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Reassurance through normalization inadvertently suppresses treatment

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7 **The Normalcy Paradox:**
8 **When Reassurance Inadvertently Suppresses Treatment**
9

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Abstract

One way healthcare providers communicate reassurance is by informing patients when their symptoms are normal, either for a particular life stage (e.g., menopause) or health context (e.g., post-procedural pain). Although reassurance aims to reduce anxiety and bolster self-efficacy, which are factors that generally facilitate action, our results suggest normalization can paradoxically have the opposite effect, reducing people's inclination to pursue treatment. Fourteen studies (n=9,371), eight in the main text, document this phenomenon, including when and why it occurs. We find that normalization triggers a reappraisal of treatment norms, where people infer that their healthcare provider is normalizing their symptoms to communicate treatment is not warranted. As this is typically not providers' intention, we also identify communication strategies to overcome this faulty inference. While these experiments demonstrate a consistent effect across many samples, they should be interpreted in light of the experiments being conducted online, rather than in a clinical setting.

Delivering reassurance is an important component of provider-patient communications and the normalization of commonly occurring medical conditions is one approach.¹⁻³ Reframing an adverse experience as normal can be beneficial, increasing people's beliefs that they are not alone, reducing their fear, and improving their overall outlook on their condition.^{4,5} However, prior work is unclear on whether or how normalization affects people's motivation to pursue treatment. Understanding this dynamic is important, as under-treatment is a critical care gap that can have adverse impacts on quality of life, including deleterious effects on mental and physical health.⁶⁻⁸

Building on prior literature, we define normalization as a cognitive reframing technique in which an adverse experience, such as painful or distressing medical symptoms, is framed as normal.⁹⁻¹¹ This reframing is often grounded in the prevalence of the condition within the relevant population. For example, a woman experiencing disruptive hot flashes during menopause may be informed her symptoms are a normal part of aging, because many women report similar experiences. Importantly, although a condition's prevalence is often invoked to justify normalization, these are distinct constructs; providing prevalence information alone, absent reframing the patient's experience as normative, does not constitute normalization. In addition, despite their often-overlapping goals, normalization is also distinct from empathic validation (i.e. affirmations of the listener's feelings to demonstrate shared understanding) in that it involves the speaker using their *own* judgment of the listener's experience to neutralize negative emotions.³ Critically, normalization involves a healthcare provider making an evaluative judgment of the patient's experience, which invites patients to make inferences about why the judgment is being made. In contrast, prevalence information is purely descriptive and empathic validation centers the patient's judgement, not the provider's.

Observations in medical literature and treatment rates for normalized medical conditions suggest normalization may reduce patients' motivation to pursue treatment. A meta-analysis of correlational, observational studies across a heterogeneous patient population showed the use of affective reassurance in patient consultations (e.g., expressing empathy or offering generic reassurance) risks unintentionally making patients more likely to tolerate their symptoms.¹² In addition, despite the significant population affected and the availability of effective treatments, meaningful treatment gaps exist for frequently normalized conditions, including menopause, adolescent acne, and musculoskeletal pain in older adults.^{13–16} For example, observational studies found ~75% of women experience moderate-to-severe menopause symptoms.^{13,17} However, surveys show only a quarter of these women treat their symptoms, with beliefs that their symptoms are a normal part of aging being cited as a barrier.¹⁸

Forming the Motivation to Act

Many streams of research focus on explaining why people fail to take actions that improve their health, pointing to a multitude of drivers, including low perceived risk, real or perceived barriers to action, and a lack of self-efficacy.^{19–22} The theory of planned behavior offers a useful framework to understand the drivers in aggregate, and we leverage this theory to ground our predictions for how normalization may impact treatment inclination. The theory suggests people's intention to act is influenced by their attitudes towards the behavior (driven by its expected benefit), normative beliefs about others' expectations about the behavior, and their perceived behavioral control.^{23–26}

The Normalcy Paradox

Perceptions of self-efficacy are influenced by mastery experiences, vicarious experiences

(knowing others like you have succeeded), verbal persuasion, and one's psychological state (e.g., anxiety arousal signals inefficacy).²⁷ Healthcare providers may believe normalization will reduce patients' anxiety and serve as a vicarious signal that others have come through the same experience, bolstering patients' self-efficacy and therefore, motivation to act. However, we propose normalizing symptoms may risk unintentionally influencing patients' perceptions of both descriptive treatment norms (how most people manage their symptoms) and injunctive treatment norms (how one ought to manage their symptoms). Specifically, normalization may reduce a patient's motivation to act by signaling that pursuing treatment is not the norm.

In cases where people are not aware of behavioral norms, as may be the case with medical treatment, they often look to others' statements or behaviors to establish the norm.²⁸⁻³⁰ While normalization statements provide no information about actual treatment norms, people may infer that their healthcare provider intends to communicate that most people suffering from the same symptoms do not pursue treatment (a descriptive norm) and/or that they should not pursue treatment (an injunctive norm). Patients' inferences about treatment norms can be explained by people's desire to seek explanations for speakers' utterances and infer the speakers' intentions and normative beliefs.^{31,32} Especially in the medical domain, normality could be presented as a contrast to dysfunction (e.g., normal vs. malignant cells). Even though providers may intend to use normality to communicate typicality, rather than acceptability, patients may infer that normal symptoms are acceptable and do not require treatment. Behavioral norms, particularly those established by an authority figure, can have a powerful influence on behavior.^{23-25,33,34}

While a norm inference might explain reduced treatment inclination, an alternative

117 explanation could be changes in severity perceptions. Normalizing symptoms could be seen as
118 equivalent to highlighting their high prevalence. Paradoxically, experimental studies have found
119 highlighting an issue's prevalence results in inferences that the issue causes less harm.³⁵⁻³⁷ If
120 normalization is causing patients to infer that their symptoms are less severe, this could also
121 explain reduced treatment inclination.

122 The present research aims to distinguish between these two mechanisms. Specifically, we
123 test two predictions. First, normalization will reduce people's inclination to pursue treatment.
124 Second, reduced treatment inclination will be driven by a reappraisal of treatment norms;
125 specifically, people infer that providers normalize symptoms to communicate that treatment is
126 not warranted. Given this mechanism, we propose the effects of normalization will apply to non-
127 life-threatening conditions, where there is uncertainty about whether treatment is warranted. We
128 also show that this inference reflects a bias, as from healthcare providers' perspective, normality
129 does not imply treatment is unwarranted.

130 We first establish that healthcare providers consider normalization to be an appropriate
131 form of reassurance, as they believe it will calm patients' anxiety and provide assurance that
132 their symptoms can be treated; we also show that providers who use normalization do not expect
133 it will reduce treatment inclination (Experiment 1A-C). We then demonstrate, by presenting lay
134 people with hypothetical scenarios about patients receiving medical advice, that when a provider
135 normalizes a patient's symptoms, people are less inclined to pursue treatment (Experiments 2-3).
136 Next, we shed light on an additional downstream consequence of normalization, negative
137 perceptions of the provider (Experiment 3). We then contrast the two potential mechanisms for
138 reduced treatment inclination, norms and severity, and show that the adverse effects of

normalization stem from people's inferences about injunctive treatment norms. While normalization does reduce severity perceptions, it is the injunctive norm that drives treatment inclination (Experiments 4). We also show normalization is distinct from increasing the perceived prevalence of the symptoms, as the latter does not significantly impact treatment inclination (Experiment 5). Finally, we show how these effects can be attenuated by the provider correcting the faulty injunctive norm inference (Experiment 6).

Results

Prevalence of Normalization

The goal of our first experiment was to generate normalization statements to use in future experiments and confirm that lay people perceive the statements as normalization. The two tested statements were:

- “What you’re experiencing, while challenging, is actually very common – many people experience this.”
- “I know this feels overwhelming, but I want to reassure you that these symptoms are normal and most people experience them at some point in their lives.”

In our second and third experiments, we surveyed healthcare providers to understand whether these statements would be used to respond to a patient with a life-stage normative medical condition and understand their beliefs about how the statements would influence the patient's treatment inclination.

In Experiment 1A, lay participants read a vignette about a patient visiting their doctor, complaining about a set of symptoms. Participants then reviewed 10 possible responses a doctor could give and rated how closely each statement aligned with the following response paradigms: reassurance by normalizing, acknowledging, dismissing, providing information, or giving a

directive. Each statement was rated on a seven-point Likert scale, with higher numbers indicating higher alignment with the response paradigm.

Both normalization statements were evaluated as highly reflective of reassurance by normalizing ($M_{\text{FirstStatement}} = 6.01$, $SD_{\text{FirstStatement}} = 1.47$), ($M_{\text{SecondStatement}} = 6.39$, $SD_{\text{SecondStatement}} = 1.09$). Paired t-tests showed both statements were rated as being significantly more reflective of normalizing than any of the other paradigms and any of the other eight tested statements. Neither statement was rated as particularly dismissing ($M_{\text{FirstStatement}} = 2.55$, $SD_{\text{FirstStatement}} = 1.68$), ($M_{\text{SecondStatement}} = 2.26$, $SD_{\text{SecondStatement}} = 1.67$)¹.

In Experiment 1B, we surveyed healthcare providers to understand whether these two normalization statements would be used to respond to a patient with life-stage normative medical symptoms. We presented a vignette about a woman suffering from menopause symptoms and then asked the providers which, if any, of the 10 statements from Experiment 1A, they would include in their response to the patient. Providers who chose a normalizing statement were then asked about how they believed the statement would influence the patient's outlook, level of openness with their provider, and likelihood of pursuing the treatment referenced in the vignette (hormone replacement therapy).

On average, the healthcare providers used two statements in their response. 62% selected at least one of the normalizing statements (122/197), 95% CI = [54.98%, 68.42%]², supporting our claim that normalizing is a common reassurance tactic. Additionally, consistent with this pattern, in Supplemental Experiment 1, we surveyed post-menopausal women and found 96% of

¹ As a comparison, the response "Thank you for sharing all of that — it's clear that this has been hard." was designed to offer acknowledgement and was the most selected response. This statement was rated 2.0 on dismissing ($SD = 1.59$), not significantly different than the normalizing statement used in this paper ($t(197.81) = 1.14$, $p = 0.255$).

