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The Constructive and Destructive Power of Social Norms in the Presence of Authoritative Influence

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A randomized survey experiment (N = 2,868) was conducted at the onset of the COVID-19 pandemic to examine the effects of information provision on individuals' cooperation with stay-home activities. Employing a 2 × 2 factorial design, the study examined the influence of social comparison and a powerful messenger. Using an online sample of approximately 3,000 Japanese respondents, it was found that participants demonstrated greater cooperation with stay-home activities when they perceived that they had spent a relatively long time outside the home compared with prevailing social norms in the previous week. Conversely, individuals who spent a relatively short time outside the home exhibited the opposite effect. However, these results were observed solely in conjunction with the influence of a powerful messenger. The study also explored heterogeneous responses based on personality traits. In conclusion, the results highlight the challenges of changing behavior through informational interventions, emphasizing the role of both the characteristics of the sender and recipient of the information.

Public Significance Statement
This study on information provision examines the effects of social comparisons and powerful messengers on behavioral changes. Combining them using a 2 × 2 factorial design is unique, and it was found that information provision is more effective when combined. An important caveat, however, is that information provision backfires for subpopulations when stimulation is strengthened. The efficacy of information provision is contingent upon the traits of both the sender and recipient, thus necessitating meticulous construction of the information.

Keywords: social comparisons, power of messenger, information provisions, randomized controlled trial

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The experiment and preanalysis plan were preregistered in the American Economic Association Randomized Controlled Trial Registry (RCT ID AEARCTR-0005772). The experiment was approved by the Review Board Ethics Committees of Kindai University, Japan (ID ECON02-01). This article was previously circulated as "Social Comparisons and Cooperation during COVID-19." JEL classifications are D91, C93, I12, and I18.

The authors contributed equally to the study and are listed in alphabetical order.

Shuhei Kitamura played an equal role in conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization,

continued

Shuhei Kitamura

Encouraging people to adopt socially desirable behaviors is a complex and challenging task for policymakers across various domains including education, public health, environmental sustainability, and charitable giving. In recent years, the use of nudges based on social comparisons, hereinafter social norm nudges, has emerged as a promising approach to promote behavioral changes (Allcott, 2011; Frey & Meier, 2004; Goldstein et al., 2008; Schultz et al., 2007).

Building on the success of social norm nudges in previous studies, this study sought to examine the efficacy of these nudges in the context of the COVID-19 pandemic, which presents a significant challenge to policymakers worldwide (Al Jazeera, 2021; British Broadcasting Corporation News, 2022). The study specifically aimed to determine whether providing information using social comparisons could effectively reduce the number of people outside the home during the early stages of the pandemic, when promoting stay-home activities was crucial.

In this study, in addition to examining the effects of social comparisons, it incorporated the influence of powerful messengers. In the real world, COVID-19-related messages were usually provided by political leaders. Reflecting the real-world situations in Japan, we set our experimental conditions with then Prime Minister Abe as a messenger for our control conditions. We then tested with our treatment conditions if a powerful messenger, Emperor Naruhito, a popular symbolic figure in Japanese society who rarely speaks up in front of the public, could enhance the efficacy of the social norm nudges.

This study includes a web-based randomized controlled trial conducted in Japan ($N = 2{,}868$) immediately after the state of emergency was imposed on April 7, 2020. Japan is a unique testing ground for addressing such a question because compliance with governments' self-quarantine requests was voluntary (i.e., no strict lockdown) and there remained room for our interventions to promote stay-home activities.[1]

As the government was requesting people to stay at home at the time of the experiment, the primary outcome variable in the study was the time spent outside the home, which is denoted by "outing time." This study examined whether information provision reduced people's outing time.

With our motivations stated above, the experiment adopted a 2×2 factorial design to investigate the effect of information provision on behavioral changes with respect to outing time. The first treatment arms considered the effects of social comparisons. In the experiment, participants were randomly informed of their past behaviors and those related to social norms, thereby allowing them to make social comparisons. Social norm in the study means the median length of time spent outside the home among respondents. This definition was borrowed from Chen et al. (2010), who used the median number of movie ratings as social information and examined whether users below or above the median ratings would change behaviors after knowing that information. The requirements from the government at the time of our experiment were that people should consider reducing their outing time as much as possible. Facing such social pressure, it would be natural, though this is merely our maintained assumption, for people to be concerned about their outing time relative to others as well as their own outing time. Hence, similar to Chen et al. (2010),

[1] A more precise description of the self-quarantine policy in Japan is provided by Watanabe and Yabu (2021) as "unlike the lockdowns in China, the United States, and European countries such as Italy, restrictions during Japan's state of emergency had no legal binding force. There were no penalties such as fines or arrests for leaving the house during the state of emergency. The police did not warn anyone who was out on the streets. The situation in Japan was one of a 'voluntary lockdown'" (pp. 1–2).

writing–original draft, and writing–review and editing. Katsunori Yamada played an equal role in conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing–original draft, and writing–review and editing.

The data are available at https://osf.io/tejmf/?view_only=4af5b3f76ce743eea903382f8143866c.

The experimental materials are available at https://osf.io/tejmf/?view_only=4af5b3f76ce743eea903382f8143866c.

The preregistered design and analysis plan are accessible at https://www.socialscienceregistry.org/trials/5772.

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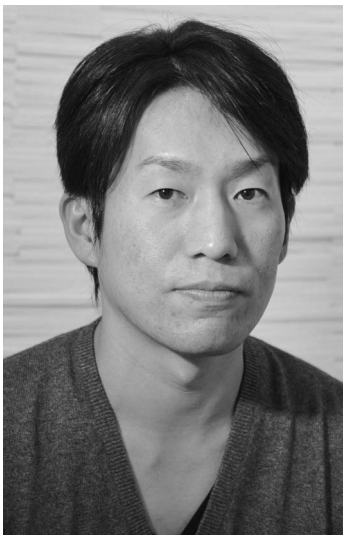


Katsunori Yamada

we apply the idea of the conformity theory by Akerlof (1980) to promote stay-home activities.[2] In our preanalysis plan (PAP), it was hypothesized that participants whose baseline outing time was above the median value would be more likely to refrain from outings after acknowledging their relative standing. In contrast, it was anticipated that participants whose baseline outing time was below or equal to the median value would be less likely to refrain from outings.

Previous studies show that informing people that their peers engage in preventive behavior during COVID-19 can motivate them to follow suit. Randomized text messaging based on social norms increases the registration of vaccine appointments among health care workers (Santos et al., 2021). Moehring et al. (2023) also found that presenting accurate information on the share of respondents in the same country who will accept a COVID-19 vaccine increases intentions to accept a vaccine.[3] In contrast to these studies, this study defines the median outing time as the social norm and examines not only the positive aspects but also the negative aspects of social norm nudges, as in Chen et al. (2010).

The second treatment arms considered the effect of powerful messengers, similar to Banerjee, Alsan, et al. (2020), who found an amplifying effect of the powerful voice of Nobel laureate Abhijit Banerjee, compared with typical government messaging, on preventive behaviors in India during COVID-19. On a related note, Ajzenman et al. (2023) found that when Brazil's president dismissed the risks of the COVID-19 pandemic and challenged scientific recommendations, social distancing in pro-government localities declined. In this experiment, two messengers were used: Prime Minister Shinzo Abe and Emperor Naruhito. Opinion surveys conducted at the time of the experiment showed that a high proportion of citizens felt an affinity for the emperor and the imperial family (Kyodo News, 2020; Nippon Hōsō Kyōkai Broadcasting Culture Research Institute, 2020), whereas the Abe Cabinet's disapproval rate exceeded its approval rate for the first time since March 2019 (The Mainichi, 2020). Thus, although both messengers likely represent society equally, their popularity among citizens differs significantly. Given this and the fact that general citizens were being flooded with similar messages from Prime Minister Abe, it was anticipated that the emperor would be more effective in inducing people to engage in preventive behaviors.[4]

One of the unique contributions of this study is that the 2×2 factorial design allows it to examine the effect of each treatment separately and the interaction effect of the two treatments. Specifically, this design facilitates the exploration of whether the effect intensifies when both manipulations are combined.

