"Good people don't need medication": How moral character beliefs affect medical decision making[☆]

Sydney E. Scott [a,*], Justin F. Landy [b]

[a] *Marketing Area, Washington University in St. Louis, 1 Brookings Drive, St. Louis, MO 63130, USA*
[b] *Department of Psychology and Neuroscience, Nova Southeastern University, 3301 College Avenue, Ft. Lauderdale, FL 33314, USA*

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ABSTRACT

We propose that moral character beliefs influence medical treatment choices. In comparison to behavioral treatments, medication is believed to be an "easy way out," showing a lack of willpower and, therefore, a lack of moral character. These beliefs lower the appeal of medication treatments relative to behavioral treatments. Reducing the impact of moral beliefs moderates this effect. Specifically, the preference for behavior over medication attenuates when treatment choice is framed as "just a preference" and therefore irrelevant to moral character inferences. Finally, we find that when medication is the more effective option, it is no longer viewed as showing worse moral character. This is because two competing indirect effects occur: Medication is still viewed as showing worse willpower than (ineffective) behavior which shows worse moral character, but it is also viewed as creating better outcomes which shows better moral character. Our findings highlight the importance of moral identity in health decision-making.

1. Introduction

Heart disease is the leading cause of death worldwide (World Health Organization, 2021). Fortunately, there are several medications to prevent cardiac issues, including statins (cholesterol-lowering medications) and aspirin. However, people do not always avail themselves of these treatments. Only about half of adults who could benefit from cholesterol-lowering medications are taking them (Centers for Disease Control and Prevention, 2021), and uptake of statins is suboptimal in high-risk groups (Salami et al., 2017). Similarly, over 30% of people say they would decline preventative medication if they were at increased risk of cardiovascular disease (Harmsen et al., 2012). This reluctance seems to be specific to medication. For example, one study found that, for preventing heart attacks, "dislike of drug taking was common, and many people preferred lifestyle change to [a drug treatment][1]" (Lewis et al., 2003), even though behavioral changes, such as dietary changes and exercise regimens, require more effort.

Even beyond heart disease, people seem to generally dislike medications more than other treatments. For example, researchers who study adherence to medication regimens often find that people are reluctant to take medications (Pound et al., 2005; Vermeire et al., 2001). This reluctance occurs across many contexts, including patients' statements about medicines in general (Britten, 1994) and for particular medicines (such as antihypertensive medication and asthma medication; Adams et al., 1997; Benson & Britten, 2002). While this body of research is informative, it leaves open a number of questions about how people decide which type of treatment to use. When and why do people have different preferences for different types of treatments (medications vs behaviors)? Are preferences driven solely by risk–benefit assessments, or are other psychological factors at work? Do people sometimes even prefer not to take medications that are highly effective, safe, and low-cost, with few or no side effects?

We posit that, beyond cost-benefit analyses, concerns about behaving consistently with one's moral identity affect preferences for medical treatments. Medications, compared to behavioral treatments, may be seen as reflecting a lack of willpower or as an "easy way out," because they generally require less effort. If people value willpower as part of their moral identity, they will desire to behave in ways that are

  [1] The verbatim original quotation is "an imperfect treatment", which refers in this study to any drug treatment that does not prevent all heart attacks (i.e., any drug treatment that is less than 100% efficacious). Given that, by this standard, all heart disease medications are imperfect, we say "drug treatment" for clarity.

reflective of willpower. Specifically, we predict that using medication, relative to behavior, is viewed as showing worse willpower, and therefore worse moral character, and therefore (all else equal) is less preferred, even when the medication is affordable, safe, and effective. In seven studies, including one field study, we examine why, when, and how moral identity concerns influence medical decisions about treatments.

2. Conceptual development

2.1. Treatment choice in medical decision-making

A great deal of research has been devoted to understanding how people make decisions about medical treatments. Much of this research has examined how risk–benefit analyses affect health behaviors. These studies have identified a number of beliefs that play important roles in decisions to take a treatment, such as beliefs about benefits, side effects, and dependence (Horne & Weinman, 1999; Janz & Becker, 1984).

Some prior work has looked beyond risk–benefit considerations into other determinants of medical decisions. Health is an important component of many people's identities, and identity concerns can factor into a number of health-relevant decisions. Identity can be related to whether people engage in behaviors that are harmful for their health. For example, among adolescents, there is an association between smoker identity and smoking escalation (Hertel & Mermelstein, 2012). That is, adolescents' smoking is more likely to escalate if they think of smoking as part of who they are.

Identity can also be related to whether people engage in behaviors that are helpful for their health. Qualitative research has posited that there is a relationship between acceptance of a diagnosis and willingness to treat it (Pound et al., 2005; Dowell & Hudson, 1997; Adams et al., 1997). For example, people who accept their asthma diagnosis are more likely to use a treatment regimen of prophylactic drugs, and people who have identity concerns about being asthmatic are less likely to use prophylactic drugs (Adams et al., 1997). Other identity concerns can occur when people are deciding whether to adhere to their medication regimens. Some people worry that they are "not themselves" when they are on medication and/or worry about stigma (Scherman & Löwhagen, 2004).

This prior work suggests that studying identity concerns could be a promising route for understanding medical decision-making, and the present research builds on it in several ways. In the context of treatment decisions, many prior studies focus on how acceptance of an ailment relates to willingness to treat it *at all*. We are the first, to our knowledge, to focus on understanding the relationship between the *type* of treatment chosen (medication vs behavior) and identity concerns. Second, we look at self-image concerns about moral character, specifically, which has not been examined in previous research on medical decision-making, as far as we are aware.

2.2. Self-image, identity, and moral character

Identity and self-image are a fundamental aspect of psychology and decision-making. Individuals strive to maintain a positive self-image and identity. Simply put, people care about "who they are."

Multiple streams of research suggest that moral character is a valued and important component of identity. Moral character is "an individual's disposition to think, feel, and behave in an ethical versus unethical manner, or [a] subset of individual differences relevant to morality" (Cohen & Morse, 2014). When asked directly, people say that moral character is an important part of who they are. For example, when people are asked how "central" different kinds of positive traits are to a person's identity, they indicate that moral traits are more central than other kinds of traits (Goodwin et al., 2014, Study 2). Moreover, when a person's moral character changes, people perceive changes in that person's identity as well. Specifically, change in a person's morality is an excellent predictor of overall perceived change in a person's identity, both in hypothetical scenarios (Strohminger & Nichols, 2014) and in cases where cognitive changes have actually occurred due to neurodegenerative disease (Strohminger & Nichols, 2015).

Perhaps in part because moral character is such an important part of identity, people strive to behave in a way consistent with their moral self-image, even when it is costly to do so (Aquino & Reed, 2002; Bénabou & Tirole, 2011; Dana et al., 2007; Gneezy et al., 2012; Mazar et al., 2008). For example, in economic games such as the dictator game, people regularly reduce their own payoffs to give to others. In the dictator game, the participant must choose to allocate a sum of money (e.g., $10) between themselves and another player. Though it would be easy to keep all of the money, many people give some amount of money to the other player because they do not want to feel selfish. Giving away some of the money is worth it to maintain a self-image as "fair", "kind", and/or "generous" (Dana et al., 2007). Similarly, when given the opportunity to cheat, people will only cheat a little bit, sacrificing easily obtained money in order to maintain their self-image as a (generally) "honest" person (Mazar et al. 2008). These phenomena are not limited to lab settings. In the field, people are sometimes less likely to buy something under "pay-what-you-want" pricing than fixed, low prices (Gneezy et al., 2012). People could pay $0 under "pay-what-you-want" pricing, but they are uncomfortable paying low amounts because it would compromise their self-image as "generous" or "fair." In each of these examples from prior literature, people undertake meaningful costs and leave money on the table in order to maintain a view of themselves as morally upstanding. Clearly, people highly value the moral aspects of their identity.

2.3. The role of willpower

What attributes are seen as constituting a positive moral self-image—or, to put it more simply, good moral character? Considerable research has been devoted to answering this question, and the general consensus is that trustworthiness is especially central to moral character (see, e.g., Abele & Brack, 2013; Cottrell et al., 2007; Lapsley & Lasky, 2001), with compassion also being nearly as important (Walker & Hennig, 2004; Walker & Pitts, 1998; see Landy & Uhlmann, 2018 for a review).

However, there is more to moral identity than just these "core" attributes. Recent research has particularly highlighted the relevance of a cluster of traits that we will collectively refer to as "willpower." Researchers who study individual differences in moral character have hypothesized that one element of good moral character is "self-regulation", such as the ability to exert self-control (Cohen & Morse, 2014). Lay people also seem to view willpower as part of moral character. People tend to infer willpower from moral character and vice versa. For instance, when people are asked to imagine a moral person, characteristics like "strong-willed" and "self-disciplined" are ascribed to such a person (Walker & Hennig, 2004; Walker & Pitts, 1998). Additionally, a person who demonstrates willpower by resisting imprudent temptations (e.g., gluttony) is judged to have good moral character (Berman & Small, 2018), as are people who are merely described as "hardworking" (Amos et al., 2019) or who demonstrate effort, even effort that is not productive (Celniker et al., in press). Moreover, a person who is described as "dedicated" is seen as more moral than a person who is not described in this way, as long as the cause to which they are dedicated is itself moral (Piazza et al., 2014). Finally, and most directly, people say that "self-control and self-restraint" is highly relevant to moral character (Mooijman et al., 2018). Therefore, there is good reason to think that willpower

is an important component of lay moral identity.[2]

In medical decision-making, we expect that the willpower component of moral identity is especially relevant. Choosing between a medication and a behavioral treatment is likely not all that relevant to one's self-image as honest or compassionate. This choice, though, may very well be relevant to one's self-image as a person with willpower. Medications might be thought of as generally "easier" than behavioral treatments, in that they often require less effort on the part of the patient. If medications are seen as taking the "easy way out", then taking medication would be inconsistent with a self-image as a moral person who possesses willpower. Opting for "harder" behavioral treatments would be more consistent with this self-image, because using behavioral treatments shows willpower (at least in many circumstances).

Support for this idea comes from an initial pilot study that we conducted with health practitioners ($N = 114$, recruited via CloudResearch using "nurse" and "physician" occupation filters, see Supplemental Material for more information). Practitioners were asked how frequently they had seen patients consider the implications of treatments for their moral self-image ("never", "once", "a few times" or "many times"). The majority indicated they had seen this (i.e., they either indicated "once", "a few times", or "many times"; for full results, see Supplemental Material). Specifically, 89% reported that they had observed "a patient worried about what taking a certain treatment (e.g., a medication or therapy) would say about who they are." Similarly, 71% reported that they had seen "a patient worried about whether taking medication would be taking a shortcut or the 'easy way out'", and 62% reported that they had seen "a patient worried about whether taking medication means they are not as good a person as someone who can treat it without medication." Additionally, 56% of the sample said that these sorts of considerations "definitely" or "probably" lead to worse decisions, 21% said they do not affect decision quality, and 23% said they probably or definitely lead to better decisions. Thus, health practitioners report that patients express concerns about what medication says about who they are, and that these concerns lead to sub-optimal decisions, in the context of real medical decisions. In the following studies, we investigate when and why moral identity concerns impact treatment preferences.

2.4. Our predictions

Based on the above literature, we developed a conceptual model of how moral character concerns affect preferences for medical treatments and some situational and individual difference moderators, which is presented in Fig. 1. From this model, we formalize a series of novel predictions. First, we expect that behavior is viewed as more effortful than medication, and so choosing behavior rather than medication bolsters one's self-image as a person of strong willpower. Furthermore, we expect that people overgeneralize this belief even when it is not accurate (e.g., when the same treatment is framed as a medication or a behavior). Second, because willpower is a component of moral character, we expect that bolstering one's self-image of willpower also bolsters one's moral self-image. Third, these identity forces should increase the appeal of behavior over medication (all else held constant). Thus, putting these three pieces together, when all else is held constant, people should prefer a behavioral treatment to a medication. Formally:

H_1: A behavioral treatment is preferred to a medication treatment,

when objective attributes of the treatment (e.g., risks and benefits) are held constant.

Moreover, people should prefer a behavioral treatment to a medication (all else held constant) *because* of the concerns about what each type of treatment says about who you are. In Fig. 1, this psychological process is reflected in the multi-step serial link between "behavioral treatment vs medication treatment" and "increased preference for behavioral treatment". We formalize these hypotheses below.

H_{2A}: Using a behavioral treatment (vs using a medication) is believed to show good willpower.

H_{2B}: The more a treatment is viewed as showing good willpower, the more people believe it shows good moral character.

H_{2C}: The more a treatment is viewed as showing good moral character, the more preferred it is, all else being equal.

This model and this investigation thus focus on treatment *type*. We are not suggesting that medication will be disliked relative to *no treatment*, or even that it will be viewed as showing worse moral character than no treatment. The comparison between taking medication and not taking any treatment confounds 1) the decision to treat an ailment *at all* with 2) the type of treatment (our variable of interest). In fact, the decision to treat an ailment at all should show good moral character for a number of reasons: treating something requires putting more effort into one's health than not treating it (thereby showing willpower) and treating something creates morally better outcomes than not treating something, because it reduces harm. Similarly, our framework does not imply behavior is *always* preferred to medication, or even that it is always viewed as showing superior moral character. Rather, it implies that behavior is viewed as showing superior moral character and preferred holding all else (e.g., efficacy, safety) constant, but not necessarily when objective attributes like safety or efficacy differ between the treatments. We return to these types of boundary conditions in Hypothesis 6.