² Normalization rates by provider type: Registered Nurse (N=68) – 57%; Medical Doctor (N=21) – 62%, Nurse Practitioner (N=14) – 43%, Physician Assistant (N=12) – 83% , Other (N=82) – 66%.

those who consulted a healthcare provider about their symptoms, experienced normalization. Among providers who used normalization, 84% believed the statements would improve the patient's outlook on their condition and 82% indicated the statements would increase the patient's willingness to be open. However, only 15% of providers (95% CI = [9.46%, 21.66%]) believed their response would decrease the patient's likelihood of pursuing treatment.

In Experiment 1C, we replicated Experiment 1B, except specifically surveyed medical doctors in continuity-of-care specialties (i.e., Primary Care Physicians and Obstetricians/Gynecologists), where we expected the sustained patient relationships to engender higher sensitivity towards the behavioral consequences of normalization, and thus reduce the tendency to normalize. Within this population, we still found meaningful rates of normalization, with 43% of physicians using one of the normalizing statements in their response (91/210), 95% CI = [36.81%, 50.10%]. When asked to explain why they chose normalization statements, the desire to reduce the patient's anxiety, reassure the patient that they were not alone, and communicate that others have effectively treated the symptoms were frequently mentioned. Consistent with Experiment 1B, only 9% of these doctors (95% CI = [5.21%, 16.50%]) believed their response would decrease the patient's likelihood of pursuing treatment. The modal response among providers was that the statement would increase the patient's likelihood of pursuing treatment (46.2%). This result is consistent with providers' free response explanations which referenced the treatability of the patient's symptoms, and inconsistent with demand effects or general concerns about HRT as a treatment (which no provider indicated).

The doctors who used normalization had been practicing for longer than those who did not, suggesting this is not a phenomenon limited to early career physicians ($M_{\text{Normalization}} = 12.89$ years, $SD_{\text{Normalization}} = 10.61$ years, $M_{\text{NoNormalization}} = 10.10$ years, $SD_{\text{NoNormalization}} = 8.42$ years, $t(167.77)$

= 2.06, $d = 0.32$, $p = .041$). Full results from Experiments 1A-C are in Tables S1-S6 in the supplement.

Effects of Normalization

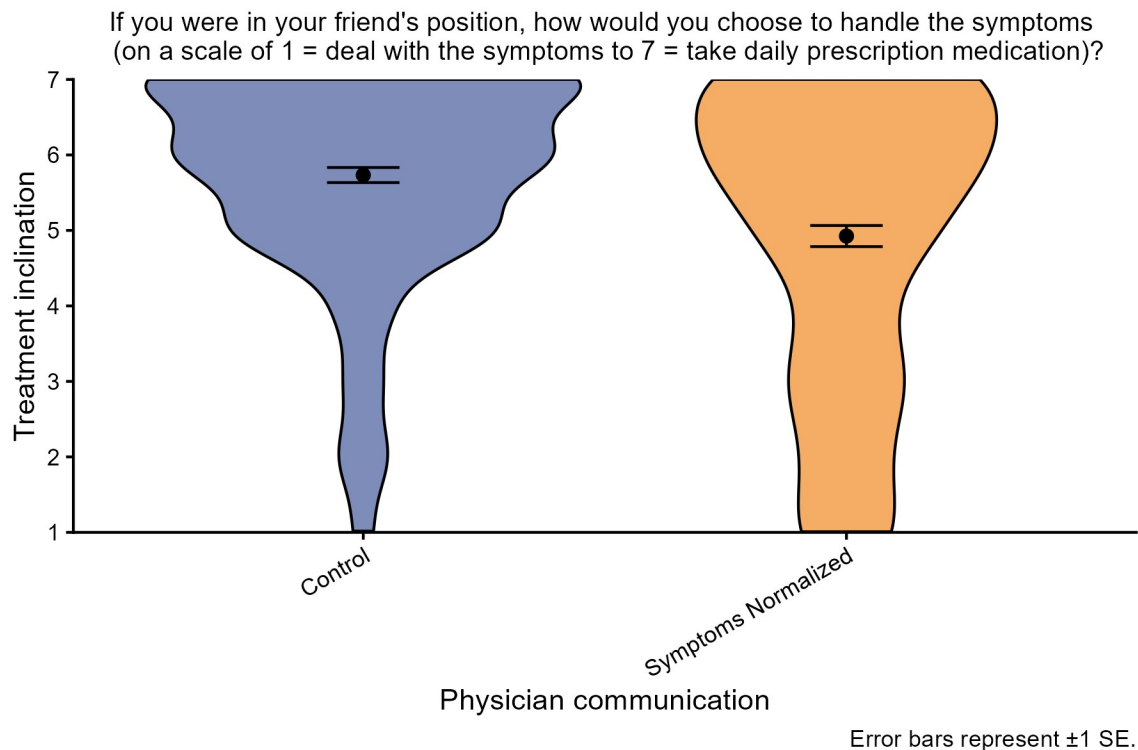
Treatment Inclination

Experiment 2 employed a two-condition between-subjects design (symptoms normalized: yes vs. no), and evaluated the effect of normalization on treatment inclination. Participants were presented with a vignette about a friend experiencing symptoms associated with Climacteric (i.e., menopause) who goes to see a doctor.³ In the vignette, we manipulate whether the doctor normalizes the symptoms prior to communicating treatment options, using the pre-tested statement from Experiment 1 (“I know this feels overwhelming, but I want to reassure you that these symptoms are normal and most people experience them at some point in their lives.”). In both conditions, the doctor in the vignette presents two options for how to handle the symptoms: take daily prescription medication or deal with the symptoms. After viewing the vignette, participants reported their treatment inclination on a seven-point Likert scale (1 = deal with the symptoms, 7 = take daily prescription medication).

A linear regression of treatment inclination on condition assignment showed that when the doctor normalized the symptoms, participants were less likely to indicate that they would take medication ($b = -0.81$, $t(398) = -4.70$, $p < .001$, $d = -0.46$, 95% CI = [-1.15, -0.47]) (Fig. 1). In Supplemental Experiment 3, we replicate this effect with a prevalent, but non-gendered medical condition, seasonal allergies.

³ In Supplemental Experiment 2, we surveyed participants to understand how frequently people experience normalization at medical appointments and which types of symptoms are normalized. Twenty-nine percent of participants reported that a provider had reassured them that their symptoms were normal during a recent medical appointment. Among the top 10 categories of normalized symptoms were pain (including dental and oral pain), reproductive health (including menopause), headaches and migraines, and respiratory symptoms (including allergies). We used these specific conditions in our primary studies to probe the mechanism.

225 **Fig. 1: Effect of symptom normalization on reported treatment inclination in Experiment 2**



227 *Violin plots depict the distribution of stated treatment inclination by condition (Control vs. Symptoms Normalized)*
228 *in Experiment 2 (N = 400). In the Symptoms Normalized condition, the doctor normalizes the patient's symptoms;*
229 *in the Control condition, the doctor does not normalize the patient's symptoms. Means and error bars by condition*
230 *are indicated in black. The error bars are ± 1 Standard Error.*

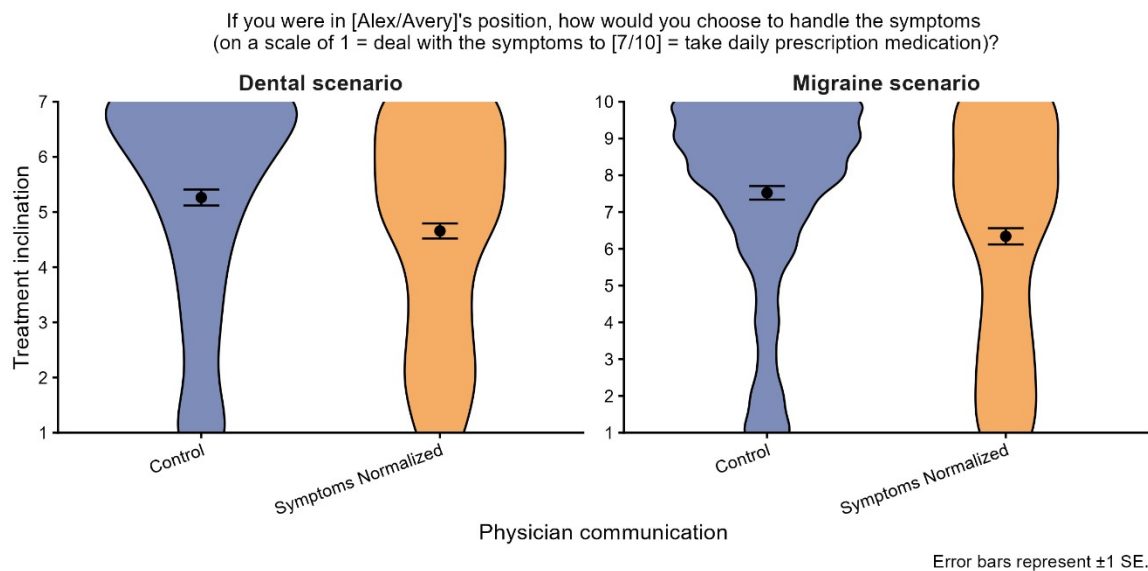
231 *Provider Perceptions*

232 In Experiment 3, we conceptually replicate the effect of normalization using different
233 medical conditions and measure the influence of normalization on provider perceptions.
234 Experiment 3 employed a 2 (symptoms: dental pain vs. migraine) x 2 (symptoms normalized:
235 yes vs. no) mixed design. Participants were presented with two vignettes in a similar structure to
236 Experiment 2: one featured a patient with migraine symptoms; the other featured a patient with
237 dental pain. We again manipulated, between subjects, whether prior to describing treatment
238 options, the doctor normalizes the symptoms.

After each vignette, participants reported their treatment inclination (seven-point Likert scale in the Dental condition; ten-point slider scale in the Migraine condition, with higher numbers indicating higher treatment inclination). As pre-registered, responses were z-scored to enable joint analysis of both scenarios. Participants then evaluated the provider on four dimensions: positive impressions, took concerns seriously, offered sufficient reassurance, and likelihood of returning to the provider; responses were given on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree).

A linear mixed effects model with normalization, scenario, and their interaction as predictors, with controls for scenario order and normalization manipulation order, and random intercepts for participants, showed a significant negative effect of normalization on treatment inclination ($b = -0.30$, $t(613.58) = -3.00$, $p = .003$, $d = -0.30$, 95% CI = [-0.49, -0.10]) (Fig. 2). The scenario, its interaction with normalization, and order covariates had no significant effect ($ps > 0.26$). Full regression results are reported in Table S7 in the supplement.

