of the mechanisms through which laws affect individual behavior has interested economists and legal scholars alike. Economists have traditionally drawn a parallel between designing optimal laws and designing optimal incentives, and have mostly focused on the role of monetary sanctions in fostering the desired behaviors and inducing compliance. Legal scholars, on the other hand, have long emphasized the expressive function of laws (Sunstein, 1996), according to which laws may affect behavior by changing individuals’ beliefs on what the majority of people consider appropriate – i.e., by changing individuals’ perception of the prevailing social norms.

The interaction between laws and social norms has drawn growing attention. Next to a theoretical literature (Cooter, 1998; 2000; Posner, 1998; 2000; McAdams, 2000a, 2000b; Benabou and Tirole, 2011; Acemoglu and Jackson, 2017), empirical and experimental studies have emerged, providing support to the existence of an effect of laws on behavior that is independent of monetary punishments (e.g., Tyran and Feld, 2006; Funk, 2007; Galbiati and Vertova, 2008, 2014; Wittlin, 2011; Deffains et al., 2019; Rees-Jones and Rozema, 2020). However, only a few studies have attempted to establish a causal, direct link between laws and the perception of social norms.\textsuperscript{1} Tankard and Paluck (2017) found that the

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\textsuperscript{1} The limited empirical research on this topic can be mainly attributed to the difficulty of isolating the effect of the law on the norm from the reverse effect of the norm on the law (Lane and Nosenzo, 2019).

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Supreme Court ruling in favor of same-sex marriage increased Americans’ perceived social norms in support of gay marriage. Aksoy et al. (2020) showed, by means of survey data, that the legal recognition of same-sex relationships significantly improved attitudes toward sexual minorities. Lane and Nosenzo (2019) used an incentivized vignette experiment to show that laws have a direct influence on social norms, determining whether behaviors are perceived as socially appropriate or not.

According to several scholars, however, the law can affect social norms only if it is viewed as legitimate, fair and close to pre-existing social norms (e.g., Bicchieri and Mercier, 2014; Bicchieri, 2017). This may explain why legislative interventions initiated in a top-down fashion by central authorities are often not effective in changing social norms and behavior (Bicchieri, 2017; see also Stuntz, 2000, for examples of failed interventions). Similarly, it may explain why compliance with the law is more likely to be achieved when the latter is chosen endogenously, for example via a referendum, than when it is imposed exogenously by a central authority (see, e.g., Tyran and Feld, 2006).

In this paper, we study the dynamics of social norms after a sudden change in the law in the light of the recent pandemic of COVID-19. Precisely, we analyze whether the sudden introduction, and subsequent removal, of social and physical distancing measures (SPDM) imposed by a central authority during the first wave of the COVID-19 pandemic was effective in changing the perception of the social norm regarding face-to-face social interactions.2 As no vaccine or effective therapy was available at that time to prevent or treat rapidly COVID-19, many governments relied on SPDM to limit social interactions and contain the spread of the disease. The success of these measures crucially hinged on their ability to quickly change people’s behavior and habits by shifting the perception of certain social norms, such as meeting friends, organizing social events or shaking hands (van Bavel et al., 2020; Habersaat et al., 2020; West et al., 2020). Indeed, while the threat of being fined by the police in case of a violation existed,3 it was probably not sufficient to deter violations of SPDM as it was virtually impossible to monitor everyone all the time.4 In addition, several of these violations occurred in the private sphere, which made them difficult to detect and sanction.

Evidence based on available country-level data suggests that the combination of different large-scale anti-contagion policies (such as border closure, schools closure, and public events ban) decreased the transmission of the disease (Flaxman et al., 2020; Hsiang et al., 2020). However, it is unknown how effective SPDM were at promoting social distancing behavior by changing the perceived social norm regarding face-to-face social interactions (Haushofer and Metcalf, 2020). Since these measures were imposed without much prior discussion in the society, the media and the parliament – in contrast to what typically happens before a law is passed (think for example of smoking bans or laws allowing same-sex marriages) – it is possible that their effect on the social norm was limited or very slow. In addition, it is unclear how the social norm varied once certain restrictions were progressively lifted. Finally, a key question is how fast and persistent the change in the perceived norm and the associated behavior was after the introduction and the removal of SPDM.

To study these questions, we conducted an incentivized experiment in France for three months, starting in the same week when the French government introduced SPDM. To examine the causal effect of the new laws on the perception of the social norm we elicited, every week, participants’ beliefs on the social appropriateness of the behavior of a hypothetical person X who invited friends over for dinner. To study changes in behavior, we asked participants to answer a number of questions on compliance with social distancing measures.

We found that the introduction of the law had a sizable effect on the social norm: as soon as social activities were banned, most people almost immediately considered them as socially inappropriate. Moreover, they reported engaging in such activities less frequently than before the law was introduced. Interestingly, the perceived norm remained low and relatively stable as long as SPDM were in force, while it increased and got closer to pre-lockdown levels once the law was lifted and social gatherings were allowed again.