Furthermore, this study adheres to recent standards for conducting randomized experiments in the social sciences, enhancing research transparency and mitigating questionable research practices, such as HARKing and *p*-hacking (Banerjee, Duflo, et al., 2020; Christensen et al., 2019). It is vital to highlight that most of the analyses in this study align with what was detailed in the PAP.

Method

When setting the sample size, standard practices from past literature of experiments were followed: a power of 0.8 and a significance level of 0.05. Given the urgency of the circumstances and unprecedentedness of the issue, the main experiment was conducted without a pilot study. A minimum detectable effect size of 0.2 *SD* was set for the outcome variables. According to the minimum detectable effect curve,

[2] In the literature on social comparison, the definition of a comparison benchmark can be specific (A. E. Clark & Senik, 2010, Yamada & Sato, 2013). While our definition of comparison groups is rather crude in that it is defined merely at the prefecture level as it will be documented below, our respondents were informed about whom they were compared to and what the comparison numbers were.

[3] Other studies have found that individuals' tendency to conform with social norms, as measured by agreeableness (Chan et al., 2021; C. Clark et al., 2020; Götz et al., 2021) and first- and second-order injunctive beliefs (Hensel et al., 2022), is associated with adherence to government rules and preventive behaviors.

[4] One particular concern regarding our experiment is that citizens were consistently receiving similar messages from Prime Minister Abe, making it challenging to discern the impacts of our manipulations. However, we contend that this concern is relatively minor for the following reason. As depicted in Figure 1, there was a notable decrease in pedestrian traffic beginning in the third week of March 2020. Particularly after April 7, when a state of emergency was declared in seven main prefectures in Japan, pedestrian traffic plummeted and remained low for over a month. It is crucial to note that this decline stagnated despite the ongoing delivery of messages from Prime Minister Abe. Therefore, by the commencement of our experiment, messages from the prime minister seemingly lost their efficacy to prompt behavioral alterations, becoming a de facto standard in the real world. Our experimental design factored in this diminished influence from Prime Minister Abe's messages, and we aimed to determine if introducing messages from the emperor or leveraging social comparisons could induce further behavioral shifts.

the required sample size for each treatment group was approximately 875 to satisfy this condition. Hence, data from 3,500 (875 × 4) participants were collected for this study.

Data Collection

An online survey was conducted in Japan from April 17 to May 5, 2020. During this period, Japan did not introduce a strict lockdown, and there was no legal enforcement against outings; hence, people were able to make their own decisions on outing behaviors without facing legal restrictions during the experiment. Figure 1 shows that the study period included a period when a substantial proportion of the Japanese population was still going outside.

A local survey company was recruited to obtain a sample of the Japanese population. Invitation emails were sent to preregistered participants aged 20–59 years living in one of the seven prefectures in Japan (Chiba, Fukuoka, Hyogo, Kanagawa, Osaka, Saitama, and Tokyo).[5]

We decided to exclude individuals aged 60 years and above from our sample because we observed a significant reduction in pedestrian traffic among individuals in their 60s and 70s compared to those in their 20s–50s just before the experiment. This pattern is evident in the figures in the Supplemental Figure A1, which show pedestrian traffic across age categories (from the 20s to the 70s) in two major cities in Japan (Osaka and Tokyo) in April 2020, when our experiment was conducted. These figures are substantiated by mobility data provided by the cellphone company NTT DOCOMO, Inc. Given this pattern, the government aimed to reduce unnecessary outings by nonolder adults. Since older adults tend to stay at home, we decided to include individuals in their 20s–50s in our experiment.

A stratified random sampling was used to ensure that the breakdown of this study's sample mirrored the national population in terms of age and sex based on the Basic Resident Register of 2019.[6] The initial sample size was 3,493.

Upon entering the study's website, participants were informed that the survey was being conducted for academic research and that the confidentiality of their answers was ensured. They were also notified that they would be answering eight surveys over 3 weeks. Informed consent was obtained from all participants. Those who agreed to participate were instructed to proceed to the survey questionnaire. The number of questions in each survey, the expected completion time, and the payment scheme (i.e., participation rewards to encourage participants to complete all surveys) were clarified. After completing all the surveys, participants earned up to 180 Japanese Yen (approximately 2 USD). These participation rewards were determined in consultation with the survey company. The following subsections describe the series of surveys in chronological order. The original survey questionnaire and its English translations are available in the Supplemental Material.

April 17: Survey of Demographic Characteristics

The first survey included demographic questions regarding gender, age, education, marital status, number of people living together, residential location, employment status, self-reported health status, annual household pretax income, and negative income shock. In addition, to understand the mechanism of the effects of the information treatment on outing time, questions were included to measure time preferences, risk preferences, social preferences, the tendency to exhibit herd behavior, political interests, political preferences, policy evaluations, religious beliefs, and national identity. The questions intended to elicit economic preferences were adopted from Yamada and Sato (2013), Falk et al. (2018), and Sutter et al. (2018). Other personality trait questions were taken from The International Social Survey Programme (2023), World Values Survey (2023), and The UTokyo-Asahi Survey (UTokyo-Asahi, 2023) as summarized in Supplemental Table A15. Finally, questions were included to ascertain the types of mobile phones and smartphones that the participants used. This information was used in a follow-up study to verify the validity of the main outcome variables.

April 18 and 19: Pretreatment Surveys (Week 1)

Data were collected on self-reported weekend outing time to measure the baseline outing behaviors of the participants.

The survey questions were carefully devised based on self-reported outing time on weekends to minimize respondents' resistance to providing answers. First, it was repeatedly stated that the research was purely for academic purposes to understand human behavior and that the researchers were in no position to judge the respondents' morals. Second, participants were asked about the total outing time and the proportion of time spent on necessary activities.[7] Subsequently, the time spent on unnecessary activities was computed by subtracting the time spent on necessary activities from the total outing time.[8]

