Supplemental Material

Table S1

Overview of Primary and Supplemental Experiments.

Study	Contents
Experiment 1	Effect of dynamic norms on interest in reducing meat consumption.
Experiment 2	Replication of Experiment 1. Statistical mediation of the effects on interest in reducing meat consumption (preconformity, perceived effort and importance).
Experiment 3	Manipulate-the-mediator: Effect of dynamic norm with altered future norm vs. dynamic norm without altered future norm and static-norm on interest in reducing meat consumption
Experiment 4	Field experiment on effects of dynamic norms on food selection.
Experiment 5	Field experiment on effects of dynamic norms on full laundry loads.
Experiment S1	Study to construct norm statements for Experiment 1.
Experiment S2	Direct replication of Experiments 1.
Experiment S3	Effect of static + dynamic norm vs. static norm on interest in reducing meat consumption, to further rule out a change in the perceived static norm. Replication of the statistical mediation pattern in Experiment 2.
Experiment S4	Survey of residents as to frequency of laundry use
Experiment S5	Psychological processes inspired by dynamic vs. static norms in the context of full laundry loads

Experiment S1: Construction of Norm Statements for Experiment 1

To create the norm statements used in Experiment 1, we assessed beliefs about meat consumption with two randomly assigned groups of participants from the same population as Experiment 1 (N=99). One group estimated that slightly less than 30% of people currently limit their meat consumption (M=27.8, SD=12.4). The second estimated that slightly less than 30% of people have started to limit their meat consumption in the last 5 years (M=25.2 SD=17.1). The

similarity of these numbers allowed us to create equivalent norm statements for the two conditions. The manipulation thus varies attention to the static or dynamic norm but not the degree to which the information presented challenges existing beliefs.

Notably, it is implausible that no one made an effort to limit their meat consumption five years ago, as the conjunction of these numbers would suggest. Consistent with the focus theory of norms, we assume that people simply do not consider both facets of the norm at once, or process this information deeply (cf. Rozenblit & Keil, 2002). Instead, the static- versus dynamic-norm manipulation simply draws attention to one aspect of the norm or the other ("Some people try to eat less meat" versus "Some people are changing and now eat less meat"). However, it is possible that, upon exposure to the dynamic-norm statement, people add the number presented to an assumed base rate greater than zero to infer a higher current static norm. This possibility is one reason why we assessed perceptions of the static norm along multiple measures in Experiments 1 and 2, and conducted Supplemental Experiment 3 where we held constant the explicit representation of the static norm in both conditions.

Experiment S2: Direct Replication of Experiment 1

A direct replication of Experiment 1 with an independent sample (N=160, 146 of whom completed the measures and were non-vegetarians) yielded the same effect on interest in reducing meat consumption (dynamic-norm condition: M=3.23 SD=1.86; static-norm condition: M=2.61 SD=1.66), $t(145)=2.12$, $p=0.035$, $d=0.35$. There was no effect on perceptions of the static norm, $t<1$.

Experiment S3: Static vs. Static + Dynamic Norm

Although participants in the dynamic-norm condition could combine the representation of change with some base rate greater than zero to perceive a higher static norm, there was no

evidence for this in measures of the perceived static norm in Experiment 1, 2, or in Supplemental Experiment 2. As noted, we assume that people do not consider both facts at once but, rather, simply attend to one aspect or the other.

To further address this question, Supplemental Experiment 3 compared the static-norm condition to a condition that explicitly represented the same static norm but added to this a change in the norm. The modified dynamic-norm statement read, "Surveys show that more and more people are starting to make an effort to limit their meat consumption. Specifically, over the past 5 years, the number of people who make an effort to limit their meat consumption has risen to 30%." This static+dynamic-norm condition highlights both aspects of the norm and thus represents a conservative test. Theoretically, it should provide a smaller condition difference. We therefore compared this condition to the static-norm condition with a relatively larger sample, 600 adults living in the United States (565 after removing vegetarians and vegans), who took part through Amazon's Mechanical Turk.

