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Changing Norms: A Meta-Analytic Integration of Research on Social Norms Appeals

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Social norm appeals attempt to change behavior by modifying the prevailing view that a particular, usually harmful, behavior is less prevalent or less approved of in certain social contexts. These messages have been widely used, such as in safe-drinking campaigns targeted towards college students, but reviews of such efforts have been mixed. The present review used meta-analytic techniques to clarify the effects of social norm manipulations by synthesizing findings from 110 articles. We found consistent support for the effectiveness of social norm manipulations across various outcomes, although effect sizes overall tended to be small. There was also evidence that injunctive norms, though underutilized, may be more effective in changing behavior than previously considered. Moderator analyses demonstrated effects for methodological, sample, and message variables that offer insights into how norms function. The analysis also revealed significant heterogeneity, which underscores the need for more standardization in this area.

Keywords: Social Norms, Injunctive Norms, Descriptive Norms, Social Norms Marketing

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Normative influence is the reliance on others for behavioral guidance. Research interest in social norms has increased dramatically over the past few decades (Mollen, Rimal, & Lapinski, 2010; Shulman et al., 2017) in a number of domains, such as health, environment, and philanthropy. In spite of this interest, or perhaps because of the applied interest in the concept, the current body of work has overlooked some important theoretical issues and conceptual inconsistencies (see Lapinski & Rimal, 2005; Rimal & Lapinski, 2015). These theoretical and operational concerns prompted a content analysis (Shulman et al., 2017) examining over 800 social norm studies. That analysis uncovered substantial diversity in the norms literature and suggested the meta-analysis as an appropriate technique to further synthesize, as well

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as empirically contextualize, findings from this large and diverse body of work. The current study addresses this call and aims to clarify some of this literature's theoretical, methodological, and conceptual contradictions and ambiguities.

Overview

Social norm manipulations aim to modify people's perceptions and behaviors by appealing to the longstanding finding that people are influenced by the thoughts and actions of others (Cialdini & Goldstein, 2004; Miller & Prentice, 2016). Work in this area has been largely motivated by the observation that people often misperceive how common a particular behavior is within a given social group (Lewis & Neighbors, 2006; Perkins & Berkowitz, 1986), and that this misperception appears to lead people to change their behavior in order to align their behavior with the misperceived norm (Schroeder & Prentice, 1998). This observation led to the idea that using communication to correct normative misperceptions would reduce the social motivation to engage in negative behaviors, such as excessive drinking by college students. Within this approach, many different variations of social norm manipulations exist, such as single-message campaigns meant to correct norm misperceptions (e.g., college students do not drink as much as students think they do) or large-scale media campaigns employing several different tactics (e.g., campus-wide intervention program with a normative component).

To understand the relative effectiveness of social norm campaigns, we limited our analysis to studies that manipulated norms through either an experimental or quasi-experimental methodology where there was at least one condition in which participants were presented with normative information and a control condition. As such, survey studies that examined self-reported normative perceptions as a predictor of behavior were not included in this analysis. Importantly, narrowing the scope in this way allowed for a summary of the effects of norms-focused communication on perceived norms, attitudes, and behaviors.

With this sampling frame in mind, this meta-analysis had three objectives. First, we sought to report the relative effectiveness of injunctive and descriptive norms in the large number of studies using these concepts. Second, we examined important methodological variations that abound in this literature (see Shulman et al., 2017). We focused on sample (e.g., age of participants), message (e.g., campaign topic), and design (e.g., type of control group) features to understand how these moderators affect the success of social norm efforts. And third, by taking a broad approach to understanding when and how each norm is successful, we obtained some insight into how these norms operate.

Injunctive versus descriptive norms

The two main theories developed to specifically understand how norms operate include the focus theory of normative conduct (Cialdini, Reno, & Kallgren, 1990)

and the theory of normative social behavior (Rimal & Real, 2005). Both theories distinguish between the concepts of injunctive and descriptive norms, which are respectively concerned with the social (dis)approval of one's actions and the perceived prevalence of a behavior (Cialdini & Trost, 1998; Rimal, 2008). Although these theories have guided much research on the role of norms in behavior, many questions remain. First, it is recognized that injunctive and descriptive norms may be differentially powerful for different behaviors and situations, but these theories have not been able to explicate the circumstances in which these different norms are most influential. We addressed these concerns by using a meta-analysis to explore the differential effects of injunctive and descriptive norms on behavior. By understanding when each type of norm is successful, practical and theoretical insights are offered into how these norms operate. This leads us to our first research question:

> RQ1: Are injunctive or descriptive norm manipulations more effective in changing behavior?

It is important to specify here that we assessed multiple outcomes to account for the diversity of research seen in the literature. Thus, we separately assessed how normative messages affect the outcomes of attitudes, normative perceptions (injunctive and descriptive), behavioral intentions, and behavior.

> RQ2: Does the effectiveness of norm manipulations vary by outcome?

What moderators can reveal about normative manipulations

Despite general agreement that different types of norms exist, the methods and measures used to study social norms have been inconsistent. Specifically, various operational definitions have been developed to measure norms. This variability makes it unclear whether effects are attributable to the norm type or the norm measure. This meta-analysis aimed to disentangle conceptualization from operationalization in a few distinct ways. First, our focus on norm manipulations (rather than norm perceptions) as the independent variable allowed us to narrow the operationalization of norms by focusing only on how the presentation of normative information affects outcomes. Second, we undertook analyses that examined moderators of the norms-outcome relationship. These moderators may provide clues about how different study designs affect certain outcomes, and may improve our understanding of how norms work.

Sample demographic moderators

A common thread within the social norms literature, and the focus of this meta-analysis, is that behavior is largely driven by perceived social norms rather than the actual prevalence of the behavior (i.e., collective norm; Lapinski & Rimal, 2005). Although collective norms may influence normative perceptions (Rimal & Lapinski, 2015), the majority of social norms research focuses on individuals' normative

perceptions. Inherent in this view is that the influence of norms is dependent upon the state and interests of the individual. Indeed, prior research has found that sample characteristics, such as culture (Heinrichs et al., 2006) and age (Elek, Miller-Day, & Hecht, 2006), influence how norms are perceived and acted upon. Thus, we examined how the geographic location of the study, participant age, and participant gender moderate the relationship between exposure to social norm manipulations and subsequent perceptions and behavior.

Study design moderators

We investigated methodological moderators to yield further insight into the circumstances in which norms do and do not perform well. Although understanding this relationship is obviously strategically beneficial to practitioners, it can also provide much needed theoretical guidance about how norms operate. Due to the increasing popularity of social norms campaigns (Shulman et al., 2017), the methods used to investigate norms have varied greatly. To examine this methodological diversity, we first considered the specific method employed to communicate the social norms information (e.g., lab experiment) and the message delivery, such as whether it was through a mass media campaign or written text. We also examined the type of control group used to compare the norm manipulations' effects. Lastly, because prior research studies have been unclear about the duration of social norm manipulation effects (Lewis & Neighbors, 2006), we assessed the total length (in days) of the study, as well as whether message exposure and outcome assessment took place in a single session or over multiple sessions.

Message feature moderators

Different behavioral domains may be more susceptible to normative influence than others (Chung & Rimal, 2016; Rimal & Lapinski, 2015; Rimal, Lapinski, Turner, & Smith, 2011). Accordingly, we examined whether topic domains, such as the environment and health, among others, produced more successful effects. We additionally assessed whether the advocated behavior was framed in such a way that it required action, considered as a "do" behavior (i.e., prescriptive norm), or refraining from action, or a "do not" behavior (i.e., proscriptive norm; Bergquist & Nilsson, 2019).