Fig. 2: Effect of symptom normalization on reported treatment inclination in Experiment 3

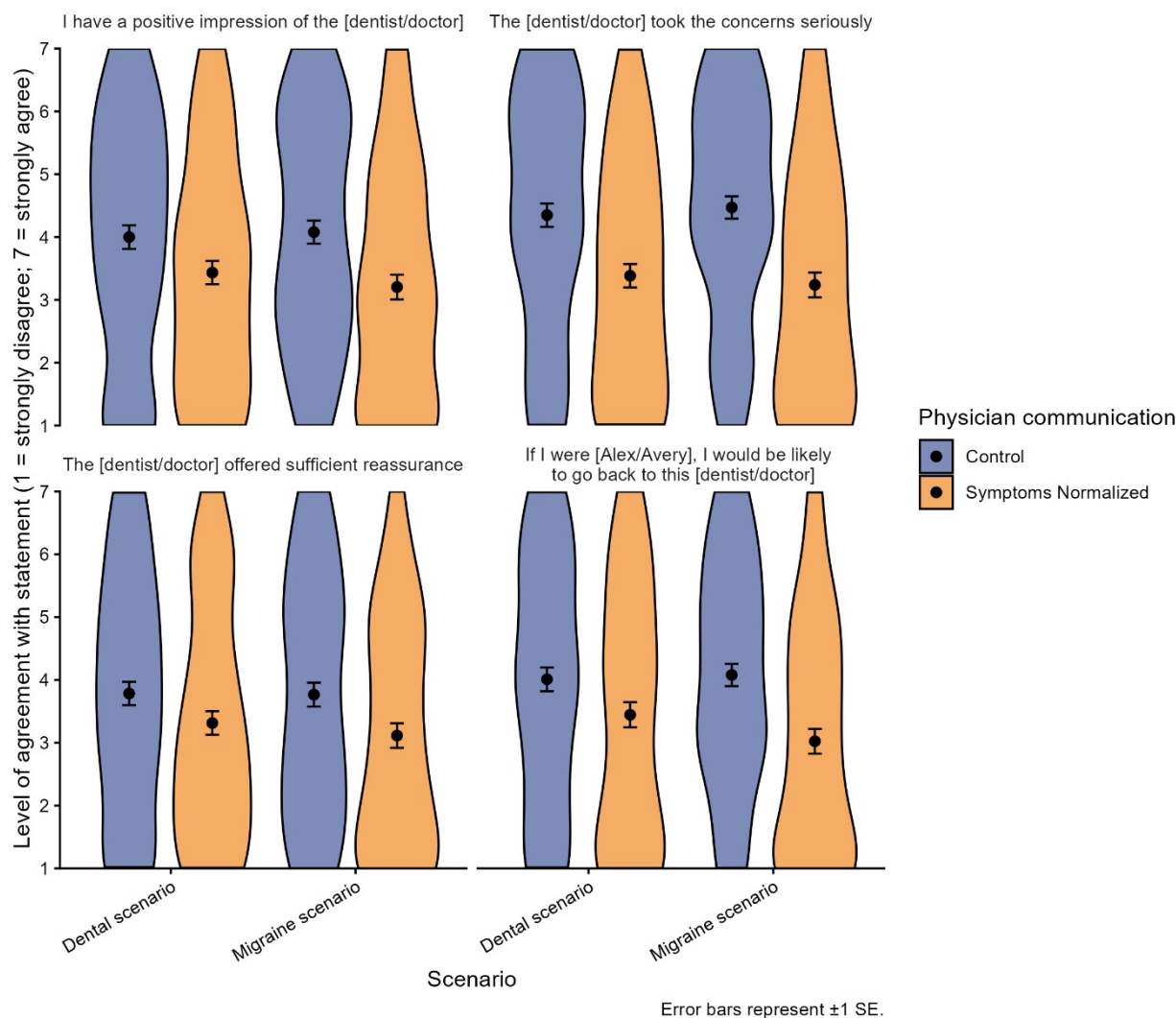


Violin plots depict the distribution of stated treatment inclination by condition (Control vs. Symptoms Normalized) and by Scenario (Dental pain vs. Migraine) in Experiment 3 (N = 395). In the Symptoms Normalized condition, the

healthcare provider normalizes the patient's symptoms; in the Control condition, the provider does not normalize the patient's symptoms. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

All provider perception measurements showed a significant order effect, where seeing a normalization statement in the first vignette reviewed had a significant negative effect on all subsequent provider assessments. Thus, to avoid carry-order effects, we deviated from the pre-registration plan and used the standard approach of analyzing the first vignette each participant viewed.³⁸ Linear regressions of each provider assessment dimension on normalization, scenario, and their interaction showed participants rated the provider more negatively when they normalized the patient's symptoms (Fig. 3); this was consistent across all four dimensions measured: positive impression ($b = -0.57$, $t(391) = -2.16$, $p = .031$, $d = -0.30$, 95% CI = [-1.08, -0.05]), took concerns seriously ($b = -0.97$, $t(391) = -3.72$, $p < .001$, $d = -0.50$, 95% CI = [-1.48, -0.45]), offered sufficient reassurance ($b = -0.47$, $t(391) = -1.78$, $p = .075$, $d = -0.25$, 95% CI = [-0.99, 0.05]), likelihood to return ($b = -0.57$, $t(391) = -2.13$, $p = .034$, $d = -0.29$, 95% CI = [-1.09, -0.04]). Full regression results are reported in Table S8 in the supplement. The supplement also includes the pre-registered analyses and an alternate analysis which treats vignette order as a moderator, and finds consistent results.

272 **Fig. 3: Effect of symptom normalization on healthcare provider perceptions in Experiment 3**



273

274 Violin plots depict the distribution of participants' agreement with positive statements about the healthcare providers
275 in Experiment 3 by condition (Control vs. Symptoms Normalized) and by Scenario (Dental pain vs. Migraine) (N =
276 395). In the Symptoms Normalized condition, the healthcare provider normalizes the patient's symptoms; in the
277 Control condition, the provider does not normalize the patient's symptoms. Participants each viewed two vignettes
278 (Dental pain, Migraine) in randomized order. Due to carryover effects between the two vignettes, only data from the
279 first vignette each participant viewed is included. Means and error bars by condition are indicated in black. The error
280 bars are ± 1 Standard Error.

281 Post-hoc analysis revealed this shift was primarily driven by changes in women's
282 perceptions of the healthcare provider. A linear regression of each dimension on normalization, a
283 gender indicator, and their interaction showed significant interaction terms across the four
284 dimensions: positive impression ($b = -0.97$, $t(391) = -2.64$, $p = .009$, $d = -0.51$, 95% CI = [-1.69,

-0.25]), took concerns seriously: ($b = -1.02$, $t(391) = -2.79$, $p = .005$, $d = -0.53$, 95% CI = [-1.74, -0.30]), offered sufficient reassurance ($b = -0.72$, $t(391) = -1.94$, $p = .053$, $d = -0.38$, 95% CI = [-1.44, 0.01]), likelihood to return: ($b = -0.93$, $t(391) = -2.49$, $p = .013$, $d = -0.48$, 95% CI = [-1.67, -0.19]).

These results show that while providers may use normalizing statements to reassure patients, they may backfire, not only in terms of the patient's treatment inclination, but also in their provider evaluations. In Supplemental Experiment 4, we investigate additional downstream effects of normalization and find normalization results in people being more likely to seek a second opinion from another doctor, family, or friends; a second opinion from the right person could reduce the adverse effects of normalization.

Mechanism Analysis

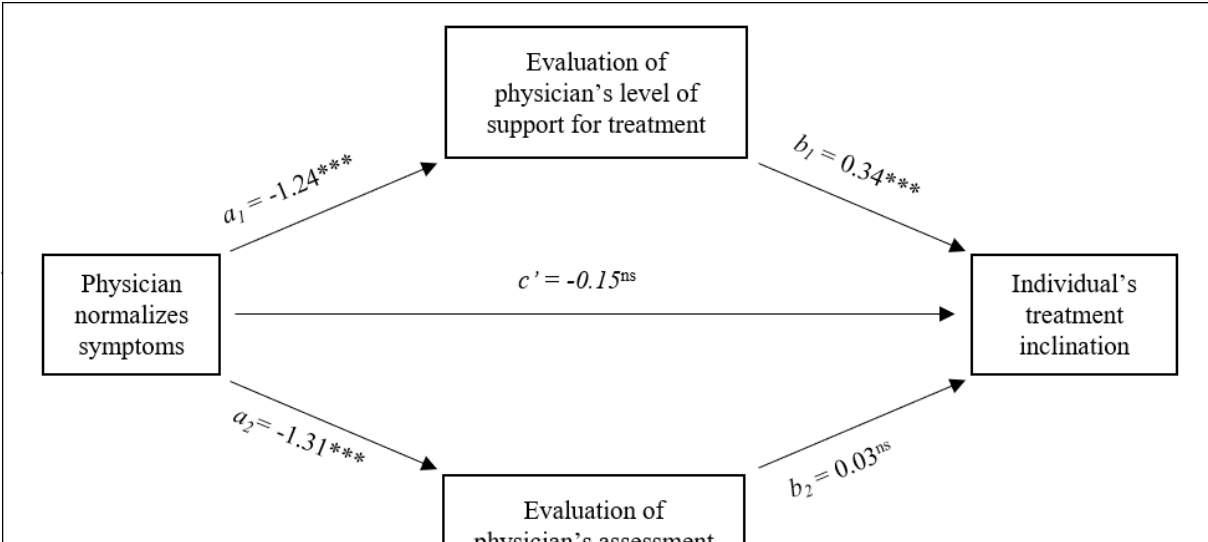
To understand why normalization reduces treatment inclination, we explore inferences about treatment norms and severity as potential mediators. This experiment starts to tease out whether the norms-based explanation is more consistent with the data than the prevalence-based account, which suggests prevalent conditions are perceived to be less severe.

