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Harmless bodily pleasures are moralized because they are perceived as reducing self-control and cooperativeness

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Abstract: Why do many people morally condemn unrestrained indulgence in bodily pleasures—such as gluttony, masturbation, and drinking alcohol—even when these behaviors do not harm others? Leading theories of moral cognition claim that these puritanical moral judgments are independent of cognitive adaptations for reciprocal cooperation. In five pre-registered experiments ($N > 3000$), we test an alternative hypothesis: that puritanical moral judgments emerge from perceptions that bodily pleasures indirectly facilitate free-riding by impairing self-control. In Studies 1 and 2a-b, participants judged that targets who increased (vs. decreased) their non-other-harming sex, food, alcohol, and inactivity would become more likely to cheat, an effect mediated by the perception that they would become less self-controlled. In Study 3, participants judged that relaxing regulations on sex, food, and alcohol in a village would decrease self-control and cooperation in the village, although they judged enforcing puritanical prohibitions even more negatively. In Study 4, participants expected that, in a scientific experiment, a treatment group made to increase their consumption of bodily pleasures would become less self-controlled and more likely to cheat than a psychologically similar control group. Across all studies, the perception that indulgence reduces self-control and cooperativeness was associated with the moral condemnation of harmless bodily pleasures. This provides support for the idea that some purity violations, although they do not directly harm other people, may be morally condemned because they activate cognitive systems designed for reciprocal cooperation.

Keywords: morality; cooperation; evolution; self-control; purity

1. Introduction

Across societies, many people regard restraint, temperance, and spiritual mastery over carnal urges as moral virtues (Fitouchi et al., 2023a; Haidt, 2012). They morally condemn the immoderate indulgence in bodily pleasures such as lust (Haidt & Hersh, 2001), gluttony (Hill, 2007), alcohol (Lugo et al., 2013), drugs (Goode & Ben-Yehuda, 2010), idleness (Celniker et al., 2022; Tierney et al., 2021), and hedonism (Goenka & Thomas, 2023), as well as the general lack of self-discipline (Mooijman et al., 2018). We refer to these as *puritanical moral judgements*. By this, we mean the moral prescription of ascetic moderation in hedonic consumption and the judgement that unrestrained indulgence is intrinsically wrong, even when it doesn't harm other people (Fitouchi et al., 2023a).

Puritanical condemnations extend to many pleasures in some contexts, including music (Otterbeck & Ackfeldt, 2012), dance (Wagner, 1997), gambling (Lugo et al., 2013), and even fiction and theater (Burke, 2017). But across cultures, the most consistent target of puritanical wrath is *bodily pleasure* in particular—the "sins of the flesh" such as lust, gluttony, drinking, or idleness (Doniger, 2011; Garden, 2014; Glucklich, 2020; Hill, 2011; Martin, 2009; Michalak & Trocki, 2006; Seidman, 1990; Suiming, 1998; Yü, 2021). This centrality of bodily appetites recurs in puritanical traditions around the world (Glucklich, 2020)—including not only variants of Christianity (Dabhoiwala, 2012; Hill, 2011), but also of Islam (Garden, 2014; Mernissi, 2011), Hinduism (Doniger, 2014), Chinese religions (Suiming, 1998; Yü, 2021), and ascetic wisdoms of ancient Rome and Greece (Gaca, 2003). In medieval Christianity, for example, "a huge body of teachings grew up in support for the notion that bodily desire was inherently shameful and sinful… the mental and physical government of fleshly appetites was the very foundation of the whole culture of discipline" (Dabhoiwala, 2012, pp. 27).

Why, then, do so many societies regard unrestrained indulgence in bodily pleasures as morally wrong? This question is at the heart of a central debate about the architecture of moral cognition, opposing "monist" to "pluralist" theories (Fitouchi et al., 2023a; Graham et al., 2013; Gray et al., 2012).

According to monist theories, all moral judgments are produced by a single, functionally unified cognitive mechanism (Fitouchi et al., 2023b; Schein & Gray, 2018). There are several monist theories, but here we focus on one monist theory in particular: the *evolutionary contractualist theory of morality*[1] (ECTM: André et al., 2022a; Baumard et al., 2013; Fitouchi et al., 2023b). On this account, moral judgment evolved exclusively for the challenges of reciprocal cooperation that recur in human life: What triggers moral judgment is the detection of *cheating* in reciprocal cooperative interactions—that is, of behaviors that take the benefits of others' cooperation without paying the cost of cooperating in return (André et al., 2022a). This account successfully explains why moral judgments across cultures overwhelmingly target cheating behaviors such as theft, adultery, free-riding, and unfair sharing (Curry et al., 2019; Hofmann et al., 2014; Purzycki et al., 2018; Singh & Garfield, 2022).

[1] There are other monist theories, notably the *theory of dyadic morality* (Gray et al., 2012; Schein & Gray, 2015, 2018), which agrees with the *evolutionary contractualist theory* that all moral judgments are produced by the same cognitive mechanism, but disagree about the nature of that mechanism. Dyadic morality holds that all moral judgments arise from perceptions of *harm*—that is, the intentional infliction of suffering on a "patient" (Schein & Gray, 2018)—whereas the evolutionary contractualist theory maintains that they stem from perceptions of *cheating*—that is, of benefiting from others' cooperation without oneself paying the cost of doing one's part of a reciprocal contract (see Fitouchi et al., 2023b for discussion of differences between the two accounts).

According to *pluralist* theories, by contrast, moral cognition comprises multiple distinct mechanisms, each specialized for a different domain of social life: not just reciprocity, but also loyalty, authority, and "purity" (Graham et al., 2013, 2023; Haidt, 2012, 2007). On these accounts, cognitive adaptations for reciprocity are not sufficient to explain the full breadth of the human moral domain (Graham et al., 2013). Cognitive adaptations for reciprocity readily explain moral condemnation of theft, adultery, free-riding, or unfair sharing, but they would be unable to explain why people also moralize behaviors that do not harm other people—such as carnal sins of lust, gluttony, and other spiritually "impure" acts[2] (Graham et al., 2013). Puritanical moral judgments condemn sex not only when it harms others, such as in rape or adultery, but also the very fact of taking sexual pleasure without restraint—such as in masturbation or in having too frequent or passionate sex, even within marriage (e.g., medieval Christianity: Dabhoiwala, 2012; neo-Confucian China: Suiming, 1998; Victorian England: Seidman, 1990). They condemn gluttony not only when you leave less food for others, but also when you simply fail to control your appetite—such as by overeating *your own food*, eating too eagerly, or craving foods that are too tasty (Adamson, 2004; Hill, 2007, 2011). They forbid intoxicants even when consumed in private and thus without harm to others (Levine, 1993; Michalak & Trocki, 2006). And they prescribe industriousness even when work is needless and effort unproductive (Celniker et al., 2022; Tierney et al., 2021; Yü, 2021).

These "harmless wrongs[3]", thus, have appeared as critical arguments against the view that all moral judgments can be reduced to cognitive adaptations for reciprocal cooperation (Graham et al., 2013; Haidt, 2007). If harmless behaviors can be morally condemned, many have argued, there must be in the mind some mechanisms that generate moral judgments despite being sensitive to something else than cheating (Graham et al., 2013; Haidt, 2012; Smith & Kurzban, 2019).

Recent theoretical developments, however, suggest that puritanical moral judgements may be reducible to cognitive systems designed for reciprocal cooperation. The *moral disciplining hypothesis*, in particular, proposes that harmless bodily pleasures are morally condemned because they are perceived as indirectly facilitating cheating behaviors by altering people's self-control (Fitouchi et al., 2023a). This account starts from the idea that refraining from cheating in reciprocal cooperation sometimes requires self-control—the ability to resist temptations of immediate reward (Stevens & Hauser, 2004). Failure to control immediate impulses can lead to violence (Vazsonyi et al., 2017), infidelity (Brady et al., 2020), free-riding (Knoch et al., 2009), stinginess (Sjåstad, 2019), as well as antisocial behaviors in the workplace (Cohen et al., 2014). This makes evolutionary sense, since reciprocal cooperation requires paying an immediate cost—forgoing the instant benefit of

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[2] More precisely, it is moral judgments of "purity"—a broader and more heterogeneous category than puritanical moral judgments—that have been central to debates about the architecture of moral cognition (Graham et al., 2013; Gray et al., 2023). Our concept of puritanical morality is a subset of this broader notion of purity (Fitouchi et al., 2023b). Purity is notoriously vague (Gray et al., 2023; Kollareth et al., 2023) and has been variously defined as the moralization of carnal sins (Haidt, 2007; Haidt & Graham, 2007, 2009), the unrestrained indulgence in humanity's "base instincts," and the prescription of chastity, self-control, and temperance (Graham et al., 2013)—which aligns with our definition of puritanism. Other aspects of purity, however, concern the avoidance of physically unclean or disgusting behaviors such as incest, cannibalism, or bestiality (for a review, see Gray et al., 2023), which are not the focus of our study.

[3] Note that by harmless wrongs, moral psychologists do not mean behaviors that are harmless *to the self*—excessive eating or drinking, for example, can surely harm one's health (Hendriks, 2020). They rather mean behaviors that are harmless *to other people*, unlike most of the behaviors that humans otherwise judge morally wrong (Haidt, 2012).

cheating—that is repaid only in the future by the delayed benefits of reciprocations and a good reputation (Axelrod, 2006; Lie-Panis et al., 2024; Lie-Panis & André, 2022; Roberts, 2020). Accordingly, people seem to perceive self-control as necessary for cooperative behavior and expect individuals with low self-control to behave less cooperatively (Righetti & Finkenauer, 2011).

People might perceive, not only that cooperation requires self-control, but also that immoderate indulgence in bodily pleasures could erode people's self-control. Historical and ethnographic evidence indicates that puritanical cultures fear that lust, gluttony, or intoxicants will make people slave to their urges, while they view ascetic restraint and regular self-discipline as ways to train one's self-control (Fitouchi et al., 2023a). People often believe that children's self-control can be trained (Mukhopadhyay & Yeung, 2010), and that pornography (Grubbs et al., 2019), intoxicants (El Khoury et al., 2019), as well as fatty and sugary foods (Ruddock & Hardman, 2017) can be addictive—addiction being basically a disruption of self-control (Baler & Volkow, 2007; Volkow & Baler, 2013).

If people perceive both that cooperation requires self-control, and that immoderate indulgence in bodily pleasures reduces self-control, they might perceive indulgence in bodily pleasures as facilitating uncooperative behaviors indirectly—through their effects on self-control (Fitouchi et al., 2023a). Because threats to cooperation trigger moral condemnation (André et al., 2022b; Curry et al., 2019), the moral disciplining hypothesis suggests that condemnations of bodily pleasures arise from perceptions that they erode cooperativeness by altering self-control (Fitouchi et al., 2023a). The hypothesis thus predicts that the more people perceive indulgence in bodily pleasures as reducing self-control and cooperativeness, the more they should judge bodily pleasures as morally wrong (Fitouchi et al., 2023a).