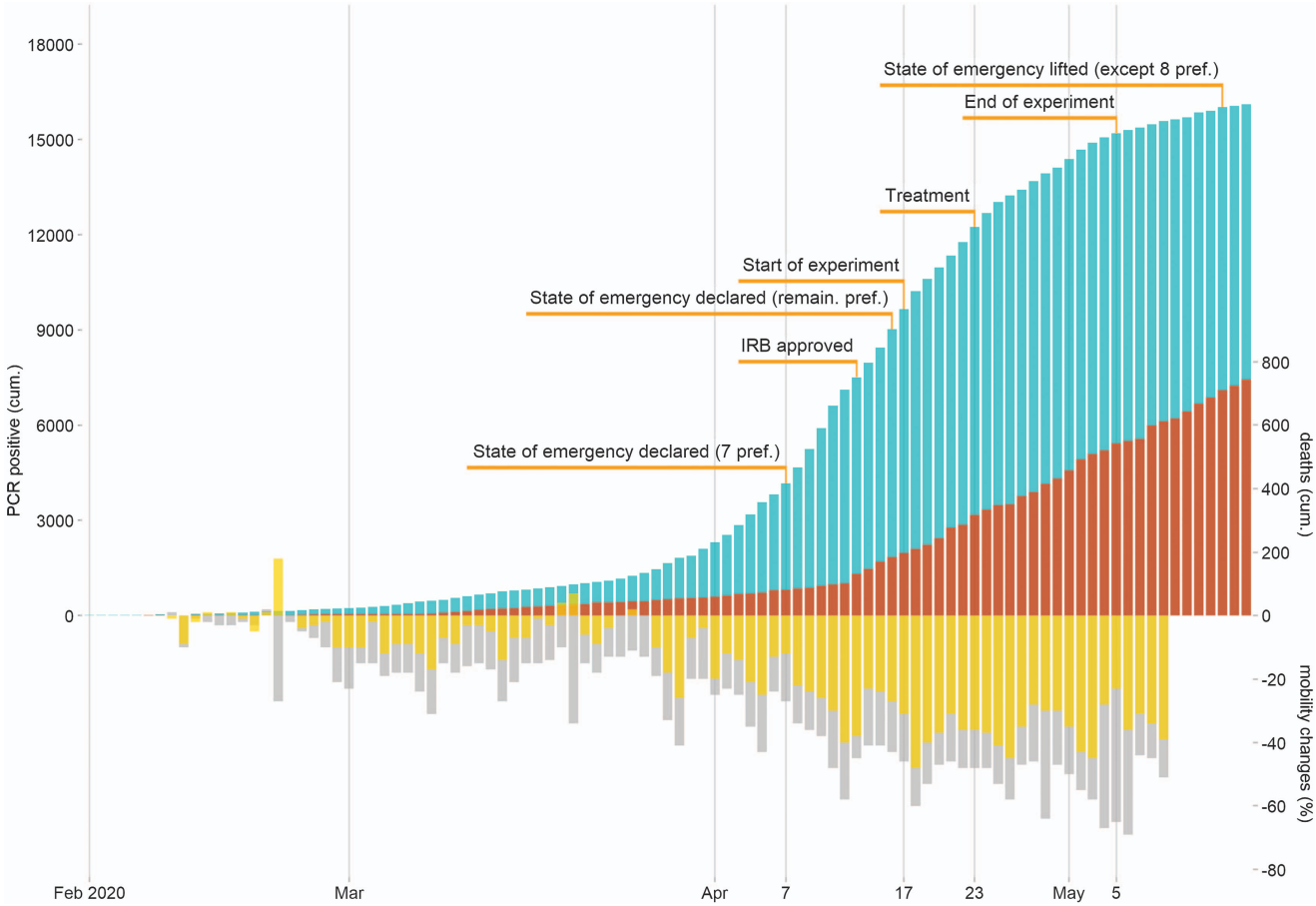
[5] The state of emergency was announced by the government for these seven prefectures on April 7 and was expanded to the other prefectures on April 16 (Figure 1). The sampling locations were limited to these seven prefectures to control for baseline conditions. When the experiment was designed, it was unclear whether the state of emergency would extend to other prefectures.

[6] We acknowledge that, by focusing on individuals in their 20s–50s, our strategy deviated from the population distribution of the census and that our survey would not perfectly represent the general population. However, considering the circumstances mentioned above, we had concerns that our intervention experiment, aimed at promoting "stay-home" behavior, might not have been meaningful given the proactive compliance of older adults with the "stay-home" recommendation.

[7] Researchers directly asking about outing time spent on unnecessary activities might face resistance.

[8] The potential concern about using self-reported outing time is acknowledged. Hence, a follow-up survey was conducted to check the validity of the data. The details are discussed in Validity of the Outcome Variable section.

Figure 1
Timeline of the Experiment



Note. The timeline of the experiment and major-related events is shown. The blue bars indicate the cumulative number of PCR-positive cases, while the red bars show the cumulative number of deaths due to COVID-19. The yellow bars mean the mobility trends for places related to retail and recreation (e.g., restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters), while the gray bars show the mobility trends for places related to transit stations (e.g., subway, bus, and train stations). For the last two series, data from January to February 6, 2020, are used as the baselines. The data on PCR-positive cases and deaths due to COVID-19 were taken from the Ministry of Health, Labour, and Welfare (https://www.mhlw.go.jp/index.html). The data on mobility changes were taken from Google Community Mobility Reports (https://www.google.com/covid19/mobility/). IRB = institutional review board; PCR = polymerase chain reaction; pref. = prefecture; cum. = cumulative.

For example, the exact phrasing used to collect data on the outing time for April 18 is as follows:

> *Question 1 (Q1):* How much time did you spend outside your home on April 18th, Saturday? Please provide the total amount of time you spent outside of your home.
>
> *If you did not leave your house, please answer "0 hr 0 min."
>
> *Question 2 (Q2):* Of which, how much time in total did you spend outside your home on activities essential to daily life (e.g., shopping for daily necessities, traveling to school, traveling to work, traveling to the hospital)?
>
> If you had more than one purpose for a single outing, please separate the time you spent for each and answer with the total amount of time spent on what you feel is necessary for daily life.
>
> *If you only left your home for matters essential to daily life, please answer the same as in Q1.

April 23: Randomized Information Treatment

The randomized information treatment was conducted on April 23. In the survey, respondents' expectations of their outing behaviors relative to those of others in Week 1 were collected first. The respondents were then shown randomly assigned pieces of information. Finally, immediately after the information provision session, data were collected on the participants' intention to cooperate with stay-home activities.

To ensure that the participants were exposed to the randomly assigned information treatment before the start of the posttreatment surveys, the window of the information

provision session was closed on April 24. Those who did not respond before April 24 were excluded from the study sample, as explained below.

April 25 and 26 (Week 2) and May 2 and 3 (Week 3): Posttreatment Surveys

To measure the responses to the information treatment, outing time data were collected on two weekends. This information constitutes the main outcome variables. The procedures and phrases were the same as those used in the pretreatment survey. The participants were monitored for two weekends because they might not have reacted to the treatments immediately, especially if their plans on the weekend immediately after the interventions were already set when the treatments were applied. Thus, a combined outing time was employed for Weeks 2 and 3 for the main outcome variables. Supplemental Table A1 provides the summary statistics of the collected data.

Design of the Randomized Information Treatment

The participants were randomly assigned to each of the four treatment arms. In all four conditions, they received a message pertaining to the ongoing problems regarding COVID-19 and were told that their behaviors and decisions would affect whether the pandemic would abate soon.

As there was no direct control over the respondents, the credibility of the information became especially crucial. The fact that messages from those messengers could easily be inspected on the internet and that when they found that the messages were fake, it would lead to great resistance to the survey by the respondents was a concern. As such, actual statements made by the prime minister and emperor were used. Although it is acknowledged that the same messages could be used across the treatments to control the experimental conditions, actual statements were chosen over fake ones to avoid resistance by the respondents.

The message treatments are displayed in the English-translated version in Figure 1. The original Japanese version is available in the Supplemental Material (Section A4.2). In the original version, it can be seen that the cognitive burden of reading the information was controlled by making the word counts of the messages almost identical between the conditions.

Follow-Up Survey to Check the Validity of the Outcome Variables

As the measures of outing time were self-reported, concerns arose with respect to measurement errors. For this reason, smartphone data were exploited. The preinstalled app, called Healthcare on iPhones, records the user's step count and distance traveled per day.[9] In the first stage, a follow-up survey was launched on May 22 to check participants' willingness to provide such records. Using information from the baseline survey, 1,146 iPhone users were identified and asked to provide screenshots of their step counts and distance traveled in the health care app on the days of their reported outings. A total of 516 respondents were willing to participate. In the second stage, 118 participants were randomly selected and asked to submit screenshots of these parameters.[10] The reward for providing screenshots was 200 Japanese Yen, greater than the amount participants received for completing all eight of the earlier surveys. This was a sufficiently high reward to motivate them to provide screenshots.

Analysis

In this analysis, the potential effects of comparing individual behaviors with social norms were examined first. Half of the participants, those in Groups B and D in Figure 2, received information on weekend outing times to enable social comparisons. These pieces of information, highlighted in red in the figure, show the weekend outing time over the previous weekend (April 18 and 19, Week 1), together with the median value of the same information for all participants in the same prefecture.[11] In contrast, participants in Groups A and C in Figure 2 received messages that prevented them from making social comparisons.