Our model predicts a number of boundary conditions. First, our model posits that moral identity concerns reduce the appeal of medication relative to behavior. A corollary is that if people view treatment choice as irrelevant to moral self-image, then the preference for medication relative to behavior will increase. In other words, if the connection between treatment type and self-image is weakened or eliminated (depicted in the conceptual model in Fig. 1 via the first italicized moderator), then so too should the downstream preference changes be weakened or eliminated. We test the consequences of framing treatment choice either as relevant to moral self-image (e.g., "about who you are") or as irrelevant to moral self-image (e.g., "just a preference" or "just a matter of taste") in a series of studies. Formally, we hypothesized:

H_3: The effect of treatment type (behavior vs medication) on preferences attenuates when treatment choice is framed as irrelevant to moral self-image (e.g., as just a preference).

This first moderator tests what happens when the connection between treatment choice and moral self-image is broken. Our next moderator digs more deeply into the nature of the moral self-image concerns. We hypothesize that willpower is the facet of moral character which drives moral character judgments, in this case. We predict that people infer that using a behavioral treatment (vs medication) shows better willpower, which in turn shows better moral character. Yet, as noted above, willpower is a more ancillary facet of lay views of moral character, and people may vary in how much they believe that willpower is a part of moral character. For people who do not believe that showing willpower shows moral character (or, more broadly, do not believe that willpower is a facet of moral character), the effects should be attenuated (the second italicized moderator in Fig. 1). Thus, our framework suggests that the relationship between treatment type and character will be moderated by whether people believe willpower is a facet of character. Formally:

H_4: The effect of treatment type (behavior vs medication) on moral character beliefs is larger for individuals who believe more strongly that willpower is a facet of moral character.

Our third moderator affects the relationship between moral self-

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[2] The research reviewed in this section is primarily focused on lay conceptions of what constitutes good moral character in *others,* rather than what is valued as part of one's *own* moral identity. However, we do not see any reason why these two things would differ greatly from one another. What is moral for another person is probably moral for oneself, at least in broad strokes. We also acknowledge that the various moral traits that have been studied in this literature (e.g., self-disciplined, self-controlled, self-restrained, hard-working, dedicated) are not *entirely* synonymous with "willpower", but they do strike us as conceptually quite similar.
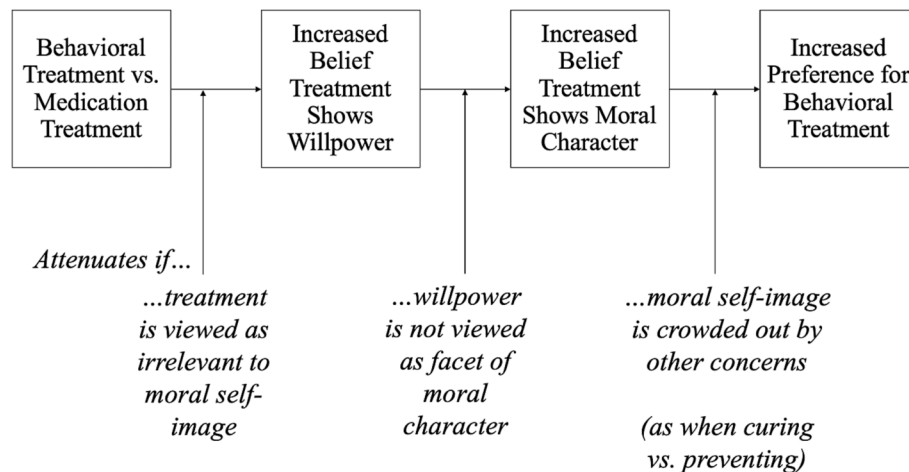
Fig. 1. Conceptual diagram. *Note.* The conceptual model for how moral character concerns affect preferences for different treatments, holding objective attributes of the treatment (e.g., risks and benefits) constant.

image and preference. Prior research has posited that people are more likely to behave immorally in order to satisfy or alleviate a visceral need (e.g., to get water for thirst; to get sleep when sleep-deprived; Ariely & Loewenstein, 2006; Williams et al., 2016). In other words, people are more willing to behave immorally when there is a physical problem with one's body that needs to be fixed. This is because people focus on satisfying the (physical) need, and thus other concerns (like moral values) are crowded out and loom less large. When combined with our conceptual model above, this research generates some intriguing predictions about preventative medicines vs curative medicines. In contrast to preventative medicines, curative medicines typically address cases where a current bodily symptom must be fixed. This prior work suggests that moral concerns will loom larger for preventative medicines (when people are generally healthy) than for curative medicines (when there is a problem that needs to be fixed). This is not to say that moral concerns will necessarily be crowded out *entirely* – we do not think that they will. Indeed, we predict (and show) that the above hypotheses are supported in the context of curing ailments. The point here is rather that moral concerns will be *less* important in curing versus preventing (see the third italicized moderator in Fig. 1). Said differently, the impact of moral concerns on preferences should be especially strong for preventatives. This should lead people to prefer behavior over medication more for preventatives than for curatives, because, according to our conceptual model, treatment choice affects self-image related to willpower and character, but the impact of character on preference is attenuated when other concerns loom large. Formally:

H_5: The effect of treatment type (behavior vs medication) on preferences attenuates when the treatments are curatives (vs preventatives).

In most of our studies, we hold the outcomes of a treatment constant, either by framing the exact same treatment in different ways or specifying that the treatments have the same costs and benefits. Doing so allows for a clean test of the effects of moral identity concerns on preferences, irrespective of costs of benefits. However, our model does not imply that behavior is always thought to show better moral character. Importantly, morality is about being a good person, but willpower is not the only component of that, as discussed above. A morally good person also creates morally good outcomes. We call this the consequentialist consideration. Consequentialism, as a moral philosophy, evaluates rightness or wrongness solely based on the consequences (Sinnott-Armstrong, 2021). (A common form of consequentialism is utilitarianism, which evaluates rightness or wrongness solely based on whether welfare is maximized among all morally relevant individuals; Bentham, 1789/1970; Mill, 1861/1998; Smart & Williams, 1973). In other words, in general, it is morally good to bring about good consequences (such as good health and minimal harm). This implies that costs and benefits will

also be relevant to moral judgments. Specifically, the expected outcomes of a treatment can also impact people's moral judgments and, therefore, impact their preferences.

If a medication is safe and *more* effective than the behavioral treatment, then it is the option that creates better outcomes, which is morally better from a consequentialist standpoint. It minimizes both self-harm (which is viewed as at least somewhat morally wrong, see Chakroff et al., 2013; Kollareth & Russell, 2018) and the harm one might inflict on others by not recovering from an ailment. Therefore, if the medication is the most effective option, it might not be viewed as reflecting worse moral character. This is because there are two (conflicting) inferences affecting moral character. Using more effective medication (vs less effective behavior) shows worse willpower, which worsens moral self-image. In other words, the effects hypothesized in H_{2A}-H_{2B} should replicate. However, another competing effect emerges: using more effective medication (vs less effective behavior) creates better outcomes, which, from to a consequentialist viewpoint, ought to improve moral self-image. Note that this competing effect through outcomes is a *distinct* psychological process from those presented in our conceptual model (Fig. 1). Differential efficacy between medication and behavior is hypothesized to suppress the effect of treatment type on character via willpower (via a different pathway). Said differently, when medication is more effective than behavior, we anticipate something akin to what Zhao et al. (2010) call "competitive mediation"—treatment type affects moral character through two indirect paths of opposite signs (one through willpower and the other through outcomes). Formally:

H_{6A}: The effect of treatment type (medication vs behavior) on moral character beliefs attenuates or reverses when the medication is more effective than the behavior (vs when they are equally effective).

H_{6B}: The impact of more effective medication vs less effective behavior on moral character beliefs is mediated by two competing paths: medication is viewed as showing worse willpower, but also producing better outcomes.

3. Overview of the present research

In the present paper, we examine people's moral beliefs and how they impact medical decision-making. In Study 1, we find that medications are viewed as showing worse willpower, and thus worse moral character, compared to behavioral treatments, which leads to medications being less preferred (H_1 and H_2). We find this both in a variety of common ailments (Study 1A) and in a tightly controlled demonstration in which the same treatment is framed as a medication or a behavior (Study 1B). In Studies 2 and 3, we find that strengthening the belief that treatment choice is irrelevant to moral character self-image increases

the appeal of medication (H_3). In a controlled experiment (Study 2), participants were more likely to search for information about medication treatments for common ailments when treatment choice was framed as irrelevant to moral character. In a large-scale field study (Study 3), participants sought out information about medication treatments more frequently when treatment choice was framed as irrelevant to moral character. In Study 4, we dig deeper into the role of willpower in driving moral character beliefs in this context and find that the effect of treatment choice on moral character is moderated by whether people believe willpower is a facet of moral character (H_4). In Studies 5 and 6, we examine types of illnesses and medications for which this effect attenuates or is eliminated. First, we look at the difference between preventatives—a case where moral character concerns loom larger—and curatives—a case where moral character concerns can be crowded out by more pragmatic concerns like alleviating the symptoms (H_5). In Study 5, we find the effect of treatment type on preference is larger for preventatives (where moral character concerns are more important) than for curatives (where moral character concerns are less important). Finally, in Study 6, we show that using medication does not always reflect better moral character. Specifically, we find the effect of treatment type on moral character is eliminated when medication is more effective than (and as safe as) behavior. This is because two competing effects occur: Even when medication is more effective, it still reflects worse willpower, which lowers moral character judgments. However, when medication is more effective, it also creates better outcomes (which is morally good, from a consequentialist standpoint), which increases moral character judgments (H_6). In sum, the research herein sheds light on the influence of moral character beliefs on medical decision making.

Studies 1B through 6 were pre-registered. Additionally, the following can be found at https://osf.io/3a89z/: pre-registrations, study materials, data, analysis syntax, descriptive statistics and correlations for the key dependent variables, and sample and recruitment information.

4. Study 1

Study 1 tests hypotheses H_1 and H_{2A-C}. Using path models, we examine whether a behavior, versus a medication, is viewed as showing more willpower, and therefore, better moral character, and therefore is more preferred. In Study 1A, we chose common health ailments and presented participants with a behavioral treatment and a medication for each ailment. For example, participants might consider depression, and indicate how likely they would be to take selective serotonin reuptake inhibitors (a common medication for depression) and how likely they would be to do cognitive behavioral therapy (a common behavioral treatment for depression). The within-subjects nature of the choices enhanced external validity, because in the real world, people are typically faced with multiple treatments and can choose to do any combination of them.

Study 1B conceptually replicates Study 1A, with a more tightly controlled manipulation of behavior and medication. In Study 1A, the behaviors and medications were objectively different. We eliminate this issue in Study 1B by using the exact same treatment, but framing it as a medication or a behavior. Specifically, we examined the ailment gingivitis and framed a medicated mouthwash as either a medication or as a behavior. We expected that when the exact same treatment is framed as a behavior, as opposed to medication, it is viewed as indicative of better willpower, and therefore better moral character, and therefore is more preferred.

4.1. Study 1A Method

Participants. Participants on Amazon Mechanical Turk completed a short survey in exchange for monetary compensation. Participants were required to complete a captcha at the beginning of the questionnaire before proceeding to the rest of the survey. After exclusions for

incomplete responses (i.e., individuals who did not reach the end of the survey), we were left with a final sample size of $N = 612$. Sample and recruitment information for all survey studies (payment, attrition, and sample descriptive statistics for demographics) can be found at the OSF page. Attrition was generally low in our studies (always less than 8%) and there was no evidence of condition-dependent attrition (Zhou & Fishbach, 2016).

Stimulus selection. To test for the robustness of our effect, we conducted some stimulus sampling (Wells & Windschitl, 1999). We began with a list of 174 medical ailments taken from the University of Maryland Medical Center Complementary and Alternative Medicine Guide.[3] We provided this list, and the link to the guide, to two research assistants, who were blind to the purpose and hypotheses of this research. One research assistant selected a medication treatment for each ailment, if there was one. The other research assistant selected a behavioral treatment for each ailment, if there was one. If there were multiple treatments, the research assistant selected one that they judged would be at least somewhat familiar to a lay audience. Subsequently, we excluded ailments for three reasons. 1) Sixty-five ailments were excluded because they did not have both a medication and a behavioral treatment. 2) Eleven ailments were excluded because they were sex-specific (e.g., menstrual pain) or had qualitatively different meanings across biological sexes (e.g., sexual dysfunction). 3) Forty-two ailments were excluded because the behavioral treatment and the medication treatment had clearly different goals (e.g., for bone cancer, the behavioral treatment, "eat a diet rich in whole foods," is intended to maintain a healthy body weight during chemotherapy, whereas the medication treatment, bisphosphonates, is intended to prevent the loss of bone mass). We next selected a subset of common ailments with which participants would likely be familiar. We relied on a popular press article entitled "Seven biggest health problems Americans face" (Speights, 2014). Six of the seven ailments described in this popular press article were among stimuli generated by our hypothesis-blind research assistants—chronic obstructive pulmonary disease, depression, diabetes, gastroesophageal reflux disease, high blood pressure, and high cholesterol. Therefore, we selected these as the stimuli for Study 1A.