We explored potential mechanisms behind the change in the perception of the norm. In particular, we checked whether the law affected people’s normative beliefs through the information it conveys regarding the risks of the disease. We investigated this in three complementary ways. First, we studied the effect on the social norm of the government announcements on the dangers of social interactions, and showed that the Presidential interventions were not sufficient to lead to an immediate shift in perceived norms and to coordinate people’s beliefs. Second, we examined how the concern for one’s own health evolved in response to the legislative interventions, and found that, on average, participants tended to be less worried for their own health over time, irrespective of the law. Third, we examined whether social attitudes played a role by testing whether more prosocial participants were more inclined to respect SPDM and therefore more likely to consider their violation as socially inappropriate than individualistic participants. We found no differences in the perception of the norm and the associated behavior between the two types of participants. We therefore interpret our results as evidence that people

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2 Two other studies tackle a similar question: Galbiati et al. (2020) and Eckel et al. (2021). They developed independently from ours in the same period, and present different methodologies.

3 For example, in France (where we conducted this study) 20.7 million controls were made between mid-March and the end of April, leading to 1.1 million fines, mainly for the lack of the circulation document; only 6% of the controls detected infractions of the law (Declaration of the Minister of Internal Affairs, C. Castaner, May 11, 2020. https://bit.ly/2QMXUf. Accessed on May 5, 2021).

4 In our study, we did not measure how deterrent the laws about social distancing were perceived by people. Hence, we cannot exclude that SPDM also worked through a standard deterrence effect by raising the marginal monetary cost of having social gatherings. We consider this possibility in our theoretical framework (see Section 3). Note that a sanction need not be perfect to be effective, provided some members of society hold sufficiently pronounced social preferences (see Engel, 2014).
people followed a general norm of legal obedience: any behavior that ceased to be legal was automatically perceived as socially inappropriate, irrespective of the costs and benefits associated with it. Overall, our findings are in line with the theoretical studies that argue in favor of an expressive function of the law to coordinate individuals’ beliefs, and corroborate the few other empirical studies that assess the impact of laws on the perception of social norms.

Our contribution to the literature on social norms is threefold. First, we show, through the example of the social distancing measures against the dissemination of COVID-19, that the perception of a social norm can adapt almost immediately to the introduction (and the lifting) of a new law. Although social norms are usually sticky (see, e.g., Bicchieri, 2006; Boettke et al., 2008; Andreoni et al., 2021), we provide an example in which the adjustment to the law was very quick, despite the absence of long discussions in the society, the media and the parliament before its introduction. Moreover, we show that the law changed the norm even though, in the context under study, the pandemic might have generated a strong norm uncertainty. Second, we explore the mechanisms behind the fast adjustment of the perceived social norm and provide support for an expressive power of the law. The third contribution is in terms of public health policy. Although we did not elicit the participants’ beliefs about the risk of being sanctioned if someone does not comply with the law, we find that these participants changed behavior consistently with the evolving norm. This suggests that, in domains in which behavior cannot be easily monitored, the adjustment of the perceived social norms can be a crucial means through which a public health policy can be effectively enforced.

The remainder of the paper is organized as follows. Section 2 describes the experimental design and procedures. Section 3 presents our conjectures. Section 4 reports the main results. Section 5 concludes.

2. Experimental design and procedures

We exploited data from an online, incentivized experiment conducted in France every week with the same participants over a span of three months: from March 18, 2020 (that is, as soon as the French government introduced SPDM) until June 24, 2020 (few weeks after the abrogation of these laws). The long duration of the experiment allowed us to assess the evolution of the perceived social norm and the associated behavior in response to changes in the law. We recruited 447 subjects within the GATE-LAB subject pool, Lyon, France. Subjects were 18 years old or older, and mostly students from the local university campus.

As for any other laboratory experiment conducted with university students, one could argue that our experiment does not produce “representative” evidence because our subject pool does not reflect the general population. We mainly chose to conduct our experiment with students for logistical reasons. First, like in many countries, the French government announced the lockdown measures with very little anticipation, and there was no time to recruit a more representative population. Second, given the longitudinal nature of the study, we wanted to minimize the risk of attrition and make sure that participants believed that we would actually pay them at the end of the study. In this respect, we expected our subjects from GATE-LAB to be more trustful and committed to participate in the 15 sessions than a sample of individuals who never participated in economic experiments before. Moreover, the predominance of students in our sample, if anything, strengthens our results. Students are the category of the adult population with the lowest health risk linked to COVID-19, with the highest density of social networks, and the highest frequency of social encounters with friends and relatives before the pandemic. Thus, this category suffered probably the highest social costs associated with the social distancing measures while getting the lowest direct health benefits from these interventions. This a priori speaks against the hypothesis of a quick adjustment of social norms and behavior to the new distancing regulations. Finally, our approach complements other studies that address similar questions to ours but use survey data (Galbiati et al., 2020; Eckel et al., 2021). While these studies provide more representative evidence, our experiment allows for more controlled and precise tests of the phenomenon under investigation.