Interest in Eating Less Meat

Replicating Experiments 1 and 2, participants expressed more interest in reducing their meat consumption in the static+dynamic-norm condition (M=3.34 SD=1.87) than in the static-norm condition (M=2.99 SD=1.81). The effect was marginally significant using a two-tailed test (significant in a one-tailed test) and, as anticipated, smaller in size than the effects observed previously, $t(562)= 1.82$, $p=0.069$ (one-tailed: $p=0.035$), $d=0.19$, 95% CI of the difference=[-0.03, 0.72]. The effect remained controlling for gender and political orientation, $t(556)= 1.90$, $p=0.058$ (one-tailed: $p=0.029$), $d=0.19$, 95% CI of the difference=[-0.01, 0.72]. As the same static norm was presented in both conditions, the results provide further evidence that the effects

of the dynamic-norm condition are due to the perception of change in the norm, not to a higher perceived static norm.

Mediation

The supplemental study also replicated the mediation pattern found in Experiment 2. Participants anticipated that many people would make an effort to reduce their meat consumption in the future more so in the static+dynamic-norm condition (M=4.57 SD=1.13) than in the static-norm condition (M=4.14 SD=1.26), $t(562)=6.87$, p=0.002, d=0.32, 95% CI of the difference=[0.16, 0.70]. The effort people make to limit their meat consumption was perceived to be greater when it represented a change (static+dynamic-norm condition: M=4.12 SD=0.97) than when it did not (static-norm condition: M=3.74 SD=0.93), $t(561)=3.42$, $p<0.001$, d=0.34, 95% CI of the difference=[0.16, 0.61]. Although the pattern of means was such that participants believed reducing meat consumption more important to others in the static+dynamic-norm condition (M=4.11 SD=1.47) than the static-norm condition (M=3.94 SD=1.41), this difference was not significant, $t(561)=1.08$, p=0.28, d=0.11, 95% Ci of the difference=[-0.14,047].

Regressing interest in eating less meat on the effect of norm condition (coded static=0, static+dynamic=1), perceived future norm, perceived effort by others, and perceived importance to others, the main effect of norm condition was reduced to nonsignificance (from b=0.35 to b=0.18), $t(349)=1.14$, p=0.26. Replicating Experiment 2, a multiple sequential mediational analysis (Fig. S1) found that future norm perceptions had a significant indirect effect, z=2.61, p=0.009, indirect effect=0.11, 95% CI from 5000 sample bootstrap=[0.03, 0.23]; perceived effort and perceived importance did not have an indirect effect, $zs<1.50$; but the sequential indirect effect of perceived effort and importance did have a significant indirect effect, z=2.90, p=0.004, indirect effect=0.10, 95% CI from 5000 sample bootstrap=[0.04, 0.18].