Procedure. Participants were randomly assigned to one of six ailments, and read a description of the ailment, and a medication and behavioral treatment. For example, if a participant were randomly assigned to consider depression, they read a sentence about what depression is, a sentence about a medication option (selective serotonin reuptake inhibitors), and a sentence about a behavioral treatment (cognitive behavioral therapy). Descriptions were repeated on each page for ease of reference. See Appendix A for all six ailments' descriptions.

Participants responded to three blocks of questions – willpower, moral character, and preferences – presented in a randomized order. In the willpower block, participants rated their agreement that choosing each treatment option would show "willpower and discipline" (two separate questions, one for each treatment; 1 = "Strongly disagree", 5 = "Neither agree nor disagree", 9 = "Strongly agree"), and in the moral character block, they rated their agreement that each treatment option would show "good character" (two separate questions, one for each treatment; 1 = "Strongly disagree", 5 = "Neither agree nor disagree", 9 = "Strongly agree"). In the preferences block, participants indicated on a nine-point scale "how likely" they would be to use each of the two treatments (two separate questions; 1 = "Very unlikely", 5 = "Neither likely nor unlikely", 9 = "Very likely"). We counterbalanced whether the medication or the behavioral treatment was presented first. After responding to all three blocks, participants completed demographic measures (age, gender, ethnicity, political orientation, and religiosity)

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[3] These webpages have, unfortunately, since been removed from the University of Maryland Medical Center's website. However, an archived version can be found at https://web.archive.org/web/20170829102553/www.umm.edu/health/medical/altmed.

before exiting the survey.

4.2. Study 1A results

Preferences. Collapsing across ailments, there was a significant preference for behavior over medication ($M_{Beh} = 7.14$, $SD = 1.80$, $M_{Med} = 5.55$, $SD = 2.41$, $t(611) = 12.97$, $p < .001$, $d = .52$[4]). In order to account for heterogeneity in judgments across different ailments, we conducted a series of linear mixed models, using the lme4 package for R (Bates et al., 2015). We modeled preference as the outcome variable, and treatment (medication vs behavior) as a predictor. Additionally, we included random intercepts for participant (to account for each person making multiple judgments), and random intercepts and slopes for ailment. When accounting for random effects, there was a significant fixed effect (consistent[5] with H_1), such that behavior was more preferred ($b = 1.58$, $SE = 0.43$, $p = .015$) than medication.

Willpower. Collapsing across ailments, behaviors were rated as showing more willpower than medications ($M_{Beh} = 7.58$, $SD = 1.42$, $M_{Med} = 4.39$, $SD = 1.91$, $t(611) = 32.33$, $p < .001$, $d = 1.31$). As with preference, we ran a linear mixed model, except that willpower was the outcome variable. When accounting for random effects, there was a significant fixed effect, such that behavioral treatment (vs medication) was viewed as a sign of stronger willpower ($b = 3.18$, $SE = 0.35$, $p < .001$).

Moral Character. Collapsing across ailments, behaviors were rated as showing better moral character than medications ($M_{Beh} = 6.59$, $SD = 1.66$, $M_{Med} = 5.11$, $SD = 1.65$, $t(611) = 18.15$, $p < .001$, $d = 0.73$). Finally, we ran a similar linear mixed model with moral character as the outcome variable. Again, after controlling for random effects, there was a significant fixed effect such that behavioral treatment (vs medication) was viewed as showing better moral character ($b = 1.48$, $SE = 0.20$, $p < .001$).

Path Model. We tested a within-subjects serial mediation model using the MEMORE ("MEdiation and MOderation analysis for REpeated measures designs"; Montoya & Hayes, 2017; Montoya, 2018) macro for SPSS, collapsing across the six ailments. Conceptually, this model tests a three-step process model (formalized in H_{2A-C}). First, medications versus behaviors are believed to show less willpower. Second, low willpower is believed to show inferior moral character. Third, concerns about moral character affect treatment preferences, lowering preferences for medication versus behaviors. In other words, behaviors are believed to show better willpower than medications, and therefore better moral character than medications, and therefore are more preferred. The overall model supported our key prediction (see Fig. 2A): treatment type (behavior vs medicine) affected willpower, which, in turn, affected moral character, which in turn led to increased preferences for behavior rather than medication (serial indirect effect = 0.73, 95% CI [0.53, 0.96]).

Interestingly, we also observed one other indirect effect, which was via willpower, bypassing moral character (indirect effect = 0.71 95% CI [0.37, 1.05]). This indicates that willpower beliefs can affect preferences through inferences other than moral character (such as, perhaps, competence). We return to this point in the study discussion.

Robustness Checks. We conducted a series of robustness checks. First, we also report the analogous mediation models for each ailment separately (six in total) in the Supplemental Material. The serial indirect effect was the same direction for all six ailments, and was statistically significant for five ailments and marginally significant for the sixth.

However, the direct effect, after accounting for the indirect effects, differed across the six ailments (range: -0.71 to 1.05), which averages to a null direct effect in the overall model in Fig. 2A. Second, we tested a different model, switching the order of the mediators (i.e., the model is specified as behavior vs medication -> moral character -> willpower -> preference). In this alternative model, the serial indirect effect, though significant, was much smaller than in the model above (0.21, 95% CI [0.10, 0.32]), which suggests that our model, in which willpower predicts moral character, which in turn predicts preferences, is a better description of the relationships among these variables than this alternative model.

4.3. Study 1B method

Our pre-registration can be found at https://aspredicted.org/m7gn3. pdf.

Participants. Participants on Prolific completed a short survey in exchange for monetary compensation. We collected a total of 1,001 responses, and, after excluding participants who failed the attention check (as pre-registered), we were left with a final sample size of 995 people.[6]

Procedure. Participants were randomly assigned to one of two between-subjects conditions: Behavior or Medication. In this study, participants in both conditions viewed the same treatment, but this treatment was either framed as a medication or a behavior. They were told (medication condition wording in brackets):

*Imagine you have **gingivitis**, a gum disease that is causing your gums to be swollen and tender and causing bad breath.*

*There is **a change in your daily routine** you can do [**a medication** you can use] to treat this, which is a medicated mouthwash. The mouthwash is used twice daily after brushing. You rinse with it for 30 seconds. Its active ingredient is .12% chlorhexidine gluconate, a germicide that reduces bacteria in the mouth.*

Participants rated the treatment in terms of preference, willpower, and moral character on items closely adapted from Study 1A. In order to ensure that the "moral character" measure was interpreted as intended, we explicitly told participants before they answered the item that "character is your disposition to think, feel, and behave in an ethical vs. unethical manner" (from Cohen & Morse, 2014).

Additionally, participants rated the degree to which the treatment would "show that I am playful" and "show that I have a sense of humor." These two items were not relevant to our hypotheses. They were filler items added to reduce potential experimenter demand (Zizzo, 2010), and ratings on them did not differ across conditions ($ps > .25$). These five items—preference, willpower, moral character, playfulness, and sense of humor—were presented on separate pages, and pages were presented in a randomized order.

Next, participants were asked "Did you think that the treatment was more of a medication or a change in behavior?" on a scale from 1 = more of a medication to 7 = more of a change in behavior. This served as a manipulation check. Then, on the same page, they were asked "What was the treatment?" with response options: "A pill", "Brushing your teeth more often", "Using a medicated mouthwash", "I don't remember". This served as an attention check, and only participants who answered correctly were included in the final analysis.

Finally, participants were asked a series of questions about demographics and background, including: age, gender, whether they had had gingivitis, whether someone else close to them had had gingivitis, how familiar they were with mouthwash to treat gingivitis, how much personal experience they had with gingivitis, whether their job was in

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[4] There are multiple options for specifying the denominator of Cohen's *d* for paired samples t-tests. We used the SPSS default, which is sample standard deviation of the mean difference, as the denominator.

[5] We say "consistent" with H_1, though in this case risks and benefits might also differ between behavior and medications. Therefore, a clearer test of H_1 is presented in Study 1B, where these potential confounds are eliminated by manipulating medication vs behavior through framing.

[6] In this study and Studies 4–6, we pre-registered excluding participants if they did not answer certain dependent measures. All participants who completed the surveys (reached the final page) also completed the requisite measures, and so we never excluded participants based on this criterion.
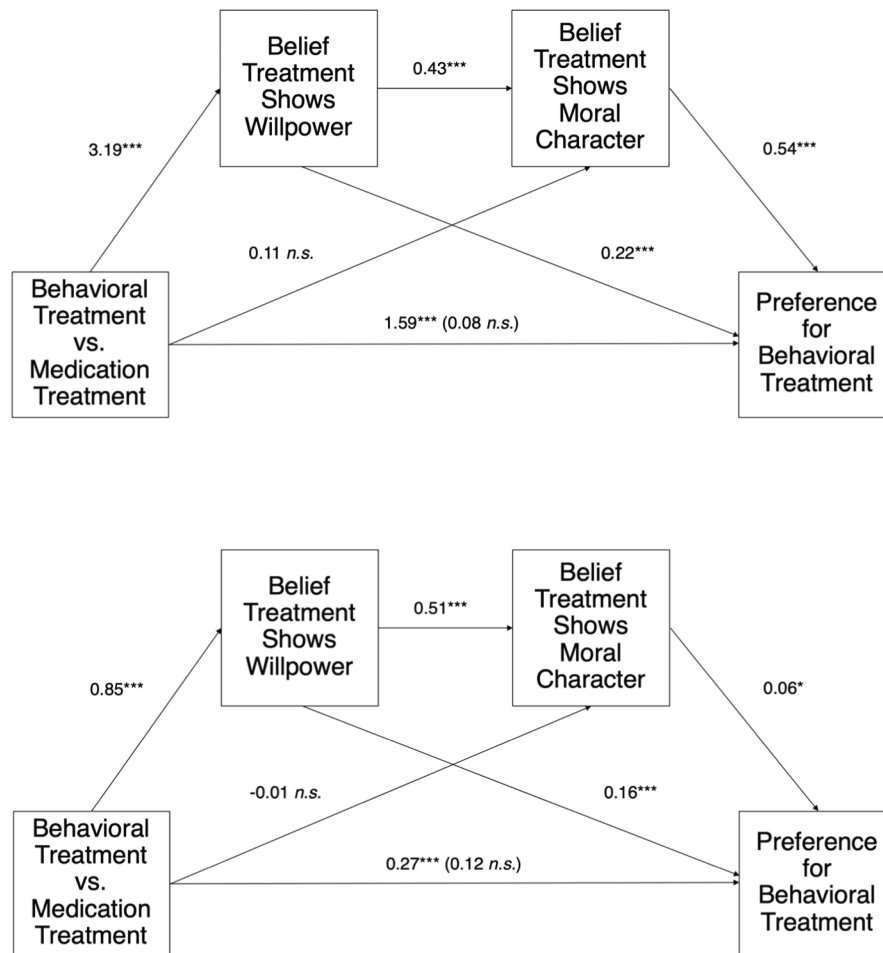
Fig. 2. Serial mediation models in Study 1A (collapsing across ailments, panel A) and Study 1B (panel B).

the healthcare industry, and what their job was. For exploratory analyses of individual differences, see section "Studies 1–6: Exploratory Analyses Examining Individual Difference Moderators" below.

4.4. Study 1B results

Manipulation check. Our manipulation was successful. Participants viewed the mouthwash more like a behavior when it was described as a behavior ($M = 3.56$, $SD = 1.80$) as opposed to when it was described as a medication ($M = 2.66$, $SD = 1.68$, $t(993) = 8.20$, $p < .001$, $d = 0.52$).[7]

Preference. Consistent with H_1, participants preferred to use the mouthwash more when it was framed as a behavior ($M = 8.29$, $SD = 1.13$) as compared to a medication ($M = 8.01$, $SD = 1.34$, $t(993) = 3.50$, $p < .001$, $d = 0.22$).

Willpower. Consistent with H_{2A}, participants thought that using the mouthwash showed better willpower when it was framed as a behavior ($M = 7.37$, $SD = 1.41$) as opposed to a medication ($M = 6.52$, $SD = 1.67$, $t(993) = 8.66$, $p < .001$, $d = 0.55$).

Moral Character. Participants thought that using the mouthwash showed better moral character when it was framed as a behavior ($M = 5.82$, $SD = 1.76$) versus a medication ($M = 5.40$, $SD = 1.89$, $t(993) = 3.67$, $p < .001$, $d = 0.23$).

Path Model. We fit a serial mediation model using the PROCESS macro for SPSS (Hayes, 2013). The overall model supported H_{2A-C} and conceptually replicated the results from Study 1A (see Fig. 2B): the manipulation of treatment type (Behavior vs Medicine) affected willpower, which in turn affected moral character, which in turn led to increased preferences for behavior rather than medication (serial indirect effect = 0.024, 95% CI [0.01, 0.05]).

As in Study 1A, there was no indirect effect through moral character bypassing willpower (indirect effect = -0.0003, 95% CI [-0.02, 0.01]). However, also replicating Study 1A, there was another indirect effect through willpower, bypassing moral character (indirect effect = 0.13, 95% CI [0.07, 0.20]), to which we return in the study discussion.

4.5. Discussion

This study tested a serial process model in which behavior, as compared to medication, shows better willpower, and therefore better moral character, which leads people to prefer behavior to medication, all else being equal. We found support for this model across several common ailments (Study 1A), when participants considered two common treatments. Additionally, we replicated this finding in a tightly controlled study (Study 1B), in which the exact same treatment was framed as a medication or a behavior.