A weaker hypothesis is that harmless bodily pleasures are perceived, not as *eroding* the perpetrator's self-control, but as *signaling* that the perpetrator has low self-control and is thus less trustworthy in the first place (Celniker et al., 2023). Like the moral disciplining hypothesis, this signaling hypothesis implies that bodily pleasures activate cognitive systems designed for reciprocal cooperation, undermining pluralists' argument that the moral condemnation of bodily pleasures would in itself imply a plurality of moral cognitive systems.

In five pre-registered experiments, we test several predictions of the moral disciplining and signaling hypotheses. We test some predictions that they both make, and also differential predictions that discriminate between them. We investigate whether targets who increase (vs. decrease) their consumption of harmless sex, food, alcohol, and inactivity over several months are perceived as becoming more likely to cheat in cooperative interactions. We test whether this perception is mediated by the perception that the targets have become less self-controlled; and whether these perceptions that bodily pleasures decrease self-control and cooperativeness are associated with viewing bodily pleasures as morally wrong—that is, with holding puritanical moral judgments.

Design and predictions for all five studies were pre-registered prior to data collection. Data, analysis scripts, pre-registrations, and study materials for all studies are available on the Open Science Framework: https://osf.io/52thu/?view_only=5d85c91bb3a1448c80cfdf0edad952cb. Unless indicated otherwise in the manuscript or in the Supplementary Materials, all analyses were pre-registered.

2. Study 1

The goal of Study 1 was to provide a first test of whether (i) increased consumption of bodily pleasures may be perceived as decreasing cooperativeness, (ii) this perception is mediated by the perception that bodily pleasures decrease self-control, and (ii) these perceptions are

associated with viewing bodily pleasures as morally wrong—that is, with holding puritanical moral judgments.

2.1. Methods

2.1.1. Participants

401 U.S. participants (199 males, 198 females, 4 unknown; M_{age} = 33.22, SD_{age} = 12.54) were recruited from online research participation platform Prolific. Our pre-registered sample size was determined by a priori power analysis, based on a minimal effect size of interest of d = 0.3 for our main experimental effects, which is conventionally considered a small-to-medium effect size (Cohen, 1988). 400 participants provide more than 80% power ($\alpha = 0.05$, two-sided t-tests) for testing our experimental predictions. Twenty-two participants who failed the attention check were excluded from the sample, bringing sample size to 379.

2.1.2. Design, procedures, and measures

After consenting, participants were randomly assigned to a Restraint condition or an Indulgence condition, between subjects. In the Indulgence condition, participants read about an individual (Max) who had been caused to increasingly consume alcohol, watch pornography, eat fatty and sugary foods, and laze on the couch over the last three months. In the Restraint condition, participants read a scenario about an individual caused to decrease his consumption of these pleasures over the last three months (see Supplementary Table S1 for full materials). Because we wanted to capture not only participants' perceptions of the signaling value of indulgence and restraint, but also their causal effect on the target's self-control and cooperativeness, we described the increase in indulgence or restraint as resulting from an exogenous change in the individual's environment and asked participants about the resulting effects of the lifestyle change on the target's character traits.

Perceived change in cooperativeness, moral character, and trait-self-control. Participants were asked to "indicate how Max's lifestyle change over the past months may have affected [several of his] character traits." They answered questions about the target's *cooperativeness* (four items; "As result of this lifestyle change, would you say that Max is now more or less likely to cheat his partner if he had the chance?", reverse-coded, "to return a significant amount of money lent to him?", "to slack off and let colleagues do his part of the work", reverse-coded, to "refuse to help a friend if he has better to do?"; $\alpha = 0.91$), *moral character* (five items; e.g., "As a result of this lifestyle change, would you say that Max is now more or less loyal", "honest", trustworthy"; $\alpha = 0.94$) and *trait-self-control* (six items; e.g., "As a result of this lifestyle change, would you say that Max is now more or less able to work himself effectively toward long-term goals"; $\alpha = 0.96$). All questions were on seven-point scales (-3 = *Much less*, 0 = *Neither more nor less*, 3 = *Much more*).

The questions about moral character provided another measure of perceived change in cooperativeness that complement our first measure. Our first measure asked about the target's likelihood to commit *specific* cheating behaviors (e.g., cheating their partner, refusing to help a friend). The questions about moral character, by contrast, asked about more *general* traits constitutive of a good cooperation partner across situations (e.g., honestly, reliability, trustworthiness). They were selected and adapted from established measures (Goodwin, 2015). Questions about trait-self-control were selected and adapted from the trait-self-control scale (Tangney et al., 2004) so that their target was not the self but the person described in the scenario. To disguise the aim of the study, participants also completed measures of the target's change in warmth and competence (Fiske et al., 2007). As pre-registered, these measures were not analyzed.

Puritanical moral judgements. Four questions assessed participants' endorsement of puritanical moral judgments ($\alpha = 0.77$). Participants rated the moral desirability of four

harmless bodily pleasures: "masturbating regularly for the sake of pleasure", "regularly drinking too much alcohol when one is alone after work", "regularly eating to excess, in particular fat and sugar, to get as much pleasure as possible," and "taking pleasure in laziness on a regular basis" (1 = *Highly morally desirable*, 7 = *Highly morality undesirable*). These questions assessed participants' moral judgment of harmless bodily pleasures in general, not their moral judgment of the target's behavior specifically.

2.2. Results

2.2.1. Perceived effect of lifestyle change on cooperativeness, moral character, and self-control.

As predicted, compared to increased restraint, increased indulgence in harmless bodily pleasures was perceived as negatively affecting the target's cooperativeness (indulgence: $M = – 0.81$, $SD = 0.86$, restraint: $M = 0.97$, $SD = 0.81$, $t(377) = - 20.5$, $p < .001$, $d = - 2.11$), moral character (indulgence: $M = -0.97$, $SD = 0.80$; restraint: M = 1.11, SD = 0.73, $t(376) = -26.44$, $p < .001$, $d = -2.71$), and trait-self-control (indulgence: $M = - 1.59$, $SD = 0.78$, restraint: $M = 1.71$, $SD = 0.78$, $t(375) = - 41.16$, $p < .001$, $d = - 4.23$).

Indulgence was perceived as *decreasing* self-control, moral character, and cooperativeness, while restraint was perceived as *increasing* self-control, moral character, and cooperativeness (Figure 1). In the indulgence condition, mean ratings of perceived change were significantly lower than the 0-point of the response scale for cooperativeness, $t(193) = - 13.07$, $p < .001$, $d = - 0.93$, moral character, $t(193) = -16.83$, $p < .001$, $d = - 1.21$, and self-control, $t(193) = -28.31$, $p < .001$, $d = -1.59$. In the restraint condition, mean ratings were significantly greater than the 0-point of the scale (cooperativeness: $t(182) = 16.11$, $p < .001$, $d = 1.19$; moral character: $t(182) = 20.65$, $p < .001$, $d = 1.52$; self-control: $t(182) = 29.72$, $p < .001$, $d = 2.20$).

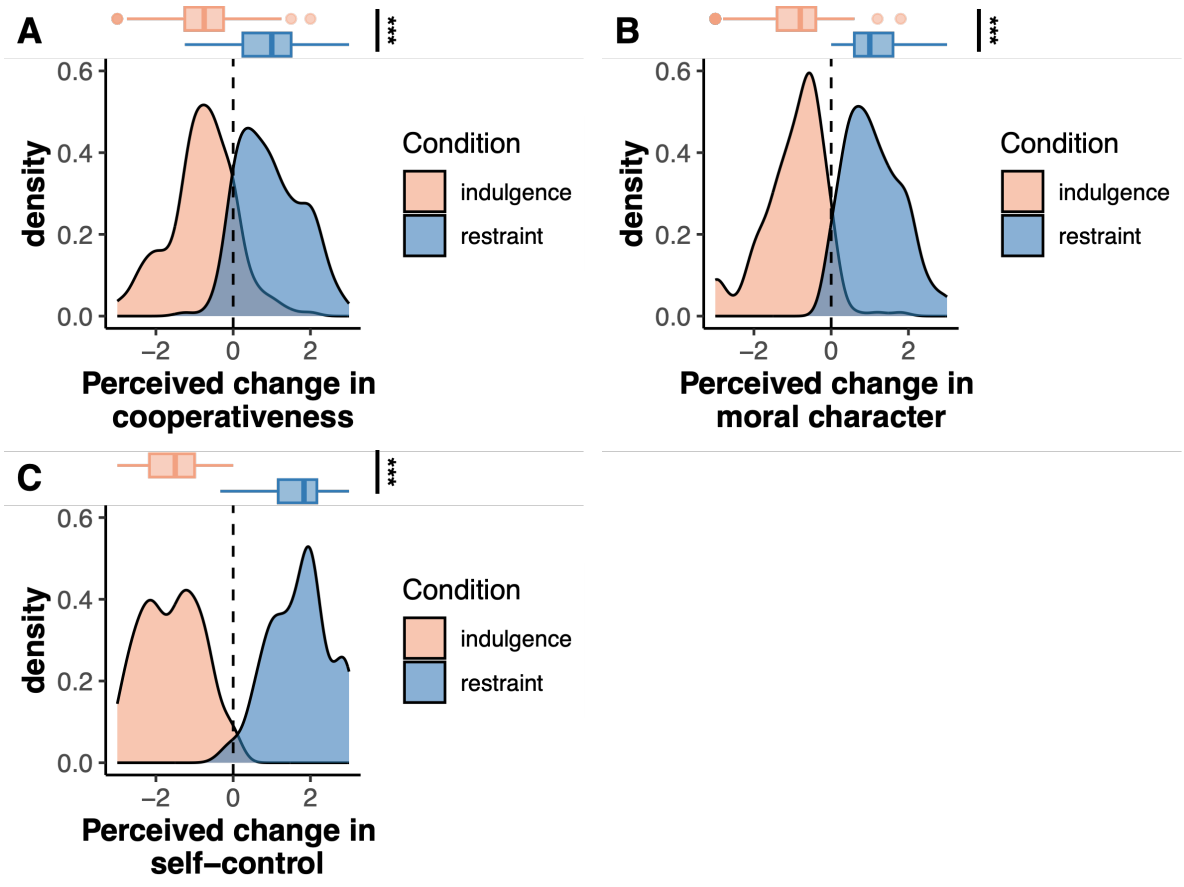

Figure 1. Distributions of perceived change in cooperativeness (**A**), moral character (**B**), and trait-self-control (**C**) of targets who increased (indulgence) vs. decreased (restraint) consumption of harmless bodily pleasures over the last three months in Study 1. Vertical dashed lines correspond to no perceived change. Values less than 0 indicate perceived reduction in a given trait; values greater than 0 indicate perceived increase in the trait.

2.2.2. Does perceived change in self-control predict perceived change in cooperativeness?
As predicted, in the indulgence condition, the more participants' perceived indulgence as decreasing the target's self-control, the more they perceived indulgence as decreasing the target's cooperativeness, $r(192) = 0.59$, $p < .001$, and moral character, $r(192) = 0.60$, $p < .001$. In the restraint condition, the more participants perceived restraint as increasing self-control, the more they perceived restraint as increasing cooperativeness, $r(181) = 0.57$, $p < .001$, and moral character, $r(181) = 0.57$, $p < .001$.