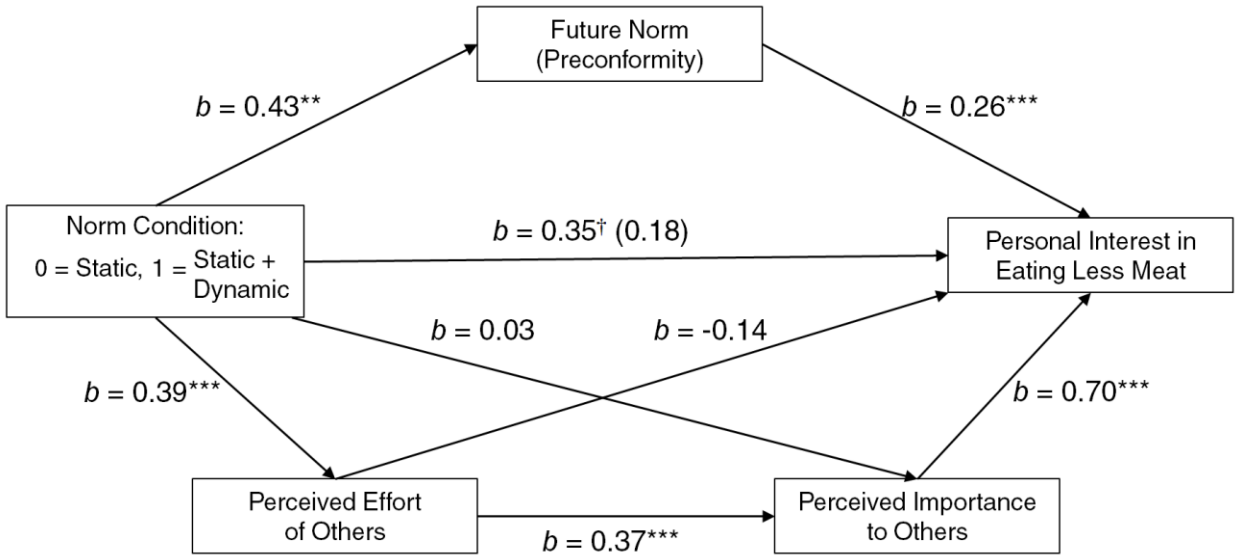

Fig. S1.
Multiple and sequential mediation analysis from Supplemental Experiment 2: The effect of the static+dynamic-norm condition on interest in eating less meat was mediated by perceptions of the future norm and perceptions of the effort of and importance to others of eating less meat. For the path from condition to interest in eating less meat, the value outside the parentheses reflects the direct effect, and the value inside the parentheses reflects the condition effect controlling for mediators. All other values reflect the effects while controlling for the effects of all other paths present. Asterisks indicate significant paths ($^{\dagger}p<0.10$, $*p<0.05$, $**p<0.01$, $***p<0.001$).

Experiment 3: Supplemental Methods and Results

Condition Materials

The manipulation in Experiment 3 was similar to that in Experiment 2 but included a visual aid to clearly manipulate beliefs about the future descriptive norm (see Fig. S2). In the two dynamic-norm conditions, participants first read a similar prompt as Experiment 2, "Recent research shows that, in the last 5 years, 30% of Americans changed and now make an effort to limit their meat consumption. That means that, in recent years, 3 in 10 people have begun to eat less meat than they otherwise would." In the future growth dynamic-norm condition, the text continued, "This trend is expected to continue in the near future." Participants then saw the line graph in Fig. S2, panel A. In the no future growth dynamic-norm, the text continued, "However, this trend is not expected to continue—instead it's expected to slow and possibly reverse in the

future." Participants then saw the line graph in Fig S2, panel B. Participants in the static-norm were given a similar prompt as Experiment 2 ("Research shows that 30% of Americans make an effort to limit their meat consumption. That means that 3 in 10 people eat less meat than they otherwise would.") and saw the pie chart in Fig. S2, panel C.

To ensure participants engaged with the normative information, in each condition participants were asked to provide a brief free-response to the material presented. The question posed reinforced the manipulation: In the static-norm condition, "Why do you think it is 30%?"; in the dynamic-norm with altered future norm condition, "Why do you think this trend may continue in the near future?"; in the dynamic-norm without altered future norm condition, "Why do you think this trend may slow or reverse in the near future?". Lastly, all participants were asked the same dependent measure as Experiment 2.