Regarding the actual social norm manipulation, an operational decision that should theoretically affect normative effectiveness pertains to the referent group chosen in the message. Consistent with prior literature (e.g., Neighbors et al., 2008), we tested whether studies that use proximal normative references, such as family, friends, or "important others," are indeed more persuasive than studies that use distal references, such as the overall population. Lastly, beyond a general understanding of injunctive versus descriptive norm manipulations, it's also of interest to examine the type of message content being used. A descriptive norm message, for example, may provide specific statistics regarding the behavior's prevalence, imply a majority without statistics, or be combined with an injunctive norms message. We thus

assessed the extent to which specific message content moderates the effectiveness of norm manipulations across the body of literature.

Thus, our final research question is:

RQ3: What moderators impact the effectiveness of norm manipulations?

Method

Literature search and selection criteria

A literature search identified published and unpublished studies that manipulated social norms in an experimental or quasi-experimental design and measured a behavioral or cognitive outcome. First, the database of articles collected by Shulman et al. (2017) was used to identify relevant articles. Second, to find more recent research, the search terms used by Shulman et al. (2017) were repeated from 1 January 2015 to 1 June 2019 in a keyword search of EBSCO databases (Communication and Mass Media Complete and PsycINFO) using the following keywords: social norms, injunctive norms, descriptive norms, personal norms, moral norms, subjective norms, and provincial norms. Filters were implemented to generate studies in full text, in English, with human populations, and that used the keywords in the title or abstract. To mitigate publication bias, no academic journal filters were used and unpublished studies (e.g., conference papers) were included. Additionally, the original sampling frame was broadened by sifting through the references of seven recent systematic reviews (2015–2018) of social norms across disciplines (Fishbein & Ajzen, 2010). A total of 251 articles were included for full review after titles and abstracts were screened for duplications and appropriate methodology.

All studies within an article were examined to establish inclusion based on the following criteria. First, the study must have manipulated social norms in order to test the causal relationship between social norms and outcomes. Second, each study must have measured an outcome of attitudes, normative beliefs, behavior, or behavioral intention and provided a comparison between an experimental and control group. We operationalized a control group as a subset of participants that received no message or an irrelevant message; a message relevant to the study topic that did not include a normative component; or a message that included a normative component that varied in strength or direction. Lastly, each study must have included necessary information to compute an effect size. After excluding based on these criteria, 110 articles remained for the full analysis (see Study Selection Flowchart in Supporting Information).[5]

Coding

Two of the authors on this paper reviewed and coded all studies in this analysis. Any disagreements were resolved by discussion.

Independent variables

The manipulation of social norms in each study was coded to represent one of the following types of norm manipulations: (a) injunctive; (b) descriptive; or (c) mixed norm.[1] Respectively, these manipulations are defined as (a) the social approval or disapproval of performing a behavior (Rimal & Real, 2005); (b) the prevalence of a behavior by others (Rimal & Real, 2005); and (c) a mixture of injunctive and descriptive norms in a single message. Given the scope of the studies identified in the search, we expanded norm manipulations to include (d) behavioral programs (that is, applied work that included a norms component in a broader behavior change program); and (e) personalized normative feedback studies, where participants were provided with information about their own behavior (e.g., how much they drink alcohol), compared with some average rate (i.e., the descriptive norm).

Moderator variables

To understand how the effects of injunctive and descriptive manipulations vary by study characteristics, these studies were subjected to moderator analyses. To examine sample characteristics, each study was coded for the reported age, gender, and geographic location of the participants. Age was categorized into categories of (a) children, with the average age of participants younger than 13 years old; (b) adolescents, with the average age between 13–18 years old; (c) college, with persons recruited from a college setting; and (d) adult, with the average age above 18 years old but not recruited from a college setting. Participant gender was recorded as the percentage of females in each sample, and geographic location was recorded as the region in which the experiment or intervention took place: (a) the United States; (b) the Americas (primarily Mexico and Central America); (c) Asia; (d) Australia and New Zealand; and (e) Europe.

For study design moderators, the following categories were used to classify each study's method: (a) lab experiment; (b) online experiment; (c) field experiment; (d) intervention; (e) online intervention; and (f) campaign.[2] Message delivery, or the way in which a norms message was provided to the participants, was coded as either (a) written, such as a text narrative vignette; (b) video, such as an audiovisual public service announcement; (c) images, such as a print advertisement; (d) face-to-face group, such as an in-person, group-based intervention; (e) face-to-face individual, such as a one-on-one, in-person intervention session; or (f) multiple message deliveries (i.e., a combination of any of the above). For the control group used, each study was coded as using either a message with (a) no content or content unrelated to the norm manipulation; or (b) as a weaker or opposed norm (e.g., 30% vs 70% of students limit their alcohol intake). To code for study duration, we coded for the length of time in days between message exposure and final measurement as a continuous variable. We also coded for session timing, which we defined as whether the study took place in (a) one session, with a single message exposure and immediate assessment; (b) one session of message exposure with a delayed follow-up assessment; (c) multiple

sessions of message exposure; or (d) a media campaign in which messages were presented over some period of time.

Lastly, for message feature moderators, each study was coded as targeting a behavior in a topic domain of (a) commerce (e.g., tax compliance); (b) health (e.g., drinking alcohol); (c) environmental behavior (e.g., energy conservation); (d) social-cultural issues (e.g., bullying or racism); (e) or other topics (e.g., studying habits). For referent group proximity, studies were coded as having a proximal referent group if the norm manipulation was said to be about more intimate referents, such as the participant's family or significant other. Distant referent groups, on the other hand, were persons not thought to have a close relationship with the participants (e.g., other college students). To assess the normative frame, studies advocating a behavior that required action were coded as a prescriptive norm: that is, a "do" behavior (e.g., eat healthy food). In contrast, behaviors refraining from action were coded as a proscriptive norm: that is, a "do not" behavior (e.g., do not eat junk food, do not drink more than 3 drinks in an outing). Lastly, message content was coded using the following categories: (a) implied approval or disapproval; (b) implied majority; (c) statistical information; (d) personalized normative feedback[3]; (e) media literacy program (i.e., teaching people how to dispel false norm perceptions in the media); (f) role playing, defined as having participants communicate the message by acting out a relevant scenario; and (g) multiple messages (i.e., a combination of two or more of the previous categories).

Outcome variables

The outcome variables of attitudes, perceived injunctive norms, perceived descriptive norm, behavioral intention, and behavior were operationalized using observed and self-report measures as described in the studies. Attitude referred to participants' evaluations of the targeted behavior or object.[4] Normative beliefs included measurements of descriptive and injunctive norms. Behavioral intention referred to the expectancy of performing a future behavior, and behavior included self-reported and/or observed behavior.

Data analysis

The analysis followed procedures described by Hedges and Olkin (1985). An effect size (d) was computed for each relevant outcome in a study to represent the standardized difference between the norm message condition, compared to the control condition. All data analyses were handled within Comprehensive Meta-Analysis (Borenstein, Hedges, Higgins, & Rothstein, 2013). The overall effect for each outcome was computed, then categorical analyses examined the differences in effect sizes among groups of studies, as defined by the variables listed above. Statistics to evaluate the homogeneity within (Q_W) and between (Q_B) groups informed the analysis. All Supporting Information is available through this study's Open Science Registry.[5]

Because individual studies often contributed effect sizes for multiple outcome variables, the assumptions of the independence of effect sizes required us to conduct all analyses separately by outcome. The results are summarized here by each research question, highlighting significant findings. All computed effect sizes and relevant statistics are presented in Tables 1 through 5. Where required for clarity, effect sizes are reported in the text, followed by their 95% confidence intervals (CIs). The label (k) represents the number of studies in an analysis.

Results

Characteristics of sampled studies

A total of 110 articles published between 1990 and 2018 were included in the analysis, yielding a total of 246 effect sizes. The median year of publication was 2011, reflecting the recent surge of interest in social norms research (Rimal & Lapinski, 2015). Most of the located studies were in journal publications (95%), four were in conference papers, and one was a dissertation. The studies were based on sample sizes that ranged from 35 to 83,319 participants, representing data from over 170,000 participants. Of the 90 studies for which it was possible to determine sample representation by gender, we found that an average of 56% of participants identified as female.