We recruited the participants using the software Hroot (Bock et al., 2014). In the invitation email, we explained that the study would consist of 15 weekly short sessions (10 min on average, 15 min for the first session) and we recommended that the subjects participate in all sessions. We informed the participants that they would receive a fixed payoff of €2 for each session they participate in (in total, they could earn up to €30 as a fixed payoff if they participated in all sessions), and that they could earn an additional variable payoff depending on their decisions and the decisions that all participants would make in the experiment.

Of the 447 participants that took part in the first session, 367 participated in the last session; 228 subjects participated in all 15 sessions. These numbers were on purpose beyond the minimum requested (around 200 subjects) to detect a small effect size (Cohen’s $d = 0.2$) of the impact of the law, assuming a significance level of 5% and a power of 80%, to anticipate the possible attrition. In the Results section, we report the analysis based on the full, unbalanced, sample. For information, we also report separate supplementary figures for the full and the balanced samples (see Appendices B and C). The visual inspection of these figures and the statistical tests show that considering either the full or the balanced sample does not change qualitatively our results.

After accepting our invitation, at the beginning of the first session, participants were told that the experiment included a set of decisions, standard background questions (age, gender, education, occupation) and a number of questions on their

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5 Ethics approval for the experiment was obtained from IRB-00003888 CEEI-INSERM (No. 20-665, March 2020).

6 The minimum sample size was computed based on a paired t-test for dependent data assuming a pre-post correlation of 0.5.
personal life (such as number of friends, type of housing, use of social networks and contacts with family and friends). The session started only after the participants signed (electronically) the consent form. Participants were given the option of not answering the health-related questions.

Each week, participants completed three incentivized behavioral tasks and a survey. The behavioral tasks included a norm-elicitation task (Krupka and Weber, 2013), a Social Value Orientation task (SVO) (Murphy et al., 2011), and a trust game (Berg et al., 1995) [see instructions in Appendix A]. In the norm-elicitation task (the focus of this paper), we described a scenario where a hypothetical person X invited friends over for dinner last week. We asked the participants to report their belief regarding the extent to which other subjects believed the behavior of person X to be socially appropriate or inappropriate. They earned money if they reported the same answer as the majority of the other participants. That is, we used a coordination game to elicit participants’ second order beliefs about the norm. This is a commonly used method in the economic literature to measure social norms (see, e.g., Fallucchi and Nosenzo, 2021). The SVO task was used to measure participants’ concerns for others, which might affect the perception of the norm and compliance behavior. In this task participants chose how to allocate money between themselves and another anonymous participant, who randomly changed each week. They made six decisions with different allocation options.

The fact that participants repeatedly played the same three tasks over several weeks might have generated learning effects that influenced players’ responses independently of the effect of the law or the norm. This, in itself, is not an issue for our research question since we are interested in marked discontinuities in the norm at specific points in time (i.e., after the introduction and after the abrogation of SPDM). That being said, to limit learning effects we did not provide participants with any feedback regarding the opponents’ behavior or the resulting monetary payoffs until the end of the last session. We also minimized portfolio and wealth effects by paying only the decisions made in one session instead of paying the sum of the earnings in each session. Conversely, the repeated nature of the experiment could have induced participants to stick to their previous decisions in order to appear consistent. This assumes that individuals were able to remember the choices they made the week(s) before. This goes against our hypothesis that the norm shifts sharply after a change in the law, and it would rather reinforce our results. In addition, the social norm was measured by eliciting participants’ opinion about what others believe is appropriate behavior. Therefore, the need to appear consistent in the eyes of the experimenters was probably very limited.

To study changes in behavior, we asked participants to answer a number of questions on compliance with social distancing practices. In particular, participants indicated how often, in the previous week, they took part in social activities (e.g., visiting friends or family members, having face-to-face conversations with people not living with them). They answered on a 0–4 scale, where 0 meant “never” and 4 meant “every day”. We elicited participants’ subjective perception of the health risk with COVID-19 by asking them how concerned they were about the pandemic for their own health. We used a 1–10 scale, where 1 meant “not at all concerned” and 10 meant “extremely concerned”. We asked participants whether they had close relatives and friends diagnosed with COVID-19 and, in the last week of the experiment, whether they themselves had been diagnosed with the disease during the whole period of investigation. More details on our subject pool are reported in Tables S1 and S2 in Appendix C.

At the end of the study, we randomly drew either the SVO or the trust game for payment. For the SVO, we randomly selected two sessions and, for each session, one of the six decisions. A participant received the money that (s)he allocated to himself or herself for the first session, and the money that another participant allocated to him or her in the other session. For the norm-elicitation task, we paid participants for their decision in one randomly drawn session. If a participant did not participate in the session that was randomly drawn, his or her variable payoff for this session was null; this rule was made common knowledge to the participants from the very beginning and it was an incentive for participants to participate in all sessions.