Experiment 4 employed a two-condition between-subjects design (symptoms normalized: yes vs. no). We present the same dental pain scenario from Experiment 3 and again manipulate whether the dentist normalizes the patient's symptoms. After viewing the scenario, participants reported treatment inclination on a seven-point Likert scale (1 = deal with the symptoms, 7 = take daily prescription medication). We then captured inferences about injunctive norms (specifically how the dentist believes the symptoms should be handled) on a seven-point Likert scale (1 = deal with the symptoms, 7 = take daily prescription medication), and how severe the

dentist believes the symptoms are on a seven-point Likert scale, with higher numbers indicating higher severity⁴.

Using a linear regression, we replicate our original finding that normalization reduces treatment inclination ($b = -0.61, t(401) = -3.14, p = .002, d = -0.31, 95\% \text{ CI} = [-0.99, -0.23]$). A mediation analysis (Hayes PROCESS 4) tested the two potential pathways: injunctive norms and severity.³⁹ Normalization significantly reduced participants' evaluation of the dentist's level of support for treatment ($a_1 = -1.24, t(401) = -7.14, p < .001, d = -0.67, 95\% \text{ CI} = [-1.58, -0.90]$) and the dentist's assessment of the symptoms' severity ($a_2 = -1.31, t(401) = -8.86, p < .001, d = -0.81, 95\% \text{ CI} = [-1.61, -1.02]$). However, in the simultaneous regression, perceptions about the dentist's treatment support remained a positive predictor ($b_1 = 0.34, t(399) = 6.20, p < .001, d = 0.32, 95\% \text{ CI} = [0.23, 0.45]$), whereas perceived severity did not ($b_2 = 0.03, t(399) = 0.41, p = .681, d = 0.02, 95\% \text{ CI} = [-0.10, 0.15]$). After accounting for both mediators, the direct effect of normalization on treatment inclination was not significant ($c' = -0.15, t(399) = -0.73, p = .469, d = -0.08, 95\% \text{ CI} = [-0.56, 0.26]$), indicative of full mediation (Fig. 4). These results demonstrate that normalization reduced participants' treatment inclination primarily because of injunctive norm inferences.

Fig. 4: Mediation model testing injunctive norms and perceived severity as parallel mediators for the effect of normalization on treatment inclination in Experiment 4



324
325 In Experiment 5, we aim to further distinguish between the prevalence-based account of
326 the impact of normalization and the norms-based account, and more clearly tease out the effect of
327 descriptive norms (i.e., beliefs about how others manage the symptoms) vs. injunctive norms
328 (i.e., beliefs about how the provider expects the symptoms to be managed).

329 We use the dental pain scenario from Experiments 3 and 4 and again manipulate whether
330 the dentist in the scenario normalizes the symptoms. In addition, we introduce a third condition
331 in which the dentist does not normalize the symptoms, but the high prevalence of dental pain is
332 made salient to participants immediately before viewing the scenario. This resulted in a three-
333 condition between-subjects design (communication: symptoms normalized vs. prevalence
334 information vs. control).

335 After reviewing the vignette, participants reported treatment inclination on a seven-point
336 Likert scale (1 = deal with the symptoms, 7 = take daily prescription medication). Participants
337 then report their beliefs about the prevalence of dental pain on a seven-point Likert scale (1 =
338 Not prevalent at all, 7 = Extremely prevalent). Finally, participants indicated how they think the
339 dentist believes the patient should handle the symptoms on a ten-point Likert scale (1 = deal with
340 the symptoms, 10 = take daily prescription medication) and estimated the percent of the
341 population with similar symptoms that takes medication.

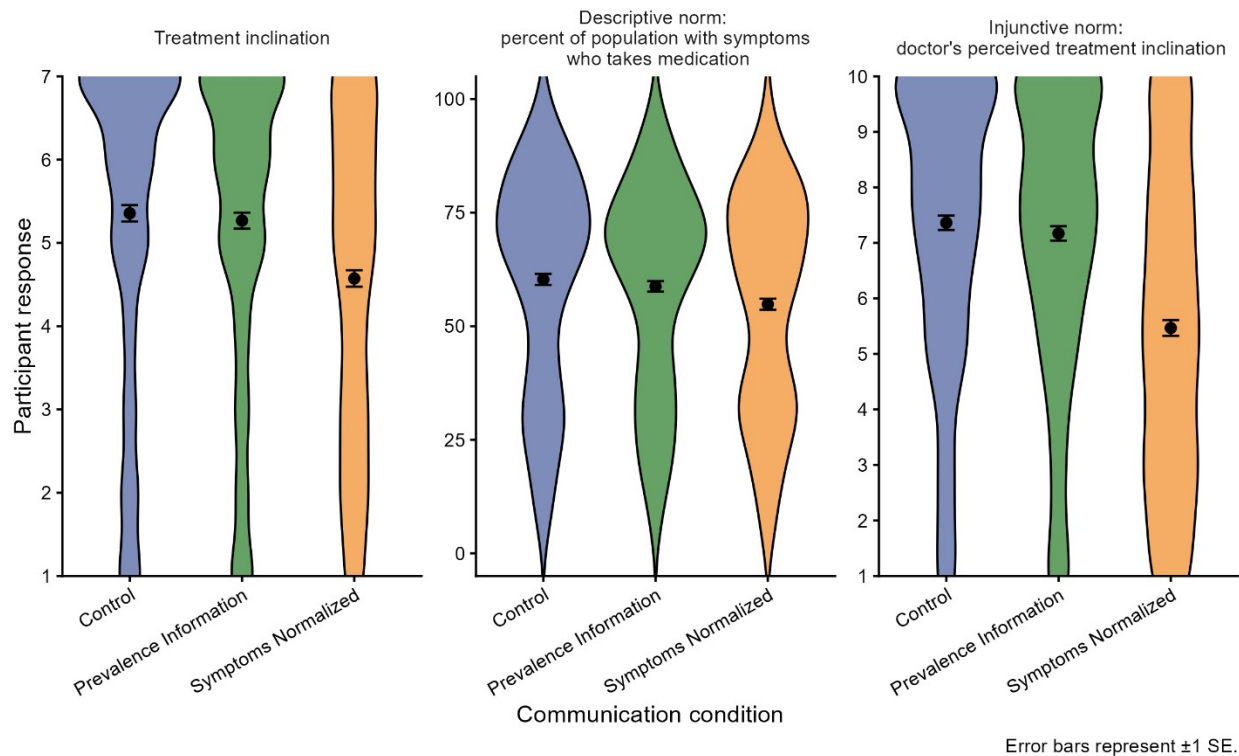
342 The prevalence manipulation was successful: participants in the prevalence condition
343 perceived dental pain to be significantly more prevalent than participants in the normalization
344 condition ($b = 0.66$, $t(1202) = 7.79$, $p < .001$, $d = 0.55$, 95% CI = [0.46, 0.85]) and the control
345 condition ($b = 0.52$, $t(1202) = 6.16$, $p < .001$, $d = 0.43$, 95% CI = [0.32, 0.71]). Notably,
346 normalization did not have a significant effect on perceived prevalence compared to the control

condition ($p = .222$); this suggests that normalization is not merely updating people's beliefs about the commonness of the symptoms in the general population.

Pairwise contrasts using estimated marginal means showed treatment inclination was significantly lower in the normalization condition compared to the control condition ($b = -0.78$, $t(1202) = -5.67$, $p < .001$, $d = -0.40$, 95% CI = $[-1.11, -0.46]$) and the prevalence condition ($b = -0.70$, $t(1202) = -5.02$, $p < .001$, $d = -0.35$, 95% CI = $[-1.02, -0.37]$). There was no significant difference between the control and prevalence conditions ($b = 0.09$, $t(1202) = 0.64$, $p = .800$, $d = 0.04$, 95% CI = $[-0.24, 0.41]$); this result suggests that increasing perceived symptom prevalence alone is insufficient to reduce treatment inclination, supporting our theory that the impact of normalization is not primarily attributable to changes in prevalence beliefs.

While perspectives on descriptive and injunctive treatment norms were both influenced by condition assignment, the impact on injunctive norms was more pronounced. The estimated percent of the population who takes medication to treat similar symptoms was lower in the normalization condition than both the control condition ($b = -5.45$, $t(1202) = -3.25$, $p = .003$, $d = -0.23$, 95% CI = $[-9.39, -1.52]$) and the prevalence condition ($b = -3.94$, $t(1202) = -2.35$, $p = .050$, $d = -0.17$, 95% CI = $[-7.89, 0.00]$). However, we see a larger effect on beliefs about injunctive treatment norms. In the normalization condition, participants perceived the dentist as significantly less supportive of medication use compared to both the control condition ($b = -1.90$, $t(1202) = -9.96$, $p < .001$, $d = -0.70$, 95% CI = $[-2.34, -1.45]$) and the prevalence condition ($b = -1.70$, $t(1202) = -8.92$, $p < .001$, $d = -0.63$, 95% CI = $[-2.15, -1.26]$). The prevalence and control conditions did not significantly differ on either dimension ($ps > .568$) (Fig. 5).

Fig. 5: Differential effect of symptom normalization and prevalence communication on treatment inclination and perceptions of treatment norms in Experiment 5



Violin plots depict the distribution of participant responses to the dental pain scenario in Experiment 5 ($N = 1205$). Participants were assigned to one of three conditions (Control vs. Prevalence Information vs. Symptoms Normalized). In the Prevalence Information condition, participants were informed that dental pain was highly prevalent. In the Symptoms Normalized condition, the dentist normalized the patient's symptoms. The Control condition included neither prevalence information nor normalization. Participants reported their own treatment inclination (1 = "Deal with the symptoms" - 7 = "Take daily prescription medication"), beliefs about the percent of the population with similar symptoms who takes medication, and their perceptions of the doctor's treatment inclination (1 = "Deal with the symptoms" - 10 = "Take daily prescription medication"). Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

We then tested injunctive and descriptive treatment norms as parallel mediators for the effect of normalization on treatment inclination to identify the larger contributor (Hayes PROCESS 4). Normalization significantly reduced participants' evaluation of the dentist's level of support for treatment ($a_1 = -1.90$, $t(1202) = -9.96$, $p < .001$, $d = -0.70$, 95% CI = [-2.27, -1.52]) and estimates of the percent of the population that uses medication to treat similar symptoms ($a_2 = -5.45$, $t(1202) = -3.25$, $p = .001$, $d = -0.23$, 95% CI = [-8.74, -2.16]). The indirect effect through injunctive norms (indirect effect = -0.60, 95% CI = [-0.75, -0.47]) was significantly larger than

the indirect effect through descriptive norms (indirect effect = -0.05, 95% CI = [-0.09, -0.01]), supporting our theory that injunctive norm inferences are the primary driver. In Supplemental Experiment 4, we rule out additional alternative explanations, including the provider's perceived dismissiveness and reduced provider trust.