The most common topic studied was health (64%), followed by environment (15%), socio-cultural issues (11%), commerce (7%), and other topics (4%). Of the studies that examined health, the most common topic was alcohol consumption (35 studies, or 51% of the health-focused publications).

Publication bias was evaluated using Duval and Tweedie's (2000a, 2000b) trim and fill procedure. This analysis demonstrated that a correction for publication bias would render the observed effect of norms manipulations nonsignificant only for studies with attitudes as an outcome. Outlier analyses were conducted by examining the overall effect sequentially, eliminating one study from each outcome group. In no case did the removal of a study significantly change the mean effect or the interpretation of the findings. Documentation of these analyses is presented in the Supporting Information.

RQ1: Injunctive versus descriptive norm manipulations on behavior

Our first research question asked which of these norm manipulations had the strongest effect on behavior. Although both types of norm manipulations had significant but small effects on behavior, injunctive norm manipulations had a significantly stronger effect ($Q_B = 21.44$; $p < .001$) on behavior ($d = .34$; 95% CI, .24–.44; $k = 11$) than descriptive norm manipulations ($d = .10$; 95% CI, .07–.12; $k = 59$). Descriptive norm manipulations ($d = .47$; 95% CI, .42–.52; $k = 26$) had significantly stronger effects on perceived descriptive norms than injunctive norm manipulations ($d = .18$; .03–.33; $k = 3$). There were no significant differences between injunctive

Table 1 Effect Sizes of Norm Manipulation by Outcome

Norm Manipulation	Outcome				
	Attitude, d (k) [95% CI] I^2	Descriptive Norm, d (k) [95% CI] I^2	Injunctive Norm, d (k) [95% CI] I^2	Behavioral Intention, d (k) [95% CI] I^2	Behavior, d (k) [95% CI] I^2
Descriptive	.168 ($k = 10$) [.063–.273] 53.453*	.466 ($k = 26$) [.415–.517] 83.110***	.231 ($k = 3$) [−.058 to .521] .000	.114 ($k = 21$) [.045–.183] 76.408***	.097 ($k = 59$) [.074–.119] 74.985***
Injunctive	.335 ($k = 4$) [.167–.503] 60.323†	.180 ($k = 3$) [.026–.333] 85.778**	.334 ($k = 6$) [.221–.448] 22.807	.201 ($k = 8$) [.065–.336] 72.989**	.340 ($k = 11$) [.239–.440] 93.550***
Intervention	−.288 ($k = 6$) [−.356 to −.221] 94.945***	.219 ($k = 6$) [.128–.309] 76.956**	.095 ($k = 2$) [−.057 to .248] .000	.069 ($k = 6$) [.002–.135] 29.382	−.039 ($k = 5$) [−.108 to .031] 57.489†
PNF	- - -	.093 ($k = 10$) [.044–.143] 82.365***	- - -	- - -	.067 ($k = 20$) [.049–.085] 40.868*
Mixed	.283 ($k = 6$) [.233–.333] 93.409***	.028 ($k = 3$) [−.070 to .126] .000	.107 ($k = 1$) −.199 to .413] .000	.218 ($k = 7$) [.139–.297] 53.795*	−.006 ($k = 11$) [−.035 to .024] 91.998***

Note: All effect sizes are based on a fixed-effects analysis. PNF = personalized normative feedback.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$.

and descriptive norm manipulations on any of the other outcomes examined in this review (see Table 1).

We also report in Table 1 three types of norm manipulations that were not easily categorized as injunctive or descriptive. Behavioral programs were effective in changing descriptive norms ($d = .22$) and behavior intentions ($d = .07$), but caused a significant change in attitudes in the undesired direction ($d = -.29$) and had nonsignificant effects on perceived injunctive norms and behavior. Personalized normative feedback had significant but small effects on perceived descriptive norms ($d = .09$) and behavior ($d = .07$). Mixed manipulations that had elements of both injunctive and descriptive norms had significant effects on attitudes ($d = .28$) and behavioral intention ($d = .22$), but no other outcome. Because the effects of these manipulations cannot be cleanly understood as occurring through injunctive or descriptive norm manipulations, they will not be discussed further.

RQ2: Effectiveness of norm manipulations by outcome

Descriptive norms manipulations

The effects of descriptive norm manipulations across the five outcomes were significant for all outcomes except perceived injunctive norms. These findings demonstrate that manipulations of descriptive norms are generally successful. Specifically, the strongest effect of descriptive norm manipulations was on the outcomes of perceived descriptive norms ($d = .47$), which is a moderate effect. The effects of descriptive norms on attitudes, behavior intentions, and behavior were small, but significantly greater than zero (see Table 1). All groups of studies demonstrated significant heterogeneity, except the group of studies that examined perceived injunctive norms as an outcome. This analysis demonstrates that there are consistent, if small, effects of descriptive norm manipulations on a variety of beliefs, attitudes, and behaviors.

Injunctive norms manipulations

Inductions of injunctive norms had significant, small effects on all outcomes. The strongest effects of injunctive manipulations were on attitudes ($d = .34$), perceived injunctive norms ($d = .33$), and behavior ($d = .34$), which are small to moderate effects. The effect of injunctive norms manipulations on behavioral intentions and perceived descriptive norms were smaller, but statistically significant. As with the findings for descriptive norms, all study groupings led to significant heterogeneity among effect sizes, except for those measuring perceived injunctive norms, suggesting that other study characteristics lead to variations in findings.

RQ3: Moderator impact on norm communication effectiveness

We examined the findings for injunctive and descriptive norm inductions for each outcome by sample, design, and message moderators. Due to space considerations and the small number of studies in some groupings, we focus in the text on notable

findings for groupings of more than 2 studies that demonstrated differences between descriptive and injunctive norm manipulations, and differences among outcome categories. All findings for this analysis can be found in the tables of moderators (Tables 2–4).

Sample moderators

Age group of participants

Significant effects across manipulation types for age group occurred primarily for the outcome of perceived descriptive norms. Descriptive norm manipulations had a stronger effect on the perceived descriptive norms of adults ($d = .85$) than adolescents ($d = .40$), and both of these effects are stronger than the effect of injunctive norm manipulations on perceived descriptive norms for college students ($d = .18$). For the few studies that evaluated perceived injunctive norms as an outcome with college students, the manipulation of injunctive norms had a significant effect ($d = .30$), whereas the effect of descriptive norm manipulations on perceived injunctive norms was not significantly different from zero for college students ($d = .23$; 95% CI, −.06 to .52). Studies that examined attitudes of college students as an outcome found that injunctive norm manipulations had a moderate effect ($d = .46$). Descriptive norm manipulations had a small effect ($d = .29$), although this was not significantly different from that of injunctive norms.

Gender composition of sample

A meta-regression evaluated the moderating effect of the gender composition (i.e., reported percent female) of the sample on the effect size for all outcomes and revealed no significant effects for injunctive or descriptive norm manipulations.

Region

The geographic region where the study was conducted revealed some interesting effects. For behavior as an outcome, studies of descriptive norm manipulations conducted in Asia yielded a strong effect ($d = .72$), which was significantly higher than all other regions. Significant effects of descriptive norm manipulations were also found in Australia/New Zealand ($d = .09$) and the United States ($d = .14$). The finding of a significantly greater effect in Asia than in other regions was obtained only for behavioral outcomes. For injunctive norm manipulations, there were generally too few studies to draw meaningful comparisons by region.

Study design moderators

Research design

The research designs employed in the studies that examined behavioral outcomes varied significantly in their effects. The most effective research design for changing behaviors though injunctive manipulations was the field experiment ($d = 1.29$).