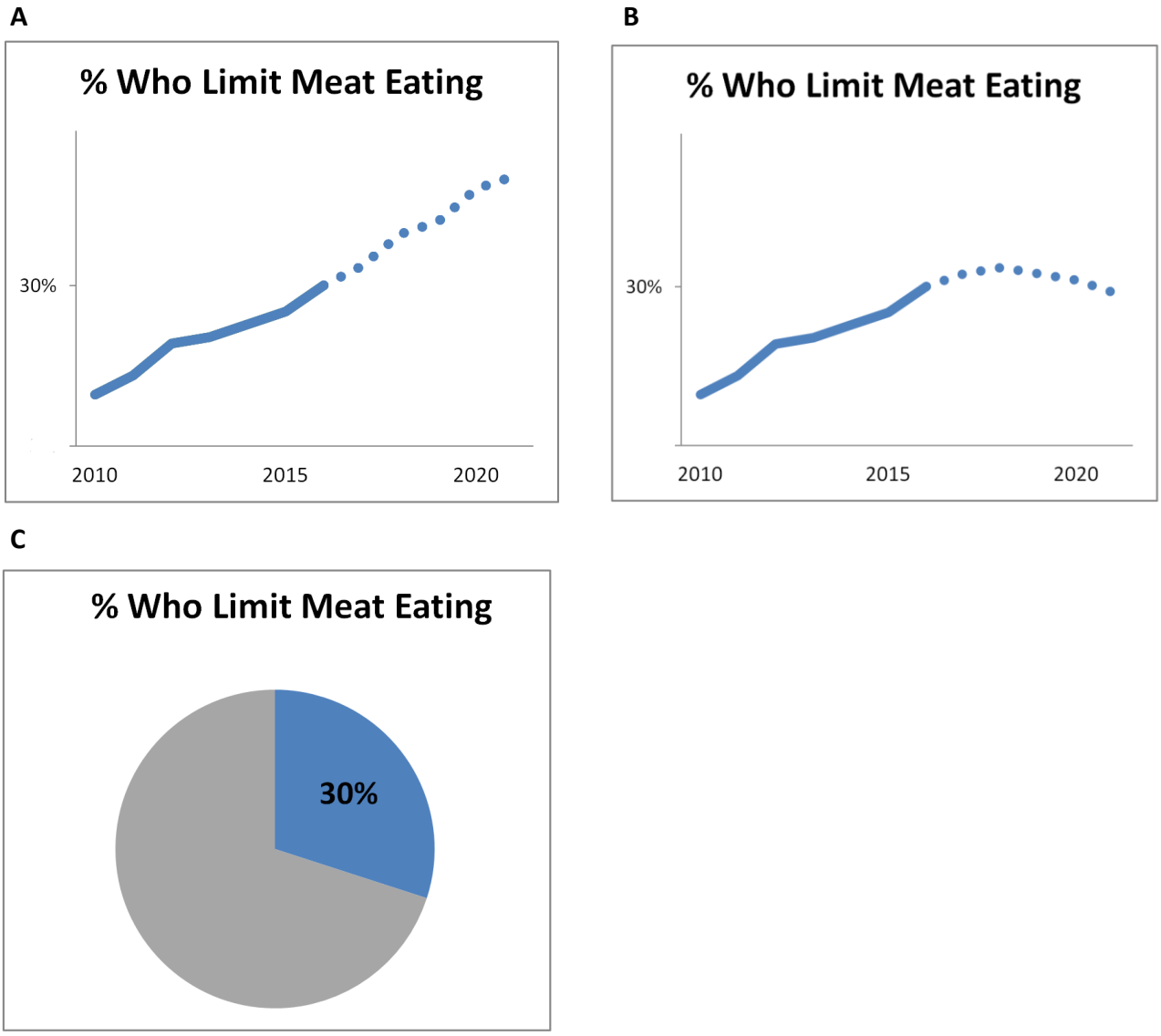

Fig. S2
Visuals included in Experiment 3: (A) future growth dynamic-norm condition; (B) no future growth dynamic-norm condition; and (C) static-norm condition. In A and B, we intentionally provided minimal cross-sectional information (i.e., the y-axis is not labeled but for the 30% benchmark) to encourage participants to focus simply on the anticipated future growth or lack thereof without representing the degree of prior (or future) increase. The study was conducted in 2016 at which point the solid line becomes dotted.

Table S2.

Orders by Food Type and Condition (Experiment 3)

Food Type	Control	Condition: Static Norm	Condition: Dynamic Norm
Meatless Salad	8.8%	6.9%	16.8%
Meatless Sandwich	9.8%	3.0%	4.0%
Meatless Special	1.0%	5.0%	5.9%
Meatless Pizza	1.0%	2.0%	2.0%
Meatless Soup / Other	0.0%	0.0%	5.0%
All Meatless Orders	20.6%	16.8%	33.7%
All Orders with Meat	79.4%	83.2%	66.3%

Experiment 4: Supplemental Methods and Results

Intervention Materials

In both norm conditions, two large (2 ft x 3 ft) signs were hung at eye level in two central locations in each laundry room so at least one would be visible and head-on from every washing machine. Signs depicted a washing machine with a line indicating a full and not full load. Additionally, two stickers (identical in both norm conditions) were placed on the front of each washing machine to indicate a full versus not full load (Fig. S3). The signs and stickers were inspected regularly to ensure they were in good condition. During the assessment period, none were defaced, altered, or removed.

Parametric Analyses

We used the R package lme4 to implement mixed-effects models (Bates, Maechler, Bolker & Walker, 2014). To calculate *p*-values, we used the R package lmerTest, which uses a

Satterthwaite approximation test to estimate the degrees of freedom (Kuznetsova, Brockhoff & Christensen, 2015). R function confint was used to implement Wald-tests to calculate 95% CIs.

The reduction in laundry usage was larger in the dynamic-norm condition (28.5%) than in both the control condition (2.5%), $t(1187)=3.21$, $p=0.001$, 95% CI of the difference=[0.37, 1.54], and the static-norm condition (9.73%), $t(1187)=2.14$, $p=0.033$, 95% CI of the difference=[0.05, 1.22]. The *a priori* difference between the dynamic-norm condition and the combined control and static-norm conditions was significant, $t(1188)=3.09$, $p=0.002$, 95% CI of the difference=[0.29, 1.30]. Although the reduction in usage in the static-norm condition exceeded that in the control condition, this difference was not significant ($p>0.25$).