Interestingly, in both studies, we observed a second significant indirect effect via willpower, even when the serial indirect effect through willpower and moral character was accounted for. This suggests that willpower beliefs also affect medical preferences via some other

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[7] In this results section, we did not pre-register the manipulation check analyses, willpower analyses, or moral character analyses, but we include them for the sake of completeness.

mechanism besides moral character beliefs. Determining these additional mediators is beyond the scope of this paper, but one plausible candidate is beliefs about competence. Previous research has found that the term "disciplined" is seen as reflecting both moral character and competence (Landy et al., 2016). If we extrapolate from this term to the related concept of willpower, it seems plausible that the remaining effect of treatment option on preference via willpower beliefs may be explained by identity concerns related to competence, as well as concerns about moral character.

It is worth noting that in Study 1B, although the preference for mouthwash was higher when it was framed as a behavior (vs medication), the preference was quite high in both conditions. We believe that one reason for this is the between-subjects design. In this case, participants were presented with an ailment and only one option for treatment (as opposed to two options). Therefore, people might have felt compelled to treat the ailment, and seen no other obvious alternatives. Any treatment is likely to be appealing when the only apparent alternative is no treatment at all. Yet, remarkably, even though it was the only treatment presented, participants were more reluctant to use the treatment when it was described as a medication.

Next, we move to examine our process through moderation techniques, to complement our examination through mediation.

5. Study 2

In Studies 2 and 3, we test our model through moderation techniques, and using real choices as our outcome measures. Study 1 provided evidence that moral character beliefs reduce the appeal of medication (vs behavior). Therefore, making moral character beliefs less relevant should increase the appeal of medication (vs behavior, H3). We test this hypothesis in the next two studies, by manipulating beliefs about how *relevant* a treatment choice is to one's own moral self-image. We expected medication to be more appealing when treatment choice is seen as irrelevant to one's moral identity ("just a preference"), compared to when it is seen as relevant. Thus, this study offers a test of the mechanism laid out in Study 1 through a different methodological approach, moderation techniques (Spencer et al., 2005).

Specifically, in Study 2, participants were led to believe either that treatment choice reflected something about a person's moral character, or that it was "just a preference". Then, participants searched for and chose to receive access to pamphlets (provided via web links) about medications and behavioral treatments for common medical concerns (e.g., high blood pressure, chronic stress). We predicted that participants would be more likely to exclude pamphlets about medication from consideration when they had been led to believe that treatment choice reflects something about their moral character.

5.1. Method

This study was pre-registered at https://aspredicted.org/ap9f2.pdf.
Participants. Participants on Amazon Mechanical Turk ($N = 602$) completed a short survey in exchange for monetary compensation.
Procedure. This study consisted of three parts: 1) experimental manipulation of moral character beliefs, 2) search task, and 3) choice task.
Part 1 (Experimental Manipulation of Moral Character Beliefs). In the first part of the survey, we asked participants a series of questions about their views on medical treatments. Embedded in this series of questions was an experimental manipulation. First, participants were asked three items about safety and efficacy of medication. These were not relevant to the key hypotheses, but were included to make the experimental manipulation less apparent.

Then, on the next page, we experimentally manipulated beliefs by drawing on literatures about constructed preferences (Ariely & Norton, 2008; Slovic, 1995) and self-perception (Bem, 1967). These literatures suggest that situational factors can (at least temporarily) change

people's preferences and beliefs. For our experimental manipulation, participants answered a question about the relationship between medication and moral character, and we manipulated the response options in order to manipulate people's beliefs. Participants were randomly assigned to one of two conditions. In the Relevant to Moral Character condition, participants answered the following question:

Which of the following statements most closely represents your opinion about choosing between medications/supplements and behavioral treatments?

a) I can see how it is possible that, on average, people who choose to use behavioral treatments have better willpower and character.

b) I can see how it is possible that, on average, people who choose to use medications/supplements have better willpower and character.

We expected that participants in this condition would tend to select choice "a", based on the results of our prior studies showing that people generally believe that using medication reflects worse willpower and moral character than using behavioral treatments. In the Just a Preference condition, participants answered the following question:

Which of the following statements most closely represents your opinion about choosing between medications/supplements and behavioral treatments?

a) Every person who chooses to use medications/supplements has bad character and bad willpower, without exception.

b) Every person who chooses to use behavioral treatments has bad character and bad willpower, without exception.

c) I can see how someone of good character and willpower could choose to use either medications/supplements or behavioral treatments. I don't think that this choice tells much about who you are. It's just a matter of taste.

In contrast to the Relevant to Moral Character condition, we expected that participants in the Just a Preference condition would shy away from the very extreme stances presented in choices "a" and "b" and favor choice "c", indicating that treatment choices are "just a matter of taste".

In order to strengthen this manipulation, the next page said: "You said this statement most closely represents your opinion: [text of chosen statement inserted here in a bold font]. How much do you agree with this statement?" with response options: slightly agree, moderately agree, and strongly agree. We anticipated that endorsing these differing stances would affect participants' beliefs (at least in the short term), with participants in the Relevant to Moral Character condition believing more strongly that using medication reflects poor moral character than participants in the Just a Preference condition.

Part 2 (Search Task). Following this manipulation, on a new page, participants were told that they could search for and choose any number of 32 pamphlets they wanted to receive about different common health issues. Participants were allowed to use filters in order to choose a subset of pamphlets they wanted to consider, similar to the use of filters on shopping websites. Participants were told that if they did not use the filters, all the pamphlets would be displayed. The filters were displayed on one page in a fixed order. Participants could filter on the types of treatments ("behavioral treatments" and/or "medications/supplements"). Participants could also filter on the health topics ("stress reduction", "cardiac disease/heart issues", and/or "promoting healthy lifestyle").

Part 3 (Choice Task). In part 3 (choice task), participants examined the consideration set of pamphlets they had created in part 2 (search task). Participants were asked "Which pamphlets would you like to get access to at the end of the study?" While we asked participants to choose at least one pamphlet, we did not require this in the Qualtrics survey logic, and participants could progress to the next page without choosing any.

After the choice task, on a separate page, participants completed a few items about demographics and background: gender, age, how often they felt nervous or stressed out in the last month (never, almost never, sometimes, fairly often, very often), whether they would want to feel less stressed out (yes, no), whether they have high blood pressure (yes,

no), whether they have ever had high blood pressure (yes, no) and whether high blood pressure runs in their family (yes, no). On the last page of the survey, participants received links to all of the pamphlets they requested.

5.2. Results

Manipulation check. As expected, most participants in the Relevant to Moral Character condition (77.2%) selected choice "a", indicating that medication reflects worse moral character. Also, as expected, most participants in the Just a Preference condition (95.0%) selected choice "c", indicating that treatment is just a preference. Based on prior work on constructed preferences (Ariely & Norton, 2008; Slovic, 1995) and self-perception (Bem, 1967), we presume that taking these different positions changed how participants were thinking about moral character, at least in the moment. We include all participants in subsequent analyses (regardless of which choice they selected on this moral character question).

Search task and choice task. In our pre-registered analysis, participants were more likely to exclude medication pamphlets from the consideration set in the Relevant to Moral Character condition (50.3%) than in the Just a Preference condition (41.7%, $\chi^2(1) = 4.55$, $p = .033$).

As an exploratory (not pre-registered) analysis, we also examined participants' choices of pamphlets, using a logistic regression with random intercepts for participants, and framing (1 = Just a Preference framing, 0 = Relevant to Moral Character framing), medication pamphlet (1 = pamphlet has medication information, 0 = pamphlet has no medication information),[8] and the interaction between framing and medication as predictors. The results indicated that Just a Preference framing marginally lowered choice for the baseline category, which was behavioral treatments ($b = -0.18$, $p = .089$), and medication pamphlets were less chosen than behavioral pamphlets overall ($b = -1.25$, $p < .001$). Most importantly, there was a significant framing by medication pamphlet interaction ($b = 0.45$, $p < .001$, see Fig. 3). As displayed in Fig. 3, the Just a Preference condition directionally increased the number of medication pamphlets chosen but directionally reduced the number of behavioral pamphlets chosen.

5.3. Discussion

Study 2 found that manipulating the perceived relevance of treatment choice to moral character changes treatment preferences. When treatment choice is framed as irrelevant to moral character, preference for medication, relative to behavior, increases.

6. Study 3

Study 3 also tests the effect of framing treatments as "just a preference" vs "relevant to moral character", but this time in the context of a large field study using Facebook's split testing platform. The study used four different advertisements, which followed a 2 (Treatment: Medication vs Behavior) X 2 (Framing: Relevant to Moral Character vs Just a Preference) design. We predicted that the Just a Preference framing would increase the click rate for medication advertisements, but that this effect would attenuate or reverse for behavior advertisements.

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[8] Two of the thirty-two pamphlets included both medication and behavior recommendations. (The other thirty pamphlets were either about behavior or about medication.) In Fig. 3, these two pamphlets are included in both the "medication pamphlets" and "behavioral pamphlets" counts, because they contain both types of information. In the regression, these pamphlets receive a 1 on the medication pamphlet dummy variable. Excluding these two pamphlets does not change the direction or significance level of any results.
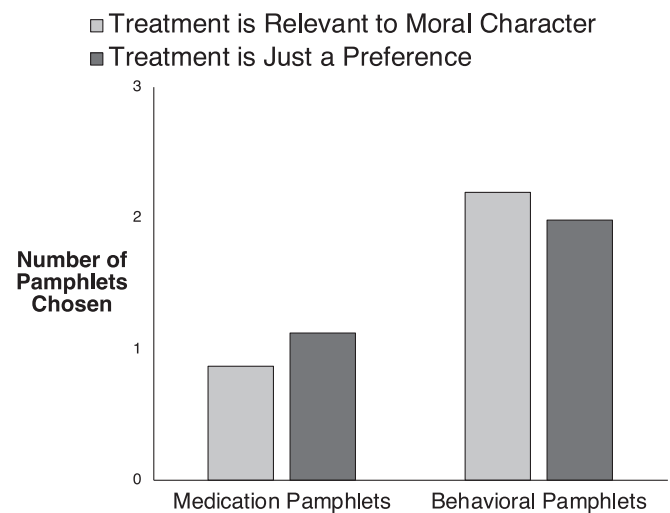

Fig. 3. The Effect of Manipulating Moral Character Beliefs on Pamphlets Chosen in Study 2.

6.1. Method

This study was pre-registered at https://aspredicted.org/aq5rt.pdf.

Participants. A total of 25,686 Facebook users were presented with one of the ads.

Procedure. We conducted an experiment over five days, using Facebook's A/B split testing platform with the following settings: split test on creative, daily budget: $60 (even split among ads), optimization for ad delivery: link clicks; age: 18–65+, Location: Living in United States, Language: English (UK) or English (US). One of four ads was presented to Facebook users (see Fig. 4). Additionally, the headlines and links either referred to supplements and directed people to information about supplements or referred to exercise and directed people to information about exercise. Specifically, the headline read: "Is exercising right for you?" or "Are supplements right for you?"; the link title was "Tips for Exercising!" or "Tips for Taking Dietary Supplements!" and the link was a website with tips for exercising, https://web.archive.org/web/20200520042105/https://www.hsph.harvard.edu/nutritionsource/2013/11/04/making-exercise-a-daily-habit-10-tips/, or supplements, https://web.archive.org/web/20200922073112/https://www.knowyourotcs.org/tips-for-taking-dietary-supplements/.

In the Medication condition, we used the word "supplements" rather than "medication", because we wanted the ad to be relevant to as many people as possible. Ads for specific medications would only be relevant to people suffering from the particular ailments they treat, but almost anyone could potentially improve their overall health through the use of supplements. We confirmed in a post-test reported in the Supplemental Material that supplements are viewed as more similar to a medication treatment than a behavioral treatment.

Our dependent measure was click-through rate – that is, the proportion of users presented with each ad who clicked on it to learn more information. Facebook calculates this by dividing Clicks (All) by Impressions. Clicks (All) is the number of times an advertisement was clicked on, and Impressions is the number of times an advertisement was displayed on a screen. Facebook does not provide data on whether one person viewed an advertisement multiple times or clicked multiple times. Therefore, each click is treated as independent of each other click, and each impression is treated as independent of each other impression.

6.2. Results

We predicted that for medication advertisements, Just a Preference framing would increase click rates. This prediction was supported (Just a Preference click rate = 3.84% vs Relevant to Character click rate =

Fig. 4. Advertisements in Study 3. *Note.* The panels show: (a) Medication advertisement with Just a Preference framing, (b) Medication advertisement with Relevant to Moral Character framing, (c) Behavior advertisement with Just a Preference framing, (d) Behavior advertisement with Relevant to Moral Character framing. Panel (a) and (b) icons were made by Smashicons - from www.flaticon.com. Panel (c) and (d) icons were made by Freepik - from www.flaticon.com.

3.10%, $\chi^2(1) = 4.53$, $p = .033$).

Moreover, we predicted the pattern would be attenuated or reversed for behavior advertisements, which would result in a significant framing by treatment interaction. This prediction was also supported. In a logistic regression with click as the outcome, and framing (Just a Preference vs Relevant to Moral Character), treatment type (Medication vs Behavior) and their interaction as predictors, the interaction between framing and type of treatment was significant ($p = .010$, see Fig. 5). In an analysis that was not pre-registered, there was a directional, but not significant, reversal, such that Just A Preference framing directionally decreased click rate for behavior advertisements (Just a Preference click rate = 6.48% vs Relevant to Moral Character click rate = 7.09%, $\chi^2(1) = 2.14$, $p = .143$).