We combined the experimental data with the information the French government provided during the three months of the experiment regarding the SPDM taken. On March 12 and 13, 2020 the French government announced that schools and universities would remain closed, that public gatherings (excluding public transport) with more than 100 people would not be allowed, and that all non-essential activities would not reopen, with immediate effect from either March 15 or 16 until further notice. On March 16, E. Macron went on television to announce the beginning of a nation-wide lockdown starting on March 17 for 15 days. Measures included the ban of all but the essential local travels, the interdiction of family or friend gatherings, and the closure of the French borders, among others. The French President also informed the public that all violations of these new regulations would result in penalty actions. The lockdown period was extended multiple times and was lifted only on May 11, 2020, though few restrictions remained in place (e.g., ban of gatherings with more than 10 people

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7 The SVO task and the trust game were used to study the evolution of social preferences during the lockdown. The results are reported in a companion paper (Casoria et al., 2021) where we test two opposite hypotheses. One is that individuals became more selfish and less trusting because the lockdown reduced direct interactions and increased the fear of contagion, making individuals less concerned about others and less willing to take social risks. The other hypothesis was that individuals became more prosocial and more trusting, because social distancing increased the bond between individuals as they shared a common fate and risk despite the reduced direct interactions.

8 In the trust game, used to measure participants’ trust and trustworthiness, participants decided how much money to send to another participant (trust), who then decided how much to send back (trustworthiness). Participants made both decisions without knowing in advance their role and the decision of their counterpart. As second movers, they made a decision for each possible amount sent by the first mover (strategy method).

9 Earnings were paid either by bank transfer or in person at GATE-Lab from June 25 onward.
in public spaces, interdiction of travels exceeding 100 km from one’s own residence) until late June. An advantage of the French setting for our analysis is that almost all SPDM were enacted roughly at the same time. This allowed us to estimate the effect of a sudden change in the law on the perception of the norm and on the associated behaviors.

3. Conjectures

In this section, we discuss our conjectures on the effects of introducing and lifting SPDM on the perceived norm regarding face-to-face social encounters, and the possible mechanisms behind these effects.

We consider a simple framework where an agent $i$ evaluates the possibility of having social gatherings. Let $a_i \in \{0, 1\}$ be his or her decision. The utility function of the agent depends on the monetary value that (s)he places on $a_i = 1$ (i.e., having social gatherings) and the extent to which (s)he believes that this decision is perceived as socially appropriate by others (see also Krupka and Weber, 2013). Let $V$ be the monetary value that the agent places on $a_i = 1$, $N$ the agent’s expectations about the extent to which others consider $a_i = 1$ socially appropriate, and $\gamma \geq 0$ a parameter that captures how much the agent values complying with social norms. We can hypothesize that, before the COVID-19 pandemic hit France, $N$ and $V$ were positive (social gatherings were not perceived as socially inappropriate and the monetary benefits outweighed the costs for most people). Let $N^0$ and $V^0$ be the value of $N$ and $V$, respectively, before the introduction of lockdown measures. We can write the utility function as

$$U_i = a_i V^0 + \gamma a_i N^0$$

(1)

The agent chooses $a_i = 1$ if $V^0 > -\gamma N^0$. Suppose now that the government introduces a law that sanctions individuals if $a_i = 1$. We expect this legislative intervention to affect the probability that agent $i$ will choose $a_i = 1$ in two ways. First, it reduces the value $V$ that the agent places on $a_i = 1$ (from $V^0$ to $V^1$ with $V^1 < V^0$). This stems directly from the imposition of a risk of sanction on $a_i = 1$, and indirectly from the signal that the law potentially conveys about social gatherings not being safe anymore for one’s own or others’ health (especially if individuals were ex-ante unsure about these risks). Second, the law may change the expectations $N$ regarding the social appropriateness of gathering with friends in person. Two main mechanisms can produce this change in expectations. The law may not only signal what the risks of the pandemic are, but also that most individuals no longer tolerate social gatherings because of those risks. This function of the law as a signal of the prevalent opinion of a society has been described, for example, by Adams (2000a, 2000b, 2015). Moreover, individuals may automatically consider any illegal behavior as socially inappropriate, irrespective of its costs and benefits. That is, the meta-norm of legal obedience, which prescribes that one ought to follow the law no matter what, may mold the perception of the social appropriateness of social gatherings (see McAdams and Rasmussen, 2007; Lane and Nosenzo, 2019). Let $N^1$ be the perception of the norm after the introduction of the lockdown measures. We formulate our first conjecture as follows.

**Conjecture 1.** The introduction of SPDM changes the perception of the social norm regarding social gatherings from being socially appropriate to inappropriate ($N^1 < 0 < N^0$).