Overcoming Normalization

Given the effect of normalization on treatment inclination is driven by inferences about treatment norms, communications that disrupt this inference should weaken the effect. In this experiment, we test two such communication interventions. The first involves the physician explicitly stating their support for treatment. The second intervention reframes normalization as cognitive reassurance by communicating that because the symptoms are normal, there is extensive clinical knowledge on how to manage them; the intention of the reframing is to correct people's inferences about why normality is being highlighted.

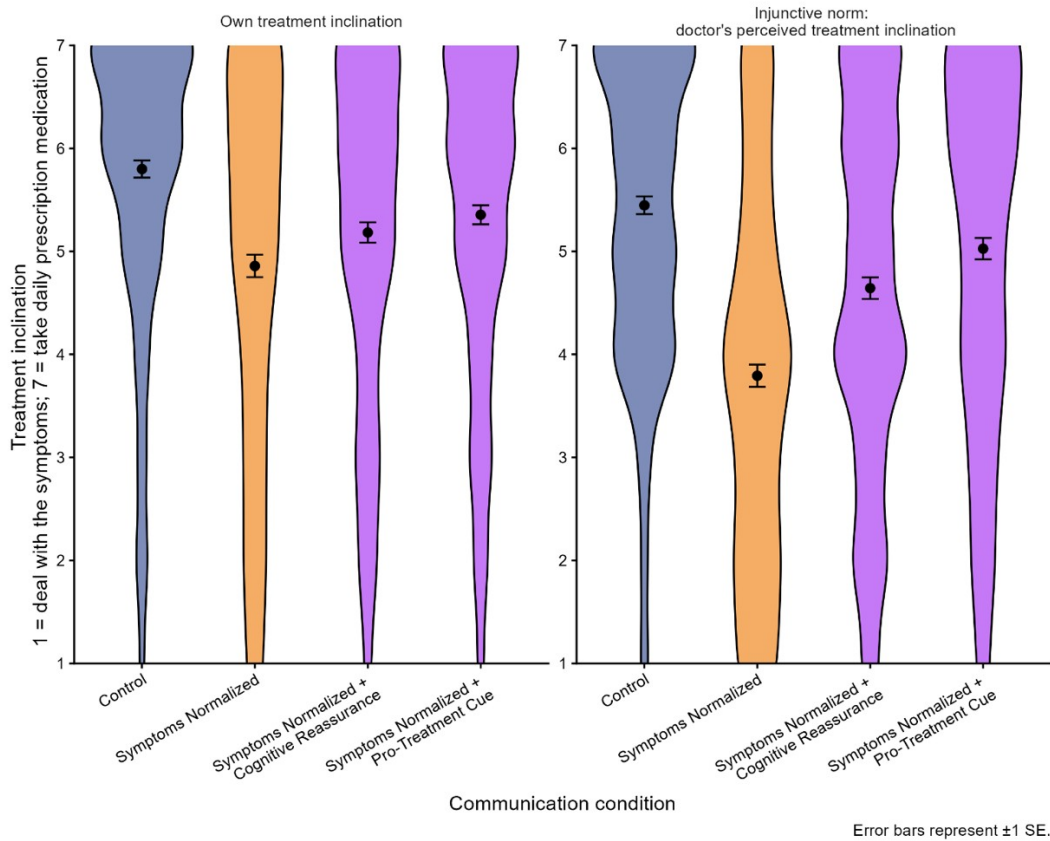
Experiment 6 employed a four-condition between-subjects design (communication: control vs. normalization vs. normalization + pro treatment cue vs. normalization + cognitive reassurance framing) using the migraine scenario from Experiment 3. After reviewing the vignette, participants reported their own treatment inclination and the doctor's treatment inclination on seven-point Likert scales (1 = deal with the symptoms, 7 = take daily prescription medication).

Planned contrasts using estimated marginal means compared the conditions. First, we replicate our finding that normalization reduces treatment inclination compared to the control condition ($b = -0.94$, $t(1208) = -6.94$, $p < .001$, $d = -0.56$, 95% CI = [-1.21, -0.67]). More critically, we find that both communication interventions resulted in significantly higher treatment inclination than the normalization condition ($b_{Pro-Treatment} = 0.50$, $t(1208) = 3.66$, p

410 $< .001, d = 0.30, 95\% \text{ CI} = [0.23, 0.76]; b_{\text{CognitiveReassurance}} = 0.33, t(1208) = 2.39, p = .017, d = 0.19,$
 411 $95\% \text{ CI} = [0.06, 0.59])$ (Fig. 6). In addition, both interventions increased perceptions of the
 412 doctor's support for treatment ($b_{\text{Pro-Treatment}} = 1.23, t(1208) = 8.69, p < .001, d = 0.70, 95\% \text{ CI} =$
 413 $[0.96, 1.51]; b_{\text{CognitiveReassurance}} = 0.85, t(1208) = 5.97, p < .001, d = 0.49, 95\% \text{ CI} = [0.57, 1.13])$ ⁵.
 414 However, the communication interventions did not fully attenuate the effect of normalization;
 415 treatment inclination in the communication intervention conditions was still lower than in the
 416 control condition ($b_{\text{Pro-Treatment}} = -0.44, t(1208) = -3.27, p = .001, d = -0.27, 95\% \text{ CI} = [-0.71, -$
 417 $0.18]; b_{\text{CognitiveReassurance}} = -0.62, t(1208) = -4.53, p < .001, d = -0.37, 95\% \text{ CI} = [-0.88, -0.35])$.

14 ⁵ Mediation analyses in the supplement show increased treatment inclination is mediated by increased perceptions of
 15 the physician's support for treatment.

Fig. 6: Effect of combining normalization with cognitive reassurance or pro-treatment cues on treatment inclination and perceived injunctive treatment norms in Experiment 6



Violin plots depict the distribution of participant responses to the migraine scenario in Experiment 6 by condition (Control – No Normalization vs. Symptoms Normalized vs. Symptoms Normalized + Cognitive Reassurance vs. Symptoms Normalized + Pro-Treatment Cue) (N = 1212). The latter two intervention conditions aimed to attenuate the effects of normalization by communicating that the doctor does not intend to signal that they are unsupportive of treatment. Participants reported their own treatment inclination and perceptions of the doctor's treatment inclination. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

Discussion

Patient-centered communication guidelines describe offering reassurance as a best practice for responding to a patient's emotions, and normalizing a patient's experience is one approach.⁴⁰ When done effectively, reassurance can reduce patients' anxiety and improve health outcomes.¹² However, our research suggests there can be unintended consequences of using normalization to reassure patients. These well-intended messages may reduce people's inclination to pursue treatment for non-life-threatening conditions.

Across experiments, people's treatment inclination was lower when healthcare providers normalized symptoms (Experiments 2-6), even though this is not providers' intention (Experiment 1). The normalcy paradox occurs because people mistakenly infer that their healthcare provider is normalizing their symptoms to imply that the norm is to not pursue treatment (Experiments 4-5). We expect this disconnect is because reassurance techniques have typically been evaluated on their affective impact. Understanding the behavioral consequences of reassurance is more challenging and has received comparatively little attention in the medical literature, and therefore, likely in clinician training.¹² In the context of discussing treatment options, a remark meant to reassure may come across as dismissive, leading patients to view the doctor less favorably. The importance of using communication strategies that validate and legitimize patients' experiences is perhaps even greater for patients with a history of medical dismissal. Many patients, especially women and underrepresented groups, report feeling dismissed or having their symptoms downplayed when they visit healthcare providers.^{41,42} Normalizing statements, due to their ambiguous intentions, may contribute to this breakdown in the provider-patient relationship, consistent with our results suggesting normalization elicits more negative provider evaluations from women (Experiment 3).

Our work does not suggest catastrophizing patients' situations is the best approach, and in some cases, not taking medication may be the better outcome; for example, some medications are not effective, carry meaningful risks to a patient's health, or have a high risk of dependence (e.g., some pain medications). However, more research is needed to understand what forms of reassurance improve patients' self-efficacy, without signaling that the norm is to not act, if that is not the providers' intention. Experiment 6 suggests reframing normalization as cognitive

reassurance or combining normalization with explicit pro-treatment cues may be better approaches.

The current research is constrained by a boundary condition and two main limitations. First, in cases where a patient's medical situation is life-threatening, we expect the effect of normalization to be attenuated, as there is little uncertainty about whether treatment is warranted. In Supplemental Experiment 5, we confirm this interaction. We also expect that in life-threatening settings, for various reasons, providers will be less likely to naturally use normalization to reassure patients. In addition to this boundary condition, we also face external validity limitations. Our normalization statements were derived from theoretical grounds, and while they were pre-tested to confirm healthcare providers would use them with patients, we do not test our findings in a natural, clinical setting. As such, we cannot ensure that providers who endorse these statements would spontaneously generate them in a clinical encounter; therefore, our results should be interpreted as evidence that providers believe normalization is an appropriate reassurance strategy to use. In addition, we cannot be sure our effects are not driven by the specific instantiations of normalization that were tested; in practice, a conversation's context will influence the impact of normalization. As an example, Experiment 6 shows how providing explicit pro-treatment cues can attenuate the effects of normalization.

It is also important to acknowledge that, despite participants stating they had a lower inclination to pursue treatment when symptoms were normalized, we do not know how stated intentions translate into actual behavior. This is particularly true given our participants may not have personally experienced the symptoms described in the study (we do not restrict our samples to those experiencing the symptoms) and may behave differently if they were in that position.

Future research that builds on these findings to test communication interventions in clinical settings is needed to maximize external validity.

An additional limitation concerns generalizability to other samples. Our experiments were done on U.S. samples.⁴³ Norms around health behaviors, the level of influence social norms have on behavior, and the nature of patient-provider relationships differs across cultures. In cultures where healthcare providers have high status and authority, and where social norms are influential, the effect of normalization may be amplified; in cultures where either is not the case, we may see a smaller effect or no effect at all. As a result, we cannot be certain the size or direction of our effect in other populations will be consistent with our U.S.-based results. Future research that studies the influence of cultural differences in physician status and attention to social norms is needed.