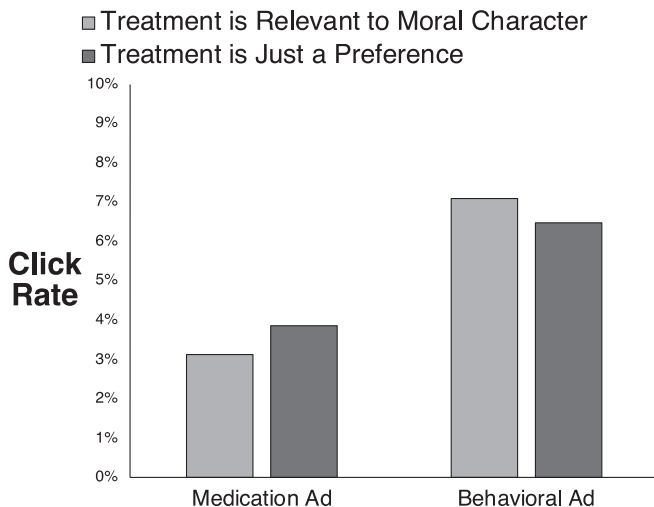Thus, this study replicates the results of Study 2 in a naturalistic field

Fig. 5. Results from Study 3.

study – people seek out more information about medication treatments when they are framed as "a matter of taste", irrelevant to one's moral character.

6.3. Discussion

Study 3 provides evidence from a field study using Facebook advertisements. The advantage of this study is the external validity provided by a field test of real (private) behaviors. However, this study does have a few limitations. First, we relied on Facebook's A/B split test platform to conduct the randomization to experimental conditions and to select the audience (pool of participants). Though Facebook defines the platform as a way to do randomized, controlled experiments manipulating only one variable (in this case, advertisement), we do not know exactly how Facebook randomizes subjects to conditions. Similarly, we do not know how Facebook selects the subject pool, except that Facebook uses algorithms to find people prone to click on the advertisements. Second, we rely on the assumption that each person views the advertisement once and clicks no more than once, which might be inaccurate. However, none of these limitations are shared by Study 2, which tests similar manipulations in a more controlled setting. Together, Studies 2 and 3 provide consistent evidence that framing a treatment choice as just a preference can impact behavior, and that it increases the appeal of medication treatments.

7. Study 4

Studies 2 and 3 provided evidence via moderation techniques for the hypothesized mechanism of moral self-image concerns. In Study 4, we further examine the nature of these self-image concerns. This study focuses on establishing the role of willpower specifically, using moderation techniques. We posit that people think medication (vs behavioral treatment) shows worse willpower, which leads people to think it shows worse moral character. If so, then we would expect the relationship between treatment type (medication vs behavior) and moral character to depend on whether people view willpower as relevant to moral character. For those who think willpower is a facet of moral character, we should see an effect of treatment choice on character, but for those who do not think willpower is a facet of moral character, the treatment choice-character relationship should attenuate or be eliminated. We test this in Study 4.

7.1. Method

This study was pre-registered at https://aspredicted.org/fv3iw.pdf.

Participants. Participants on Prolific ($N = 600$) completed a short survey in exchange for monetary compensation.

Procedure. This study was closely adapted from Study 1A. As in Study 1A, participants began the survey by considering one of six ailments (chronic obstructive pulmonary disease, depression, diabetes, gastroesophageal reflux disease, high blood pressure, and high cholesterol), randomly assigned. Each ailment had a behavioral treatment and a medication treatment and the information about the ailment and treatments was identical to Study 1A (see Appendix A). Then, participants indicated the degree to which each treatment would show good character on 9-point scales from strongly disagree to strongly agree. (Here, we also included the definition of moral character, as we did in Study 1B.) On the next page, participants indicated the degree to which they believed that willpower is a facet of moral character by answering 3 items on 5-point strongly disagree to strongly agree scales. These items were "When I exert self-control, it shows that I have good character"; "When I exert discipline, it shows that I have good character"; "Part of having good character is showing willpower and discipline". Finally, on the next page, participants indicated their age and gender, and then exited the survey. All items were presented in a fixed order, except that we counterbalanced treatment presentation order (medication vs

behavior), as in Study 1A.

7.2. Results

Replicating Study 1A, participants viewed behavioral treatments as showing better moral character, collapsing across all ailments (M_{Beh} = 6.76, SD = 1.67, M_{Med} = 5.31, SD = 1.70, $t(599)$ = 18.17, $p < .001$, d = 0.74).

Next, we examined whether moral character beliefs varied depending on whether people believed that willpower is a facet of moral character. People generally agreed that willpower is a facet of moral character (M = 4.10, SD = 0.72 on a scale from 1 to 5). In a regression, with character judgments as the outcome variable, we entered the following predictors: treatment (medication = 1 vs behavior = 0), endorsement of willpower as a facet of character (continuous, range: 1 to 5), and their interaction. We clustered errors by participant to account for repeated observations. In this regression, there was a statistically significant interaction effect (b = -0.75, $p < .001$), as predicted. In other words, we found support for H_4, that the effect of treatment type on moral character is moderated by individual differences in the belief that willpower is a facet of character.

The interaction is plotted in Fig. 6. To understand the nature of this interaction, we used the Johnson-Neyman technique (Spiller et al., 2013) to identify where the simple effect of treatment type was significant. (We did not pre-register this analysis, but we think it is helpful for understanding the pre-registered interaction test.) We looked over the range of the willpower as a facet of character measure, which was from 1 to 5, where higher scores indicated stronger agreement that willpower is a facet of moral character. For participants scoring above 2.5 on the willpower as facet of character measure, there was a significant effect of treatment type on character, such that behavioral treatment was viewed as showing better character than medication treatment. For participants scoring between 1.6 and 2.5 on the willpower as facet of character measure, there was no statistically significant relationship between treatment type and moral character. Finally, for participants scoring 1.6 or lower (i.e., strongly disagreeing that willpower is a facet of moral character), the effect of treatment type on moral character reversed, such that participants viewed medication treatment as showing better moral character than behavioral treatment. (Of note, only 3 participants in the sample of 600 had scores below 1.6.)

Lastly, following our pre-registration, we also ran a linear mixed model. The outcome, as above, was character beliefs, and the predictors were treatment, endorsement of willpower as a facet of character, and their interaction. We included random intercepts for participant and random intercepts and slopes (on all predictors) for ailment. This serves as a robustness test, accounting for variability across stimuli. The results are substantively identical to the OLS regression. Most importantly, the interaction term was significant, and similar in magnitude (b = -0.79, SE = 0.17, p = .007).

7.3. Discussion

Study 4 uses moderation techniques to support the link in our conceptual model between willpower and moral character beliefs. The more that a person agrees that willpower is a part of moral character, the more they see behavior as showing better moral character than medication. This not only adds evidence for our proposed psychological process, but it also shows evidence for heterogeneity in our effects across individuals. We examine more individual differences later (see "Studies 1–6: Exploratory Analyses Examining Individual Difference Moderators").

Studies 3 and 4 can also address a possible concern with Studies 1 and 2, which is that we directly elicited participants' beliefs about whether treatment choices reflect willpower and character. It is possible that people do not *spontaneously* infer that treatment choices are relevant to their moral self-image unless they are directly probed about this possibility. Notably, however, in Study 3, we did not directly ask participants about willpower or moral character, and we found that framing treatment choice as just a preference increased the appeal of medication. Similarly, in Study 4, we did not even mention willpower until after participants had made their moral character judgments. Here, we examined the relevance of willpower to character as a moderator, finding that people who more strongly believe that willpower is a facet of character also see a stronger perceived moral character advantage of behavior over medication. If people did not spontaneously draw a connection between treatment choice, willpower, and moral character, at least some of the time, we would not expect either of these moderation effects. Finally, as noted above, medical practitioners also report that patients have such concerns, at least some of the time. Therefore, we think there is good reason to believe that people do see a connection between treatment choice, willpower, and character naturally, and that this affects their preferences. Next, we begin to examine ailments and treatments for which our key effects might be stronger or weaker.

8. Study 5

We hypothesize that people view medication, as compared to behavior, as showing worse willpower and worse moral character, which thereby reduces preferences for it. Studies 1A and 1B showed evidence for this process through path modeling. Studies 2 and 3 focus on what happens when treatment type is viewed as irrelevant to moral character. Similarly, Study 4 tests what happens for people who think willpower is less relevant to moral character. These studies provided further support for the hypothesized model, through moderation techniques, by showing attenuated effects when treatment type or willpower is viewed as irrelevant to character.

Study 5 had two goals. First, we continued assessing moderation hypotheses that would provide evidence for our theoretical model (as in Studies 2–4). Second, we started to test how the hypothesized effects vary across different types of ailments and medications. This study focused on the distinction between preventatives and curatives. For preventatives, we expected that people would place importance on a variety of things, including effectively preventing the issue and acting in a way that is consistent with their moral identity. However, when people have an ailment to cure, we expected that people would focus more singularly on fixing the issue, which can crowd out other concerns. In other words, we expected the relationship between moral concerns and preferences to be weakened when curing as compared to preventing. A pre-test supported this supposition. Participants (N = 100 from Prolific) answered a series of questions about preventing and treating ailments, on scales from 1 = not at all to 5 = very much. Participants indicated they would be more focused on behaving "in a way that was consistent with your moral ideals" when preventing (M = 4.22, SD = 0.91) versus curing (M = 3.71, SD = 1.14, $t(99)$ = 4.86, $p < .001$, d = 0.49) and on behaving in a way "that shows good moral character" when preventing (M = 4.06, SD = 0.97) vs curing (M = 3.49, SD = 1.10, $t(99)$ = 5.83, $p < .001$, d = 0.58). Additionally, they said they would be more willing to "do something that ISN'T morally ideal to get the job done" when curing (M = 2.83, SD = 1.20) vs preventing (M = 1.97, SD = 0.90, $t(99)$ = 7.88, $p < .001$, d = 0.79) and more willing to "take a shortcut to get the job done" when curing (M = 3.48, SD = 1.23) vs preventing (M = 2.75, SD = 1.18, $t(99)$ = 6.75, $p < .001$, d = 0.68). Because we have posited that medication is less appealing than behavior due, in part, to moral character beliefs (H_{2A-C}), the difference between preferences for medication and behavior should be larger when moral character beliefs loom larger
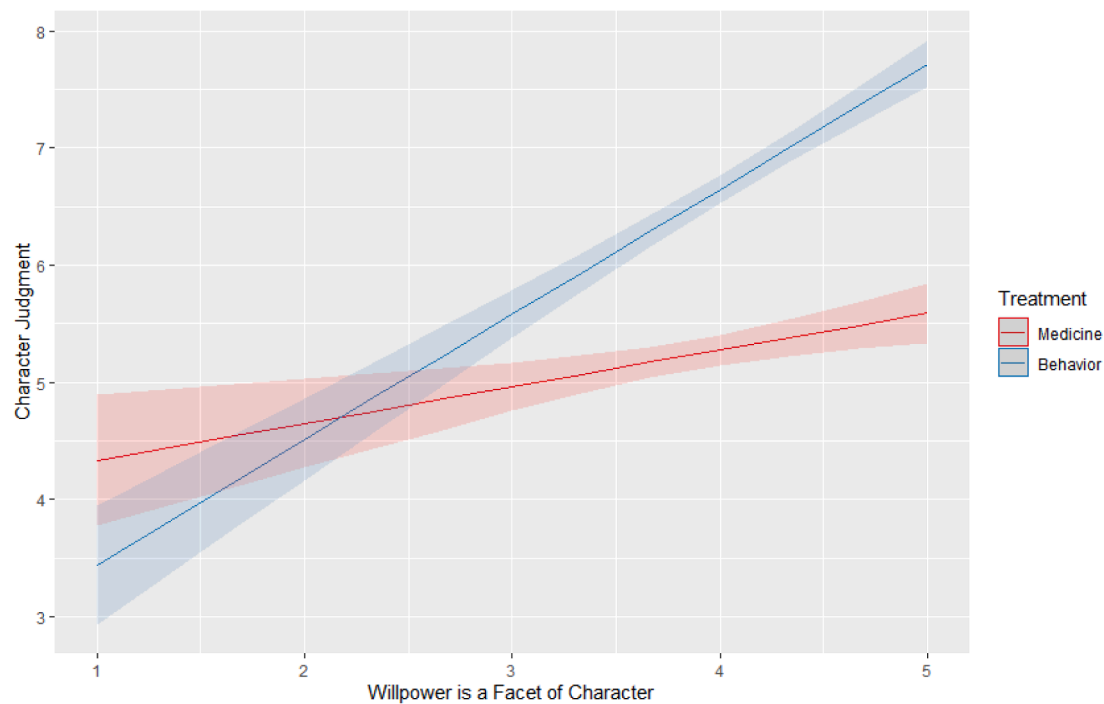
Fig. 6. The interaction between willpower as facet of character beliefs and treatment type in Study 4.

(i.e., when preventing). In other words, the difference in appeal of medication vs behavior should be lessened for curatives, compared to preventatives (H₅). We tested this hypothesis in Study 5.