Table 2 Sample Characteristic Moderator Analyses for Injunctive and Descriptive Norm Manipulations for All Outcomes

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Age group					
Children	. . .	. . .	. . .	. . .	2.842 ($k = 1$) [2.40–3.29]
Adolescents	. . .	. . .	. . .	−.650 ($k = 1$) [−1.26 to -.04]	−.215 ($k = 1$) [−.82 to .40]
College	.456 ($k = 3$) [.21–.71]	.180 ($k = 3$) [.03–.33]	.301 ($k = 4$) [.16–.45]	.337 ($k = 5$) [.12–.55]	.286 ($k = 5$) [.09–.48]
Adults	.236 ($k = 1$) [.01–.46]	. . .	.387 ($k = 2$) [.20–.57]	.179 ($k = 2$) [−.002 to .36]	.189 ($k = 4$) [.07–.31]
Region					
Asia	. . .	. . .	. . .	.000 ($k = 1$) [−.56 to .56]	1.461 ($k = 1$) [.770–2.152]
Australia/NZ	.623 ($k = 2$) [.34–.91]	. . .	. . .	.629 ($k = 2$) [.34–.92]	.093 ($k = 3$) [−.03 to .22]
Europe	. . .	. . .	.066 ($k = 1$) [−.37 to .50]	−.077 ($k = 2$) [−.35 to .19]	.344 ($k = 4$) [.06–.63]
N/C America	. . .	. . .	. . .	. . .	2.842 ($k = 1$) [2.40–3.29]
United States	.185 ($k = 2$) [−.02 to .39]	.180 ($k = 3$) [.03–.33]	.354 ($k = 5$) [.23–.47]	.170 ($k = 3$) [−.03 to .37]	.457 ($k = 2$) [.17–.74]

(Continued)

Table 2 Continued

Moderator	Descriptive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Age group					
Children	. . .	.589 ($k = 1$) [.32–.86]	. . .	.452 ($k = 1$) [.18–.72]	. . .
Adolescents	. . .	. . .	. . .	−.032 ($k = 1$) [−.65 to −.08]	.116 ($k = 2$) [.04–.20]
College	.288 ($k = 8$) [.16–.42]	.396 ($k = 20$) [.34–.45]	.231 ($k = 3$) [−.06 to .52]	.140 ($k = 15$) [.04–.24]	.105 ($k = 40$) [.08–.13]
Adults	−.056 ($k = 2$) [−.23 to .12]	.850 ($k = 5$) [.71–.99]	. . .	.031 ($k = 4$) [−.08 to .14]	.076 ($k = 17$) [.04–.12]
Region					
Asia	. . .	.405 ($k = 2$) [.21–.60]	. . .	.244 ($k = 3$) [.12–.37]	.722 ($k = 3$) [.43–1.01]
Australia/NZ	.393 ($k = 2$) [.11–.67]	. . .	. . .	.054 ($k = 3$) [−.14 to .25]	.086 ($k = 4$) [.03–.15]
Europe	.281 ($k = 1$) [.08–.48]	.579 ($k = 2$) [.32–.84]	. . .	.305 ($k = 4$) [.14–.47]	.031 ($k = 14$) [−.01 to .07]
N/C America	. . .	. . .	.532 ($k = 1$) [.28–.78]	. . .	.079 ($k = 5$) [−.05 to .20]
United States	.061 ($k = 7$) [−.08 to .20]	.462 ($k = 21$) [.41–.52]	.231 ($k = 3$) [−.06 to .52]	−.041 ($k = 11$) [−.15 to .07]	.144 ($k = 32$) [.11–.18]

Note: All effect sizes are based on a fixed-effects analysis. N/C America = North and Central America, excluding the United States; NZ = New Zealand.

Table 3 Study Design Moderator Analyses for Injunctive and Descriptive Norm Manipulations for All Outcomes

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Design					
Campaign	. . .	. . .	. . .	. . .	. . .
Field experiment		.584 ($k = 1$) [.12–1.05]	.066 ($k = 1$) [−.37 to .50]	−.510 ($k = 1$) [−1.13 to .11]	1.294 ($k = 4$) [1.05–1.54]
Intervention	. . .	. . .	. . .	. . .	.074 ($k = 1$) [−.06 to .21]
Lab experiment	.456 ($k = 3$) [.21–.71]	.130 ($k = 2$) [−.03 to .29]	.262 ($k = 3$) [.04–.49]	.231 ($k = 5$) [.05–.42]	.227 ($k = 5$) [.02–.44]
Online experiment	. . .	. . .	. . .	.229 ($k = 1$) [−.29 to .74]	.460 ($k = 1$) [.02–.90]
Online intervention	.236 ($k = 1$) [.01–.46]	. . .	.389 ($k = 2$) [.25–.53]	.243 ($k = 1$) [.02–.47]	. . .
Delivery					
Environmental manipulation	. . .	. . .	. . .	. . .	.375 ($k = 1$) [−.01 to .76]
FTF group	. . .	. . .	. . .	. . .	. . .
FTF individual	. . .	. . .	. . .	−.510 ($k = 1$) [−1.13 to .11]	. . .
Image	. . .	. . .	. . .	. . .	. . .
Multiple modalities	. . .	. . .	. . .	. . .	. . .
Video	. . .	. . .	. . .	. . .	2.842 ($k = 1$) [2.40–3.29]
Written	.335 ($k = 4$) [.17–.50]	.180 ($k = 3$) [.03–.33]	.334 ($k = 6$) [.22–.45]	.236 ($k = 7$) [.10–.37]	.191 ($k = 9$) [.08–.30]

(Continued)

Table 3 Study Design Moderator Analyses for Injunctive and Descriptive Norm Manipulations for All Outcomes

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Control					
Unrelated	.2 ($k = 1$) [.01–.46]	.11 ($k = 2$) [−.05 to .27]	.35 ($k = 3$) [.22–.49]	.06 ($k = 5$) [−.10 to .22]	.36 ($k = 8$) [.25–.47]
Weaker/opposed	.46 ($k = 3$) [.21–.71]	1.01 ($k = 1$) [.46–1.55]	.28 ($k = 3$) [−.06 to .50]	.54 ($k = 3$) [.29–.79]	.25 ($k = 3$) [.02–.49]
Session timing					
Single session	.456 ($k = 3$) [.21–.71]	.180 ($k = 3$) [.03–.33]	.183 ($k = 2$) [−.06 to .43]	.246 ($k = 6$) [.07–.42]	.754 ($k = 8$) [.59–.92]
Single + follow-up	.236 ($k = 1$) [.01–.46]	. . .	.404 ($k = 3$) [.27–.54]	.134 ($k = 2$) [−.08 to .35]	.094 ($k = 3$) [−.03 to .22]
Multiple session	. . .	. . .	. . .	. . .	. . .
Campaign	. . .	. . .	.066 ($k = 1$) [−.37 to .50]	. . .	. . .