Healthcare providers often encounter anxious patients; a desire to reassure these patients is natural. Informing patients when their experience is normal could empower patients to believe that if others have overcome the same issue, they can too. This is consistent with our healthcare provider surveys, where those who normalized symptoms strongly believed it would improve the patient's outlook on their condition. However, in the present work, we find that when healthcare providers normalize a patient's symptoms, the patient is likely to be less motivated to pursue treatment. This is because people infer that if their healthcare provider normalizes their situation, it means the provider is less supportive of treatment. As a result, a remark meant to reassure and promote self-efficacy, can backfire and unintentionally de-motivate action. To these patients, normal may not just mean prevalent, it means acceptable.

Methods

The present research complies with all relevant ethical regulations. Research protocols were approved by the University of California – San Diego Institutional Review Board. All participants provided informed consent prior to participating in the study. Participants received a nominal payment for their participation. All studies were pre-registered and we report all conditions, collected variables, and data exclusions. In all studies, participants were randomly assigned to a condition after submitting the online consent form. Experimental conditions were masked from participants; conditions were not masked from researchers during data analysis. Analyses were conducted in R (v4.4.1). We estimated the effect sizes of our results using the effectsize package in R, except for the pairwise contrasts in Experiments 5 and 6, where the eff_size function from the emmeans R package was used. Regression results for all studies are reported in Table S7-S10 in the supplemental materials.

Sample sizes were determined and pre-registered prior to data collection, and no additional data was collected after analysis began. Experiments were designed to have at least 80% power to detect a small-medium sized effect (Cohen's $d = 0.35$). For our two-cell experiments (Experiments 2, 4, Supplemental Experiment 3), this required using >130 participants per cell. For our two x two main effect experiment (Experiment 3), this required >130 participants per cell. For our three-cell experiment with pairwise contrasts (Experiment 5), this required >171 participants per cell. For our four-cell experiment, with pairwise contrasts of each treatment arm against the control, this required >171 participants per cell (Experiment 6). For our two by two experiments testing interactions, this required >256 participants per cell (Supplemental Experiments 4-6).

Experiment 1A

This experiment was pre-registered on May 22, 2025, and data was collected subsequently on May 22, 2025.

Participants

Two hundred participants ($M_{\text{age}} = 38.08$, $SD_{\text{age}} = 11.62$, 49.50% Female) completed this survey on CloudResearch Connect. Participants were paid US\$0.30 for their participation.

Materials

Participants were asked to read a scenario about a patient visiting a doctor with a set of non-specific symptoms.

Scenario: Imagine a patient visits their doctor and describes a set of symptoms they've recently been experiencing - including fatigue, weight gain, joint & muscle pain, and headaches. A doctor could respond to their concerns in a variety of ways.

Participants were then told they would see five possible responses the doctor could give to the patient and were asked to rate how closely each statement reflects each of the below response paradigms:

1. **Reassurance by normalizing:** Reassures the patient that what they are experiencing is normal.
2. **Acknowledging:** Validates the patient's concerns as real.
3. **Dismissing:** Downplays or minimizes the patient's symptoms or concerns.
4. **Providing information:** Provides factual or medical explanations about the symptoms or condition.
5. **Giving a directive:** Tells the patient what to do, without the patient's input.

Ten total statements were included in the experiment, with two intended to line up with each of the five response paradigms:

1. "What you're experiencing, while challenging, is actually very common — many people experience this." [Normalizing]
2. "I know this feels overwhelming, but I want to reassure you that these symptoms are

- normal and most people experience them at some point in their lives." [Normalizing]
3. "Thank you for sharing all of that — it's clear that this has been hard." [Acknowledging]
 4. "I can see that this has been really affecting you." [Acknowledging]
 5. "These things tend to sort themselves out, so I wouldn't overthink it." [Dismissing]
 6. "It's probably nothing to worry about." [Dismissing]
 7. "What you're experiencing may reflect temporary dysregulation across several physiological domains." [Information]
 8. "These symptoms are often the result of multisystem interactions—commonly involving the autonomic nervous system, metabolic function, or circadian regulation." [Information]
 9. "I'm going to prescribe something for you, and we'll check back in a month." [Directive]
 10. "You should start taking this medication daily — it's the standard approach for your symptoms." [Directive]

Design and Procedures

Participants were randomly assigned to see one of the two sample responses associated with each paradigm (for a total of five responses evaluated per participant); the order in which participants viewed the statements was randomized.

For each statement, participants evaluated how closely it reflected each response paradigm on a seven-point Likert scale, with 1 defined as "Not at all reflective" and 7 defined as "Extremely reflective."

After rating the five statements, participants were asked to evaluate how they believe a patient hearing the statement would influence whether the patient in the scenario decided to take daily medication to help them feel better or deal with the symptoms without medication.

Participants provided their response on a seven-point Likert scale, with 1 defined as "Deal with the symptoms" and 7 defined as "Take daily prescription medication."

After completing these questions, participants provided demographic information, including age and gender. Two hundred and eight participants started the survey; eight participants did not complete the survey. All participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 1B

This experiment was pre-registered on May 29, 2025, and data was collected between May 30, 2025 and May 31, 2025.

Participants

One hundred and ninety-seven participants ($M_{\text{age}} = 37.74$, $SD_{\text{age}} = 11.66$, 60.91% Female) completed this survey on CloudResearch Connect. The survey was restricted to individuals who were pre-screened by CloudResearch as stating they were healthcare providers – independent of our study. Prior to starting the survey, participants were again asked to confirm that they were a healthcare provider, through a Yes / No question, and then select their occupation from the choice of Medical Doctor, Nurse Practitioner, Registered Nurse, Physician Assistant or Other. Any participant who did not affirm that they were a healthcare provider was screened out of the survey, consistent with our pre-registration. The sample consisted of 68 RNs, 21 MDs/DOs, 14 NPs, 12 PAs, and 82 individuals who classified themselves as another type of healthcare provider (the most prevalent occupations among the Other category were pharmacists, mental health care providers, and physical therapists). Given our sample sizes by provider type, we are underpowered to test for heterogeneity in our results by provider type; however, raw results by provider type are included in the supplement. We did not collect data on years of experience. Participants were paid US\$0.65 for their participation.

Materials

After completing the screener, participants were presented with a vignette where a patient describes a firsthand account of their menopause symptoms and then gives an indication that they want to know whether hormone replacement therapy is a potential treatment option.

The vignette read “Imagine, as a healthcare professional, a patient comes in to see you and says the following:

“I’m 52, and honestly... I just don’t feel like myself anymore. For the last 8 months, I’ve been having these intense hot flashes — like five, six times a day. I’ll just be sitting there and suddenly I’m burning up, sweating, and it’s so uncomfortable I have to stop what I’m doing. I’m exhausted all the time — not just physically but mentally. I can’t focus at work, and little things are getting to me in ways they never used to. I feel irritable, out of control emotionally, and just... off. I knew menopause was coming, but I didn’t expect it to feel like this. I’m starting to think something may be wrong. Like... this level of exhaustion and fog... what if it’s early dementia? Or something with my thyroid? Or worse? Part of me wonders if this is just what happens when you get older. But another part of me thinks... it may not have to be so hard. I just want to know what my options are. A friend of mine started hormone replacement therapy a few months back and she says it’s changed her life.””

The vignette was designed to represent an ideal candidate for hormone replacement therapy (HRT). The patient was under 60, within 10 years of menopause, and was having symptoms severe enough to affect quality of life. Consensus among major clinical societies, including the North American Menopause Society, is that for these patients, HRT is the most effective treatment and has a favorable risk-benefit ratio.^{44,45} As a result, despite concerns stemming from a now-challenged 2002 Women’s Health Initiative report^{46,47} about HRT’s risks, recent surveys of US clinicians show the vast majority support the use of HRT for patients meeting these criteria.^{48,49}

Design and Procedures

After viewing the vignette, participants are asked to describe what their initial response to the patient’s concerns would be. They are presented with the ten statements that were pre-tested in Experiment 1A⁶ (listed in random order) and are asked to select which ones they believe

⁶ To better align with the menopause scenario in Experiment 1B, in the two normalizing statements, we replaced the word “people” with “women”. As a result, the normalizing statements read: “What you’re experiencing, while challenging, is actually very common - many [women] experience this.” and “I know this feels overwhelming, but I want to reassure you that these symptoms are normal and most [women] experience them at some point in their lives.”

would be helpful to include in their response to the patient. Participants also had the option to select “N/A – None of these statements.”

After composing their response, participants who selected a normalizing statement are presented with the following three questions for each normalizing statement selected: “How do you believe the statement would influence the patient’s outlook on their condition?”, “How do you believe the statement would influence the patient’s willingness to be open with you (as their healthcare provider)?” and “How do you believe the statement would influence the patient’s likelihood of pursuing Hormone Replacement Therapy (HRT)?” For each question, participants are given three options – a shift in a positive direction (improve outlook, increase willingness to be open, increase likelihood of pursuing HRT), a shift in a negative direction, or no real impact.

After completing these questions, participants provided demographic information, including age and gender. Two hundred and eighty-nine participants started the survey. Sixty-three participants were screened out because they did not affirm that they were a healthcare provider. Fourteen additional participants were screened out due to failing an attention check, which asked participants to select which medical condition the patient in the vignette thought was causing their symptoms (participants had to select “Menopause”). An additional fifteen participants did not complete the survey. All the remaining participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 1C

This experiment was pre-registered on February 19, 2026, and data was collected between February 23, 2026 and February 24, 2026.

Participants

Two hundred and ten participants ($M_{\text{age}} = 41.55$, $SD_{\text{age}} = 11.66$, $M_{\text{yearsofpractice}} = 11.31$, $SD_{\text{yearsofpractice}} = 9.51$, 34.76% Female) completed this survey through Sermo, a provider engagement platform. Sermo validates participants are physicians by collecting National Provider Identifier (NPI) numbers from members, medical credentials, and conducting identity validation. Our survey was targeted towards primary care physicians and obstetricians / gynecologists on Sermo's platform. Within our survey, we again asked participants to confirm they were a Medical Doctor, and to indicate their specialty and for how many years they had been practicing. Our sample consisted of 210 Medical Doctors (102 Internal Medicine; 82 Family Medicine / General Practice; 16 Obstetrics and Gynecology; 10 providers indicated other specialties). Participants were paid US\$18.00 for their participation.