8.1. Method

This study was pre-registered at https://aspredicted.org/hn26f.pdf.

Participants. Participants on Prolific (N = 400) completed a short survey in exchange for monetary compensation.

Procedure. Participants viewed two scenarios, in a counterbalanced order. In one scenario participants imagined that they were preventing (their own) insomnia, and in another scenario, they imagined that they were treating it. (For full stimuli, see Appendix B.) In both scenarios, we stipulated that participants should imagine that insomnia runs in their family, and that the symptoms tend to be waking up and not being able to fall back asleep a few nights a week. We specified that insomnia runs in the family to make it more reasonable for someone to be concerned about preventing it in the Prevent condition. Participants then saw two options to promote better sleep—behavioral therapy and medication. Prior work shows that people prefer safer, less potent treatments more for preventatives than for curatives, which leads them to prefer natural treatments more for preventatives than for curatives (Scott et al., 2020). In contrast, in the present work we hypothesize that, independent of safety and potency, people prefer behavior over medication more for preventatives because moral concerns loom larger for preventatives than for curatives. Therefore, to rule out that our effects are driven by safety or potency preferences, we experimentally equated the treatments on costs and benefits: we created a table showing that the medication and behavioral therapy were highly effective, had no side effects, and were covered by insurance (i.e., they were free to the participant). Participants answered two questions per scenario, in a fixed order: whether they would start by trying the behavioral therapy (from 1 = "Definitely would not" to 5 = "Definitely would") and whether they would start by trying the medication (from 1 = "Definitely would not" to 5 = "Definitely would").

Finally, participants were asked a series of questions about demographics and background, including: age, gender, whether they had had insomnia, whether someone else close to them had had insomnia, how familiar they were with medication for insomnia, how familiar they were with behavioral therapy for insomnia, how much personal experience they had with insomnia, whether their job was in the healthcare industry, and what their job was.

8.2. Results

A 2 (Treatment Type: Medication vs Behavior) X 2 (Treatment Goal: Prevent vs Cure) repeated-measures ANOVA revealed a main effect of treatment type ($F(1, 399) = 109.50$, $p < .001$, $\eta_p^2 = 0.22$) and a main
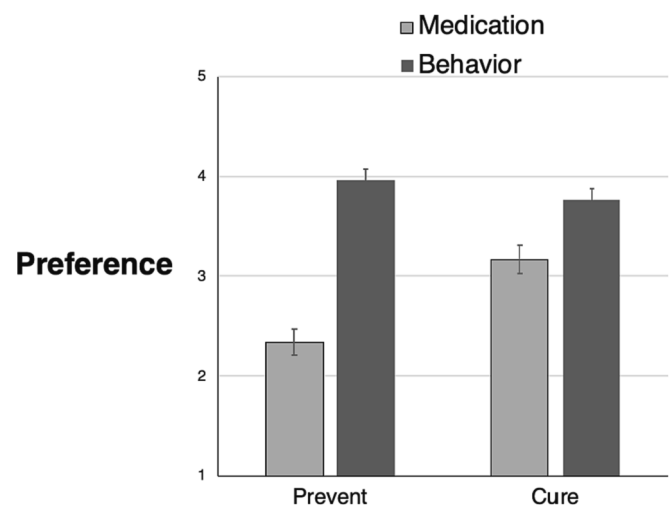

Fig. 7. Results from Study 5. *Note.* Error bars are 95% CIs of the mean.

effect of treatment goal ($F(1, 399) = 101.77$, $p < .001$, $\eta_p^2 = 0.20$). Importantly, these main effects were qualified by a significant two-way interaction ($F(1, 399) = 109.08$, $p < .001$, $\eta_p^2 = 0.22$), indicating that the difference in preference for medication vs behavior depended on the treatment goal (Prevent or Cure). This interaction is displayed in Fig. 7.

Paired samples t-tests revealed the nature of this interaction. People preferred behavior over medication when preventing ($M_{Beh} = 3.96$, $SD = 1.21$, $M_{Med} = 2.34$, $SD = 1.33$, $t(399) = 14.37$, $p < .001$, $d = 0.72$). This difference was substantially smaller, though still significant, when curing ($M_{Beh} = 3.76$, $SD = 1.25$, $M_{Med} = 3.17$, $SD = 1.41$, $t(399) = 4.90$, $p < .001$, $d = 0.25$). In terms of effect sizes, effects of $d = 0.2$ are often considered small, $d = 0.5$ medium, and $d = 0.8$ large for independent means (Cohen, 1992). Based on this rule of thumb, the effect went from fairly large ($d = 0.72$) to fairly small ($d = 0.25$). Additionally, we examined the data a different way, looking at how treatment goal (Prevent or Cure) affected preferences for each type of treatment. Preventing, as compared to curing, reduced preference for medication ($M_{Prevent} = 2.34$, $SD = 1.33$, $M_{Cure} = 3.17$, $SD = 1.41$, $t(399) = -13.69$, $p < .001$, $d = -0.69$). However, preventing, as compared to curing, increased preference for behavior ($M_{Prevent} = 3.96$, $SD = 1.21$, $M_{Cure} = 3.76$, $SD = 1.25$, $t(399) = 3.58$, $p < .001$, $d = 0.18$).

8.3. Discussion

Study 5 shows that the preference for behavior over medication is especially strong for preventatives, where moral concerns loom larger. In contrast, when people focus on curing an existing issue, moral concerns are crowded out and loom less large, so the preference for behavior over medication is weaker. In the next study, we continue to study variability across different medications and ailments.

9. Study 6

In Study 6, we examine a boundary condition of the inference that medication reflects worse moral character. We have focused so far on beliefs about medication and willpower, and the hypothesis that people sometimes think medication reflects worse moral character than a behavioral treatment because it shows worse willpower. However, there might be cases where people think that taking medication does not conflict with their moral identity. For example, it seems unlikely that people would object on moral grounds to taking medication as part of a cancer treatment regimen, or for a deadly disease that can only be cured through medication. What is it about cases like these that distinguishes them from the cases we have examined so far?

We suggest that examining another component of moral identity, specifically the desire to cause good outcomes (i.e., a consequentialist approach) can help us make sense of such cases. Separate from willpower inferences, people also believe that good people do actions with good consequences. We will call this a consequentialist belief, because consequentialism is the idea that people judge morality based on the consequences of the action. If a medication is safe and more effective than a behavioral treatment, then it is the option that creates better consequences, which is morally good. It minimizes both self-harm (which is considered somewhat morally wrong, see, e.g., Chakroff et al., 2013; Kollareth & Russell, 2018) and the harm one might inflict on others by not recovering from an ailment. Therefore, if the medication is the most effective option, it might be viewed as consistent with positive self-views of one's moral character. This is because there are two conflicting inferences, both affecting judgments of what a treatment says about one's moral character. When medication is more effective, it still shows worse willpower which reflects poor moral character (as in H_{2A} and H_{2B}), but it *also* creates better outcomes (which is morally good from a consequentialist perspective), which reflects good moral character (H_6). We test this prediction in our final study.

9.1. Method

Our analysis plan was pre-registered at https://aspredicted.org/3s5a4.pdf.[9]

Participants. Participants on Prolific completed a short survey in exchange for monetary compensation. We recruited 202 participants, and after applying our pre-registered exclusion criteria (i.e., excluding people who failed the attention check), we were left with $N = 188$ participants.

Procedure. Participants read a scenario in which they imagined that they suffered from insomnia (closely adapted from Study 5), and there was a behavioral therapy and a medication available. Participants learned that the behavior and the medication were both free to them (i.e., covered by insurance) and had no side effects. In the Control condition, participants also learned the medication and behavior were equally effective (both were described as "extremely effective"). In the Medication More Effective condition, participants learned that the medication was much more effective than the behavior (the medication was "extremely effective" and the behavior was "not very effective").

Participants were asked five blocks of questions – moral character, willpower, outcomes, playfulness, and sense of humor. As in Study 1B, playfulness and sense of humor were included to reduce any potential demand effects. Blocks were presented in randomized order, and within each block questions were presented in randomized order.

In each block, participants were asked about the medication and about the behavior, on scales from 1 = not at all to 5 = a great deal. In the willpower block, participants were asked two questions (one about medication and one about behavior): "To what extent would using the **medication** [doing the **behavioral therapy**] show **willpower and discipline**?". In the moral character block, participants were also asked two questions: "To what extent would using the **medication** [doing the **behavioral therapy**] show **good character**? (Character is your disposition to think, feel, and behave in an ethical vs. unethical manner.)" In the outcomes block, participants were asked four questions adapted from a scale measuring moral consequentialism (Tanner et al., 2008): "To what extent do you think that, if you used this **medication** [did this **behavioral therapy**], the positive outcomes outweigh the negative consequences?" and "To what extent do you think that the outcomes of using this **medication** [you doing this **behavioral therapy**] produce the best net value?". The composite of these items served as our "outcomes" measure.

Finally, participants were asked an attention check question ("In the previous scenario, which was more effective?" Response Options: "the medication", "the behavioral therapy" and "they were equally effective"). Then, participants completed demographic and background measures (same as Study 5) and exited the survey.

9.2. Results

Moral Character. As predicted in H_{6A}, there was a significant interaction between our efficacy manipulation and treatment type on moral character. In a 2 (Relative Efficacy: Equal vs Medication More Effective) X 2 (Treatment Type: Medication vs Behavior) ANOVA, with the first factor between-subjects and the second factor within-subjects, we found a main effect of relative efficacy ($F(1, 186) = 12.67$, $p < .001$, $\eta_p^2 = 0.06$), a main effect of treatment type ($F(1, 186) = 27.18$, $p <$

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[9] We deviated from the pre-registered plan in two ways. First, at the time of pre-registration, moderated mediation models were not available in the MEMORE package, and so we did not pre-register a moderated mediation model. However, after data collection, we contacted the author of MEMORE, who kindly provided us a new version of MEMORE that includes moderated mediation. Second, in part because moderated mediation was not available, we pre-registered other tests to examine our data, which we have now moved to the Supplemental Material for the sake of brevity.

.001, $\eta_p^2 = 0.13$), and a significant interaction ($F(1, 186) = 11.79$, $p < .001$, $\eta_p^2 = 0.06$).

Paired samples t-tests revealed the nature of this interaction. As predicted, and replicating prior studies, in the Control condition, people believed that using medication reflected worse moral character than using behavior ($M_{Med} = 3.04$, $SD = 0.86$, $M_{Beh} = 3.69$, $SD = 1.00$, $t(89) = 7.29$, $p < .001$, $d = 0.77$). However, there was no significant effect of treatment type on moral character beliefs in the Medication More Effective condition ($M_{Med} = 2.78$, $SD = 1.25$, $M_{Beh} = 2.91$, $SD = 1.33$, $t(97) = 1.13$, $p = .262$, $d = 0.11$). In other words, when medication was more effective, people thought it showed similar levels of moral character to take medication as to use a behavioral treatment.

Moderated Mediation. Next, we aimed to assess the role of willpower inferences and inferences about outcomes. We ran a moderated mediation model assessing willpower and outcomes as simultaneous mediators, and relative efficacy as a moderator of the two "a" paths (i.e., the predictive effects of medication vs behavior on willpower and outcomes; Model 15 in MEMORE). As predicted, the index of moderated mediation for the indirect effect through outcomes was statistically significant (Index = -0.32, 95% CI [-0.57, -0.09]), indicating that the impact of treatment choice on moral character via perceptions of treatment outcomes depended on whether people were in the Control condition or the Medication More Effective condition. Additionally, the index of moderated mediation for the indirect effect through willpower was also statistically significant, which was unexpected (Index = -0.16, 95% CI [-0.32, -0.04]). We return to this point in the study discussion.

We next examined the conditional indirect effects to understand the nature of the indirect effects, depending on the efficacy manipulation. The Control condition conceptually replicates prior studies but adds outcomes as another potential mediating pathway. In the Control condition (when medication and behavior are equally effective), there is an indirect effect such that behavior (vs medication) shows better willpower, which shows better moral character (Conditional Indirect Effect via Willpower = 0.45, 95% CI [0.24, 0.68]). This replicates the results of Study 1. There is also a much smaller, but significant, indirect effect such that people believe behavior (vs medication) produces better outcomes, which shows better moral character (Conditional Indirect Effect via Outcomes = 0.09, 95% CI [0.02, 0.17]). This suggests that people viewed medication as having more negative outcomes, even when it is equal in efficacy, side effects, and cost. We suspect that this might reflect a belief that in general, even when the consequences of a medication are the same as other treatments, taking medication may be seen as normalizing the undesirable behavior of "medication taking", both personally and in society more broadly, and therefore as having some broadly negative outcomes.

The conditional indirect effects in the Medication More Effective condition also followed our predictions, as laid out in H_{6B}. Again, there was an indirect effect such that behavior (vs medication) shows better willpower, which shows better moral character (Conditional Indirect Effect via Willpower = 0.29, 95% CI [0.15, 0.45]). Additionally, there was a competing path such that behavior (vs a more effective medication) creates worse outcomes, which shows worse moral character (Conditional Indirect Effect via Outcome = -0.23, 95% CI [-0.41, -0.07]). The conflicting paths result in a null total effect, such that moral character inferences do not differ reliably between the Medication and Behavior conditions, because while behavior still shows better willpower, medication also creates better outcomes. In statistical terms, the indirect effect via outcomes suppresses the indirect effect via willpower.