Examining pre/post change within each condition, the reduction in use was significant in the dynamic-norm condition, $t(40)=3.02$, $p=0.004$, 95% CI of the difference=[0.36, 1.73], but not in the static-norm condition, $t<1$, or the control condition, $t<1$.

Experiment S5: Frequency of Doing Laundry

To estimate how often residents would see the signs in the norm conditions, we surveyed 45 residents in the buildings as to how often they did laundry. The mean was once every 8.7 days ($SD=3.29$) with 66.7% responding they did laundry at least weekly. Thus most residents likely saw the signs multiple times over the 3-week postintervention period.

Experiment S6: Process Measures in Laundry Context

To examine processes that may have contributed to the effects of dynamic norms on full laundry loads found in Experiment 4, we conducted an online experiment with adults living in the United States through Amazon's Mechanical Turk ($N=204$). We anticipated that, in this context, the representation that norms are rising (dynamic norms) may lead people to anticipate a higher future static norm and, insofar as this change is seen as a response to the need to conserve

water, to impute greater importance to the use of full loads to others. However, insofar as using full loads may actually take less effort than distributing laundry across multiple machines, the perceived effort of others might be less relevant in this context than in the context of reducing meat consumption.

Participants were randomized into a static- or dynamic-norm condition designed to evoke the context examined in Experiment 4. Participants were asked to imagine they lived in university housing with a shared laundry facility. Those in the static-norm condition were asked to imagine seeing a sign that said “Most Residents Use Full Loads! / Help Our Campus Conserve Water!”. Those in the dynamic-norm condition were asked to imagine they saw a sign that said “Residents Are Changing: Now Most Use Full Loads! / Help Our Campus Conserve Water!”. (In both cases, they weren't shown an actual visual of a sign, just asked to imagine seeing one with the above text.)

We then assessed anticipated change in the static norm: “In what way, if at all, do you think the percent of people who do full loads will change in the near future?” (*1=go down a lot, 3=no change, 5=go up a lot*); perceived effort of others: “How much would you think residents are making an effort to do full loads?" (*1=not at all*, *5=a lot*); and perceived importance to others, “How much would you think that residents think it is important to do full loads?” (*1=not at all, 5=a lot*). We also assessed perceived current static norms: “What percent of residents would you think use full loads now?”.

Participants expressed a greater belief that the norm would increase in prevalence in the dynamic-norm condition (M=3.86 SD=0.58) than in the static-norm condition (M=3.68 SD=0.65), $t(201)$= 2.13, P=0.034, d=0.30, 95% confidence interval (CI) of the difference=[0.01, 0.35]. There was no condition difference in the perceived effort of others (dynamic-norm

condition: *M*= 3.12 *SD*=0.94; static-norm condition: (*M*=3.23 *SD*=1.03), *t*<1. Additionally, participants perceived others to place somewhat greater importance on using full laundry loads in the dynamic-norm condition (*M*= 3.34 *SD*=0.98) than in the static-norm condition (*M*=3.13 *SD*=1.06), though this difference did not reach significance, *t*(200)=1.44, *P*=0.15, *d*=0.24, 95% CI of the difference=[-0.08, 0.49]. Multivariate analysis examining anticipated future change in the norm and perceived importance to others found these factors to be greater in the dynamic-norm condition than in the static-norm condition, *F*(2, 198)=3.03, *p*=0.051. Taken together, these results suggest that preconformity and the perceived importance to others may be at play in the laundry context, but not the perceived effort of others.

Examining perceptions of the current static norm, participants perceived marginally *fewer* people to use full laundry loads currently in the dynamic-norm condition (*M*=55.8, *SD*=19.4) than in the static-norm condition (*M*=60.5, *SD*=20.5), *t*(200)=1.69, *P*=0.092, *d*=0.24, 95% CI of the difference=[-10.24, 0.78]. These results provide further evidence that the observed behavioral effects of dynamic norms arise from the perception that the norm is changing, not from a change in the perceived static norm.