2.2.3. Is the perceived effect of harmless pleasures on cooperativeness mediated by their perceived effect on self-control?
We performed model-based mediation analyses, with 10,000 bootstrap samples, with R package "mediation" (Tingley et al., 2014). This analysis was not pre-specified in our pre-registration. The effect of lifestyle change on perceived change in cooperativeness was significantly mediated by perceived change in self-control, $b = 2.06$, 95% CI = [1.75, 2.38], $p < .001$, leaving a nonsignificant direct effect, $b = -0.28$, 95% CI = [-0.61, 0.04], $p = .09$. The proportion of effect mediated was 100%. The effect of lifestyle change on perceived change in moral character was also significantly mediated by perceived change in self-control, $b = 1.91$, 95% CI = [1.62, 2.19], $p < .001$, leaving a nonsignificant direct effect, $b = .17$, 95% CI = [-0.12, 0.46], $p = .2$. The proportion of effect mediated was 92%. Note that we did not manipulate the mediator experimentally: these mediations are correlational results. They are consistent with bodily pleasures being perceived as decreasing cooperativeness because they are perceived as decreasing self-control, but they do not provide causal evidence for this claim.

2.2.4. Do these perceptions predict puritanical moral judgements?
As predicted, the more participants in the indulgence condition perceived indulgence as decreasing cooperativeness, the more they considered harmless bodily pleasures to be morally wrong, $r(192) = -0.31$, $p < .001$. Perception that indulgence decreases moral character $r(192) = -0.56$, $p < .001$, and self-control, $r(192) = -0.36$, $p < .001$, also predicted puritanical moral judgments. Puritanical moral judgments were also associated with perceiving restraint as increasing moral character, $r(181) = 0.15$, $p < .05$, and self-control, $r(181) = 0.18$, $p < .05$, for participants in the restraint condition. Contrary to prediction, there was no significant relationship between perceiving restraint as increasing cooperativeness and puritanical moral judgments, $r(181) = 0.12$, $p = 0.1$. Figure 2 summarizes these relationships.

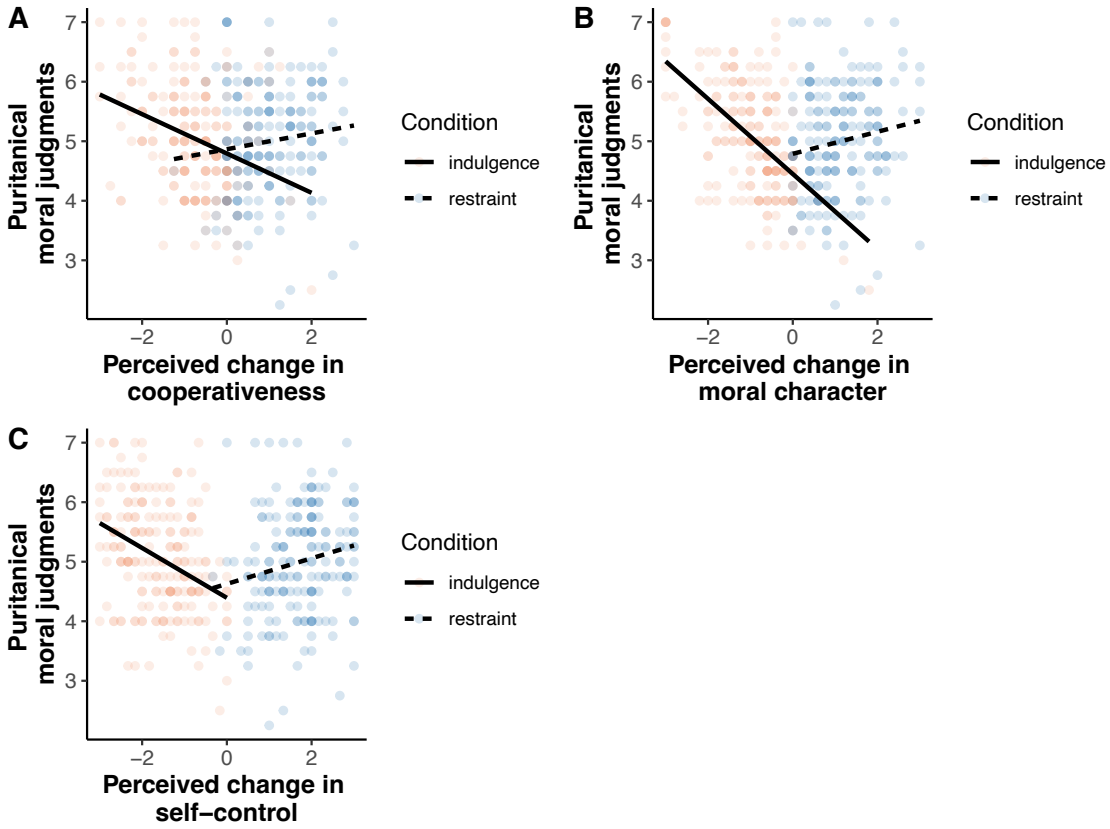

Figure 2. Relationships between puritanical moral judgements and perceptions that indulgence (or restraint) decreases (or increases) cooperativeness (**A**), moral character (**B**), and self-control (**C**). Values less than 0 indicate perceived reduction in a given trait; values greater than 0 indicate perceived increase in the trait.

2.3. Discussion

Study 1 suggests that indulgence in bodily pleasures activates inferences about cooperation and self-control and that these inferences are associated with puritanical moral judgments. Three questions remain, however. First, the target indulged in four pleasures simultaneously (sex, food, alcohol, laziness). This leaves open the possibility that only some of these pleasures are responsible for the overall effects. Second, the effects observed may be due to general halo effects (Nisbett & Wilson, 1977) or to demand characteristics (Nichols & Maner, 2008). We address these questions in Studies 2a-b.

Third, the target's lifestyle change was prompted by an exogenous change in opportunities for indulgence but still depended on *his decision* to seize these opportunities. Thus, participants' answers might reflect the perception that indulgence *signals* that the target had low self-control to begin with (consistent with the signaling hypothesis), rather than the belief that indulgence has *eroded* the target's self-control (consistent with the moral disciplining hypothesis). We address these questions in Studies 3 and 4.

3. Study 2a

The main goal of Study 2a was to test whether each of the several harmless bodily pleasures (food, sex, alcohol, and laziness) independently triggers inferences about self-control and thus cooperativeness. We used scenarios describing an increase (or decrease) in only one bodily pleasure at a time, varying which one between subjects.

3.1. Methods

3.1.1. Participants

720 U.S. participants (90 per condition; 358 males, 358 females, 4 unknown; M_{age} = 36.81, SD_{age} = 12.49) were recruited from Prolific. Pre-registered sample size was determined by a priori power analysis. In Study 1, the smallest correlation between puritanical moral judgements and perceived change in cooperativeness was ~0.30. The number of participants required to achieve 80% power to detect such an effect within each "indulgence" condition in the current design is 82 (α = 0.05). Our target sample size thus provides better than 80% power for our main correlational predictions. Twenty-four participants who failed the attention check were excluded from the sample, bringing sample size to 696.

3.1.2. Design, procedure, and measures

After consenting, participants were randomly assigned to one of eight conditions: Food-Indulgence, Food-Restraint, Sex-Indulgence, Sex-Restraint, Alcohol-Indulgence, Alcohol-Restraint, Laziness-Indulgence, Laziness-Restraint (see Supplementary Table S2 for full descriptions of the eight scenarios). Participants completed measures of perceived change in cooperativeness (α = 0.87), moral character (α = 0.92), trait-self-control (α = 0.94), warmth (α = 0.82), and competence (α = 0.90), identical to those of Study 1.

In the indulgence conditions, participants completed measures of puritanical moral judgments identical to those of Study 1 (e.g., "masturbating regularly for the sake of pleasure"; 1 = *Highly morally desirable,* 7 = *Highly morally undesirable*; α = 0.73). Unlike in Study 1, in the restraint conditions, puritanical moral judgments were assessed in terms of moral praise of restraint rather than in terms of moral disapproval of indulgence (e.g., "refraining from masturbating too frequently", 1 = *Highly morally undesirable,* 7 = *Highly morally desirable*; α = 0.87). This was to determine whether the weaker correlations between perceived effects of restraint and puritanical moral judgments in Study 1 were only due to our questions being framed in terms of moral disapproval of indulgence rather than in terms of moral praise of restraint.

3.2. Results

3.2.1. Is each bodily pleasure independently perceived as decreasing self-control, cooperativeness, and moral character?

Collapsing across domains of pleasure (sex, food, alcohol, and laziness), Study 2 replicated the first finding of Study 1. Indulgence was perceived as generating a significantly negative change in the target's cooperativeness, M = - 0.42, SD = 0.84, $t(348)$ = - 9.3, $p < .001$, d = -0.50, moral character, M = - 0.49, SD = 0.84, $t(348)$ = -11.1, $p < .001$, d = -0.59, and self-control, M = -1.06, SD = 0.93, $t(348)$ = -21.4, $p < .001$, d = -1.14. By contrast, restraint was perceived as generating a significantly positive change in the target's cooperativeness, M = 0.58, SD = 0.80, $t(346)$ = 13.4, $p < .001$, d = 0.72, moral character, M = 0.75, SD = 0.75, $t(346)$ = 18.7, $p < .001$, d = 1.00, and self-control, M = 1.11, SD = 0.76, $t(346)$ = 27.3, $p < .001$, d = 1.47.

As shown in Table 1 and Figure 3, each bodily pleasure was significantly and independently perceived as more negatively affecting the target's cooperativeness, self-control, and moral character, compared to restraint from this pleasure.