9.3. Discussion

This study supported H_{6A} and H_{6B}. First, even when medication was more effective, it was viewed as showing worse willpower, and thus worse character. However, a competing effect also occurred. When medication was more effective, it was also viewed as the treatment that

created better outcomes, which is also morally relevant, as it is morally good to create good outcomes from a consequentialist perspective. Because there were two conflicting moral character considerations (medication shows worse willpower but creates better outcomes), overall, medication was not judged as showing better or worse moral character than behavior in this case. Thus, this demonstrates an important and pragmatic boundary condition to our findings—a case where medication reflects as good moral character as behavior.

Interestingly, we found one unexpected effect. Though in all cases behavior showed better willpower than medication, this difference was weaker when medication was more effective. In other words, people believe that it shows more willpower to put effort into an effective health behavior than to put effort into an ineffective health behavior. We suspect that this is because willpower is influenced by both the effort exerted and the commitment to the goal (see Piazza et al., 2014 for a similar distinction between "strength of will" and "value commitment"). Putting effort into an ineffective (vs effective) treatment may show less willpower and discipline because it evinces less commitment to the health goal. However, it is worth noting that even when efficacy is held constant (e.g., Study 1B, Study 5, Study 6's Control condition), and when holding the actual treatment constant (Study 1B), medication is viewed as showing worse willpower.

10. Studies 1–6: Exploratory analyses examining individual difference moderators

We also collected a series of individual difference variables that could plausibly moderate our effects. Specifically, in Studies 1B, 2, 5, and 6 we asked whether or not the person has had the ailment in the past, and in Studies 1B, 5 and 6, we also asked whether the participant worked in healthcare. To test whether these variables moderate any of our findings, we conducted a series of exploratory analyses. In each study, we examined whether prior experience with the ailment (yes or no) moderated the effect of treatment type (medication vs behavior) on preference, willpower, and/or character. In Study 1B, there was some evidence that prior experience moderated our key effects. Participants in this study were more likely to believe that behavior shows better willpower and moral character than medication if they had never experienced the ailment than if they had (interaction between treatment type and prior experience on Willpower DV: $p = .043$; on Character: $p = .013$). However, we did not find any significant moderation in Studies 2, 5, and 6 ($ps > .15$). Next, we examined whether being a healthcare professional moderated the effect of treatment type (medication vs behavior) on preference, willpower, and/or character. In Study 1B, lay people (non-healthcare professionals) preferred behavior-framed mouthwash over medication-framed mouthwash, but healthcare professionals actually preferred medication-framed mouthwash over behavior-framed mouthwash (interaction between treatment type and healthcare professional: $p = .001$). We did not find evidence of moderation in Studies 5 and 6 ($ps > .15$). Overall, given the multiple comparisons (four studies, many with multiple outcome variables, and two exploratory moderators), and the lack of consistency in any individual difference effects across studies, we think it would be premature to make strong claims about individual differences in experience or profession as moderators.

11. General discussion

Across seven studies, we find that people's moral beliefs impact their medical treatment choices. In particular, people view medical choices as relevant to their moral self-image. Medication is viewed as showing weaker willpower than behavioral treatments, and therefore worse moral character than behavioral treatments. These beliefs lower preferences for medication. Said differently, behavioral treatments are viewed as showing stronger willpower than medications, and therefore better moral character, which leads to preferences to use behavioral

treatment over medications (Study 1). When we manipulated beliefs about the relevance of treatment choice to moral character, such that medication was thought to be merely a matter of preference, participants sought out more information about medication treatments, both in a controlled experiment (Study 2) and in a large field study (Study 3). We also examined the types of individuals, treatments, and ailments for which this is mostly likely to occur. We first found variability in the effects across people; the perception that behavioral treatment shows better moral character than medication is larger for people who believe that willpower is a facet of moral character (Study 4). We then found that the preference for behavioral treatment over medication is larger for preventatives, where moral concerns loom large, than for curatives, where moral concerns are crowded out by other concerns (such as effectively fixing the problem; Study 5). Finally, when the medication was more effective, people no longer saw medication as showing worse moral character than behavior. This is because, though the medication still showed worse willpower, it also created better outcomes, and these two effects canceled each other out (Study 6).

11.1. Connection to past research in social and moral psychology

Our results have implications for our understanding of moral psychology, outside of the medical domain. One popular theoretical approach says that moral character judgments are made in order to assess and predict the intentions of others and determine whether we should affiliate and cooperate with them (Helzer & Critcher, 2018; Landy et al., 2016; Landy & Uhlmann, 2018; Martin & Cushman, 2015, 2016; Wojciszke et al., 1998). People with good moral character, who are kind and honest, are more likely to have helpful intentions and therefore make good social partners. The present work expands on this approach by offering an in-depth exploration of a case which does not obviously fit this framework. We find that treatment choices are considered relevant to moral character, even though they do not obviously indicate good or bad intentions towards other social beings. Instead, these choices reflect another important component of the lay conception of moral character—willpower. Specifically, we go beyond recent research showing that laypeople consider willpower to be a component of moral character (e.g., Berman & Small, 2018; Mooijman et al., 2018), by examining in depth a particular domain—medical treatment choice—in which this belief affects important and consequential decisions. Moreover, we begin to examine how inferences about willpower and inferences about best outcomes can conflict with each other, and the implications of this conflict for moral identity.

This research also adds to our understanding of how people evaluate effort, and especially the prospect of exerting effort. Prior work has examined how effort can increase value in retrospect—in the context of effort justification, cognitive dissonance theory, and self-perception theory (Bem, 1967; Cooper, 2007; Festinger, 1957). The present work suggests one reason why the *prospect* of effort might be valued. In the medical domain, people evaluate behavioral treatments (which generally require more effort than medications) positively because using these treatments shows superior willpower and character. In this sense, the prospect of effort may itself have some positive effects on valuation.

11.2. Implications for medical decision-making

The present work has implications for theories of medical decision-making. It suggests that theories of health and medical decision-making as pure cost-benefit analyses are fundamentally incomplete. Moral character concerns impact health decisions. Over the past few decades, some practitioners and researchers have advocated for "shared" medical decision making, in which patients and doctors work together to select a treatment consistent with the patients' values, goals, and preferences (Barry & Edgman-Levitan, 2012; Frosch & Kaplan, 1999). If there are multiple, reasonable treatment options available, patients can communicate their preferences and be involved in the decision (Barry & Edgman-Levitan, 2012). Our work shows a link between patients' moral identity concerns and the type of treatment they choose. Patients may eschew medication treatments in favor of behavioral treatments in order to maintain a positive self-image as a person with good willpower and moral character, especially in preventative contexts.

Our findings may also speak to one root cause of the view that modern Americans are "over-medicated". Widely expressed in the popular media, this view says that people are too eager to use medication (Capretto, 2013; Carpenter, 2008; Rubinstein, 2013). To be sure, there are very legitimate causes for concern in some cases (e.g., the over-prescription of antibiotics contributes to the emergence of antibiotic-resistant bacteria, or "super-bugs"; Rubinstein, 2013). However, in many cases the expressed concerns about over-medication take on a more moralistic tone (e.g., "people take pills like candy"; Capretto, 2013). Our results suggest that some beliefs that people are over-medicated may actually be caused in part by the beliefs documented in the present article. People believe that using medication betrays a lack of moral character, and therefore view widespread use of medications as excessive and as evidence of moral decay in our society.

11.3. Limitations

Our results may be limited by the populations from which we sampled and the methods that we employed. Our studies were conducted on non-patient populations. It is possible that when people are actually suffering from an ailment and choosing a treatment, they are willing to completely overlook concerns about their character. However, we think that this is unlikely, given that the health practitioners reported seeing these types of concerns from patients (see survey discussed in introduction). Moreover, we do observe an effect of framing on real (private) choices in our large field study (Study 3), albeit for treatments to prevent ailments and generally improve health. Therefore, we think that there is strong evidence that these effects persist in real patients' health choices. Moreover, beyond patient preferences, third-party moral judgments still have important implications for how patients are treated by friends, family, and society at large. People appear to make inferences about the type of person you are based on the treatment choices you make, which might cause people to avoid otherwise effective medical alternatives, to avoid stigmatization.

11.4. Future directions

One open question is how treatment preferences and moral beliefs change as multiple treatments are tried over time. In some cases, people may avoid medication when initially trying to treat an ailment, and then take medication when other treatments are unsuccessful. It is unclear how people would view this with respect to their moral identity. One possibility is that people still feel they are doing it "the wrong way" even in these cases. Another possibility is that, if behavioral treatment proves ineffective, then people think medication is consistent with their moral self-image because it produces the better moral outcome (similar to Study 6). Exploring these sorts of dynamic inferences is an interesting and important task for future research.

Second, we do not know whether treatment choices are considered relevant to personality dimensions other than moral character, such as warmth or competence. It is possible that competence tracks risks and benefits, such that choosing an option with a good risk–benefit ratio shows competence. Another possibility is that doing a behavior instead of a medication increases moral self-image and competence self-image, which, as we noted above, might explain the remaining indirect effect through willpower in Study 1. Yet another possibility is that we mostly make inferences about people's competence based on how they construct the consideration set, and we mostly make inferences about their moral character based on how they choose. In other words, whether people understand the set of treatment alternatives and their

efficacy and side effects is relevant to competence. Whether people choose the path that takes more willpower while knowing that it is the harder route is relevant to character. A moral decision maker understands that medication is effective and safe but chooses to treat an ailment by exerting willpower. We leave adjudicating between these possibilities as a task for future research.

Finally, we have identified only one factor, beyond cost-benefit assessments, that influences medical decision-making. There may be other important factors, such as the naturalness of a treatment. Medications are typically less natural than behavioral treatments because they are often created by humans. And, consistent with the work herein, natural products are often preferred over unnatural ones, and especially more preferred for preventing than for curing (Scott et al., 2016; Scott et al., 2020). However, we assert that the mechanism we explore here is quite distinct from the mechanisms discussed in the naturalness literature and is not particularly relevant to naturalness. Whether something is natural or man-made has little to do with the willpower exerted when using it. Using natural items can take low effort, and using man-made items can require lots of willpower. Nonetheless, we think naturalness is another ideational factor that affects medical preferences. Like in the case of preferring non-genetically modified foods, some consumers may prefer behavioral treatments because those treatments are natural and naturalness is morally valued in and of itself (Rozin et al., 2004; Scott et al., 2016).

11.5. Conclusion

Our findings demonstrate the importance of moral character beliefs

in health and medical decision-making: using medication as compared to a behavioral treatment is often seen as demonstrative of poor moral character, specifically a lack of willpower, which causes medication to be less appealing. These results have important implications for improving health outcomes and connect recent insights from moral psychology to the medical decision-making literature. In some cases, it seems, a desire to be moral may outweigh concerns about being healthy.

CRediT authorship contribution statement

Sydney E. Scott: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualization. **Justin F. Landy:** Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data and materials can be found at https://osf.io/3a89z/.

Appendix A. Study 1A Stimuli

Each participant in Study 1A was randomly assigned to one of these six different ailments:

Depression is when feelings of loss, anger, sadness, or frustration make it hard for you to do the things you enjoy in everyday life.
Selective Serotonin Reuptake Inhibitors (SSRIs) are drugs that can reduce symptoms of depression, especially negative feelings.
Cognitive Behavioral Therapy can teach you to identify and change negative thoughts and feelings.

Hypercholesterolemia, or high cholesterol, occurs when there is too much cholesterol in your body.
Crestor is a drug that can lower cholesterol.
Reducing fat intake can lower cholesterol.

Gastroesophageal Reflux Disease is a condition in which contents of your stomach or small intestine repeatedly move back up into your esophagus (the tube connecting your throat to your stomach). The primary symptom is frequent heartburn.
Antacids are drugs that neutralize stomach acids, which can relieve and prevent symptoms.
Avoiding acidic foods and beverages can relieve and prevent symptoms.

Chronic Obstructive Pulmonary Disease (COPD) is a chronic lung condition that causes severe shortness of breath and blocks the airways in your lungs.
Bronchodilators are drugs that can open airways, increasing airflow and making it easier to breathe.
Breathing exercises twice a day can improve lung function, making it easier to breathe.

High blood pressure, or hypertension, is elevated force of blood as it pumps through your arteries. The more blood your heart pumps and the narrower your arteries are, the higher the blood pressure.
Microzide is a drug that can reduce the amount of blood in your body and lower blood pressure.
Losing weight by eating a healthy, balanced diet can lower blood pressure.

Diabetes is a chronic (long term) condition where you either cannot produce or use insulin. As a result, glucose (sugar) can build up in the bloodstream, which can lead to blindness, nerve damage, and heart disease.
Byetta is a drug that can reduce the level of glucose in your blood so that glucose does not build up in your bloodstream.
Reducing carbohydrate intake can reduce the level of glucose in your blood so that glucose does not build up in your bloodstream.

Appendix B. Study 5 Scenarios

Prevent Condition Scenario:

Imagine you **do NOT have insomnia and want to prevent it**. Insomnia runs in your family. Those who struggle with insomnia in your family have the following symptoms: They have no trouble falling asleep. However, three or four nights a week they wake up around 2 or 3am and cannot fall back asleep for a few hours. They end up with about 5 hours of sleep on those nights.