Materials

After completing the initial questions about specialty and years of experience, participants were presented with a vignette where a patient describes a firsthand account of their menopause symptoms and then gives an indication that they want to know whether hormone replacement therapy is a potential treatment option. The vignette was the same one used in Experiment 1B.

Design and Procedures

After viewing the vignette, participants are asked to describe what their initial response to the patient's concerns would be. They are presented with the ten statements that were pre-tested in Experiment 1A-B⁷ (listed in random order) and are asked to select which ones they believe

⁷ To better align with the menopause scenario in Experiment 1B, in the two normalizing statements, we replaced the word "people" with "women". As a result, the normalizing statements read: "What you're experiencing, while challenging, is actually very common - many [women] experience this." and "I know this feels overwhelming, but I want to reassure you that these symptoms are normal and most [women] experience them at some point in their lives."

would be helpful to include in their response to the patient. Participants also had the option to select “N/A – None of these statements.”

After composing their response, participants who selected a normalizing statement are presented with the following four questions for each normalizing statement selected: “How do you believe the statement would influence the patient’s outlook on their condition?”, “How do you believe the statement would influence the patient’s willingness to be open with you (as their healthcare provider)?”, “How do you believe the statement would influence the patient’s likelihood of pursuing Hormone Replacement Therapy (HRT)?”, and an open ended question to “Please describe in your own words why you chose this statement (1-2 sentences).” For the non-open-ended questions, participants are given three options – a shift in a positive direction (improve outlook, increase willingness to be open, increase likelihood of pursuing HRT), a shift in a negative direction, or no real impact.

After completing these questions, participants provided demographic information, including age and gender. Two hundred and forty-nine participants started the survey. Ten participants were screened out because they did not affirm that they were a Medical Doctor (MD/DO). Ten additional participants were screened out due to failing an attention check, which asked participants to select which medical condition the patient in the vignette thought was causing their symptoms (participants had to select “Menopause”). An additional nineteen participants did not complete the survey. All the remaining participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 2

This experiment was pre-registered on July 7, 2025 and data was collected on July 9, 2025.

Participants

Four hundred participants ($M_{\text{age}} = 38.84$, $SD_{\text{age}} = 12.23$, 50% Female) completed this survey on CloudResearch Connect. Participants were paid US\$0.25 for their participation.

Materials, Design, and Procedure

Participants were presented with a scenario about a friend who was experiencing physical symptoms from Climacteric (i.e., menopause). Participants were assigned to one of two conditions which varied in whether the doctor in the scenario normalized the symptoms (using a pre-tested normalization statement from Experiment 1), leading to a two-cell between-subjects design. The scenario read (text added in the normalization condition is bracketed):

“Imagine your friend is experiencing physical symptoms from a temporary condition called Climacteric. Symptoms include extreme fatigue, significant weight gain, intense joint & muscle pain, and persistent headaches.

Your friend goes to the doctor. After hearing the symptoms, your friend's doctor tells them: "I know this feels overwhelming[, **but I want to reassure you that these symptoms are normal and most people experience them at some point in their lives**]. You could take daily prescription medication (with mild potential side effects) to make you feel better or you can deal with these [**normal**] symptoms.”

In both experimental conditions, the doctor offers the patient a choice between taking medication or dealing with the symptoms. While communicating that dealing with the symptoms is an option might independently lower participants' treatment inclination, any negative impact would apply equally to both experimental conditions, ensuring observed differences between the two conditions are driven by the normalization manipulation.

After viewing the vignette, participants are asked “If you were in your friend's position, how would you choose to handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)” Responses were on a seven-point Likert scale.

For exploratory purposes, after responding to the main dependent variable, participants were also asked about their beliefs about treatment norms, specifically “What percent of the population with Climacteric do you think takes medication to treat the symptoms?”. Participants were also asked “How severe are the symptoms your friend was experiencing?” on a seven-point Likert scale, where 1 = Not severe at all and 7 = Very severe.

After completing these questions, participants provided demographic information, including age and gender. Four hundred and seven participants started the survey on CloudResearch Connect. Seven participants were filtered out for failing an attention check which asked, “Please select the number three.” Participants had to select “3.” All remaining participants were included in the analysis and results, consistent with the pre-registration.

Experiment 3

This experiment was pre-registered on April 1, 2025 and data was collected subsequently on April 1, 2025.

Participants

Three hundred and ninety-five participants ($M_{\text{age}} = 45.41$, $SD_{\text{age}} = 16.22$, 49.37% Female) completed this experiment online on CloudResearch Connect. Participants were paid US\$0.25 for their participation.

Materials, Design, and Procedure

Participants were presented with two vignettes, in random order, about a patient suffering from medical symptoms who goes to their doctor and is presented with options for how to manage the symptoms. The first vignette was about a patient with dental pain; the second vignette was about a patient suffering from migraine symptoms. In this study, we also manipulate whether the doctor uses a normalizing statement in their response to the patient’s symptoms.

745 This results in a 2 (symptoms normalized: yes vs. no) x 2 (symptoms: dental pain vs. migraine)
746 mixed design.

747 The Dental Scenario read (text added in the normalization condition is bracketed):

748 “Alex has been experiencing jaw pain, swollen gums, and severe tooth sensitivity. Alex
749 goes to the dentist. After hearing the symptoms, the dentist tells Alex about their options:
750 “[These symptoms are normal and most people experience them at some point in their
751 lives.] You could take daily prescription medication to make you feel better or you can deal with
752 these [normal] symptoms.””

753

754 The Migraine Scenario read (text added in the normalization condition is bracketed):

755 “Avery is experiencing throbbing headaches, blurred vision, and high sensitivity to light
756 and sound. Avery goes to the doctor. After hearing the symptoms, the doctor tells Avery about
757 their options: “[These symptoms are normal and most people experience them at some point
758 in their lives.] You could take daily prescription medication to make you feel better or you can
759 deal with these [normal] symptoms.””

760

761 Each participant saw both symptom scenarios; one of the two symptom scenarios

762 included normalization and one did not. After viewing each vignette, participants were asked “If
763 you were in [the patient’s] position, how would you choose to handle the symptoms?” For the
764 dental pain scenario, responses were given on a seven-point Likert scale, where 1 = deal with the
765 symptoms and 7 = take daily prescription medication. For the migraine scenario, responses were
766 given on a ten-point slider scale, with the same descriptions of the end points.

767 After giving their response to the main dependent variable, participants were asked to

768 provide their impressions of the doctor by rating their agreement with the following four

769 statements: “I have a positive impression of the [doctor/dentist]”, “The [doctor/dentist] took the

770 concerns seriously”, “The [doctor/dentist] offered sufficient reassurance”, “If I were

771 [Avery/Alex], I would be likely to go back to this [doctor/dentist].” All responses were given on

772 a seven-point Likert scale, with 1 = strongly disagree and 7 = strongly agree.

For exploratory purposes, we also measured participants' general beliefs about physical discomfort after they viewed both scenarios. They indicated their level of agreement with the following statements: "Many people go through life with some amount of physical discomfort," "Not all physical discomfort needs to be treated," "As you get older, living with some amount of physical discomfort becomes part of life." Responses were given on a seven-point Likert scale, with 1 = strongly disagree and 7 = strongly agree. None of these measures influenced the regression results reported in the main text; results with these controls are included in the supplement (Tables S7-S8).

After completing these questions, participants provided demographic information, including age and gender. Four hundred and sixty-two participants started the survey on CloudResearch Connect. Fifty-five participants were filtered out for failing an attention check which asked after the migraine scenario, "In the scenario you just read, what was causing Avery's symptoms." Participants had to respond "Migraines." An additional twelve participants did not complete the survey. All remaining participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 4

This experiment was pre-registered on June 4, 2025 and data was collected subsequently on June 4, 2025.

Participants

Four hundred and three participants ($M_{\text{age}} = 38.97$, $SD_{\text{age}} = 12.71$, 49.38% Female) completed this experiment online on CloudResearch Connect. Participants were paid US\$0.25 for their participation.

Materials, Design, and Procedures

Participants read the same dental pain scenario from Experiment 3. We manipulated between subjects whether the dentist in the scenario normalized the patient's symptoms by stating, "These symptoms are normal and most people experience them at some point in their lives," prior to presenting treatment options. This resulted in a two-cell experimental design. We use the same dependent variable from Experiment 3, which asks the participant how they would choose to handle the symptoms on a seven-point Likert scale.

After responding to the question, participants are asked about their inferences about the dentist's beliefs. First, they are asked about how the dentist believes the patient in the scenario should handle the symptoms, "Based on the scenario you just read, how do you think the doctor believes Alex should handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)?" Then, they are asked about how severe the dentist believes the symptoms are "Based on the scenario you just read, how severe do you think the doctor believes Alex's symptoms are (on a scale of 1 = extremely severe to 7 = not at all severe)?" Both are on seven-point Likert scales; responses to the severity question were reverse coded prior to analysis, as a result, higher numbers indicated higher severity in the analysis. Cronbach's alpha for the two measures, injunctive norms and severity, was 0.52, indicating low internal consistency and supporting their treatment as distinct constructs.

After completing these questions, participants provided demographic information, including age and gender. Four hundred and twenty-two participants started the survey. Sixteen participants were filtered out for failing an attention check which asked after the scenario, "In the scenario you just read, what type of symptoms did Alex have?" Participants had to respond, "Dental pain." An additional three participants did not complete the survey. All remaining

participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 5

This experiment was pre-registered on July 10, 2025 and data was collected subsequently between July 10, 2025 and July 11, 2025.

Participants

Twelve hundred and five participants ($M_{\text{age}} = 38.85$, $SD_{\text{age}} = 13.14$, 49.63% Female) completed this experiment online on CloudResearch Connect. Participants were paid US\$0.38 for their participation.

Materials, Design and Procedure

Participants were assigned to one of three conditions in a between subjects design: physician normalization vs. prevalence information vs. control. All participants first saw a background information page.

Participants in the physician normalization and control conditions read the following background information:

Background Information: Dental pain is pain in or around the teeth and jaws, typically caused by inflammation.