Second, the information sender was manipulated. In Groups A and B, the sender is the prime minister. These conditions were considered control conditions because, in the real world, COVID-19-related messages are usually provided by political leaders, including the prime minister. If a series of pieces of information repeatedly comes from the same person or authority, people may begin to pay little attention to them; this is termed the burnout effect (Eckel et al., 2007) in the literature on behavioral economics. In Groups C and D, participants received messages from Emperor Naruhito presenting the powerful voice. These messages included images of messengers to enhance the reality of the experiment.

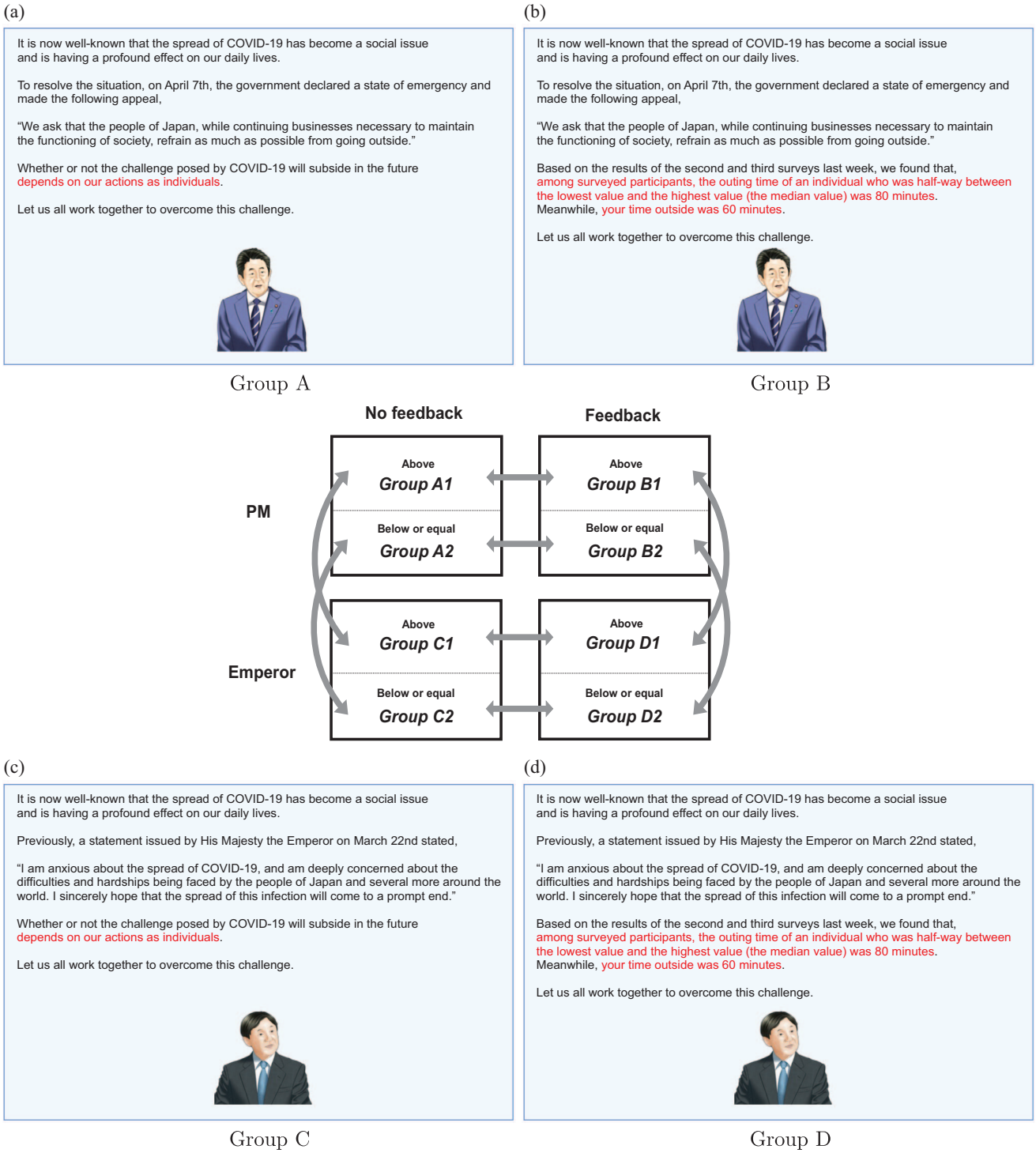
Finally, in the experimental setting, it was crucial to test the heterogeneous responses caused by different perspectives on the distribution of weekend outing time. For the PAP, it was hypothesized that participants whose outing time in Week 1 was above the median value, namely, those in Subgroup 1 through Groups A–D, would be more likely to refrain from outings after acknowledging their relative standing. In contrast, it was anticipated that participants whose outing time in Week 1 was below or equal to the median value, namely, those

[9] For Android phones, a similar app, Google Fit, was not preinstalled until the latest version of Android 10.0. At the time of this experiment, the circulation rate of Android 10.0 was well below 10%. Therefore, iPhone users were focused on in the follow-up surveys.

[10] This could not be requested from all 516 people because of a shortage of research funds.

[11] As the weather conditions differed across prefectures at the time of the experiment, these median values were allowed to be different across prefectures to take into account differences in weather conditions.

Figure 2
Experimental Design



Note. Examples of the information treatments are shown. Group A (Panel a) and Group B (Panel b) receive messages from the prime minister, while Group C (Panel c) and Group D (Panel d) receive messages from the emperor. Those messages share the basic concepts of efforts to overcome the COVID-19 pandemic. In addition to the basic concept, those in Groups B and D receive tailored information about each individual's relative outing time on the previous weekend in the same prefecture. PM = Prime Minister.

in Subgroup 2 through Groups A–D, would be less likely to refrain from outings. Such information could even increase weekend outing time after the treatments because of the boomerang effect, as noted by Schultz et al. (2007), the occurrence of which is denoted as an example of the backfiring effects of information provision (Osman et al., 2020).

Transparency and Openness

We declare that our research plan has been made accessible to the public, and the code and data necessary for replicating the results are also publicly available.

Results

Study Sample and Balance Checks

Of the initial 3,493 participants, respondents who did not receive the randomly assigned information treatment (188) and those who did not provide all of their posttreatment outings (247) were excluded. Finally, respondents who did not pass the attention question in the information treatment survey (190) were excluded. The final sample included 2,868 participants (1,449 males and 1,419 females; 82.1% of the original sample).

As documented in the PAP, balance checks were conducted for gender, age, education, marital status, per capita household income, negative income shocks, and residential location. Although the baseline outing time in Week 1 was not included in the PAP, the balance was also checked. Supplemental Table A2 shows that all variables are balanced at a false discovery rate of 0.05, except for the indicator of a negative income shock. To control for the potential effects stemming from the imbalance of this variable, it was included in the subsequent analyses.

In addition, because information content differs by treatment group, a common concern is that attrition may differ across groups. After the respondents received information treatment, 247 of the 3,305 participants did not complete all the surveys, as mentioned above. When an attrition dummy was regressed on the treatment dummies and demographic variables, it was found that attrition in Group C was marginally higher than that in Group A ($p = .092$), which could be a concern (see Supplemental Table A5). However, because only 52 participants from Group A and 70 participants from Group C dropped out of the survey, this difference does not seem to have quantitative implications (Supplemental Table A6). At the very least, the study sample was balanced, as previously stated. Hence, attrition is less likely to produce the following results.[12]

Main Results

Table 1 summarizes the effects of information manipulation on outing time. Calculations of the effect sizes of manipulations (in minutes) were done using estimation results of Equation 1 in the Supplemental Material. Results are displayed for the three different outcome variables: total outing time, unnecessary outing time, and necessary outing time. The outing times were compared in Weeks 2 and 3 (combined) between participants with similar baseline outing times in Week 1 to control for the initial condition, as illustrated in Figure 2.