There are two options for preventing insomnia: behavioral therapy, which includes a variety of ways to change your behavior before bed to promote better sleep, and medication, which includes chemicals to promote better sleep.

	Behavioral Therapy	Medication
Efficacy	Highly Effective	Highly Effective
Side Effects	No side effects	No side effects
Cost	Free (covered by insurance)	Free (covered by insurance)

Cure Condition Scenario:

Imagine you **have insomnia and want to treat it**. Insomnia runs in your family. You and those who struggle with insomnia in your family have the following symptoms: You have no trouble falling asleep. However, three or four nights a week you wake up around 2 or 3am and cannot fall back asleep for a few hours. You end up with about 5 hours of sleep on those nights.

There are two options for treating the insomnia: behavioral therapy, which includes a variety of ways to change your behavior before bed to promote better sleep, and medication, which includes chemicals to promote better sleep.

	Behavioral Therapy	Medication
Efficacy	Highly Effective	Highly Effective
Side Effects	No side effects	No side effects
Cost	Free (covered by insurance)	Free (covered by insurance)

Appendix C. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.obhdp.2022.104225.

References

Abele, A. E., & Brack, S. (2013). Preference for other persons' traits is dependent on the kind of social relationship. *Social Psychology, 44*(2), 84–94.

Adams, S., Pill, R., & Jones, A. (1997). Medication, chronic illness and identity: The perspective of people with asthma. *Social Science & Medicine, 45*(2), 189–201.

Amos, C., Zhang, L., & Read, D. (2019). Hardworking as a heuristic for moral character: Why we attribute moral values to those who work hard and its implications. *Journal of Business Ethics, 158*, 1047–1062.

Aquino, K., & Reed, A., II. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology, 83*(6), 1423–1440.

Ariely, D., & Loewenstein, G. (2006). The heat of the moment: The effect of sexual arousal on sexual decision making. *Journal of Behavioral Decision Making, 19*, 87–98.

Ariely, D., & Norton, M. I. (2008). How actions create—not just reveal—preferences. *Trends in Cognitive Sciences, 12*(1), 13–16.

Barry, M. J., & Edgman-Levitan, S. (2012). Shared decision making—the pinnacle of patient-centered care. *The New England Journal of Medicine, 366*(9), 780–781.

Bates, D., Mächler, M., Bolker, B. M., & Walker, S. C. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1–48.

Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review, 74*(3), 183–200.

Bénabou, R., & Tirole, J. (2011). Identity, morals, and taboos: Beliefs as assets. *The Quarterly Journal of Economics, 126*, 805–855.

Benson, J., & Britten, N. (2002). Patients' decisions about whether or not to take antihypertensive drugs: Qualitative study. *British Medical Journal, 325*, 873–877.

Bentham, J. (1970). *An introduction to the principles of morals and legislation*. London: Athlone Press. (Original work published 1789).

Berman, J. Z., & Small, D. A. (2018). Discipline and desire: On the relative importance of willpower and purity in signaling virtue. *Journal of Experimental Social Psychology, 76*, 220–230.

Britten, N. (1994). Patients' ideas about medicines: A qualitative study in a general practice population. *British Journal of General Practice, 44*, 465–468.

Capretto, L. (2013). Oprah on prescription drugs: Americans 'take pills like candy' (VIDEO). *The Huffington Post*. https://web.archive.org/web/20230106001427/https://www.huffpost.com/entry/oprah-super-soul-sunday-prescription-drugs_n_3328546.

Carpenter, S. (2008). The epidemic of overmedication. *NBC News*. https://web.archive.org/web/20230106001751/https://www.nbcnews.com/health/health-news/epidemic-overmedication-flna1c9466428.

Celniker, J. B., Gregory, A., Koo, H. J., Piff, P. K., Ditto, P. H., Shariff, A. F., in press. The moralization of effort. *Journal of Experimental Psychology: General*. Advance online publication. https://doi.org/10.1037/xge0001259.

Centers for Disease Control and Prevention. (2021). *High Cholesterol Facts*. https://web.archive.org/web/20220422182226/https://www.cdc.gov/cholesterol/facts.htm.

Chakroff, A., Dungan, J., & Young, L. (2013). Harming ourselves and defiling others: What determines a moral domain? *PloS One, 8*(9). Article 74434.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.

Cohen, T. R., & Morse, L. (2014). Moral character: What it is and what it does. *Research in Organizational Behavior, 34*, 43–61.

Cooper, J. (2007). *Cognitive Dissonance: 50 years of a classic theory*. Thousand Oaks, CA: Sage.

Cottrell, C. A., Neuberg, S. L., & Li, N. P. (2007). What do people desire in others? A sociofunctional perspective on the importance of different valued characteristics. *Journal of Personality and Social Psychology, 92*(2), 208–231.

Dana, J., Weber, R. A., & Kuang, J. X. (2007). Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness. *Economic Theory, 33*, 67–80.

Dowell, J., & Hudson, H. (1997). A qualitative study of medication-taking behaviour in primary care. *Family Practice, 14*(5), 369–375.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Frosch, D. L., & Kaplan, R. M. (1999). Shared decision making in clinical medicine: Past research and future directions. *American Journal of Preventive Medicine, 17*(4), 285–294.

Gneezy, A., Gneezy, U., Riener, G., & Nelson, L. D. (2012). Pay-what-you-want, identity, and self-signaling in markets. *Proceedings of the National Academy of Sciences, 109*(19), 7236–7240.

Goodwin, G. P., Piazza, J., & Rozin, P. (2014). Moral character predominates in person perception and evaluation. *Journal of Personality and Social Psychology, 106*(1), 148–168.

Harmsen, C. G., Støvring, H., Jarbøl, D. E., Nexøe, J., Gyrd-Hansen, D., Nielsen, J. B., Edwards, A., & Kristiansen, I. S. (2012). Medication effectiveness may not be the major reason for accepting cardiovascular preventive medication: A population-based survey. *BMC Medical Informatics and Decision Making, 12*, Article 89.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Helzer, E. G., & Critcher, C. R. (2018). What do we evaluate when we evaluate moral character? In K. Gray, & J. Graham (Eds.), *Atlas of moral psychology* (pp. 99–107). New York, NY: Guilford Press.

Hertel, A. W., & Mermelstein, R. J. (2012). Smoker identity and smoking escalation among adolescents. *Health Psychology, 31*(4), 467–475.

Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research, 47*(6), 555–567.

Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly, 11*(1), 1–47.

Kollareth, D., & Russell, J. A. (2018). On an observer's reaction to hearing of someone harming him or herself. *Psychological Studies, 63*, 298–314.

Landy, J. F., Piazza, J., & Goodwin, G. P. (2016). When it's bad to be friendly and smart: The desirability of sociability and competence depends on morality. *Personality and Social Psychology Bulletin, 42*(9), 1272–1290.

Landy, J. F., & Uhlmann, E. L. (2018). Morality is personal. In K. Gray, & J. Graham (Eds.), *The atlas of moral psychology: Mapping good and evil in the mind* (pp. 121–132). New York: Guilford Press.

Lapsley, D. K., & Lasky, B. (2001). Prototypic moral character. *Identity: An International Journal of Theory and Research, 1*(4), 345–363.

Lewis, D. K., Robinson, J., & Wilkinson, E. (2003). Factors involved in deciding to start preventive treatment: Qualitative study of clinicians' and lay people's attitudes. *British Medical Journal, 327*, 841–846.

Martin, J. W., & Cushman, F. (2015). To punish or to leave: Distinct cognitive processes underlie partner control and partner choice behaviors. *PLOS ONE, 10*(4). Article e0125193.

Martin, J. W., & Cushman, F. (2016). Why we forgive what can't be controlled. *Cognition, 147*, 133–143.

Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research, 45*(6), 633–644.

Mill, J. S. (1998). *Utilitarianism. (R. Crisp, Ed.)*. New York: Oxford University Press (Original work published 1861).

Montoya, A. K. (2018). *Conditional process analysis in two-instance repeated-measures designs*. [Doctoral dissertation, The Ohio State University].

Montoya, A. K., & Hayes, A. F. (2017). Two-condition within-participant statistical mediation analysis: A path-analytic framework. *Psychological Methods, 22*(1), 6–27.

Mooijman, M., Meindl, P., Oyserman, D., Monterosso, J., Dehghani, M., Doris, J. M., & Graham, J. (2018). Resisting temptation for the good of the group: Binding moral values and the moralization of self-control. *Journal of Personality and Social Psychology, 115*(3), 585–599.

Piazza, J., Goodwin, G. P., Rozin, P., & Royzman, E. B. (2014). When a virtue is not a virtue: Conditional virtues in moral evaluation. *Social Cognition, 32*(6), 528–558.

Pound, P., Britten, N., Morgan, M., Yardley, L., Pope, C., Daker-White, G., & Campbell, R. (2005). Resisting medicines: A synthesis of qualitative studies of medicine taking. *Social Science & Medicine, 61*(1), 133–155.

Rozin, P., Spranca, M., Krieger, Z., Neuhaus, R., Surillo, D., Swerdlin, A., & Wood, K. (2004). Preference for natural: Instrumental and ideational/moral motivations, and the contrast between foods and medicines. *Appetite, 43*, 147–154.

Rubinstein, M. (2013). Medication nation. *The Huffington Post*. https://web.archive.or g/web/20230106002141/https://www.huffpost.com/entry/over-prescribing-me dication_b_3204175.

Salami, J. A., Warraich, H., Valero-Elizondo, J., Spatz, E. S., Desai, N. R., Rana, J. S., … Nasir, K. (2017). National trends in statin use and expenditures in the US adult population from 2002 to 2013: Insights from the Medical Expenditure Panel Survey. *JAMA Cardiology, 2*(1), 56–65.

Scherman, M. H., & Löwhagen, O. (2004). Drug compliance and identity: Reasons for non-compliance: Experiences of medication from persons with asthma/allergy. *Patient Education and Counseling, 54*, 3–9.

Scott, S. E., Inbar, Y., & Rozin, P. (2016). Evidence for absolute moral opposition to genetically modified food in the United States. *Perspectives on Psychological Science, 11*(3), 315–324.

Scott, S. E., Rozin, P., & Small, D. A. (2020). Consumers prefer "natural" more for preventatives than for curatives. *Journal of Consumer Research, 47*, 454–471.

Sinnott-Armstrong, W. (2021). Consequentialism. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy (Fall 2021 Edition)*. https://web.archive.org/web/202209 30082045/https://plato.stanford.edu/archives/fall2021/entries/consequentialism/ .

Slovic, P. (1995). The construction of preference. *American Psychologist, 50*(5), 364–371.

Smart, J. J. C., & Williams, B. (1973). *Utilitarianism: For and against*. Cambridge, UK: Cambridge University Press.

Speights, K.. Seven biggest health problems Americans face. USA Today. https://web. archive.org/web/20220706160632/https://www.usatoday.com/story/money/201 4/11/30/seven-biggest-health-problems-americans-face/19445189/.

Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology, 89*(6), 845–851.

Spiller, S. A., Fitzsimons, G. J., Lynch, J. G., Jr., & McClelland, G. H. (2013). Spotlights, floodlights, and the magic number zero: Simple effects tests in moderated regression. *Journal of Marketing Research, 50*(2), 277–288.

Strohminger, N., & Nichols, S. (2014). The essential moral self. *Cognition, 131*, 159–171.

Strohminger, N., & Nichols, S. (2015). Neurodegeneration and identity. *Psychological Science, 26*(9), 1469–1479.

Tanner, C., Medin, D. L., & Iliev, R. (2008). Influence of deontological versus consequentialist orientations on act choices and framing effects: When principles are more important than consequences. *European Journal of Social Psychology, 38*, 757–769.

Vermeire, E., Hearnshaw, H., Van Royen, P., & Denekens, J. (2001). Patient adherence to treatment: Three decades of research. A comprehensive review. *Journal of Clinical Pharmacy and Therapeutics, 26*, 331–342.

Walker, L. J., & Hennig, K. H. (2004). Differing conceptions of moral exemplarity: Just, brave, and caring. *Journal of Personality and Social Psychology, 86*(4), 629–647.

Walker, L. J., & Pitts, R. C. (1998). Naturalistic conceptions of moral maturity. *Developmental Psychology, 34*(3), 403–419.

Wells, G. L., & Windschitl, P. D. (1999). Stimulus sampling and social psychological experimentation. *Personality and Social Psychology Bulletin, 25*(9), 1115–1125.

Williams, E. F., Pizarro, D., Ariely, D., & Weinberg, J. D. (2016). The Valjean effect: Visceral states and cheating. *Emotion, 16*(6), 897–902.

Wojciszke, B., Bazinska, R., & Jaworski, M. (1998). On the dominance of moral categories in impression formation. *Personality and Social Psychology Bulletin, 24*(12), 1251–1263.

World Health Organization (2021). *Cardiovascular diseases (CVDs)*. https://web.archive. org/web/20220412200306/https://www.who.int/news-room/fact-sh eets/detail/cardiovascular-diseases-(cvds).

Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research, 37*, 197–206.

Zhou, H., & Fishbach, A. (2016). The pitfall of experimenting on the web: How unattended selective attrition leads to surprising (yet false) research conclusions. *Journal of Personality and Social Psychology, 111(4)*, 493–504.

Zizzo, D. J. (2010). Experimenter demand effects in economic experiments. *Experimental Economics, 13*, 75–98.