(Continued)

Table 3 Continued

Moderator	Descriptive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Design					
Campaign	...	.369 ($k = 3$) [.27–.47]	...	...	.049 ($k = 5$) [−.01 to .11]
Field experiment	.342 ($k = 2$) [.124–.512]	.569 ($k = 3$) [.39–.75]	...	.002 ($k = 3$) [−.15 to .15]	.300 ($k = 14$) [.22–.38]
Intervention	...	.314 ($k = 2$) [.09–.54]	...	...	.084 ($k = 11$) [.04–.12]
Lab experiment	.318 ($k = 5$) [.12–.51]	.422 ($k = 9$) [.34–.51]	.133 ($k = 2$) [−.24 to .50]	.341 ($k = 11$) [.22–.46]	.056 ($k = 16$) [.02–.10]
Online experiment	−.072 ($k = 3$) [−.24 to .09]	.838 ($k = 8$) [.71–.97]	.388 ($k = 1$) [−.08 to .85]	−.092 ($k = 6$) [−.22 to .04]	.357 ($k = 7$) [.26–.46]
Online intervention	...	.125 ($k = 1$) [−.11 to .36]	...	.150 ($k = 1$) [−.01 to .31]	.056 ($k = 6$) [−.01 to .12]
Delivery					
Environmental manipulation	.281 ($k = 1$) [.08–.48]	...	...	.182 ($k = 1$) [−.02 to .38]	1.094 ($k = 2$) [.80–1.39]
FTF group	...	...	...	...	.082 ($k = 10$) [.05–.12]
FTF individual	...	...	...	...	−.149 ($k = 1$) [−.75 to .45]
Image	−.071 ($k = 1$) [−.29 to .15]	.848 ($k = 2$) [.62–1.08]	...	.193 ($k = 2$) [−.07 to .46]	...
Multiple modalities	...	...	...	...	.417 ($k = 6$) [.27–.57]
Video	...	...	...	...	...
Written	.241 ($k = 8$) [.07–.36]	.446 ($k = 24$) [.39–.50]	.231 ($k = 3$) [−.06 to .52]	.097 ($k = 18$)[.02–.17]	.085 ($k = 40$) [.06–.12]

(Continued)

Table 3 Continued

Moderator	Descriptive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Control					
Unrelated	.135 ($k = 7$) [.02–.25]	.461 ($k = 23$) [.41–.51]	.243 ($k = 2$) [−.11 to .59]	.061 ($k = 12$) [−.04 to .16]	.091 ($k = 44$) [.07–.12]
Weaker/opposed	.316 ($k = 3$) [.07–.56]	.541 ($k = 3$) [.34–.75]	.205 ($k = 1$) [−.21 to .72]	.167 ($k = 9$) [.07–.27]	.131 ($k = 15$) [.07–.19]
Session timing					
Single session	.168 ($k = 10$) [.06–.27]	.584 ($k = 15$) [.51–.66]	.231 ($k = 3$) [−.06 to .52]	.051 ($k = 15$) [−.03 to .13]	.125 ($k = 28$) [.09–.16]
Single + follow-up	. . .	.257 ($k = 7$) [.14–.38]	. . .	.202 ($k = 5$) [.07–.33]	.116 ($k = 20$) [.07–.16]
Multiple session	. . .	.549 ($k = 1$) [.21–.89]	. . .	1.683 ($k = 1$) [1.05–2.32]	.044 ($k = 6$) [−.01 to .10]
Campaign	. . .	.369 ($k = 3$) [.27–.47]	. . .	. . .	.049 ($k = 5$) [−.01 to .011]

Note: All effect sizes are based on a fixed-effects analysis. FTF = face-to-face.

Table 4 Message Moderator Analyses for Injunctive and Descriptive Norm Manipulations for All Outcomes

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Topic					
Commerce	...	...	...	...	.074 ($k = 1$) [−.06 to .21]
Environment	...	...	...	...	.612 ($k = 4$) [.38–.85]
Health	.185 ($k = 2$) [−.02 to .39]	.180 ($k = 3$) [.03–.33]	.334 ($k = 6$) [.22–.45]	.078 ($k = 6$) [−.06 to .23]	1.159 ($k = 4$) [.90–1.42]
Miscellaneous	...	...	...	...	...
Socio-cultural	.623 ($k = 2$) [.34–.91]	...	...	.629 ($k = 2$) [.34–.92]	.170 ($k = 2$) [−.11 to .45]
Content					
Implied (dis)approval	...	.045 ($k = 1$) [−.13 to .22]	...	.124 ($k = 2$) [−.26 to .50]	2.003 ($k = 2$) [1.66–2.35]
Implied majority	...	...	...	...	...
Media literacy	...	...	...	...	...
Model of behavior	...	...	...	−.510 ($k = 1$) [−1.13 to .11]	.375 ($k = 1$) [−.01 to .76]
Multiple	−.083 ($k = 1$) [−.60 to .43]	1.006 ($k = 1$) [.46–1.55]	.177 ($k = 3$) [−.09 to .45]	.256 ($k = 1$) [−.26 to .77]	.512 ($k = 4$) [.26–.77]
Personalized	.236 ($k = 1$) [.01–.46]	...	.389 ($k = 2$) [.25–.53]	.243 ($k = 1$) [.02–.47]	.276 ($k = 1$) [−.58 to 1.13]
Role play	...	...	...	...	...
Statistics	.623 ($k = 2$) [.34–.91]	.584 ($k = 1$) [.12–1.05]	.274 ($k = 1$) [−.02 to .57]	.261 ($k = 3$) [.05–.47]	.093 ($k = 3$) [.24–.44]

(Continued)

Table 4 Continued

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Referent proximity					
Distal	.335 ($k = 4$) [.17–.50]	.180 ($k = 3$) [.03–.33]	.334 ($k = 6$) [.22–.45]	.304 ($k = 5$) [.14–.47]	.327 ($k = 10$) [.22–.43]
Proximal	. . .	. . .	. . .	.050 ($k = 2$) [−.22 to .32]	.556 ($k = 1$) [.14–.98]
Mixed	. . .	. . .	. . .	−.510 ($k = 1$) [−1.13 to .11]	. . .
Action frame					
Unclear	. . .	. . .	. . .	.065 ($k = 1$) [−.24 to .37]	. . .
Prescriptive	.335 ($k = 4$) [.17–.50]	.762 ($k = 2$)[.41–1.12]	.321 ($k = 5$)[.17–.47]	.304 ($k = 5$) [.14–.47]	.323 ($k = 9$)[.22–.43]
Proscriptive	. . .	.045 ($k = 1$)[−.13 to .22]	.351 ($k = 1$)[.18–.52]	−.228 ($k = 2$) [−.65 to .19]	.457 ($k = 2$)[.17–.74]

(Continued)

Table 4 Continued

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Topic					
Commerce	−.056 (*k* = 2) [−.23 to .12]	.905 (*k* = 3) [.72–1.09]	...	−.067 (*k* = 2) [−.25 to .11]	.023 (*k* = 6) [−.02 to .06]
Environment	−.190 (*k* = 1) [−.65 to .27]	.644 (*k* = 4) [.44–.85]	.388 (*k* = 1) [−.08 to .85]	−.200 (*k* = 4) [−.40 to −.00]	.246 (*k* = 13) [.18–.31]
Health	.310 (*k* = 5) [.16–.47]	.360 (*k* = 15) [.30–.42]	.133 (*k* = 2) [−.24 to .50]	.164 (*k* = 10) [.05–.28]	.127 (*k* = 31) [.09–.16]
Miscellaneous	...	...	...	.150 (*k* = 1) [−.01 to .31]	.389 (*k* = 3) [.09–.69]
Socio-cultural	.393 (*k* = 2) [.11–.67]	.792 (*k* = 4) [.63–.95]	...	.353 (*k* = 4) [.18–.52]	.000 (*k* = 6) [−.08 to .08]
Content					
Implied (dis)approval	...	.549 (*k* = 1) [.21–.89]	...	...	−.072 (*k* = 1) [.84–.24]
Implied majority	.264 (*k* = 2) [.08–.45]	.813 (*k* = 1) [.51–1.12]	...	.318 (*k* = 2) [.13–.51]	.108 (*k* = 4) [.04–.18]
Media literacy	...	...	...	...	.478 (*k* = 1) [.23–.73]
Model of behavior	...	.569 (*k* = 2) [.37–.77]	...	.270 (*k* = 3) [.06–.48]	.356 (*k* = 4) [.15–.57]
Multiple	.061 (*k* = 1) [−.45 to .58]	.350 (*k* = 5) [.25–.45]	.133 (*k* = 2) [−.24 to .50]	.107 (*k* = 5) [−.12 to .33]	.116 (*k* = 20) [.08–.16]
Personalized	...	.133 (*k* = 2) [−.05 to .31]	...	.150 (*k* = 1) [−.01 to .31]	.073 (*k* = 8) [.01–.14]
Role play	...	...	...	...	.033 (*k* = 1) [−.60 to .66]
Statistics	.129 (*k* = 7) [−.00 to .26]	.545 (*k* = 15) [.47–.62]	.388 (*k* = 1) [−.08 to .85]	.006 (*k* = 10) [−.10 to .11]	.072 (*k* = 20) [.04–.11]