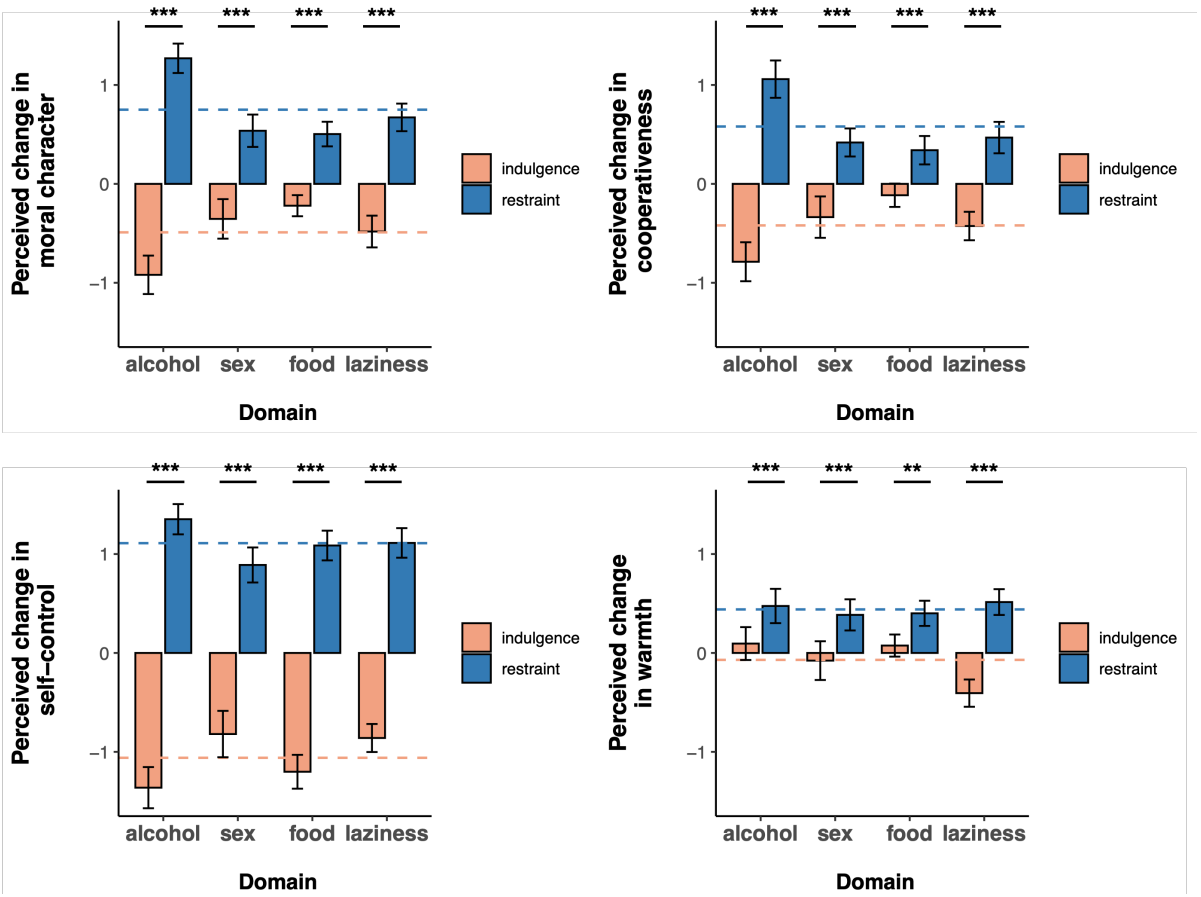

Figure 3. Mean perceived change in moral character (**A**), cooperativeness (**B**), self-control (**C**), and warmth (**D**) for targets who increased (indulgence) vs. decreased (restraint) their indulgence in alcohol, sex, food, and laziness in Study 2a. Values less than 0 indicate perceived reduction in a given trait; values greater than 0 indicate perceived increase in the trait. Horizontal dashed lines represent the mean perceived change in the trait across each class of condition (blue: across restraint conditions; orange: across indulgence conditions). Error bars represent the 95% confidence intervals.

Table 1. Perceived effect of target lifestyle changes in each domain of pleasure (sex, food, alcohol, laziness) on target's cooperativeness, moral character, self-control, and warmth in Study 2a. Effect sizes for all one-sample *t*-tests against the scale midpoint are reported in Supplementary Table S4.

	Food indulgence (n = 87)	Food restraint (n = 83)	Difference between group means

	M	*SD*	*p*	*M*	*SD*	*p*	*t*	*p*	*d*
Cooperativeness change	-0.11	0.55	.056	0.34	0.66	<.001	-4.87	<.001	-0.75
Moral character change	-0.22	0.50	<.001	0.50	0.57	<.001	-8.79	<.001	-1.35
Self-control change	-1.20	0.80	<.001	1.09	0.69	<.001	-19.98	<.001	-3.05
Warmth change	0.07	0.52	.19	0.40	0.58	<.001	-3.83	<.001	-0.59
	Alcohol indulgence (*n* = 87)			Alcohol restraint (*n* = 89)			Difference between group means		
	M	*SD*	*p*	*M*	*SD*	*p*	*t*	*p*	*d*
Cooperativeness change	-0.79	0.92	<.001	1.06	0.90	<.001	-13.44	<.001	-2.03
Moral character change	-0.92	0.91	<.001	1.27	0.71	<.001	-17.78	<.001	-2.69
Self-control change	-1.36	0.98	<.001	1.35	0.73	<.001	-20.89	<.001	-3.16
Warmth change	0.09	0.78	.26	0.47	0.82	<.001	-3.14	.002	-0.47
	Sexual indulgence (*n* = 87)			Sexual restraint (*n* = 89)			Difference between group means		
	M	*SD*	*p*	*M*	*SD*	*p*	*t*	*p*	*d*
Cooperativeness change	-0.34	0.98	.0019	0.42	0.67	<.001	-5.94	<.001	-0.90
Moral character change	-0.35	0.94	<.001	0.54	0.78	<.001	-6.86	<.001	-1.04
Self-control change	-0.82	1.10	<.001	0.89	0.84	<.001	-11.57	<.001	-1.75
Warmth change	-0.08	0.92	.43	0.38	0.75	<.001	-3.66	<.001	-0.55
	Laziness indulgence (*n* = 88)			Laziness restraint (*n* = 86)			Difference between group means		
	M	*SD*	*p*	*M*	*SD*	*p*	*t*	*p*	*d*
Cooperativeness change	-0.43	0.68	<.001	0.47	0.74	<.001	-8.29	<.001	-1.26
Moral character change	-0.48	0.76	<.001	0.67	0.65	<.001	-10.78	<.001	-1.63
Self-control change	-0.86	0.67	<.001	1.11	0.68	<.001	-19.04	<.001	-2.89
Warmth change	-0.41	0.65	<.001	0.51	0.61	<.001	-9.65	<.001	-1.46

To rule out halo effects (Nisbett & Wilson, 1977) and demand characteristics (Nichols & Maner, 2008) as alternative explanations for our results, we compared the effects on self-control, cooperativeness, and moral character with those on perceived change in warmth (not preregistered). Halo effects occur when people assume that individuals with a positive trait in one domain (e.g., attractiveness) also have positive traits in unrelated domains (e.g., intelligence). In our context, participants may have rated indulgent targets as less cooperative not because they see self-control as necessary for cooperation, but because they would have overgeneralized a negative trait in one domain (indulgence) to a negative trait in another domain (uncooperativeness). If this were the case, participants should also rate the indulgent target as more unwarm—another negative trait that is theoretically not expected to depend on self-control (Fitouchi et al., 2023a). Similarly, demand characteristics imply that participants would indiscriminately rate indulgent targets negatively on all dimensions; it would be unlikely that participants figure out the experimenter's hypothesis to be about some traits (self-control, cooperation), but not others (warmth).

While indulgence in each bodily pleasure was almost always significantly perceived as decreasing self-control, cooperativeness, and moral character, the perceived effect of indulgence on warmth was less consistent (see Figure 3 and Table 1). Mean perceived change

in warmth was not significantly different from zero in the food-indulgence condition, M = 0.07, SD = 0.52, $t(86) = 1.33$, $p = 0.19$, $d = 0.14$, the alcohol-indulgence condition, $M = 0.09$, $SD = 0.78$, $t(86) = 1.13$, $p = 0.26$, $d = 0.12$, and the sex-indulgence condition, $M = -0.78$, $SD = 0.92$, $t(86) = -0.79$, $p = 0.43$, $d = -0.08$. To further test whether perceived changes in warmth were less affected by indulgence than other traits, we fitted a linear mixed-effects regression predicting trait ratings (−3 to +3) from condition (indulgence vs. restraint), trait type (warmth, self-control, moral character, cooperativeness), and their interaction, with a random intercept for participant. There were significant interactions between trait type and condition, such that the effect of indulgence on participants' ratings was significantly weaker for warmth than for self-control, $b = 1.65$, $t(2082) = 29.01$, $p < .001$, cooperativeness, $b = 0.47$, $t(2082) = 8.29$, $p < .001$, and moral character, $b = 0.72$, $t(2082) = 12.74$, $p < .001$. This suggests that the effects observed for self-control, cooperativeness, and moral character were not due to participants indiscriminately rating indulgent targets negatively in all respects.

As pre-registered, we also tested whether the effect of indulgence varied by domain of pleasure. We regressed lifestyle change (indulgence vs. restraint; contrast coded), domain (sex, food, alcohol, laziness; contrast coded), and their interaction on perceived change in cooperativeness. There was a significant interaction between domain and lifestyle change. Indulging in alcohol was perceived as more negatively affecting the target's cooperativeness, compared to the mean effect of indulgence across domains of pleasure, $b = -0.43$, $t(688) = -8.45$, $p < .001$. Indulgence in sex, $b = 0.12$, $t(688) = 2.29$, $p = .02$, and food, $b = 0.27$, $t(688) = 5.17$, $p < .001$, were perceived as less negatively affecting the target's cooperativeness, compared to the mean effect of indulgence across domains of pleasure. In other words, as visible on Figure 3, not all bodily were perceived as equally affecting cooperativeness; the negative effect of indulgence on cooperativeness was significantly stronger for alcohol and significantly weaker for food and sex. The same models for perceived change in self-control and moral character yielded similar results (see Supplementary Table S6 for full statistics).

3.2.2. Is the effect of each bodily pleasure on cooperativeness and moral character mediated by its effect on self-control?

Replicating Study 1, when collapsing across domains of pleasure, perceived change in self-control fully mediated the effect of indulgence (vs. restraint) on perceived change in cooperativeness (*ACME* = 1.29, 95% CI = [1.15, 1.44], $p < .001$, *ADE* = -0.30, 95% CI = [-0.46, -0.15], $p < .001$, Prop. mediated: 100%) and moral character (*ACME* = 1.22, 95% CI = [1.09, 1.37], $p < .001$, *ADE* = 0.02, 95% CI = [-0.13, -0.17], $p = 0.78$, Prop. mediated: 98%).

As pre-registered, we tested whether these mediation effects were found for each bodily pleasure independently. As shown in Table 2, the perceived effect of gluttony, masturbation, and laziness on moral character were fully mediated by their perceived effect on self-control, while the perceived effect of alcohol on moral character was only partially mediated its perceived effect on self-control. Similar mediation results were found for perceived change in cooperativeness (Supplementary Table S7).

Table 2. Mediation of perceived change in moral character by perceived change in self-control for each harmless bodily pleasure in Study 2a.

Domain	ACME	ADE	Total effect	Prop. mediated
Alcohol	1.56^{***} [1.23,1.91]	0.63^{***} [0.27, 0.99]	2.19^{***} [1.95, 2.43]	71%
Sex	1.12^{***} [0.88, 1.37]	-0.23^{*} [-0.45, 0.00]	0.89^{***} [0.63, 1.14]	100%

Food	0.70*** [0.47, 0.94]	0.03 [-0.24, 0.29]	0.72*** [0.56, 0.84]	96%
Laziness	1.03*** [0.75, 1.32]	0.13 [-0.19, 0.45]	1.15*** [0.94, 1.37]	89%

Note: Numbers in brackets represent the 95% confidence intervals. ACME, average causal mediation effect; ADE, average direct effect.
*$p < .05$. **$p < .01$, ***$p < .001$

3.2.3. Do these perceptions predict puritanical moral judgments?
Collapsing across domains of pleasure, the more participants perceived indulgence as decreasing self-control, $r(347) = -.37$, $p < .001$, cooperativeness, $r(347) = -.27$, $p < .001$, and moral character $r(347) = -.35$, $p < .001$, the more they judged harmless bodily pleasures to be morally wrong. Puritanical moral judgments were also associated, although to a weaker extent, with perceptions that restraint increases self-control, $r(345) = .26$, $p < .001$, cooperativeness, $r(345) = .20$, $p < .001$, and moral character, $r(345) = .17$, $p = .0016$.