Once the government removes the lockdown measures, social gatherings are no longer sanctioned. In addition, individuals may perceive that the risk of contracting the virus or the one imposed on public health is less pronounced than before. The overall effect is an increase in the value $V$ (from $V^0$ to $V^2$ with $V^2 > V^1$). The perception of the norm may change too, since the law no longer signals that social gatherings are socially inappropriate. Individuals may expect less social disapproval if they participate in social gatherings since the perception of the risks has changed. Moreover, the meta-norm of legal obedience does not apply anymore to social gatherings. We call $N^2$ the new perception of the norm after the abrogation of the lockdown measures, and propose the following conjecture.

**Conjecture 2.** The abrogation of SPDM changes the perception of the social norm regarding social gatherings from being socially inappropriate to appropriate ($N^1 < 0 < N^2$).

While the most stringent lockdown measures were dropped by the French government on May 11, 2020, few restrictions remained in place after that date. In addition, the French government continued to remind people to respect the health measures and to limit social gatherings. Hence, the perception of the social norm regarding social gatherings might not return immediately to pre-lockdown levels. We formulate the following conjecture.

**Conjecture 3.** After the abrogation of SPDM, social gatherings are perceived as less socially appropriate than before the introduction of SPDM ($N^2 < N^0$).

We can test Conjectures 1–3 against the null hypothesis that a legal intervention has no effect on the social norm. Indeed, a large body of evidence suggests that social norms are sticky, and top-down interventions are often ineffective in shifting people’s perception of what is appropriate or inappropriate behavior (Bicchieri, 2017). The literature on social norms often argues that the legal approach to norm change can be effective only under very strict conditions – among others, that the law is perceived as legitimate and that it originates from fair and participative procedures (Bicchieri and Merchier, 2014; Bicchieri, 2017). In the case of the COVID-19 pandemic and the social distancing regulations, long discussions in the society, the media and the parliament did not precede the introduction of the law. Hence, it is possible that people did not perceive the introduction of SPDM as legitimate or fair. This might have been especially true for young people (the most represented category in our subject pool) who are less at risk of developing serious illnesses and potentially more damaged by a lockdown. It is not a priori obvious, therefore, that our participants would immediately change their perception of the social norm after the introduction of lockdown measures.
Fig. 1. Average level of social appropriateness of inviting friends over for dinner for the period March 18–June 24, 2020. Each week, participants had to assess the social appropriateness of the following scenario: “Last week, “Person X” invited some friends to her house for dinner”. The week numbers refer to the week in which the hypothetical scenario took place. In the first experimental session (March 18), the hypothetical scenario took place a week earlier (March 11), before the introduction of SPDM. We refer to it as week 0. The dashed lines represent the two legal thresholds: introduction (week 1) and abrogation (week 8) of SPDM. The dash-dotted lines represent three government nation-wide announcements: recommendations on social distancing (first line, March 12); introduction of the law (second line, March 16); lifting of the law (third line, April 13). Besides testing the aforementioned conjectures, our experiment allowed us to explore the mechanisms behind the potential change in the perception of the norm. In particular, we tested whether the law changed the perception of the norm only by informing of the danger that social gatherings pose to oneself and/or to others, or whether it activated a meta-norm of legal obedience. We investigated this in three complementary ways. First, we checked whether the introduction of SPDM had a different effect on the social norm than governmental announcements regarding the dangers of social interactions. Second, we studied how the concern for one’s own health evolved over time in response to legislative interventions. Finally, we tested whether participants with a prosocial orientation, as measured with the SVO task, reacted more to the introduction of SPDM than individualistic participants. Indeed, if the law revealed that social interactions were dangerous for public health, prosocial individuals might be more inclined to respect it and more likely to consider social gatherings inappropriate compared to individualistic individuals.

4. Results

4.1. Social norms quickly adapt to legal changes

The experiment allowed us to collect measures of social appropriateness one week before the lockdown (week 0), during (weeks 1–8) and after (weeks 9–14) the lockdown. In particular, week 1 represents the legal threshold after which social gatherings were illegal, while week 8 represents the legal threshold after which social gatherings were legal again. Supplementary Table S3 in Appendix C reports the mean appropriateness ratings, while Figure S1 in Appendix B displays the full distribution of ratings for the three time-span periods. Mean ratings were constructed by converting subjects’ responses into numerical scores using the same scale as in Krupka and Weber (2013): “very socially inappropriate” = −1, “socially inappropriate” = −2/3, “somewhat socially inappropriate” = −1/3, “somewhat socially appropriate” = 1/3, “socially appropriate” = 2/3, “very socially appropriate” = 1.

To investigate the impact of SPDM on the perceived social norm regarding social gatherings, we tested for the existence of a discontinuity in the norm at the two legal thresholds, week 1 (introduction of SPDM) and week 8 (abrogation of SPDM), using an OLS regression. We included a dummy variable for each week to capture the evolution of the perceived norm over time. We controlled for age, gender, education, occupation, reported number of friends and accommodation type. Standard errors were clustered at the individual level. The results are reported in Table 1, Model (1). The regression shows that, in line with Conjecture 1, the introduction of the law in week 1 significantly changed the perception of the norm compared to the week before the lockdown (Wald test, p < 0.001). Similarly, the abrogation of the law in week 8 generated a significant change in the perception of the norm in week 9 compared to the week before the abrogation (comparison of weeks 9 and 8, Wald test, p < 0.001). Control variables are not significant at standard levels. This analysis supports Conjecture 2.