Rows 1–4 display the effects of social comparisons on outing time, with the former two having the prime minister as the messenger and the latter two having the emperor as the messenger. For example, Groups B1–A1 indicate that a comparison was made between Groups B1 and A1 (see Figure 2). In this case, the effect of feedback was examined when the messenger was the prime minister among individuals whose outings were above social norms. Rows 5–8 examine the effects of powerful messengers. The former two rows have no information feedback, whereas the latter two have information feedback. For example, Groups C1–A1 indicate a comparison between Groups C1 and A1 (see Figure 2). In this case, the effect of a powerful messenger was examined among individuals whose outing time was above social norms (but who did not receive feedback).

The first striking result of the experiment was that no strong support for the main effects of a powerful messenger was found, as shown in Rows 5–8. This result is in sharp contrast to the results of previous studies (Banerjee, Alsan, et al., 2020; Viskupič et al., 2022) that found a strong effect of powerful messengers on preventive behavior. Moreover, no effects were found of social comparisons when the messenger was the prime minister (Rows 1 and 2). In contrast, significant effects were found when the messenger was the emperor (Rows 3 and 4).

Moreover, the last results show both positive and negative aspects of social comparisons. On the one hand, Row 3 shows that the treatment reduced the unnecessary outing time for those whose outing time was above the social norms ($\beta = -41.88$, CI [−79.95, −3.82], $p = .031$ with a control mean of 159 min).[13] On the other hand, Row (4) shows that the treatment increased the necessary outing time for those whose outing time was below the social norms ($\beta = 46.79$, CI [16.06, 77.51], $p = .003$ with a control mean of 96 min). The effect of this backfiring also remained after combining

[12] The main regressions were also run by including age variables, that is, variables that are statistically significant in Supplemental Table A5, as additional controls in the Supplemental Table A8. The results were qualitatively and quantitatively similar. See also the discussion in the Main Results section.

[13] Some readers may be interested in pure comparison effects through the emperor's voice, free from the counterpart of the prime minister, namely (Group D2–Group C2)–(Group B2–Group A2). For an illustration, we calculated this comparison for the total outing time. The effect size for this comparison was 43.17 min, which is a substantial magnitude given the control mean value. However, this estimate was not significant ($p = .153$).

Table 1
Summary of the Treatment Effects

List of effects	Outcome variable								
	Total outing time			Unnecessary outing time			Necessary outing time		
	Effect (in min)	95% CI	*p*	Effect (in min)	95% CI	*p*	Effect (in min)	95% CI	*p*
1. Effect of social comparison (PM and above, Groups B1–A1)	−53.43	[−121.75, 14.89]	.13	−9.66	[−48.72, 29.40]	.63	−43.77	[−112.81, 25.27]	.21
2. Effect of social comparison (PM and below, Groups B2–A2)	7.60	[−40.50, 55.70]	.76	−9.04	[−28.97, 10.91]	.37	16.64	[−23.80, 57.07]	.42
3. Effect of social comparison (Emperor and above, Groups D1–C1)	−7.28	[−77.11, 62.54]	.84	−41.88	[−79.95, −3.82]	.03	34.60	[−32.19, 101.39]	.31
4. Effect of social comparison (Emperor and below, Groups D2–C2)	50.77	[16.52, 85.03]	<.01	3.99	[−10.73, 18.70]	.60	46.79	[16.06, 77.51]	<.01
5. Effect of messenger (no comparison and above, Groups C1–A1)	−28.99	[−97.84, 39.85]	.41	19.41	[−20.45, 59.27]	.34	−48.40	[−117.37, 20.57]	.17
6. Effect of messenger (no comparison and below, Groups C2–A2)	−23.53	[−56.22, 9.16]	.16	−9.24	[−26.94, 8.45]	.31	−14.29	[−37.42, 8.84]	.23
7. Effect of messenger (comparison and above, Groups D1–B1)	17.15	[−51.89, 86.19]	.63	−12.81	[−50.02, 24.40]	.50	29.97	[−36.50, 96.43]	.38
8. Effect of messenger (comparison and below, Groups D2–B2)	19.64	[−29.38, 68.66]	.43	3.78	[−13.59, 21.15]	.67	15.86	[−29.16, 60.89]	.49

Note. Robust standard errors were used to compute the confidence intervals and *p* values. Control variables are outing time in Week 1, an indicator of a negative income shock, and the prefecture fixed effects. For the values for the first and second rows, the estimation results in Columns 1–3 of Supplemental Table A7 were used. For the values for the third and fourth rows, the estimation results in Columns 7–9 of the same table were used. For the values for the fifth and sixth rows, the estimation results in Columns 1–3 of Supplemental Table A7 were used. The estimation results in Columns 4–6 of the same table were used for the values for the seventh and eighth rows. See Figure 2 for the definition of each group. PM = Prime Minister.

the unnecessary and necessary outing times ($\beta = 50.77$, CI [16.52, 85.03], $p = .004$ with a control mean of 129 min).[14]

Although a main effect of social comparison or a powerful messenger was not found, when combined the treatment was strong enough to change behavior. Interestingly, the direction of the change could go either way: not only was the expected effect observed but also a backfiring effect.

Three caveats to our main results are in order. First, our estimates were potentially biased because of attrition. In Supplemental Table A5, we observed that younger subjects tended to drop out of the survey. Acknowledging the concern of potentially biasing our main results due to the higher attrition of younger subjects, we conducted additional analyses that considered attrition (Supplemental Table A8). Comparing the results in Supplemental Table A7 (our main regression results that yield Table 1) with those in Supplemental Table A8 (and Table A9 as the counterpart of Table 1), we found that the estimates were qualitatively and quantitatively almost the same. Hence, we concluded that the potential concern about attrition was not an issue.

Second, it is plausible that the significant intervention effects we found came from comparisons by participants at the extremes of the distribution of outing times rather than by participants near the median. Somewhat surprisingly, our original significant results were found to be derived not from participants at the extremes of the distribution of outing times but from participants near the median. Examining the effect across quartiles, we found a significant reduction in unnecessary outing time in Group D came from participants in the third quartile ($\beta = -40.33$, $p = .049$) rather than those in the extreme of the fourth quartile. Similarly, a significant increase in the necessary outing time in Group D was observed in those in the second quartile ($\beta = 67.49$, $p = .006$) rather than those in the first quartile. From these observations, it seems that what matters more is binary information on whether an individual's outing time is above or below the social norm rather than more detailed information on the relative positions from the social norm.

Third, convergence to the mean is a common concern for this type of manipulation study. As significant effects were found in the comparisons of Groups C and D (namely, the effect of social comparisons in the Emperor conditions), we have checked if the people in the control group (in this case, Group C, where they got no feedback for comparisons) showed such convergence. First, we found that the average unnecessary outing time among those whose figures were above the median decreased after our manipulations, which is a sign of convergence to the mean. However, the magnitude of the convergence was merely 10.71 min, which is approximately one fourth of the significant effect size of the manipulation (41.88 min). Similarly, the average necessary outing time among those whose figures were below the median increased after our manipulations, which is a sign of convergence to the mean. In this case, the magnitude of the convergence was 25.09 min, which is approximately half of the significant effect size observed after manipulations in the form of backfiring effects (46.79 min).

Mechanism

Subsequently, the underlying mechanisms of these findings were investigated using participants' personality traits. Ten personality traits were examined. In addition to the eight personality traits preregistered in the PAP, the heterogeneous effects based on respondents' initial beliefs about outing time during the baseline week were examined, as well as their political interests. Supplemental Table A15 includes the details of these variables.