As pre-registered, we tested whether the effect of perceived change in cooperativeness on puritanical moral judgments was stronger for certain domains of pleasure than for others. In predicting puritanical moral judgments, no significant interaction was found between domain (sex, food, alcohol, laziness) and cooperativeness change, nor between domain and self-control change and moral character change (see Supplementary Tables S8, S9, and S10 for full statistics). In other words, holding puritanical moral judgments was not more strongly associated with perceiving one bodily pleasure, more than others, as decreasing self-control, cooperativeness, or moral character.

4. Study 2b

The goal of Study 2b was to further ensure that the effects observed in Study 1 and Study 2a were not due to demand characteristics. When describing the target's behavior, the vignettes of Studies 1 and 2a used words such as "indulging" or "moderation," which could have created demand characteristics by being interpreted as conveying a judgement of the experimenter on the self-control and character of Max. Study 2b thus aimed to conceptually replicate Study 2a while only using neutral words that do not relate to self-control or character.

4.1. Methods

4.1.1. Participants
1,200 U.S. participants (150 per condition; 589 males, 593 females, 10 unknown; M_{age} = 39.63, SD_{age} = 12.85) were recruited from Prolific. Pre-registered sample size was determined by a priori power analysis. In study 2a, the smallest difference from zero in an "indulgence" condition was for cooperativeness change in the food-indulgence condition, with an effect size of $d = -0.21$ ($M = -0.11$, $SD = 0.55$). The number of participants required to achieve 80% power to detect such an effect within each "indulgence" condition in the current design is 142 ($\alpha = 0.05$). Our target sample size thus provides better than 80% power for detecting this smallest effect of interest. Seventy participants who failed the attention check were excluded from the sample, bringing sample size to 1,130.

4.1.2. Design, procedure, and measures
The design was identical to that of Study 2a, with one exception. The vignettes described an increase in the target's indulgence or restraint without using words such as "indulging," "overindulging," or "moderation," which might have been perceived by participants as a suggestion from the experimenter that Max had lost self-control or character. Instead, the

scenarios used neutral words that focused on the concrete behaviors enacted by Max, such as "drinking alcohol on a regular basis," "masturbated much less frequently," or being "physically inactive" (Table 3; see Supplementary Table S2 for full materials).

Participants completed the measures of perceived change in cooperativeness (α = 0.84), moral character (α = 0.92), trait-self-control (α = 0.93), warmth (α = 0.86), competence (α = 0.93), and puritanical moral judgements (indulgence conditions: α = 0.75; restraint conditions: α = 0.89), identical to those of Study 2a.

Table 3. Examples of scenarios describing indulgence versus restraint in Study 2b.

Domain	Indulgence	Restraint
Sex	Three months ago, Max moved across the border, from a country where pornography is illegal to a country where it is easily available. As a result of this new environment, Max has been masturbating on a regular basis over the past three months. He has greatly increased his consumption of pornography, and has engaged in sexual stimulation much more frequently in his free time.	Three months ago, Max moved across a border to a country where pornography is illegal, and thus much less easily available. As a result of this new environment, Max has masturbated much less frequently over the past three months. He has greatly decreased his consumption of pornography, and has engaged in sexual stimulation much less frequently in his free time.
Alcohol	Three months ago, Max moved to another city for the purpose of his job. The neighborhood he now lives in has many more bars than his previous neighborhood. As a result of this new environment, Max has been drinking alcohol on a regular basis over the past three months. He has greatly increased his consumption of beer, wine, and other alcoholic beverages. He got drunk much more frequently.	Three months ago, Max moved to another city for the purpose of his job. The neighborhood he now lives in has many fewer bars than his previous neighborhood. As a result of this new environment, Max has been drinking alcohol much less frequently over the past three months. He has greatly decreased his consumption of beer, wine, and other alcoholic beverages. He got drunk much less frequently.

4.2. Results

4.2.1. Is each bodily pleasure independently perceived as decreasing self-control, cooperativeness, and moral character?

Conceptually replicating Study 1, collapsing across domains of pleasure, indulgence was perceived as generating a significantly negative change in the target's cooperativeness, M = -0.37, SD = 0.76, $t(556)$ = -11.73, $p < .001$, d = -0.50, moral character, M = -0.51, SD = 0.77, $t(556)$ = -15.55, $p < .001$, d = -0.66, and self-control, M = -1.08, SD = 0.87, $t(556)$ = -29.40, $p < .001$, d = -1.24. By contrast, restraint was perceived as generating a significantly positive change in the target's cooperativeness, M = 0.60, SD = 0.84, $t(564)$ = 16.97, $p < .001$, d = 0.71, moral character, M = 0.78, SD = 0.78, $t(564)$ = 24.24, $p < .001$, d = 1.02, and self-control, M = 1.12, SD = 0.82, $t(564)$ = 32.30, $p < .001$, d = 1.36.

Conceptually replicating Study 2a, indulgence in sex, food, alcohol, and laziness were all independently and significantly perceived as decreasing the target's cooperativeness, self-control, and moral character (Figure 4; Supplementary Table S11). Restraint from food, sex, alcohol, and laziness, meanwhile, were all significantly and independently perceived as increasing the target's self-control, cooperativeness, and moral character (Figure 4; Supplementary Table S11). This suggests that the effects found in Study 1 and Study 2a were not due to demand characteristics emerging from words such as "indulging" or "moderation" in the vignettes of Study 1 and 2a.

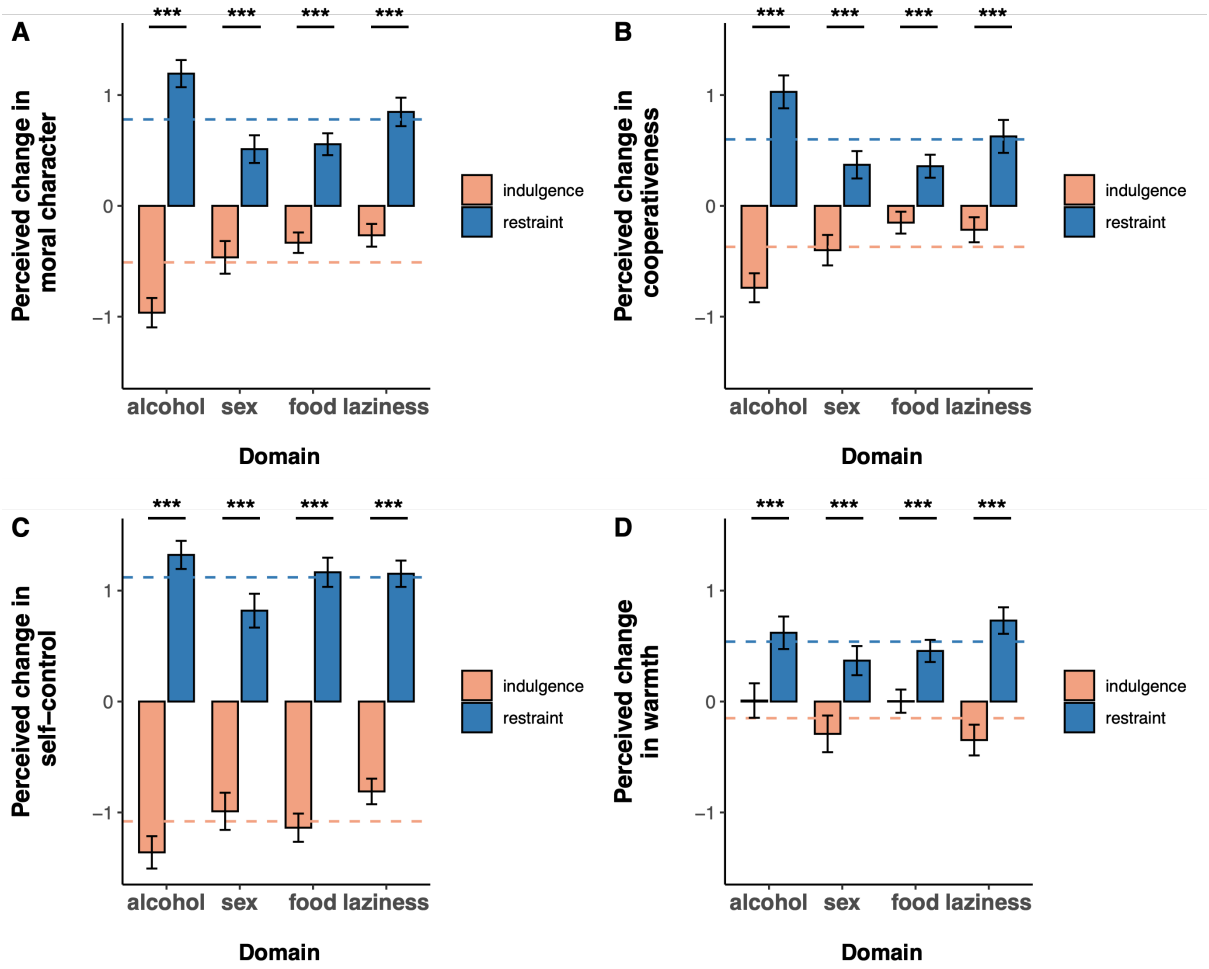

Figure 4. Mean perceived change in moral character (**A**), cooperativeness (**B**), self-control (**C**), and warmth (**D**) for targets who increased (indulgence) vs. decreased (restraint) their indulgence in alcohol, sex, food, and laziness in Study 2b. Values less than 0 indicate perceived reduction in a given trait; values greater than 0 indicate perceived increase in the trait. Horizontal dashed lines represent the mean perceived change in the trait across each class of condition (blue: across restraint conditions; orange: across indulgence conditions). Error bars represent the 95% confidence intervals.

To further rule out demand characteristics (Nichols & Maner, 2008), as well as halo effects (Nisbett & Wilson, 1977), as explanations of these results, we also tested—as we did in Study 2a—if the effects observed for self-control, cooperativeness, and moral character, were also observed for perceived change in warmth, a trait that is not theoretically predicted to be influenced by indulgence in harmless bodily pleasures (Fitouchi et al., 2023a). As shown in Figure 4, while indulgence in each bodily pleasure was always significantly perceived as decreasing self-control, cooperativeness, and moral character (see Supplementary Table S11 and S13 for full statistics), the perceived effect of indulgence on warmth was less consistent. Mean perceived change in warmth was not significantly different from zero in the food-indulgence condition, $M = 0.00$, $SD = 0.63$, $t(141) = 0.07$, $p = 0.95$, $d = 0.01$, and the alcohol-indulgence condition, $M = 0.01$, $SD = 0.93$, $t(138) = 0.11$, $p = 0.91$, $d = 0.01$. To further test whether perceived changes in warmth were less affected by indulgence than other traits, we fitted a linear mixed-effects regression predicting trait ratings (−3 to +3) from condition (indulgence vs. restraint), trait type (warmth, self-control, moral character, cooperativeness), and their interaction, with a random intercept for participant. There were significant interactions between trait type and condition, such that the effect of indulgence on

participants' ratings was significantly weaker for warmth than for self-control, $b = 1.50$, $t(3365) = 33.24$, $p < .001$, cooperativeness, $b = 0.28$, $t(3365) = 6.27$, $p < .001$, and moral character, $b = 0.59$, $t(3365) = 13.19$, $p < .001$). This suggests that the effects observed for self-control, cooperativeness, and moral character were not due to participants indiscriminately rating indulgent targets negatively in all respects.