Participants in the prevalence information condition read background information that additionally highlighted the prevalence of dental pain (text added for the prevalence information condition is bracketed):

Background Information: Dental pain is pain in or around the teeth and jaws, typically caused by inflammation. **[It is a prevalent issue across the country, with reports suggesting ~70% of adults will experience some form of dental pain at some point in their lives.]**

Participants were then presented with the same dental pain scenario from Experiments 3 and 4. Participants in the control and prevalence information conditions read:

“Alex has been experiencing significant jaw pain, swollen gums, and severe tooth sensitivity. Alex goes to the dentist. After hearing the symptoms, the dentist tells Alex about their options: “You could take daily prescription medication to make you feel better or you can deal with these symptoms.””

Participants in the normalization condition read (text added for the normalization condition is bracketed):

“Alex has been experiencing significant jaw pain, swollen gums, and severe tooth sensitivity. Alex goes to the dentist. After hearing the symptoms, the dentist tells Alex about their options: “[**These symptoms are normal and most people experience them at some point in their lives.**] You could take daily prescription medication to make you feel better or you can deal with these [**normal**] symptoms.””

We use the same dependent variable from Experiment 3, which asks the participant how they would choose to handle the symptoms on a seven-point Likert scale. After responding to the main dependent variable, participants are asked about the prevalence of dental pain through the question, “How prevalent do you believe dental pain is in the general population?” This is reported on a seven-point Likert scale, with 1 = Not prevalent at all and 7 = Extremely prevalent.

Then, participants are asked about their beliefs about injunctive and descriptive treatment norms. To capture injunctive norms, participants are asked about how they think the doctor believes the patient should handle the symptoms, through the question “Based on the scenario you just read, how do you think the doctor believes Alex should handle the symptoms (on a scale of 1 = deal with the symptoms to 10 = take daily prescription medication)?” To capture descriptive norms, participants are asked “What percent of the population with dental pain like Alex’s do you think takes medication to treat the symptoms?” Responses are given on a 0-100% slider scale.

For exploratory purposes, participants completed the 13-item Attention to Social Comparison Information (ATSCI) scale, which measures an individual's sensitivity to norms and social cues.⁵⁰ The scale asks people to report to what extent statements such as "At parties I usually try to behave in a manner that makes me fit in." are true for them on a scale of 0 = always false to 5 = always true. Responses are averaged to create a composite ATSCI score.

After completing these questions, participants provided demographic information, including age and gender. Twelve hundred and sixty-five participants started the survey. Thirty-eight participants were filtered out for failing an attention check which asked after the scenario, "In the scenario you just read, what type of symptoms did Alex have?" Participants had to respond, "Dental pain." An additional twenty-two participants did not complete the survey. All remaining participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Experiment 6

This experiment was pre-registered on January 22, 2026 and data was collected subsequently between January 22, 2026 and January 24, 2026.

Participants

Twelve hundred and twelve participants ($M_{\text{age}} = 42.25$, $SD_{\text{age}} = 13.72$, 49.5% Female) completed this experiment online on CloudResearch Connect. Participants were paid US\$0.25 for their participation.

890 *Materials*

891 Participants were assigned to one of four conditions in a between subjects design: control,
892 normalization, normalization + cognitive reassurance framing, or normalization + pro-treatment
893 cue.

894 Participants in the control condition read:

895 “Avery is experiencing throbbing headaches, blurred vision, and high sensitivity to light
896 and sound. Avery goes to the doctor. After hearing the symptoms, the doctor tells Avery about
897 their options: "I know this feels overwhelming. You could take daily prescription medication to
898 make you feel better or you can deal with these symptoms."”

899
900 Participants in the normalization condition read (text added to the control condition is
901 bracketed):

902 “Avery is experiencing throbbing headaches, blurred vision, and high sensitivity to light
903 and sound. Avery goes to the doctor. After hearing the symptoms, the doctor tells Avery about
904 their options: "I know this feels overwhelming[, **but I want to reassure you that these**
905 **symptoms are normal and most people experience them at some point in their lives**]. You
906 could take daily prescription medication to make you feel better or you can deal with these
907 **[normal]** symptoms.””

908
909 Participants in the normalization + cognitive reassurance condition read (text added to the
910 normalization condition is bracketed):

911 “Avery is experiencing throbbing headaches, blurred vision, and high sensitivity to light
912 and sound. Avery goes to the doctor. After hearing the symptoms, the doctor tells Avery about
913 their options: "I know this feels overwhelming, but I want to reassure you that these symptoms
914 are normal and most people experience them at some point in their lives **[due to inflammation**
915 **in the brain's nerves and blood vessels. As a result, we have extensive clinical knowledge**
916 **about how to successfully treat the symptoms.]** You could take daily prescription medication
917 to make you feel better or you can deal with these normal symptoms.””

918
919 Participants in the normalization + pro-treatment cue condition read (text added to the
920 normalization condition is bracketed):

921 “Avery is experiencing throbbing headaches, blurred vision, and high sensitivity to light
922 and sound. Avery goes to the doctor. After hearing the symptoms, the doctor tells Avery about

their options: “I know this feels overwhelming, but I want to reassure you that these symptoms are normal and most people experience them at some point in their lives. You could take daily prescription medication[, **which I fully support as it will help**] to make you feel better, or you can deal with these normal symptoms.””

Design and Procedures

After viewing the vignette, participants are asked about how they would choose to handle the symptoms if they were in the same position as the person in the vignette, elicited through the question, “If you were in Avery's position, how would you choose to handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)?” Then, to capture injunctive norm inferences, participants are asked about how they think the doctor believes the patient should handle the symptoms, through the question “Based on the scenario you just read, how do you think the doctor believes Avery should handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)?”

After completing these questions, participants provided demographic information, including age and gender. Twelve hundred and sixty-nine participants started the survey. Fifty participants were filtered out for failing an attention check which asked after the scenario, “In the scenario you just read, what type of symptoms did Avery have?” Participants had to respond, “Headache/Migraine.” An additional seven participants did not complete the survey. All remaining participants who completed the survey were included in the analysis and results, consistent with the pre-registration.

Data availability

The anonymized data for this research is available on Research Box at https://researchbox.org/4452&PEER_REVIEW_passcode=CGYBRX.

Code availability

The code to reproduce the presented results and figures is available on Research Box at https://researchbox.org/4452&PEER_REVIEW_passcode=CGYBRX.

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Author Contributions Statement

S.L., B.C., and O.A. conceived of the research. S.L. and B.C. designed and conducted the online experiments, with supervision from O.A. S.L. analyzed the experiments and created the visualizations. S.L., B.C., and O.A. drafted and revised the manuscript.

Competing Interests Statement

The authors declare no competing interests.

Figure Legends/Captions

Fig. 1: Effect of symptom normalization on reported treatment inclination in Experiment 2

Violin plots depict the distribution of stated treatment inclination by condition (Control vs. Symptoms Normalized) in Experiment 2 (N = 400). In the Symptoms Normalized condition, the doctor normalizes the patient's symptoms; in the Control condition, the doctor does not normalize the patient's symptoms. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

Fig. 2: Effect of symptom normalization on reported treatment inclination in Experiment 3

Violin plots depict the distribution of stated treatment inclination by condition (Control vs. Symptoms Normalized) and by Scenario (Dental pain vs. Migraine) in Experiment 3 (N = 395). In the Symptoms Normalized condition, the healthcare provider normalizes the patient's symptoms; in the Control condition, the provider does not normalize the patient's symptoms. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

Fig. 3: Effect of symptom normalization on healthcare provider perceptions in Experiment 3

Violin plots depict the distribution of participants' agreement with positive statements about the healthcare providers in Experiment 3 by condition (Control vs. Symptoms Normalized) and by Scenario (Dental pain vs. Migraine) (N= 395). In the Symptoms Normalized condition, the healthcare provider normalizes the patient's symptoms; in the Control condition, the provider does not normalize the patient's symptoms. Participants each viewed two vignettes (Dental pain, Migraine) in randomized order. Due to carryover effects between the two vignettes, only data from the

first vignette each participant viewed is included. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

Fig. 4: Mediation model testing injunctive norms and perceived severity as parallel mediators for the effect of normalization on treatment inclination in Experiment 4

The diagram shows the mediation model testing inferences about the physician's support for treatment and the physician's assessment of the symptoms' severity as parallel mediators of the effect of normalization on treatment inclination based on data from Experiment 4 ($N = 403$). Participants were assigned to one of two conditions (Control vs. Symptoms Normalized) and reported their treatment inclination "If you were in Alex's position, how would you choose to handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)?" They then reported their beliefs about injunctive treatment norms "Based on the scenario you just read, how do you think the doctor believes Alex should handle the symptoms (on a scale of 1 = deal with the symptoms to 7 = take daily prescription medication)?" and symptom severity "Based on the scenario you just read, how severe do you think the doctor believes Alex's symptoms are (on a scale of 1 = extremely severe to 7 = not at all severe)?" The mediation model (Hayes PROCESS Model 4) showed normalization had a significant negative effect on perceptions of the physician's support for treatment and symptom severity, but only the physician's perceived treatment support predicted participants' treatment inclination.

Fig. 5: Differential effect of symptom normalization and prevalence communication on treatment inclination and perceptions of treatment norms in Experiment 5

Violin plots depict the distribution of participant responses to the dental pain scenario in Experiment 5 ($N = 1205$). Participants were assigned to one of three conditions (Control vs. Prevalence Information vs. Symptoms Normalized). In the Prevalence Information condition, participants were informed that dental pain was highly prevalent. In the Symptoms Normalized condition, the dentist normalized the patient's symptoms. The Control condition included neither prevalence information nor normalization. Participants reported their own treatment inclination (1 = "Deal with the symptoms" - 7 = "Take daily prescription medication"), beliefs about the percent of the population with similar symptoms who takes medication, and their perceptions of the doctor's treatment inclination (1 = "Deal with the symptoms" - 10 = "Take daily prescription medication"). Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

Fig. 6: Effect of combining normalization with cognitive reassurance or pro-treatment cues on treatment inclination and perceived injunctive treatment norms in Experiment 6

Violin plots depict the distribution of participant responses to the migraine scenario in Experiment 6 by condition (Control - No Normalization vs. Symptoms Normalized vs. Symptoms Normalized + Cognitive Reassurance vs. Symptoms Normalized + Pro-Treatment Cue) ($N = 1212$). The latter two intervention conditions aimed to attenuate the effects of normalization by communicating that the doctor does not intend to signal that they are unsupportive of treatment. Participants reported their own treatment inclination and perceptions of the doctor's treatment inclination. Means and error bars by condition are indicated in black. The error bars are ± 1 Standard Error.

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