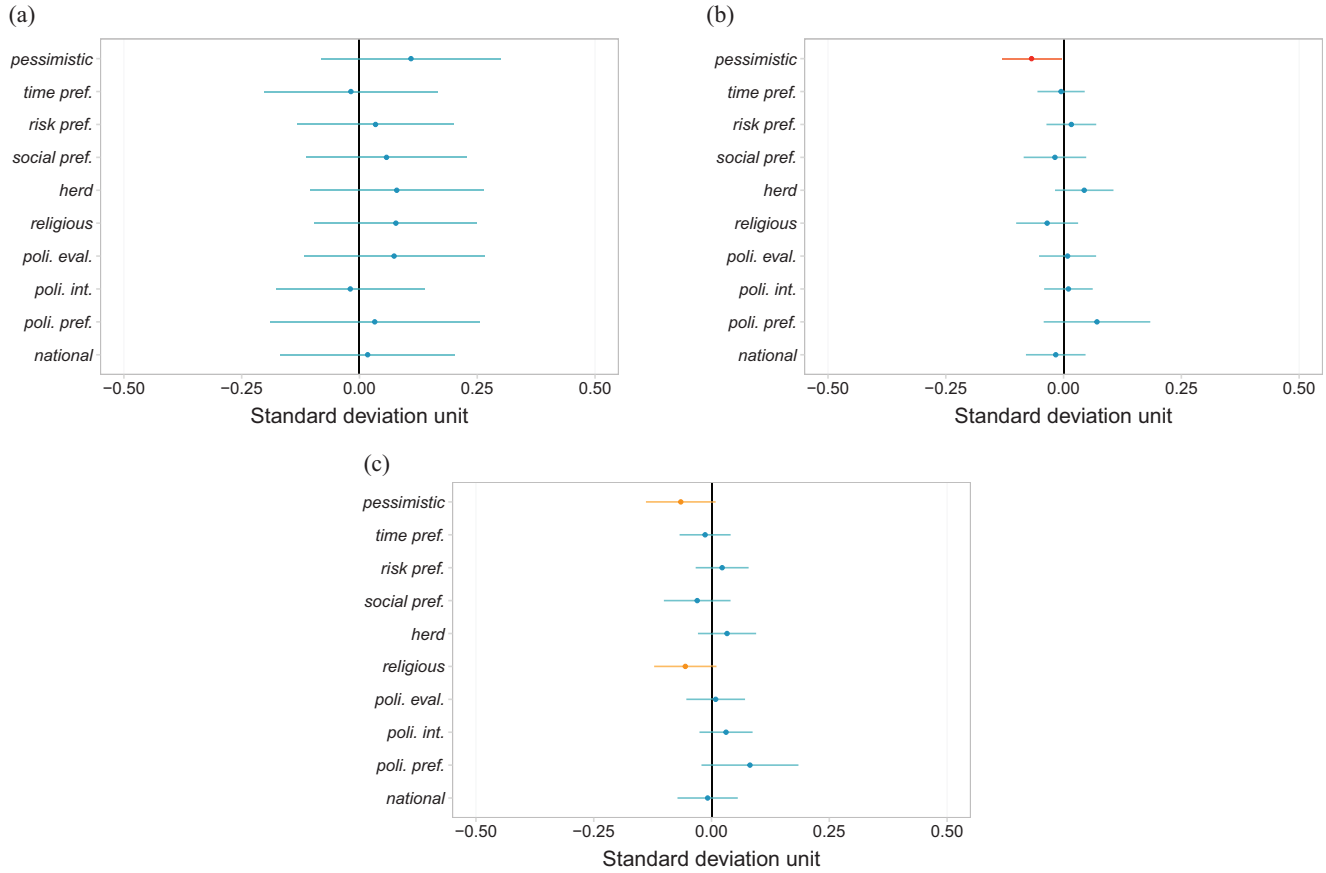
In the analysis, a regression model similar to the main regression was employed, incorporating interaction variables between the treatment conditions and a certain personality trait. The possible interaction effects of each personality trait were tested separately. Using these regressions, it can be determined whether the treatment effect is greater or smaller for individuals with certain personality traits. The following section focuses on the results for Groups D1 (above-median and Emperor) and D2 (below-or-equal-median and Emperor), as significant results were found for these groups (Table 1).

Figure 3 shows the coefficients (in standard deviations) of the interaction terms. On the one hand, in the case of the time-reducing effects of social comparisons (unnecessary outing time, in Row (3) in Table 1), none of the prespecified personality traits (e.g., social and risk preferences) offer a plausible explanation for the effect (Figure 3, Panel a).

On the other hand, Panels (b) and (c) in Figure 3 provide plausible mechanisms behind the backfiring effects (total and necessary outing time, in Row (4) in Table 1). The panels indicate that the backfiring effect is smaller for those who had pessimistic expectations about their own outing behavior in the baseline week (i.e., those who thought that they had spent more time outside the home longer than social norms). By contrast, the backfiring effect is larger for those with optimistic expectations of their own outing behavior (i.e., those who thought that they had spent time outside the home shorter than social norms). Moreover, Panel (c) in Figure 3 shows that the backfiring effect is smaller for those who

[14] There is a concern that individuals in the above-median group and the below-or-equal-median group are not balanced, undermining this study's identification strategy. Therefore, balance checks were conducted across groups within the above-median or below-or-equal-median group. Supplemental Tables A3 and A4 show that all variables are balanced at a false discovery rate of 0.05, except for the indicators for the highest level of education being junior high school (above-median group) and Osaka Prefecture (below-or-equal-median group). Supplemental Table A8 shows that the results do not change when the former variable is included as an additional control (whereas the latter is included as a fixed effect in the main regression).

Figure 3
Interaction Effects of Information Treatments With Personality Traits



Note. The unnecessary outing time (Panel a), the necessary outing time (Panel b), or the total outing time (Panel c) is regressed on treatment variables (Groups A1, A2, B1, B2, D1, and D2), the personality traits, the personality traits interacted with the treatment variables, the above median dummy, the personality traits interacted with the above median dummy, and control variables. The control variables are outing time in Week 1, an indicator of a negative income shock, and the prefecture fixed effects. The point estimates and the 95% confidence interval of the interaction between the Group D1 dummy and the personality traits (Panel a) or the Group D2 dummy and the personality traits (Panels b and c) are shown. Robust standard errors were used to compute the confidence intervals. Group C1 was set as the baseline for Panel (a), while Group C2 was set as the baseline for Panels (b) and (c). time pref. = time preferences; risk pref. = risk preferences; social pref. = social preferences; poli. eval. = policy evaluations; poli. int. = political interests; poli. pref. = political preferences; see Supplemental Table A15 for the definitions of the personality traits.

regard themselves as more religious. In contrast, the effect was larger for those who regarded themselves as less religious.[15]

Finally, we also examined potential heterogeneous treatment effects through objective personality traits, such as gender and age, for cases in which we observed significant main effects (namely, Group C vs. Group D). The definitions of variables are in Supplemental Table A16. As Supplemental Figure A2 shows, we found no significant interaction effects at the 5% level.

Validity of the Outcome Variable

The self-reported nature of outing time can be a source of concern, as the participants might have misreported their outing time. This concern was addressed by checking for discrepancies between the reported outing time and the actual distance traveled recorded on the respondents' smartphones.

First, Supplemental Table A10 shows the balance test results between the chosen subjects ($N = 116$, as two of 118 did not supply all necessary screenshots after agreeing to do so) and those who were not at our random sampling. The results are encouraging: except for the age category information of the 50s, distributions are balanced in terms of all the objective variables

[15] While we did not observe the main effects of manipulations in terms of comparison between Groups A and B, we also examined the heterogeneous interaction effects in terms of these comparisons. We found only one significant interaction effect at the 5% level for pessimistic attitudes in the above-median group for total outing time. Specifically, those who were pessimistic about their outing time compared to the social norm tended to decrease their total outing time after social comparisons. See Supplemental Figure A3.

of baseline outing time, gender, educational attainment, marital status, and two pieces of income information at the 5% level.[16]

Second, Figure 4 shows the scatter plot with a fitted line. As can be seen, the self-reported outing time (on the *y* axis) and distance traveled from the screenshots (on the *x* axis) showed a strong positive correlation ($r = 0.59$, $p < .001$), validating the outcome data. In addition, in the Supplemental Material, Supplemental Table A12 shows that estimated effect sizes of information manipulation on distance traveled were similar to that obtained using self-reported measures.