4.2.2. Is the effect of each bodily pleasure on cooperativeness and moral character mediated by its effect on self-control?

Conceptually replicating Study 1, when collapsing across domains of pleasure, perceived change in self-control fully mediated the effect of indulgence (vs. restraint) on perceived change in cooperativeness (*ACME* = 1.25, 95% CI = [1.14, 1.36], $p < .001$, *ADE* = -0.27, 95% CI = [-0.39, -0.15], $p < .001$, Prop. mediated: 100%) and moral character (*ACME* = 1.19, 95% CI = [1.09, 1.30], $p < .001$, *ADE* = 0.10, 95% CI = [-0.02, 0.22], $p = .1$, Prop. mediated: 92%).

Conceptually replicating Study 2a, perceived change in self-control mediated the perceived effect on cooperativeness of each bodily pleasure taken independently. As shown in Table 4, the perceived effect of gluttony, masturbation, and laziness on moral character were fully mediated by their perceived effect on self-control, while the perceived effect of alcohol on moral character was only partially mediated its perceived effect on self-control. Similar mediation results were found for perceived change in cooperativeness (see Supplementary Table S14 for full statistics).

Table 4. Mediation of perceived change in moral character by perceived change in self-control for each harmless bodily pleasure in Study 2b.

Domain	ACME	ADE	Total effect	Prop. mediated
Alcohol	1.63^{***} [1.38, 1.87]	0.53^{***} [0.27, 0.79]	2.16^{***} [1.98, 2.34]	75%
Sex	0.92^{***} [0.74, 1.11]	0.05 [-0.16, 0.26]	0.98^{***} [0.78, 1.17]	94%
Food	0.84^{***} [0.65, 1.02]	0.05 [-0.16, 0.27]	0.89^{***} [0.75, 1.02]	94%
Laziness	1.09^{***} [0.88, 1.30]	0.03 [-0.21, 0.27]	1.11^{***} [0.95, 1.28]	97%

Note: Numbers in brackets represent the 95% confidence intervals. ACME, average causal mediation effect; ADE, average direct effect.
$^{*}p < .05$. $^{**}p < .01$, $^{***}p < .001$

4.2.3. Do these perceptions predict puritanical moral judgments?

Conceptually replicating Study 2a, collapsing across domains of pleasure, the more participants perceived indulgence as decreasing self-control, $r(556) = -0.34$ $p < .001$, cooperativeness, $r(556) = -0.24$, $p < .001$, and moral character $r(556) = -0.23$, $p < .001$, the more they judged harmless bodily pleasures to be morally wrong. Puritanical moral judgments were also associated, although to a weaker extent, with perceptions that restraint increases self-control, $r(564) = 0.13$, $p = 0.003$, and cooperativeness, $r(564) = 0.17$, $p < .001$. Contrary to prediction, however, the perception that restraint increases moral character did not significantly predict puritanical moral judgements, $r(564) = 0.05$, $p = 0.25$.

4.3. Discussion of Studies 2a-b

Studies 2a-b indicate that the effects observed in Study 1 hold for each bodily pleasure separately and are unlikely to be due to demand characteristics or general halo effects. However, they do not rule out the possibility that participants perceived indulgence as *signaling* that the targets had low self-control and cooperativeness to begin with (consistent with the signaling hypothesis), rather than as *eroding* the target's self-control and cooperativeness (consistent with the moral disciplining hypothesis).

5. Study 3

Studies 1 and 2a-b have established that harmless bodily pleasures, at the very least, trigger cooperation-related inferences. In those studies, we described the increase in indulgence or restraint as stemming from an exogenous change in the individual's environment. This was to ensure that participants perceived the individual's lifestyle change not only as signaling his underlying disposition to cooperate, but also as causing him to behave less cooperatively. Yet because the target still had control over his behavior, his lifestyle change might still have been interpreted as resulting from his underlying traits. In Study 3, we avoid this interpretation by presenting participants with whole populations (hypothetical villages) that were either allowed or prohibited from indulging in bodily pleasures, explicitly caused by external authorities.

Study 3 also tested another, auxiliary hypothesis. Several lines of theory predict that people's preference for tight norms in general (Fitouchi et al., 2025; Gelfand et al., 2017; Nettle & Saxe, 2021), and puritanical norms in particular (Fitouchi et al., 2023a), should be stronger in more deprived and more unsecure environments. Thus, we manipulated both the village policy (indulgent or prohibitive) and the village resources (abundant or scarce) to test whether participants expect indulgence (vs. prohibition) to more negatively affect cooperativeness in poor populations compared to affluent ones.

5.1. Methods

5.1.1. Participants

500 U.S. participants (125 per condition; 226 males, 229 females, 6 unknown; M_{age} = 37.13, SD_{age} = 13.39) were recruited from www.prolific.co. Pre-registered sample size was determined by a priori power analysis. In Study 2a, the smallest correlation between puritanical moral judgments and perceived decrease in cooperativeness in the indulgence conditions was ~0.25. The number of participants required to achieve 80% power to detect such an effect within each indulgence condition in the current design is 120 (α= 0.05). Our target sample size thus provides more than 80% power for our main correlational predictions (~82%). Thirty-nine participants who failed the attention check were excluded from the sample, bringing sample size to 461.

5.1.2. Design, procedure, and measures

Study 3 used a "hypothetical society" methodology, in which participants are asked to make judgements about faraway societies in which they are never likely to live (Nettle & Saxe, 2021; Sprong et al., 2019). We manipulated both the village's resources (abundance vs. scarcity) and policy (indulgence vs. restraint) in a 2 x 2, between subject design.

After consenting, participants read about a village where villagers live in familial households, interact with neighbors regularly, and grow food in shared fields where all villagers work collectively. In the abundance conditions, the village was described as having more than enough resources for everyone's basic needs, while in the scarcity conditions, the

village had just enough resources for everyone's basic needs. We measured participants expectations about villager's *baseline cooperativeness* (six items; e.g., "villagers will be honest / reliable / trustworthy"; $\alpha = .91$) and *baseline self-control* (six items; e.g., "villagers will be self-disciplined / able to resist temptations"; $\alpha = .84$). Both measures were on 7-point scales (1 = *Strongly disagree*, 7 = *Strongly agree*).

Participants then read that a village council, which decides on the laws that govern life in the village, had recently made some changes to the law. In the indulgence condition, the council relaxed a law that used to limit sex, food, alcohol, and laziness in the village. In the prohibition condition, the council passed such a law (Supplementary Table S3).

Participants indicated whether they expected the legal change to increase or decrease villagers' cooperativeness (six items; e.g., "Compared to before the law was passed, would you say that villagers will become more or less honest / trustworthy"; $\alpha = .90$), and self-control (six items; e.g., "Compared to before the law was passed, would you say that villagers will become more or less impulsive / able to resist temptations"; $\alpha = .85$). Both measures were on 7-point scales (-3 = *Much less*, 0 = *Neither more nor less*, 3 = *Much more*). We assessed *puritanical moral judgments* with measures identical to those in Studies 2a-b (indulgent conditions: $\alpha = .84$; prohibition conditions: $\alpha = .85$).

5.2. Results

5.2.1. Baseline self-control and cooperativeness

Conceptually replicating previous studies (Nettle & Saxe, 2021), participants expected villagers to be more cooperative at baseline in the abundance village, $M = 5.77$, $SD = 0.80$, than in the scarcity village, $M = 5.52$, $SD = 0.85$, $t(455) = 3.29$, $p = .001$, $d = 0.31$. Non-preregistered analyses found a similar trend for baseline self-control that was not significant, $M_{abundance} = 5.25$, $SD = 0.86$; $M_{scarcity} = 5.10$, $SD = 0.87$, $t(459) = 1.86$, $p = .06$, $d = 0.17$.

5.2.2. Are harmless bodily pleasures perceived as reducing self-control and cooperativeness?

As predicted, participants expected the indulgence policy to make villagers less cooperative, $M = -0.62$, $t(212) = -8.77$, $p < .001$, $d = -0.60$, and less self-controlled, $M = -0.79$, $t(212) = -11.67$, $p < .001$, $d = -0.80$. Did they think the prohibition policy would make people more cooperative and self-controlled? No. Contrary to our prediction, these effects were negative, too (cooperativeness: $M = -1.24$, $t(247) = -18.44$, $p < .001$, $d = -1.17$; self-control: $M = -1.18$, $t(247) = -18.18$, $p < .001$, $d = -1.15$).

To explore why, we reasoned that unlike in Studies 1 and 2a-b, targets in Study 3 were coerced by an external authority to reduce their indulgence. Because online participants are more liberal and less puritanical than the general U.S. population (Chandler et al., 2019; Levay et al., 2016), which is itself amongst the least puritanical societies in a historical and cross-cultural perspective (Fitouchi et al., 2023a), participants might have perceived this coerced change as an oppressive restriction on villagers' rights, making villagers less likely to cooperate (specifically, they might revolt against the authorities who imposed the prohibition, which is a form of non-cooperation). Participants might also have expressed their disagreement with the prohibitive policy by rating it negatively.

To explore this, non-preregistered analyses tested whether the effect of policy on perceived change in self-control and cooperativeness was moderated by participants level of puritanism. The exploratory analyses revealed that participants' level of puritanism significantly moderated the effect of policy on expected change in self-control, $b_{interaction} = 0.28$, $t(457) = 3.77$, $p < .001$, and expected change in cooperation, $b_{interaction} = 0.31$, $t(457) = 3.90$, $p < .001$, to the point of reversing the effect of more puritanical participants. Participants with the highest score in puritanism (*7*) expected the prohibitive policy to be

better for cooperation (M = -0.77, SD = 1.71) and self-control (M = -1.07, SD = 1.57) than the indulgence policy ($M_{cooperation}$ = -1.31, SD = 1.21, $M_{self\text{-}control}$ = -1.40, $SD_{self\text{-}control}$ = 1.19). By contrast, participants with the lowest puritanism score (*1*) judged the indulgence policy to be better for cooperation (M = 2.11, SD = 1.26) and self-control (M = 1.33, SD = 1.53) than the restraint policy ($M_{cooperation}$ = -1.28, $SD_{cooperation}$ =0.96, $M_{self\text{-}control}$ = -0.833, $SD_{self\text{-}control}$ = 0.83).

As pre-registered, we also regressed policy, resources, and their interaction on both perceived change in cooperativeness and perceived change in self-control. There was a main effect of the restraint policy (vs. indulgence) on perceived change in cooperativeness, b = -0.64, $t(457)$ = -7.22, p < .001, which did not interact with village resources, $b_{interaction}$ = 0.04, $t(457)$ = 0.196, p = 0.845. There also was a main effect of the restraint policy (vs. indulgence) on perceived change in cooperativeness, b = -0.67, t(457) = -4.80, p < .001, which did significantly interact with village resource, $b_{interaction}$ = 0.37, $t(457)$ = 2.046, p = .04. The difference between the prohibition policy and the indulgent policy was lower in the affluent village than in the scarce village.