(Continued)

Table 4 Continued

Moderator	Injunctive Norm Manipulations				
	Attitude, *d* (*k*) [95% CI]	Perceived Descriptive Norm, *d* (*k*) [95% CI]	Perceived Injunctive Norm, *d* (*k*) [95% CI]	Behavioral Intention, *d* (*k*) [95% CI]	Behavior, *d* (*k*) [95% CI]
Referent proximity					
Distal	.168 ($k = 10$) [.06–.27]	.466 ($k = 26$) [.42–.52]	.231 ($k = 3$) [−.06 to .52]	.104 ($k = 20$) [.03–.17]	.094 ($k = 57$) [.07–.12]
Proximal	. . .	. . .	. . .	.790 ($k = 1$) [.21–1.37]	1.371 ($k = 1$) [.76–1.98]
Mixed	. . .	. . .	. . .	. . .	.111 ($k = 1$) [.01–.21]
Action frame					
Unclear	.408 ($k = 1$) [.03–.79]	.594 ($k = 1$) [.21–.98]	. . .	1.683 ($k = 1$) [1.05–2.36]	.135 ($k = 3$) [.07–.20]
Prescriptive	.148 ($k = 8$) [.04–.26]	.794 ($k = 14$) [.70–.89]	.231 ($k = 3$) [−.06 to .52]	.092 ($k = 19$) [.02–.16]	.081 ($k = 35$) [.05–.11]
Proscriptive	.128 ($k = 1$) [−.43 to .69]	.342 ($k = 11$) [.28–.40]	. . .	.274 ($k = 1$) [−.29 to .84]	.111 ($k = 21$) [.07–.15]

Note: All effect sizes are based on a fixed-effects analysis.

Lab experiments of injunctive norms on behavior ($d = .23$) and behavior intention ($d = .23$) also had significant effects. Descriptive norm manipulations had significant effects on behavior in field experiments ($d = .30$) and online experiments ($d = .34$) and significant, but quite small, effects on behavior through lab experiments ($d = .05$) and interventions ($d = .08$). Interestingly, lab experiments of descriptive norms yielded stronger effects on attitudes ($d = .32$), perceived descriptive norms ($d = .42$), and behavioral intention ($d = .34$) than on behavior ($d = .05$).

Type of control group

Although the most common control group design for studies was a no message/unrelated message control, for the most part the more effective control for demonstrating the effects of norm manipulations was a control group that presented a weaker or opposite norm. Although these comparisons were rarely statistically significant (i.e., the confidence intervals overlap in most cases) the consistency of the findings is notable.

Message delivery method

The most prevalent message delivery method was through written text, which yields generally consistent effects across injunctive and descriptive norm manipulations. Significant effects were found for all outcomes except for the effect of descriptive norms manipulations on perceived injunctive norms ($d = .23$; 95% CI, −.06 to .52]). In studies examining the effect of descriptive norms on behavioral outcomes, multiple modalities ($d = .42$) tended to outperform other modalities with a sufficient number of effect sizes to make a comparison.

Study duration

The time in days between message exposure and final assessment was entered into a meta-regression analysis for each outcome. Statistically significant but extremely small effects of study duration were found for behavior ($b = -.0009$; $z = -2.85$; $p = .004$) and perceived descriptive norm ($b = -.0023$; $z = -3.24$; $p = .001$), indicating a slight tendency for the manipulation effect to wane over time. There were no significant effects of study duration for attitudes, intention, and perceived injunctive norm.

Session timing

The effect of the timing of message exposure and assessment was examined for all outcomes. For injunctive norms manipulations, the most effective timing scheme for influencing behavior was the single-session study ($d = .75$), which had a stronger effect than all other methods and for all other outcomes that evaluated the effect of injunctive norm manipulations. For descriptive norm manipulations, the most effective design for studies with sufficient numbers to make a comparison was the single-session design on perceived descriptive norms ($d = .58$). For studies examining behavioral outcomes, those examining the effect of injunctive norms

manipulations on behavior ($d = .75$) were significantly more effective than those examining the effect of descriptive norms manipulations on behavior ($d = .13$).

Message moderators

Message topic

The most common topic domain for behavioral outcomes was health ($k = 36$, injunctive and descriptive norm manipulations combined), followed by environmental behaviors ($k = 17$). Within the health domain, injunctive ($d = 1.16$) manipulations had a significantly stronger effect on behavior than descriptive manipulations ($d = .13$). Similarly, in the environmental domain, injunctive manipulations had a stronger effect on behavior ($d = .61$) than descriptive norm manipulations ($d = .25$).

Referent proximity

By far the most common representation of the norm referent group observed was distal referents. Based on prior research (Neighbors et al., 2008), we had anticipated that a proximal referent would be more effective than a distal referent. Unfortunately, there were too few data points in the proximal conditions for meaningful comparisons to be made.

Message content

Of the many content strategies present in this set of studies, the most commonly employed were statistics and multiple strategies in the same message. One notable finding is that in studies of descriptive norms, presenting a model of behavior ($d = .36$) was more effective than statistical ($d = .07$) and personalized ($d = .07$) message strategies.

Action frame

Whether the message was communicated with a prescriptive (do) or proscriptive (do not) frame had no significant effect on behavioral outcomes. However, messages framed as prescriptive were significantly more effective at influencing perceived descriptive norms ($d = .79$) than proscriptive messages ($d = .34$). Sufficient data were not available for addressing other comparisons.

Discussion

Given the scope of the social norms literature, the purpose of this meta-analysis was to examine (a) the effectiveness of social norm manipulations; (b) their effectiveness on specific study outcomes; and (c) whether certain moderators tend to differentially affect the outcomes of norm manipulations. By taking a meta-analytic approach to this literature, insight is afforded into how norms operate. This section aims to highlight relevant findings from our analysis and speculate about what these findings tell us about the utility of the social norms concept.

Norm types and outcomes

First and foremost, this meta-analysis found that norm manipulations are generally effective at influencing attitudes, perceived norms, intentions, and behavior, though the effects are small and the heterogeneity is significant (see Table 1). One of the most interesting findings emerging from this analysis is that injunctive norms appeared to be more effective at influencing behavior than descriptive norms. This finding was surprising given recent statements suggesting that injunctive norms are harder to manipulate than descriptive norms (Rimal & Lapinski, 2015; Shulman et al., 2017). Perhaps because of this difficulty in manipulating injunctive norms, our literature search yielded far fewer studies manipulating injunctive norms, compared to descriptive norms. However, given the modest effect sizes for the descriptive norm–behavior relationship, compared to injunctive norms manipulations, our analysis suggests that it may behoove researchers to focus more on how to effectively manipulate injunctive norms.

This analysis also revealed that the manipulation of norms, both descriptive and injunctive, had significant effects on their respective normative perceptions. There are theoretical reasons to view these findings with optimism. Specifically, research guided by the theory of normative social behavior (Rimal & Real, 2005) proposes that changing normative perceptions is an incremental step towards eventual behavior change. Guided by this logic, the effects we examined (i.e., the relationship between norm exposure and norm perceptions) were just one part of the larger causal structure of norm perceptions mediating the effect of norm communication on behavior. The magnitude of effect sizes from our analysis were not inconsistent with that explanation, but direct tests of this pattern were not possible within the structure of the current review. Future work should more fully explicate the role of manipulated norm perceptions on behavior.