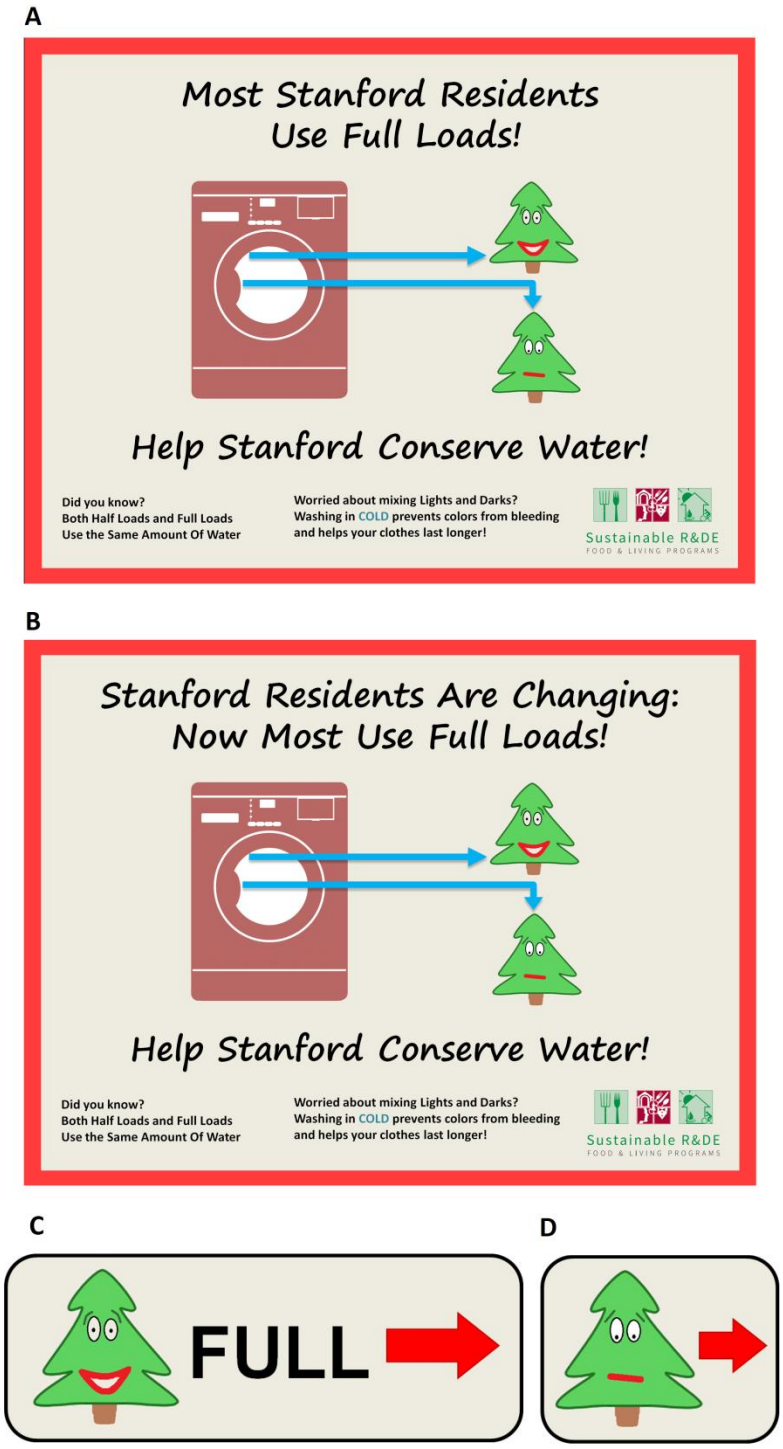

Fig. S3

Poster for Static-Norm (A) and Dynamic-Norm Condition (B), and stickers for both conditions indicating a full load of laundry (C) and a not full load (D).

Supplemental References

Bates, D., Maechler, M., Bolker, B., Walker, S. (2014). lme4: Linear mixed-effects models using Eigen and S4. R package version 1.1-12. http://CRAN.R-project.org/package=lme4/.

Kuznetsova, A., Brockhoff, P.B., Christensen, R.H.B. (2015). lmerTest: Tests in linear mixed effects models. R package version 2.0-25. http://cran.r-project.org/web/packages/lmertest

Rozenblit, L., & Keil, F. (2002). The misunderstood limits of folk science: An illusion of explanatory depth. *Cognitive Science*, 26(5), 521–562.