5.2.3. Do perceptions predict puritanical moral judgments?

As predicted, the more participants expected the indulgence policy to decrease villagers' self-control, $r(211)$ = -.39, p < .001, and cooperativeness, $r(211)$ = -.33, p < .001, the more they judged bodily pleasures to be morally wrong (Figure 5). These effects did not interact with village resources (self-control: $b_{interaction}$ = -0.113, $t(209)$ = - 0.723, p = 0.47; cooperativeness: $b_{interaction}$ = -0.127, $t(209)$= -0.858, p = 0.39). Participants' expectations about the effects of the restraint policy on villagers' self-control and cooperativeness were not associated with puritanical moral judgments, neither as main effects (self-control: b = -0.125, $t(244)$= -1.076, p = 0.28; cooperativeness: b = 0.005, $t(244)$ = 0.057, p = 0.95), nor in interaction with village resources (self-control: $b_{interaction}$ = - 0.125, $t(244)$= -1.076, p = 0.28; cooperativeness: $b_{interaction}$ = 0.040, $t(244)$= 0.273, p = 0.78) (Figure 5).

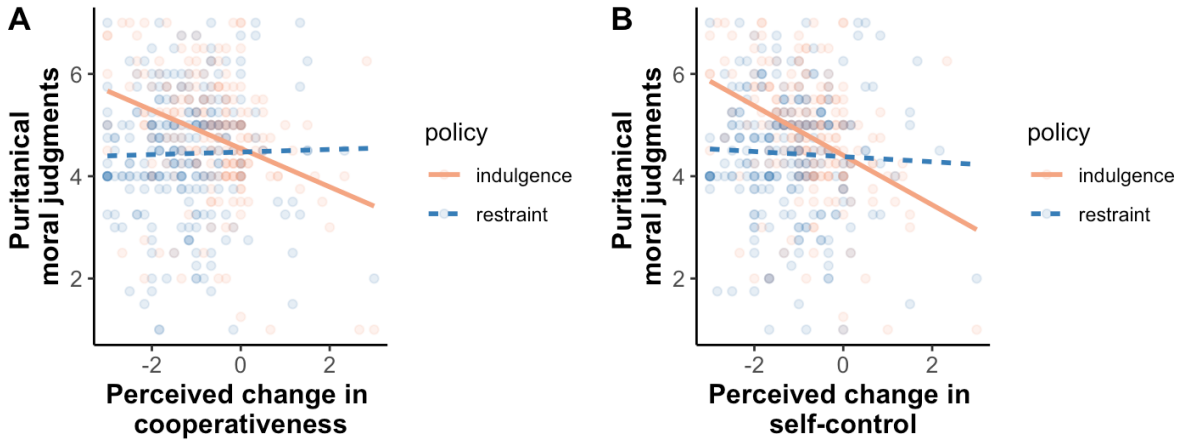

Figure 5. Relationships between puritanical moral judgements and expectations about the effects—on cooperativeness (**A**) and self-control (**B**)—of legal changes facilitating (vs. restraining) villagers' indulgence in harmless bodily pleasures in Study 3. Values less than 0 indicate expected reduction in a given trait; values greater than 0 indicate expected increase in the trait.

5.3. Discussion

Study 3 produced mixed results. In the indulgence conditions, participants expected the relaxation of legal restrictions on bodily pleasure to causally lead to less self-control and cooperation in the village than before the law was relaxed. This expectation was associated with puritanical moral judgments. In the restraint conditions, participants expected the

imposition of a puritanical prohibition to even more negative affect self-control and cooperation. This perception that was not associated with holding puritanical moral judgments.

One possibility is that participants found the imposition of the puritanical ban oppressive and expressed their disagreement with it by rating it negatively. Another possibility is that although we asked them about the future consequences of the ban for the village, participants thought that the council imposed the ban because the villagers were more impulsive and less trustworthy in the first place. Another difference between Study 3 and our previous studies is that it combined two manipulations: village policy (indulgent vs. prohibitive) and village resources (abundant vs. scarce). This may have produced scenarios that felt unfamiliar or incongruent with participants' expectations—such as a village enjoying abundance yet adopting a prohibitive policy. Such combinations might have influenced participants' responses in ways that make it harder to isolate the main effects of indulgence versus restraint in participants' perceptions.

6. Study 4

The goal of Study 3 was to exclude the signaling interpretation by relying on a forced change in indulgence or restraint prompted by external authorities. Forced changes in restraint, however, produced results that were hard to interpret. In Study 4, we tried again to adjudicate between the signaling hypothesis and the moral disciplining hypothesis by asking participants to guess the results of a scientific experiment about the causal effects of bodily pleasures on people's life. This "guess the results" design was inspired by recent studies in which laypeople were asked to predict the replicability of psychological experiments (Hoogeveen et al., 2020).

6.1. Methods

6.1.1. Participants

201 U.S. participants (99 males, 102 females; M_{age} = 34.97, SD_{age} = 12.52) were recruited from www.prolific.co. Pre-registered sample size was determined by a priori power analysis. In studies 2a-b, the smallest difference from zero in an "indulgence" condition was for cooperativeness change in the food-indulgence condition, with an effect size of d = -0.21 (M = - 0.11, SD = 0.55). The number of participants required to achieve 80% power to detect such an effect in the current design with a two-tailed t-test is 199 (α= 0.05). Our target sample size thus provides better than 80% power for detecting this smallest effect of interest. Seventeen participants who failed the attention check were excluded from the sample, bringing sample size to 184.

6.1.2. Design, procedures, and measures

After consenting, participants were presented with the description of a scientific experiment. The experiment was described as designed to assess the causal effect of frequent alcohol and pornography consumption on people's lives. Participants were told that researchers had recruited two groups of young men—a treatment group and a control group. In the treatment group, the researchers gave "free, unlimited access to their favorite alcoholic drink and premium pornographic videos" and asked the (fictitious) participants to "increase their consumption of alcohol and pornography." The control group was "not given free access to alcohol and pornography" and was "asked to keep living their lives as they usually did, without changing their daily routines" (see Pre-registration document for full materials).

We made it clear to our participants that the (fictitious) participants in both groups followed the experimenters' instructions because they were incentivized to do so by monetary compensation. To ensure that we capture causal judgments, we made it clear that "before the

study, both groups were similar in their behavior and personalities" and that the aim of the experiment was to know whether the different treatments would make a difference, after the three months of the experiment, to "their personal lives, their feelings, and their work."

Participants were asked to guess the effect of the experimental manipulation on people's *cooperativeness* (four items; e.g., "Do you think that people in the 'alcohol and pornography' group, compared to people in the 'life as usual' group, have become more or less likely to return a significant amount of money lent to them" / "likely to cheat their partner if they had the chance" / "likely to refuse to help a friend if they had better to do"; α = 0.73), *moral character* (five items; e.g., "Do you think that people in the 'alcohol and pornography' group, compared to people in the 'life as usual' group, have become more or less reliable / trustworthy"; α = 0.94), and *self-control* (six items; e.g., "Do you think that people in the 'alcohol and pornography' group, compared to people in the 'life as usual' group, have become more or less able to work themselves effectively towards long-term goals"; α = 0.80). All questions were on seven-point scales (-3 = *Much less*, 0 = *Neither more nor less*, 3 = *Much more*). We assessed *puritanical moral judgments* with measures identical to those of Study 1 (α = 0.85).

6.2. Results

6.2.1. Compared to the control group, is the treatment group expected to become less cooperative and self-controlled?

As predicted, participants expected the treatment group - in which alcohol and pornography were increased - to become less cooperative and less self-controlled than the control group - in which alcohol and pornography were held constant (**Figure 6**). The expected change in cooperativeness of the treatment group compared to the control group was less than 0 on the scale, M = -1.10, SD = 1.07, $t(183)$ = -13.98, $p < .001$, d = -1.03. This was also the case for expected change in moral character, M = -1.28, SD = 1.28, $t(183)$ = -13.43, $p < .001$, d = -0.99, and self-control, M = -1.49, SD = 1.11, $t(183)$ = -18.33, $p < .001$, d = -1.35. Exploratory analyses (not pre-registered) revealed that the more participants perceived bodily pleasures to negatively affect self-control, the more they perceived them to negatively affect cooperativeness, $r(182)$ = 0.48, p = .001, and moral character, $r(182)$ = 0.69, p = .001.

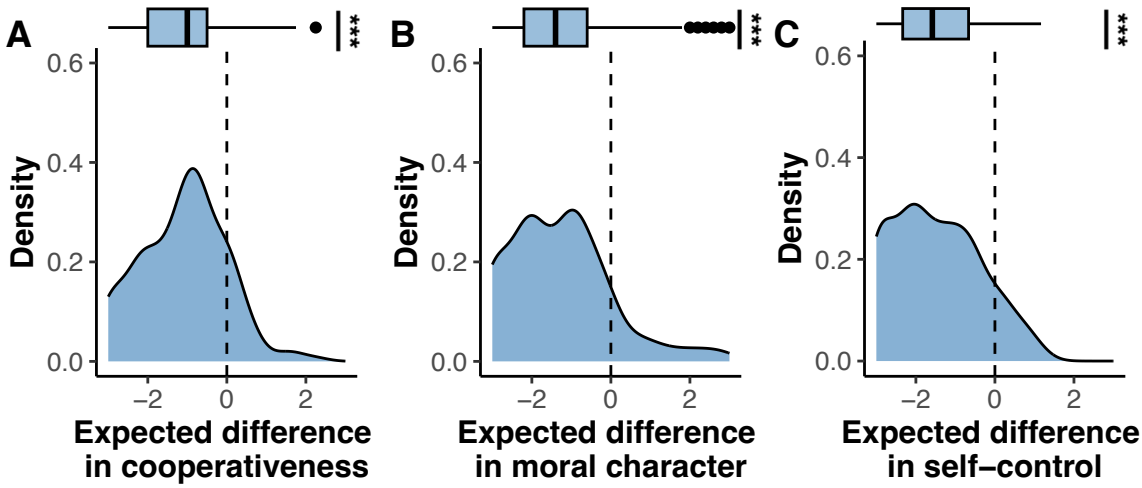

Figure 6. Distribution of expected difference in cooperativeness (**A**), moral character (**B**), and trait-self-control (**C**) between the treatment group and the control group in the fictitious experiment. Vertical dashed lines correspond to no expected difference between groups. Values less than 0 indicate lower value of the trait in the treatment group; values greater than 0 indicate higher value of the trait in the treatment group.

6.2.2. Do these perceptions predict puritanical moral judgements?

As predicted, the more participants perceived bodily pleasures to negatively affect cooperativeness, the more they judged harmless bodily pleasures to be morally wrong, $r(182) = -0.24$, $p = .001$. Expectations of a negative causal effect of bodily pleasures on moral character, $r(182) = -0.61$, $p < .001$, and self-control, $r(182) = -0.46$, $p < .001$, were also associated with puritanical moral judgments (**Figure 7**).