There still may be a concern arising due to the selection of iPhone users and to measurement errors of travel distances using iPhones. We argue that these are not an issue in our context for the following reasons: First, Supplemental Figure A2 shows no heterogeneous treatment effects between iPhone users and non-iPhone users. Second, we argue that it seems unlikely that measurement errors of travel distances in the direction of undermeasurement occurred only among those subjects who reported shorter outing time, which, if it happened, would result in a false positive result.

Discussion

Interpretations of the Results

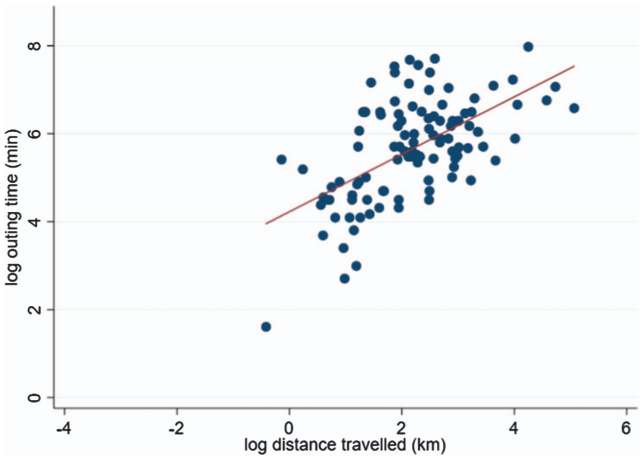
In summary, it was found that none of the treatments alone affected individual cooperation with stay-home activities. However, a significant effect was found when they were combined. When information was delivered by a powerful messenger, notifying participants that their outing time was longer than social norms promoted them to reduce their unnecessary outing time, whereas notifying them that their outing time was shorter than the social norms led them to increase their necessary outing time. These findings were made possible through our 2 × 2 factorial design, which allowed us to assess the effect of each treatment separately and the interaction effect of the two treatments. In addition, compared to previous studies demonstrating that text messaging based on social norms increases preventive behaviors in the context of infectious diseases (Moehring et al., 2023; Santos et al., 2021), the present study found both positive and negative aspects of preventive messages based on social norms.

Examining the potential mechanism underlying the main finding on reducing unnecessary outing time in Table 1, we discerned that none of our measures of personality traits captured significant effects. We interpret this to mean that adherence to social norms is universal among those whose baseline outing time exceeded the median, provided it contributes to a societal objective, such as curtailing outing time during an infectious disease outbreak. Given that this effect was absent across prime minister conditions, it underscores the pivotal role of a powerful messenger in managing such exigent situations.

However, having a powerful messenger might not be without drawbacks due to the backfiring effects we observed in the Emperor conditions. Further investigations revealed that those who held optimistic beliefs about their own outing behavior in the baseline week and those who considered themselves less religious were more likely to exhibit such effects. Our interpretation regarding the former is that individuals became so assured in their optimistic beliefs that they lost discipline, increasing their outing time. Put differently, the endorsement from the emperor might have been excessive. As for the latter, Japan has a primary religion called "Shinto," and the emperor and his family maintain a close connection with it. We speculate that those more invested in religion were inclined to heed the emperor's voice, hoping for a swift end to the pandemic. Given the importance of the emperor's voice for these individuals, they would be reluctant to extend their outing times, even if their baseline times were below the social norm. Conversely, for those less devoted to religion, the emperor's influence might not suffice to maintain their adherence to the social norm.

The findings regarding backfiring after information provision have drawn special attention. In an influential article, Schultz et al. (2007) conducted social norm nudges on energy consumption and found that the subgroup of participants who consumed less energy than the social norm before began to consume more energy after treatment. They also provided injunctive norms, in addition to social norms, to a subgroup and found that the

Figure 4
Correlation Between Outing Time and Distance Traveled



Note. Correlation between self-reported outing time and distance traveled from the screenshots is shown.

[16] The balance is less ideal regarding the representativeness of our chosen subjects compared to our entire study sample. Supplemental Table A11 shows that age information and information about educational attainment and marital status are not balanced. However, we argue that this is of less concern as the main variables, such as baseline outing time and income information, are balanced. Moreover, none of the objective variables, such as age and educational attainment, provided us with significant interaction effects with treatment dummies (Supplemental Figure A2), which would mitigate potential concerns about biases in our main results.

provision of injunctive norms was useful in preventing the backfiring effect. In the present study, after backfiring effects were observed that were similar to those in Schultz et al. (2007) among those whose behaviors were better than the social norm, the heterogeneity in the backfiring effects was analyzed instead of trying another condition to prevent negative responses. It is important for policymakers to recognize the existence of heterogeneous responses by personality traits that cause backfiring, which was not the focus of Schultz et al. (2007) but was demonstrated in this study before implementing nudge policies.

The effect sizes of the manipulation of informing social norms are 26%–49% compared with the control mean. The effect sizes of the results can be compared to those of previous studies. First, Frey and Meier (2004) found that informing students that many other students had contributed to charitable funds in the past increased the probability of contributions to funds by six percent. Second, Goldstein et al. (2008) showed that informing hotel room guests that many other guests had joined a towel reuse program in the past increased the reuse of towels by 26%. Third, Allcott (2011) found that providing residential utility consumers with information about their neighbors' energy consumption reduced the energy consumption of those who consumed more than that of their neighbors by 2%. Finally, Chen et al. (2010) provided evidence that informing users of the median user's total number of movie ratings changed the number of ratings for those below the median value by 530% and for those above the median value by 62%. Although the outcome, treatment, and context are different, the effect sizes in this experiment are in line with or slightly larger than those in these studies, with the exception of Chen et al. (2010).

Observing the expected effect only for the unnecessary outing time and finding the backfiring effect only for the necessary outing time require further explanation. The interpretation of this study is that participants might think that it would be less guilty to adjust the necessary outing time rather than the unnecessary time when they increase it. In contrast, they might think that it would be necessary to adjust unnecessary outing time when decreasing it. Indeed, the government asked people to reduce unnecessary time spent away from home during the experiment.

Limitations Due to Experimental Settings

Our choice of wording in the prime minister conditions that "the government made a statement that …" may become a concern, as it might be taken as a message from the government, not from Prime Minister Abe, distorting the effects of Abe's voice. We argue that such a concern is minimal because our main results were obtained by measuring the effects of social comparisons in the Emperor conditions (Group C vs. Group D). Thus, the potential distorting effects of the prime minister's conditions are irrelevant. However, there remains a possibility that these effects could have driven the result; we found no significant effects of social comparisons in the prime minister conditions (Group A vs. Group B). We argue that the concern is again minimal because, when we examined the interaction effects of subjective evaluations of government policy (Q17) and the dummy variable of treatment Group B, we did not observe significant effects. If our respondents had regarded that the message had been from the government instead of Prime Minister Abe, then the interaction term would have had significant effects (e.g., those with high or low evaluations of government policies would have responded more or less to our treatments).