We also found that the manipulation of injunctive norms significantly increased perceptions of descriptive norms, but the converse was not true. That is, manipulations of descriptive norms did not increase the perception that the behaviors were approved of by one's social group. This is theoretically relevant, because both focus theory (Cialdini et al., 1990) and the theory of normative social behavior (Rimal, 2008) have suggested that descriptive norm information—that is, information that describes a behavior as commonly enacted by one's peers—is taken by recipients to imply that these behaviors are approved of by that peer group. Our data refute that claim. However—and we were surprised by this—relatively few studies have directly examined this hypothesis.

Sample characteristics

Our investigation into sample characteristics revealed a few noteworthy findings. First, audience age appeared to affect the success of the norm manipulations. Although we can only speculate due to the limited number of studies conducted on children and adolescents, trends suggest that social norm manipulations were

more successful at changing behaviors for younger audiences. This finding makes sociological and psychological sense and seems to support foundational assumptions about how social norms operate. Social norms are thought to influence behavior because people feel a "need to belong" (Baumeister & Leary, 1995), and this need drives us to engage in behaviors that are socially acceptable (Shulman & Levine, 2012). Given that pre-adulthood is a time in life when individuals are acutely tuned into their peer environment (Arnett, 2010), it is unsurprising that young people were more susceptible to normative appeals than adults. Further, it is interesting that norm manipulations affected different outcomes differently for participants at different ages. For example, adolescents' attitudes were strongly affected by norm manipulations, which was only slightly true for college students and was not at all true for adults. The interplay of attitudes and norms is theoretically interesting (Boster, Shaw, Carpenter, & Massi Lindsey, 2014), and these findings suggest a developmental trend in which young people rely on their social environment to help them develop their beliefs about the world (a form of social proof; Cialdini, 1984). Although our analysis offers support for this conclusion, admittedly, more work needs to be done.

In terms of geographic location, it was found that social norm appeals were more effective in Asia and Latin America than the United States. This finding also makes sense given that Asia and Latin America are collectivistic cultures. In cultures where group cohesion is valued, normative information is likely to be especially valuable for discerning the appropriate behavior for a given situation (Bond & Smith, 1996; Cialdini, Wosinska, Barett, & Gornik-Durose, 1999). Once again, this finding offers insight into the operation of social norms. Specifically, normative appeals are more effective in circumstances where a higher value is placed on "fitting in" or "being appropriate."

Study design moderators

Our analysis revealed that field experiments were the most successful method to evoke behavior change. This result offers a couple of interesting insights into the operation of norms. First, it is logical that making norms salient in the field, where the norm is likely to be relevant, should increase the potency of the manipulation. This finding once again underscores the idea that people want to behave "normally" or "acceptably" within a given social context. This insight suggests that exposing people to normative information when it is most relevant increases the likelihood that people will behave in ways consistent with this information. Although obvious at face value, many strategic, normative messages do not take place in the context where the normative information is most needed. For example, while alcohol campaigns often place norm messages around campus, the actual alcohol drinking behavior is more likely to occur off-campus, such as at parties or in bars. Thus, in the future, finding ways to think more strategically about how and where to place normative appeals should be given greater consideration.

It is also worth noting that normative appeals were most effective when the information was conveyed through multiple message delivery channels, as opposed to written messages. Although it is difficult to speculate whether these effects are due to production quality, content, the viewing experience, repetition, and so forth, one takeaway from this finding is that investing time, money, and energy into the production of normative appeals appears to be worthwhile.

Message content

Interestingly, we found that utilizing personalized normative feedback (a specific type of descriptive norm message) was a successful approach to influencing participants' perceptions of perceived *injunctive* norms. This suggests that by telling people how their behavior in a particular domain compares to others, subsequent perceptions of the social approval of that action are affected. Although this result is based on only a few studies, the use of personalized, normative feedback seems like a promising message design strategy for future efforts. Additionally, framing appeared to influence the success of normative messages. Although our findings varied somewhat by outcome, it was found that prescriptive (i.e., do) frames were more successful at influencing behavior and descriptive norm perceptions than proscriptive frames (do not). Proscriptive frames, on the other hand, were more effective at changing attitudes. Further work in this area may yield valuable guidance into how to frame norm communications.

On a different note, we were surprised that there was not a significant effect of referent proximity on the effect of norm manipulations. Although in theory referent proximity should matter, pragmatically we wonder whether messages attempting to communicate norms about and/or from close referents fall short of the goal. The recipients' lived experiences with their close associates may be more salient than information conveyed in a strategic message. Other work has similarly failed to confirm the superiority of proximal referents (Nolan, 2011; Schultz, Khazian, & Zaleski, 2008). Future research in this area may shed light on more effective means of manipulating proximal norms.

Suggestions for practitioners

To get a clearer understanding of the largest groupings of studies—those that examined behavioral outcomes within the health and environmental behavioral domain—we selected those groups for a more detailed analysis. We examine here the most common practices in these areas, and we describe ways in which common practices may diverge from those that have been found to be most effective. In this way, we hope this review might inform improved designs of norm messages and delivery to improve the chances of adoption of healthier behavior for individuals and for the environment.

Health behavior

Studies examining the use of norms manipulations to influence health behavior comprised the largest group of studies in our review. These studies were mostly conducted in the United States, but stronger effects were generally found in Europe and in the Americas. These studies were largely conducted with college students, but the effects were very small. Studies in this group most frequently used a descriptive norm or personalized norm manipulation, but those that used an injunctive norm manipulation had stronger effects. These studies almost always used a no-message control group within an intervention or a lab experiment, but studies that used a weaker/opposed norm control and an online experiment obtained stronger effects. Messages were likely to be delivered as written text advocating abstaining from a particular behavior, but a video message with a prescriptive frame might be more effective. These studies most commonly used a distal referent, which is more effective than using a mixed or proximal referent.

Environmental behavior

Studies in our sample that used norm manipulations to influence environmental behaviors were most likely to be conducted with college students in the United States, but studies that used adolescents or were conducted in Europe were more effective. These studies were most often field experiments, which were the most effective method in this group of studies. They were likely to use a descriptive norm manipulation and a no-message control, yet those using an injunctive norm or a weaker/opposed norm control found stronger effects. They were likely to use a distal referent who used a prescriptive frame, both of which are effective options. These studies most often presented a written message, but a video message might be more effective. Finally, the message was likely to present multiple messages or to present a model of behavior, both of which are effective options.

Limitations and conclusions

Overall, this meta-analysis in some ways clarified and in other ways complicated our broad understanding of the social norm concepts. What was clear from this analysis was that the *social* nature inherent to social norms appears to be the fundamental mechanism that drives change. For example, injunctive norms are distinct, because they inform what beliefs, attitudes, and/or behaviors are socially acceptable and will be met with social approval. By contrast, descriptive norms merely state what people do. Thus, when injunctive norms provide useful social information that informs us of how others will respond to a given behavior, this type of appeal is more effective at producing behavior change than a descriptive appeal. Other findings that support the importance of the social component of social norms was that normative messages were particularly effective for young people, were more successful in collectivist cultures, and produced stronger results in the field, where,

ostensibly, people were around and the social nature of the behavior would be more salient.

Despite this clarity, there were also complications that arose from this analysis. The most notable is the heterogeneity in the observed effect sizes, which was generally not explained by moderator analyses. This finding echoes the concerns raised by Shulman et al. (2017) that this area is rife with diverse measures and methods, and that greater standardization would be beneficial. Although there was heterogeneity in the sample of studies, we think the overall findings are robust, and suggest that stronger theory in this area will help tighten the operational definitions of these concepts.

Guided by these findings, we end this review by offering a few suggestions for strategic communication efforts that utilize social norms. First, when possible, communicators should place strategic messages in the location—or situation—where norm activation is most relevant. Second, know your audience. Social norm appeals will be more effective when an audience is more likely to care about the approval of those around them. This means that norms will be more effective when the audience is either (a) in a novel or ambiguous situation; or (b) is composed of members of a social group or culture that is particularly sensitive to social approval. Third, we suggest that constructing "rich" messages is worthwhile. In other words, investing in production value or the creation of multiple messages within a campaign should increase the potency of the normative information. And finally, personalization. Our investigation into the personalized, normative feedback literature offers promising initial evidence for future campaigns. If strategic efforts can tailor information to make it more relevant and useful to the target audience, they should render normative comparisons more accurate, salient, and, consequently, effective.