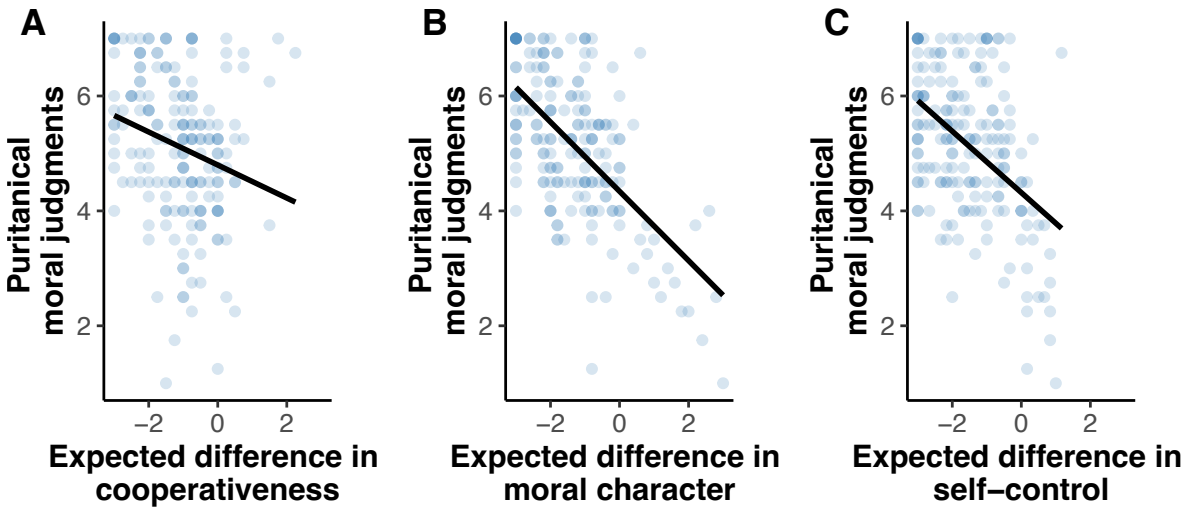

Figure 7. Relationships between puritanical moral judgements and expected causal effects of indulgence in bodily pleasures on cooperativeness (**A**), moral character (**B**), and self-control (**C**). Values less than 0 indicate expected reduction in the trait in the treatment group compared to the control group; values greater than 0 indicate expected increase in the trait.

6.3. Discussion

Study 4 provides evidence for the moral disciplining hypothesis specifically. If people believed that indulgence only signals pre-existing self-control and cooperativeness, they should have expected no difference between the two experimental groups at the end of the (fictitious) experiment. Instead, participants judged that the group instructed to indulge in bodily pleasures would become less self-controlled and less cooperative than the control group at the end of the treatment, an expectation associated with puritanical moral judgments. These results clearly support the moral disciplining view.

7. General discussion

Unrestrained indulgence in bodily pleasures, a special case of "harmless purity violations" (Gray et al., 2023), has been central to debates in moral psychology (Fitouchi et al., 2023b; Graham et al., 2013; Gray et al., 2023). Some theories of moral cognition, such as the *evolutionary contractualist theory of morality*, propose that all moral judgments can be reduced to cognitive adaptations for reciprocal cooperation (André et al., 2022b; Baumard et al., 2013; Fitouchi et al., 2023b). Moral condemnations of behaviors that do not harm others have been seen as a challenge to this view. The argument goes that if moral judgment can be triggered by harmless behaviors—which do not cheat other people—then part of human moral cognition must have evolved for purposes beyond reciprocity (DeScioli & Kurzban, 2023; Graham et al., 2013; Smith & Kurzban, 2019).

Across five experiments, we find evidence against this claim. Our results suggest that unrestrained indulgence in bodily pleasures does, in fact, activate cognitive systems for reciprocal cooperation. Participants judged that after increasing their indulgence in pleasures such as alcohol, gluttony, or masturbation, targets would be less trustworthy and more prone to uncooperative behaviors, such as cheating on their partners or failing to repay a significant amount of money lent to them. In some studies (study 1 and 2a-b), these effects could have reflected either the perception that indulgence *signals* the target's pre-existing self-control and cooperativeness, or the perception that indulgence *causally diminishes it*. In Study 4, however, only the causal diminishing interpretation is possible. In a fictitious experimental setting, participants expected a treatment group assigned by researchers to increase their consumption of bodily pleasures to become less cooperative and self-controlled than a psychologically similar control group by the end of the experiment.

Second, consistent with the idea that indulgence is perceived as decreasing cooperativeness because it is perceived as decreasing self-control (Fitouchi et al., 2023a), the effect of indulgence (vs. restraint) on perceived change in cooperativeness and moral character was mediated by perceived change in self-control in Studies 1 and 2-ab. And, consistent with a key prediction of the moral disciplining hypothesis (Fitouchi et al., 2023a), the more people perceive harmless bodily pleasures as decreasing self-control and cooperativeness, the more they judged these behaviors to be morally wrong.

Notably, however, puritanical moral judgments were less strongly and less consistently associated with perceptions that restraint increases self-control and cooperativeness—a pattern that was not anticipated by the moral disciplining hypothesis (Fitouchi et al., 2023a). This may suggest that fears of the harmful effects of indulgence may actually contribute more to puritanical moral judgments than perceptions of the positive effects of restraint, which would be consistent with more general asymmetries between moral blame of negative behaviors and moral praise for positive behaviors (Anderson et al., 2020). Less substantially, these asymmetries may be to the indulgence and restraint scenarios being not entirely symmetrical. In the restraint conditions, the restraint was more externally imposed (e.g. total lack of availability, legal prohibition) than indulgence was in the indulgence conditions (e.g., more opportunities that the individual also chose to pursue).

Relatedly, in Study 3, implementing a puritanical prohibition was expected to make villagers even less cooperative than relaxing such a prohibition. One possibility we explored is that this arises from the fact that, unlike in Studies 1 and 2a-b, the targets in Study 3 were forced to reduce their indulgence by an external authority. Given that online participants are more liberal and less puritanical than the general U.S. population (Chandler et al., 2019; Levay et al., 2016), which is itself amongst the least puritanical societies in a historical and cross-cultural perspective (Fitouchi et al., 2023a), participants might have perceived this prohibitive policy as an oppressive and illegitimate restriction on villagers' rights, making them less likely to cooperate in return. Participants might also have expressed their disagreement with the puritanical prohibition by rating it negatively. Consistent with this possibility, the effect of policy on participants ratings was moderated by participants' level of puritanism. Still another possibility is that although we asked them about the future consequences of the ban for the village, participants may have thought that the council imposed the ban because the villagers were more impulsive and less trustworthy in the first place.

The present results add to a growing body of findings, inspired by the theory of *dyadic morality* (Gray et al., 2012; Schein & Gray, 2015, 2018), which suggest that "harmless crimes" are in fact perceived by people as harmful, and that perceptions of harm robustly predict their moral condemnation (Gray et al., 2014; Gray & Schein, 2016; Schein et al., 2016). Although close to ours, this account remains slightly different. The theory of

dyadic morality suggests that moral condemnation in the human mind is caused by perceptions of harm *per se*, which can include self-harm or "abstract harms" such as harm to the soul, rather than by uncooperative behaviors strictly speaking (DiMaggio et al., 2023; Schein & Gray, 2018). Dyadic Morality thus suggests an alternative explanation that may be compatible with our results, namely that people morally condemn bodily pleasures because they perceive them to be harmful, not to the community at large, but *to the individuals engaging in them*. These perceptions of self-harm could, for example, stem from the health problems caused by alcohol consumption or the damage to one's career that can result from being lazy. By contrast, as a cooperation-based theory of puritanism, the moral disciplining hypothesis expects behaviors to be moralized only when they are perceived to cause harm to *others* by increasing the likelihood of *cheating* (Fitouchi et al., 2023b). Future research could test the subtle differences between theories based on harm and theories based on cooperation and fairness (see, e.g., Kürthy & Sousa, 2024; Piazza et al., 2019), especially when it comes to harmless crimes.

Aside from studies of harmless wrongs, our results echo recent work suggesting the importance of considering people's folk-theories of human behavior in explaining moral judgments and their variations (Fitouchi et al., 2025; Fitouchi & Singh, 2022; Moon et al., 2021; Sijilmassi et al., 2024). Nettle & Saxe (2021), for example, found evidence that authoritarian values stem from lay beliefs that people—in particular when under conditions of war and scarcity—are not spontaneously motivated to behave cooperatively, so that strong, punitive leaders appear necessary to ensure their cooperation. Puritanical moral judgements, our results suggest, may stem from lay beliefs that repeatedly indulging in bodily pleasures would impair people's self-control, thus making future temptations—including uncooperative ones—harder to resist. This is consistent with recent evidence for the importance of lay theories of self-control in the moral condemnation of immodesty—another puritanical norm. Moon et al. (2021) found that folk-beliefs that males have low sexual self-control predict the moralization of female immodest clothing. Although inherently harmless to others, immodesty seems perceived as indirectly favoring socially harmful behaviors by triggering hard-to-control sex drives in impulsive males.

This raises the question of whether these folk beliefs are accurate. Does repeatedly indulging in bodily pleasures actually reduce self-control and, in turn, increase uncooperative behaviors such as cheating? The current evidence is inconclusive. One possible kernel of truth is that bodily pleasures can sometimes lead to addiction-like behaviors—food addiction (Volkow et al., 2011, 2017), sexual addiction (Farré et al., 2015; Karila et al., 2014), alcohol addiction (Vengeliene et al., 2008)—suggesting that some kinds of indulgence, beyond a certain point, may impair future self-control in that narrow domain (Baler & Volkow, 2007; Volkow et al., 2017). Another is that low self-control is objectively linked to a range of antisocial behaviors, including criminal activity (Moffitt et al., 2011; Vazsonyi et al., 2017), poorer interpersonal functioning (Cohen et al., 2014; de Ridder et al., 2012), and lower cooperativeness in various experimental tasks (Sebastián-Enesco & Warneken, 2015; Sjåstad, 2019; Vonasch & Sjåstad, 2021; although see Thielmann et al., 2020). However, while some econometric studies suggest that moral crusades against alcohol may have successfully reduced drunkenness-driven violent crimes in earlier periods (Lowe, 2020), meta-analytic evidence indicates that self-control does not improve with repeated practice (Friese et al., 2017; Miles et al., 2016), calling into question the effectiveness of puritanical norms, at least in contemporary populations.

Our studies, however, have important limitations. First, they only provide correlational evidence for the relationship between puritanical moral judgements and the perception that bodily pleasures reduce self-control and cooperativeness. Second, they only rely on U.S. participants, which limits our ability to draw conclusions about the origins of

puritanical moral judgements in general, in particular in more puritanical cultures. Indeed, while puritanical moral judgements are widespread across cultures (Tierney et al., 2021), they have largely declined in rich and industrialized societies such as the U.S. (Fitouchi et al., 2022). Uncovering their psychological origins will require investigating the generalizability of these findings in other populations, particularly more puritanical ones.

Conflicts of interest. None.

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