Fig. 1 plots the average social appropriateness of inviting friends for dinner, over time. The two dashed lines indicate the two legal thresholds. The figure shows a large effect of the introduction of the new regulation on the norm. As soon as

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10 We also conducted OLS regressions where we interacted each week dummy with the demographic variables to explore individual differences in the effect of the law on the perception of social norms and behavior. The results are reported in Figures S9 and S10 in Appendix B.

11 The details of the coefficients of the control variables are provided in Table S4 in Appendix C.
SPDM were introduced, the average appropriateness dropped dramatically (from 0.63 in week 0 to −0.65 in week 1), and it remained rather low and stable (but with a small increasing trend from about week 5) until week 8 (from −0.65 in week 1 to −0.53 in week 8). Once the law was lifted and meetings with friends were allowed again, average appropriateness values increased (from −0.53 in week 8 to 0.05 in week 9), though less sharply than they dropped when the law was introduced. This supports Conjecture 3. The perceived appropriateness of social gatherings then kept increasing gradually in the last 5 weeks until it reached a value of 0.51 in week 14, which was close to pre-lockdown levels but still slightly below (from 0.63 in week 0 to 0.51 in week 14). As a complement, Figure S2 in Appendix B displays the variation in social appropriateness ratings between one week and the previous one, from a regression analysis controlling for participant’s age, gender, education background, occupation, reported number of friends and accommodation type. It reveals that the largest changes occur just after the introduction and after the lifting of the law.

4.2. Behavior conforms to the new perceived social norm

Next, we studied whether the change in the perceived social norm translated into change in behavior. Participants were invited to report whether they visited friends and/or family in person. We did not ask them whether they invited friends and family at home because we felt that they would have been less reluctant to admit a norm violation initiated by someone else (being invited by a friend or a family member) than a self-initiated violation (inviting a friend or a family member). In other words, we expected “being invited” and “inviting” to be associated with a different feeling of responsibility. In addition, we anticipated that a large proportion of participants would change accommodation during the pandemic crisis, and return
to live with their parents or family.\textsuperscript{12} In that environment, we expected participants not to have the same freedom to invite people over.

We performed a similar regression analysis as for the norm, except that we also included the perceived norm among the explanatory variables. The results of the OLS regression on the number of visits to friends and/or family in person are reported in Table 1, Model (2) (see Table S4 in Appendix C for the details of the coefficients of the control variables). The regression results show that the effect of time on behavior was highly non-linear: after the introduction of the law, visits to friends or family dropped dramatically compared to the previous week (Wald test, \(p<0.001\)). Similarly, the abrogation of the law in week 8 generated a significant increase in friends and family gatherings in week 9 compared to the week before the abrogation (comparisons of weeks 9 and 8, Wald test, \(p<0.001\)). The results also show that the frequency of visits to friends and family significantly increased with the perceived social norm about appropriateness of social encounters: the more socially appropriate participants perceived social gatherings to be, the more they engaged in such behaviors. The sociodemographic control variables had no effect on the frequency of visits, except that a higher number of friends increased the frequency of violations of the law (significant at the 1\% level).

Fig. 2 plots the average frequency at which participants reported to have visited in person friends and/or family (see also Table S5 in Appendix C). As a complement, Figures S3 and S4 in Appendix B show the average frequency at which participants took part in other social activities. Fig. 2 clearly shows that behavior followed a very similar pattern as the social norm: at the first legal threshold, there was a sharp drop in the average frequency at which participants met in person with friends and family (from 1.60 in week 0 to 0.16 in week 1). During the lockdown, participants visited friends and family slightly more frequently over time (from 0.16 in week 1 to 0.51 in week 8). After the law had been lifted, from week 9 onward, participants reported engaging in these activities more often (from 1.40 in week 9 to 1.82 in week 14). On average, in week 14 participants met in person more frequently than they did before the lockdown (from 1.60 in week 0 to 1.82 in week 14).

4.3. Mechanisms

The law might change the perception of the norm by providing crucial information on the dangers of face-to-face social interactions (thereby leading people to disapprove social gatherings) and/or by activating a meta-norm of legal obedience. Our data allowed us to test to what extent the effect of the law on the norm was driven by the former mechanism. First, we checked whether government announcements on the dangers of social interactions had a similar effect as the law. If the law acts only as a public information signal, its effect on the norm should be comparable to that of nation-wide announcements held by the French President. Already before the introduction of SPDM, the French government has warned against the dangers of social interactions and has promoted social isolation. In Fig. 1, the three dash-dotted lines correspond to the three nation-wide announcements held by the French President. On March 12, 2020 (week 0), E. Macron urged people to respect measures such as handwashing, limited travels and gatherings,\textsuperscript{13} and on March 16 he announced the introduction

\textsuperscript{12} Indeed, 41.67\% of those living in a flat or a student dormitory in week 0 moved to a house after the government imposed the lockdown. This is probably because many students returned to live with their family once courses moved online.