A possible concern for our manipulation of social comparison feedback in Groups B and D is that our subjects did not understand the delivered information. We have no direct evidence of our respondents' comprehension. However, we have information about the correct answer rate for our attention question immediately after our manipulations, which is most likely to be positively correlated with the comprehension of the manipulation. Our data show that 93.45% (1440/1541) of individuals in the no-feedback conditions (Groups A and C) answered correctly. In comparison, 94.13% (1428/1517) did so in the feedback conditions (Groups B and D). Please also note that we omitted the data of those who failed the attention question (190) from our analyses, which should partly mitigate this concern.

Finally, while this study isolates the causal effect of information treatment in Japanese society, the external validity of the empirical results should be tested in future studies.

References

Ajzenman, N., Cavalcanti, T., & Da Mata, D. (2023). More than words: Leaders' speech and risky behavior during a pandemic. *American Economic Journal: Economic Policy*, *15*(3), 351–371. https://doi.org/10.1257/pol.20210284

Akerlof, G. A. (1980). A theory of social custom, of which unemployment may be one consequence. *The Quarterly Journal of Economics*, *94*(4), 749–775. https://doi.org/10.2307/1885667

Al Jazeera. (2021). *Mapping coronavirus anti-lockdown protests around the world*. https://www.aljazeera.com/news/2021/2/2/mapping-coronavirus-anti-lockdown-protests-around-the-world

Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, *95*(9–10), 1082–1095. https://doi.org/10.1016/j.jpubeco.2011.03.003

Banerjee, A., Alsan, M., Breza, E., Chandrasekhar, A., Chowdhury, A., Duflo, E., Goldsmith-Pinkham, P., & Olken, B. (2020). *Messages on COVID-19 prevention in India increased symptoms reporting and adherence to preventive behaviors among 25 million recipients with similar effects on non-recipient members of their communities* (NBER Working Paper). National Bureau of Economic Research. https://www.nber.org/papers/w27496

Banerjee, A., Duflo, E., Finkelstein, A., Katz, L., Olken, B., & Sautmann, A. (2020). *In praise of moderation: Suggestions for the scope and use of pre-analysis plans for RCTs in economics* (NBER Working Paper). National Bureau of Economic Research. https://www.nber.org/papers/w26993

British Broadcasting Corporation News. (2022). *China Covid: Protests continue in major cities across the country*. https://www.bbc.com/news/world-asia-63771109

Chan, H. F., Moon, J. W., Savage, D. A., Skali, A., Torgler, B., & Whyte, S. (2021). Can psychological traits explain mobility behavior during the COVID-19 pandemic? *Social Psychological and Personality Science*, *12*(6), 1018–1029. https://doi.org/10.1177/1948550620952572

Chen, Y., Harper, F. M., Konstan, J., & Li, S. X. (2010). Social comparisons and contributions to online communities: A field experiment on movielens. *American Economic Review*, *100*(4), 1358–1398. https://doi.org/10.1257/aer.100.4.1358

Christensen, G., Freese, J., & Miguel, E. (2019). *Transparent and reproducible social science research: How to do open science*. University of California Press.

Clark, A. E., & Senik, C. (2010). Who compares to whom? The anatomy of income comparisons in Europe. *The Economic Journal*, *120*(544), 573–594. https://doi.org/10.1111/j.1468-0297.2010.02359.x

Clark, C., Davila, A., Regis, M., & Kraus, S. (2020). Predictors of COVID-19 voluntary compliance behaviors: An international investigation. *Global Transitions*, *2*, 76–82. https://doi.org/10.1016/j.glt.2020.06.003

Eckel, C., Grossman, P. J., & Milano, A. (2007). Is more information always better? An experimental study of charitable giving and hurricane Katrina. *Southern Economic Journal*, *74*(2), 388–411. https://doi.org/10.1002/j.2325-8012.2007.tb00845.x

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. (2018). Global evidence on economic preferences. *The Quarterly Journal of Economics*, *133*(4), 1645–1692. https://doi.org/10.1093/qje/qjy013

Frey, B. S., & Meier, S. (2004). Social comparisons and pro-social behavior: Testing "conditional cooperation" in a field experiment. *American Economic Review*, *94*(5), 1717–1722. https://doi.org/10.1257/0002828043052187

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, *35*(3), 472–482. https://doi.org/10.1086/586910

Götz, F. M., Gvirtz, A., Galinsky, A. D., & Jachimowicz, J. M. (2021). How personality and policy predict pandemic behavior: Understanding sheltering-in-place in 54 countries at the onset of COVID-19. *American Psychologist*, *76*(1), 39–49. https://doi.org/10.1037/amp0000740

Hensel, L., Witte, M., Caria, S., Fetzer, T., Fiorin, S., Goetz, F. M., Gomez, M., Haushofer, J., Ivchenko, A., Kraft-Todd, G., Reutskaja, E., Roth, C., Yoeli, E., & Jachimowicz, J. M. (2022). Global behaviors, perceptions, and the emergence of social norms at the onset of the COVID-19 pandemic. *Journal of Economic Behavior & Organization*, *193*, 473–496. https://doi.org/10.1016/j.jebo.2021.11.015

International Social Survey Programme. (2023). *The International Social Survey Programme*. https://issp.org/

Kyodo News. (2020). *75% of Japanese positive about emperor: Kyodo survey*. https://english.kyodonews.net/news/2020/04/229cdabecdd7-75-of-japanese-positive-about-emperor-kyodo-survey.html

Moehring, A., Collis, A., Garimella, K., Rahimian, M. A., Aral, S., & Eckles, D. (2023). Providing normative information increases intentions to accept a COVID-19 vaccine. *Nature Communications*, *14*(1), Article 126. https://doi.org/10.1038/s41467-022-35052-4

Nippon Hōsō Kyōkai Broadcasting Culture Research Institute. (2020). *Public views on the imperial family*. https://www.nhk.or.jp/bunken/english/research/yoron/20200301_9.html

Osman, M., McLachlan, S., Fenton, N., Neil, M., Löfstedt, R., & Meder, B. (2020). Learning from behavioural changes that fail. *Trends in Cognitive Sciences*, *24*(12), 969–980. https://doi.org/10.1016/j.tics.2020.09.009

Santos, H. C., Goren, A., Chabris, C. F., & Meyer, M. N. (2021). Effect of targeted behavioral science messages on COVID-19 vaccination registration among employees of a large health system. *JAMA Network Open*, *4*(7), Article e2118702. https://doi.org/10.1001/jamanetworkopen.2021.18702

Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, *18*(5), 429–434. https://doi.org/10.1111/j.1467-9280.2007.01917.x

Sutter, M., Angerer, S., Glätzle-Rützler, D., & Lergetporer, P. (2018). Language group differences in time preferences: Evidence from primary school children in a bilingual city. *European Economic Review*, *106*, 21–34. https://doi.org/10.1016/j.euroecorev.2018.04.003

The Mainichi. (2020). *Majority in Japan don't approve Abe govt's coronavirus response: Mainichi poll*. https://mainichi.jp/english/articles/20200420/p2a/00m/0na/016000c

UTokyo-Asahi. (2023). *The UTokyo-Asahi survey*. http://www.masaki.j.u-tokyo.ac.jp/utas/utasindex_en.html

Viskupič, F., Wiltse, D. L., & Meyer, B. A. (2022). Beyond vaccination: Messaging from religious leaders can help increase adherence to COVID-19 mitigation guidelines following vaccination. A research note. *The Social Science Journal*. Advance online publication. https://doi.org/10.1080/03623319.2022.2049557

Watanabe, T., & Yabu, T. (2021). Japan's voluntary lockdown. *PLOS ONE*, *16*(6), Article e0252468. https://doi.org/10.1371/journal.pone.0252468

World Values Survey. (2023). *World values survey*. https://www.worldvaluessurvey.org/wvs.jsp

Yamada, K., & Sato, M. (2013). Another avenue for anatomy of income comparisons: Evidence from hypothetical choice experiments. *Journal of Economic Behavior & Organization*, *89*, 35–57. https://doi.org/10.1016/j.jebo.2013.03.001

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