Supporting Information

Additional Supporting Information may be found in the online version of this article. Please note: Oxford University Press is not responsible for the content or functionality of any supplementary materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

Notes

1. Studies of personal (the self-expectation of performing a behavior), moral (the perceived moral correctness or incorrectness of performing a behavior), subjective (perceived expectation of valued others), and provincial (behavior of others in the immediate setting) norms were included in the search terms but yielded too few studies to be included in the final analysis.
2. Field experiments, interventions, and campaigns were defined in the following way: field experiments were any study employed in a naturalistic setting with ran-

dom assignment to condition; interventions were programs carried out in order to address a specific behavior that communicated either descriptive or injunctive norms; and campaigns consisted of studies of media campaigns for large audiences.

3. Personalized, normative feedback is maintained as a separate type of content because it specifically situates the participants' behavior within the context of the prevailing behavior of the norm group. Thus, although it is usually presented statistically, it is conceptually different from other types of normative information.
4. We specifically excluded measures of evaluation of the message, as we were only interested here in evaluations of the behavior.
5. This study's Open Science Registry can be found at: https://osf.io/vp6q8/?view_only=581c0c92c3124cdb9a3e67208a6730d1.

References

Arnett, J. J. (2010). *Adolescence and emerging adulthood: A cultural approach* (4th ed.,). Boston, MA: Prentice Hall.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497–529. doi:10.1037/0033-2909.117.3.497.

Bergquist, M., & Nilsson, A. (2019). The DOs and DON'Ts in social norms: A descriptive don't norm increases conformity. *Journal of Theoretical Social Psychology*, *3*, 158–166. doi:10.1002/jts5.43.

Bond, R., & Smith, P. B. (1996). Culture and conformity: A meta-analysis of studies using Asch's (1952, 1956) line judgment task. *Psychological Bulletin*, *119*, 111–137. doi:10.1037/0033-2909.119.1.111.

Borenstein, N., Hedges, L., Higgins, J., & Rothstein, H.. (2013). *Comprehensive meta-analysis version 2*. Englewood, NJ: Biostat.

Boster, F. J., Shaw, A. Z., Carpenter, C. J., & Massi Lindsey, L. L. (2014). Simulation of a dynamic theory of reasoned action. *Simulation & Gaming*, *45*, 699–731. doi:10.1177/1046878114562930.

Chung, A., & Rimal, R. N. (2016). Social norms: A review. *Review of Communication Research*, *4*, 1–28. doi:10.12840/issn.2255-4165.2016.04.01.008.

Cialdini, R. (1984). *Influence: The psychology of persuasion*. New York, NY: Quill.

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, *55*, 591–621. doi: 10.1146/annurev.psych.55.090902.142015.

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, *58*, 1015–1026. doi:10.1037//0022-3514.58.6.1015.

Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity, and compliance. In D. T. Gilbert, S. T. Fiske & G. Lindzey (Eds.), *Handbook of social psychology* (Vol. *2*, 4th ed., pp. 151–192). Boston, MA: McGraw-Hill.

Cialdini, R. B., Wosinska, W., Barett, D. W., & Gornik-Durose, M. (1999). Compliance with a request in two cultures: The differential influence of social proof and commitment/

consistency on collectivists and individualists. *Personality and Social Psychology Bulletin*, *25*, 1242–1253. doi:10.1177/0146167299258006.

Duval, S., & Tweedie, R. (2000a). A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. *Journal of the American Statistical Association*, *95*, 89–98.doi:10.1080/01621459.2000.10473905.

Duval, S., & Tweedie, R. (2000b). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*, 455–463. doi:10.1111/j.0006-341X.2000.00455.x.

Elek, E., Miller-Day, M., & Hecht, M. L. (2006). Influences of personal, injunctive, and descriptive norms on early adolescent substance use. *Journal of Drug Issues*, *36*, 147–172. doi:10.1177/002204260603600107.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Psychology Press.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.

Heinrichs, N., Rapee, R. M., Alden, L. A., Bögels, S., Hofmann, S. G., Ja Oh, K., & Sakano, Y. (2006). Cultural differences in perceived social norms and social anxiety. *Behaviour Research and Therapy*, *44*, 1187–1197 doi:10.1016/j.brat.2005.09.006.

Lapinski, M. K., & Rimal, R. N. (2005). An explication of social norms. *Communication Theory*, *15*, 127–147. doi:10.1093/ct/15.2.127.

Lewis, M. A., & Neighbors, C. (2006). Social norms approaches using descriptive drinking norms education: A review of the research on personalized normative feedback. *Journal of American College Health*, *54*, 213–218. doi:10.3200/jach.54.4.213-218.

Miller, D. T., & Prentice, D. A. (2016). Changing norms to change behavior. *Annual Review of Psychology*, *67*, 339–361. doi:10.1146/annurev-psych-010814-015013.

Mollen, S., Rimal, R. N., & Lapinski, M. K. (2010). What is normative in *Health Communication* research on norms? A review and recommendations for future scholarship. *Health Communication*, *25*, 544–547. doi:10.1080/10410236.2010.496704.

Neighbors, C., O'Connor, R. M., Lewis, M. A., Chawla, N., Lee, C. M., & Fossos, N. (2008). The relative impact of injunctive norms on college student drinking: The role of reference group. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, *22*, 576–581. doi:10.1037/a0013043.

Nolan, J. M. (2011). The cognitive ripple of social norms communications. *Group Processes and Intergroup Relations: Special Issue on Social Influence in Action*, *14*, 689–702. doi:10.1177/1368430210392398.

Perkins, H. W., & Berkowitz, A. D. (1986). Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. *International Journal of the Addictions*, *21*, 961–976. doi:10.3109/10826088609077249.

Rimal, R. N. (2008). Modeling the relationship between descriptive norms and behaviors: A test and extension of the theory of normative social behavior (TNSB). *Health Communication*, *23*, 103–116. doi:10.1080/10410230801967791.

Rimal, R. N., & Lapinski, M. K. (2015). A re-explication of social norms, ten years later. *Communication Theory*, *25*, 393–409. doi:10.1111/comt.12080.

Rimal, R. N., Lapinski, M. K., Turner, M. M., & Smith, K. (2011). The attribute-centered approach for understanding health behaviors: Initial ideas and future research directions. *Studies in Communication Sciences*, *11*, 15–34. doi:10.5169/seals-791183.

Rimal, R. N., & Real, K. (2005). How behaviors are influenced by perceived norms: A test of the theory of normative social behavior. *Communication Research*, *32*, 389–414. doi:10.1177/0093650205275385.

Schroeder, C. M., & Prentice, D. A. (1998). Exposing pluralistic ignorance to reduce alcohol use among college students. *Journal of Applied Social Psychology*, *28*, 2150–2180. doi:10.1111/j.1559-1816.1998.tb01365.x.

Schultz, W. P., Khazian, A. M., & Zaleski, A. C. (2008). Using normative social influence to promote conservation among hotel guests. *Social Influence*, *3*, 4–26. doi:10.1080/15534510701755614.

Shulman, H. C., & Levine, T. R. (2012). Exploring social norms as a group-level phenomenon do political participation norms exist and influence political participation on college campuses? *Journal of Communication*, *62*, 532–552. doi:10.111/j.1460-2466.2012.01642.

Shulman, H. C., Rhodes, N., Davidson, E., Ralston, R., Borghetti, L., & Morr, L. (2017). The state of the field of social norms research. *International Journal of Communication*, *11*, 1192–1213. doi:1932-8036/20170005.