\textsuperscript{13} Broadcast of the President of the French Republic, E. Macron, March 3, 2020. https://www.elysee.fr/emmanuel-macron/2020/03/12/adresse-aux-francais. Accessed on September 15, 2020.
of the law on social distancing.\textsuperscript{14} As Fig. 1 shows, inviting friends over was still considered socially appropriate in week 0, while it was not in week 1, once the law was introduced. Similarly, the announcement of April 13 (week 4), when E. Macron informed about the future lifting of the law,\textsuperscript{15} had very little effect on the social appropriateness rating: inviting friends for dinner was seen increasingly as more socially appropriate, but it was only after the law was formally lifted that the average social appropriateness returned to positive levels. The April 13's speech could have also been interpreted as a reminder of the importance of social distancing, since E. Macron announced that the lockdown would be prolonged for three more weeks, before being lifted on May 11. However, social appropriateness, if anything, started to increase after that speech, which therefore did not seem to work either as a reminder of the importance of social distancing. All these patterns suggest that informing people of the appropriateness or inappropriateness of some behaviors alone is not sufficient to rapidly shift norms and coordinate beliefs, even in a time of acute sanitary crisis. This is an important implication for public policy. It is possible that participants interpreted the introduction of a law that forbids social interactions as a stronger signal of the danger posed by the disease compared to public announcements. Therefore, they might have considered meeting other people as more unsafe. On the contrary, the lifting of the law might have been seen as a signal that the virus was not spreading easily anymore and that meeting friends had become less dangerous. However, this analysis is not supported by our data. Indeed, Fig. 3 shows that, on average, participants tended to be less worried for their own health over time, without leading to a similar evolution in the perception of the social norm. The trend was decreasing even during the first weeks of the lockdown (panel (a)), notwithstanding the increasing number of confirmed cases and deaths (panel (b)), and the consequent greater exposure to the virus.

While we can rule out that the perceived riskiness of the disease for one’s health explains the drop in perceived social appropriateness of social encounters, it is still possible that the influence of the law on the norm was mediated by the perceived riskiness for others. Indeed, meeting friends was dangerous not only for oneself, but for others too. If the law signaled that social gatherings were dangerous for others or for the public health in general, we would expect prosocial participants (i.e., participants who showed concern for the wellbeing of others) to be more inclined to respect the law and more likely to consider violating the social distancing rules as socially inappropriate compared to individualistic participants (i.e., participants who showed concern only for their own monetary wellbeing). The SVO task, which captures an individual’s willingness to forgo some of their material payoff in order to increase the payoff of another person, allowed us to classify participants into prosocial and individualistic (see details in the comments of Table S6 in Appendix C). Figure S5 in Appendix B plots the average social appropriateness of inviting friends for dinner (left panel) and the average frequency at which participants visited in person friends and family, separately for prosocial and individualistic types. Our results show that there were no differences in the perception of the norm and the associated behavior for the two types of participants, and

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\textsuperscript{14} Broadcast of the President of the French Republic, E. Macron, March 16, 2020. https://www.elysee.fr/emmanuel-macron/2020/03/16/adresse-aux-francais-
covid19. Accessed on September 15, 2020.

\textsuperscript{15} Broadcast of the President of the French Republic, E. Macron, April 13, 2020. https://www.elysee.fr/emmanuel-macron/2020/04/13/adresse-aux-francais-
13-avril-2020. Accessed on September 15, 2020.
suggest that the concern for others (as it is measured in the SVO task) did not play a role in the observed patterns (this was confirmed by the regression analysis reported in Table S6 in Appendix C).\textsuperscript{16} Altogether, these results speak in favor of an effect of the law that was not (only) driven by the information that the law conveyed regarding the risks of social gatherings. They suggest that the law also shaped the social norm for the very fact that it is the law and one must comply with it, besides any other motivation.

5. Discussion and conclusion

In the context of the recent pandemic of COVID-19, our study suggests that SPDM strongly and very quickly influenced the perception of the social norm regarding meeting friends, and the associated behavior. As soon as social activities were banned, people considered them almost immediately as socially inappropriate and engaged less frequently in such activities. We argue that this is because people automatically associate illegal behavior to something that is socially inappropriate. In contrast, announcements by the government, even if widely listened to (for example, the intervention of E. Macron on March 16 on the TV has been watched by 35.3 million citizens and that of April 13 by 36.7 million out of a population of 67 million), had not such an impact. In this specific context, the coordinating power of political discourse on people’s beliefs has been much weaker than that of the law. These results are useful for policymakers who are considering whether and when to enact or remove social distancing measures. They indicate that it is the introduction of SPDM that causally affected people’s perception of what constituted socially appropriate distancing behavior, and their behavior itself. They suggest that the channel through which SPDM contributed to reduce the spread of the disease went beyond the mere monetary disincentive from engaging in certain behaviors, and extended to the informal rules that regulate how people should behave in society.

Interestingly, the perceived norm remained relatively stable while SPDM were in force, and the level of appropriateness only slightly increased when approaching week 9. These results are striking as the majority of our participants were young students (mean age: 23.79 y, S.D.: 6.87 y) with a large social network (mean network size: 313.56 friends, S.D.: 372.7) and an active social life (see Table S1 in Appendix C), and who might have perceived the pandemic as less threatening (indeed, cohort studies like Williamson et al., 2020, have concluded that risk increases exponentially with age) and the SPDM less legitimate.

The effect of the introduction of SPDM was also surprisingly fast and relatively long lasting: SPDM produced an immediate and substantial change in the perceived norm and behavior and this lasted several weeks after the introduction of these measures. This reveals that social norms are not always sticky. Our results, however, also showed that the effect died quickly as soon as the measures were lifted. Social gatherings ceased to be perceived as socially inappropriate by the majority of people and, after a few weeks, the perceived norm and the associated behavior almost returned to pre-lockdown levels, despite the recommendations of the French government to remain vigilant and behave responsibly. This suggests that the relaxation of social distancing measures may have reinstated previous habits and behaviors, perhaps too quickly, and this could have contributed to the resurgence of COVID-19 cases in the following months.

Our results on the joint dynamics of laws and social norms are in line with theoretical studies that argued in favor of an expressive function of the law through its impact on the coordination of beliefs (Sunstein, 1996; Cooter, 1998; 2000; Posner, 1998; 2000; McAdams, 2000a, 2000b). They corroborate the few other empirical studies that assessed the impact of laws on the perception of social norms (Tankard and Paluck, 2017; Aksoy et al., 2020; Lane and Nosenzo, 2019). Our study also informs public policy by showing that, in addition to monetary sanctions in case of detected misbehavior, compliance depends in a crucial way on the perception of social norms about appropriate behavior; social norms therefore represent a major lever for public policy.

We naturally acknowledge potential limitations of our study. One potential drawback of our experiment (shared with other experimental studies of the same kind) is the lack of representativeness of our subject pool compared to the national population. But on this matter, one should interpret our study as a hard test of the effect of the law on the norm. This is because our experiment was conducted with the category of the adult population that we expected to be less motivated to adjust to the social distancing regulations. Another potential limitation of our study is the fact that it was conducted under unique circumstances (the COVID-19 pandemic) and relied on a one-off variation in the field (the introduction, and subsequent removal, of SPDM).\textsuperscript{17} Hence, a direct replication of our experiment is unlikely. However, we believe that there are other ways in which replication can operate. One could test the conjectures of our study using different methods or data. In this respect, it is reassuring that our main results are in line with those of other recent studies on the same topic.

\textsuperscript{16} Leder et al. (2020) studied whether SVO was related to the use of protective measures against COVID-19 depending on the protective value of these measures for oneself or the public. They found that the SVO value did not influence the frequency of usage of protective measures, which is consistent with our results. However, we acknowledge that pro-sociality in the context of public health is not the same as pro-sociality in the context of monetary payoffs. In the domain of health, some studies contend that the SVO test that measures prosociality in the payoff domain captures some of the features of prosociality in the public health domain [see, e.g., van Lange et al., 2007; Piko, 2009]. More generally, evidence from previous studies on the correlation between behavior in experimental games and in various field contexts tends to be mixed (see, e.g., Galizzi and Navarro-Martinez, 2019 and references cited therein). Hence, one should be cautious about interpreting our results as hard evidence that social preferences do not matter for the norm. We thank a reviewer for drawing our attention to this.

\textsuperscript{17} The French governments introduced other restrictive measures to prevent and control the following waves of the pandemic (e.g. in October/November 2020) but of different degrees and lengths compared to the first wave.
developed in parallel with ours but using different methodologies (Galbiati et al., 2020; Eckel et al., 2021). Finally, while the focus of our study is on the social norm, we also looked at the effect of the law on behavior. A potential problem of that analysis is that the questions on self-reported actual behavior could not be incentivized, and we had no way to check the truthfulness of the responses. Hence, it is possible that our study underestimates the extent of the norm violations if participants were reluctant to reveal this information because of a social desirability bias. However, it is worth noting that the behaviors reported by our subjects have patterns similar to those observed in available country-level proxies of law compliance (e.g., the mobility data provided by Google; see Figure S11 in Appendix B for details).

Declaration of Competing Interest

The authors declare that they have no relevant or material financial interests that relate to the research described in the paper “Perceived Social Norm and Behaviour Quickly Adjusted to Legal Changes During the COVID-19 Pandemic”.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2021.07.030.

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