

Sex, Drugs, and Moral Goals: Reproductive Strategies & Views About Recreational Drugs

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RUNNING HEAD: Sex and Drugs

Sex, Drugs, and Moral Goals:

Reproductive Strategies & Views About Recreational Drugs

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1 **Abstract.** Humans, unlike most other species, show intense interest in the activities of
2 conspecifics, even when the activities in question pose no obvious fitness threat or
3 opportunity. Here we investigate one content domain in which people show substantial
4 interest, the use of drugs for non-medical purposes. Drawing from two subject
5 populations, we look at the relationships among 1) abstract political commitments, 2)
6 attitudes about sexuality, and 3) views surrounding recreational drugs. Whereas some
7 theories suggest that drug views are best understood as the result of abstract political
8 ideology, we suggest that these views can be better understood in the context of
9 reproductive strategy. In two samples, one undergraduate and one internet based, we
10 show that, as predicted by a strategic construal, drug attitudes are best predicted by sexual
11 items rather than abstract political commitments and, further, that the relationship
12 between factors such as political ideology and drugs, while positive, are reduced to zero
13 or nearly zero when items assessing sexuality are controlled for. We conclude that
14 considering morality from the standpoint of strategic interests is a potentially useful way
15 to understand why humans care about third party behavior.

16 Sex, Drugs, and Moral Goals

17 Reproductive Strategies & Views About Recreational Drugs

18 **1. Introduction**

19 A zoologically peculiar feature of humans is that people not only monitor
20 conspecifics' activities across a wide array of domains, but also express a desire that
21 costs be imposed on third parties for a wide variety of behaviors. Humans do this even in
22 circumstances in which they typically do not consciously perceive – and indeed often
23 expressly deny – that they themselves (or their relatives) are harmed by the behavior in
24 question.

25 Our present interest is in one such category of activity, namely, the use of
26 recreational drugs. Why do some people think that *other people* should be prevented from
27 using certain drugs – various chemical substances with psychoactive properties that are
28 smoked, injected, or otherwise consumed for recreational or other non-medical reasons –
29 and punished if they do so? The studies reported here explore the moral intuitions that
30 give rise to opposition to the use of these substances by others.

31 Unlike some categories of moral behavior – for example, those involving
32 unprovoked physical harm, theft, and breach of contract, in which there is considerable
33 agreement regarding moral wrongness (Robinson *et al.* 2008) – there is substantial
34 variation in opposition to the sale and use of recreational drugs (Robinson & Kurzban
35 2007). For example, a Gallup Poll from 2009 found that 44% of Americans favored
36 marijuana legalization while 54% opposed it, which showed substantial movement from
37 the same item asked in 1969, when only 12% of Americans favored marijuana
38 legalization while 84% opposed it (Saad 2009).

39 Our primary purpose here is to investigate the sources of the large amount of
40 variation in views about recreational drugs. In addressing this puzzle, we shed light as
41 well on the related puzzle of why anyone at all ever morally condemns the use of
42 recreational drugs.

43 **1.1. Candidate Models**

44 Most work surrounding the evolved function of morality focuses on *conscience*,
45 putative mechanisms designed to guide individuals' own behavior (de Waal 1996; Haidt
46 & Joseph 2004, 2007; Krebs & Janicki 2004). These models focus on adaptive problems
47 such as gathering the benefits of cooperation, avoiding pathogens, avoiding incest, and of
48 course, avoiding physical damage (Haidt & Joseph 2004; Lieberman *et al.* 2003).

49 Such models, however, have the potential to explain the *condemnation* of others
50 only obliquely. For example, the fitness costs of incest explain why people – and other
51 organisms – have mechanisms designed to avoid having sex with closely related
52 individuals (Fessler & Navarrete 2004; Lieberman *et al.* 2003, 2007). This explanation
53 for incest-avoidance mechanisms does not, however, in itself, explain why people want
54 *others* to be punished for committing incest.

55 That is not to say that such an explanation is not possible. Lieberman (2007), for
56 example, suggests that incest-condemnation systems might be designed to guide one's
57 kin away from this fitness reducing behavior. Condemnation, on this view, benefits the
58 individual's genes through the distal disincentivizing effects on related others. More
59 generally, one might argue that if moralization is applied to nearby individuals, and these
60 individuals are differentially likely to be friends, kin, and allies, condemnation can be
61 explained.

62 A similar argument could be made regarding what might be the most intuitive
63 potential explanation regarding moralization of drugs, that they are harmful. Perhaps
64 people oppose the use of drugs as a means of generating benefits to others, particularly
65 kin and allies. By imposing costs on using drugs, people reduce the chance that others
66 will use harmful drugs, and so lead to net (indirect) benefits. On this view, condemnation
67 is an altruism device. Related arguments could be made that the foundations of
68 opposition to recreational drugs lie in individuals' desire to protect others from addiction
69 or criminal activities associated with drug use.

70 These explanations seem unlikely for at least two reasons. First, people do not
71 moralize a very large number of activities that are dangerous. People do not have the
72 intuition that horseback riding, skiing, boxing, skydiving, and many other hazardous
73 activities are wrong, to say nothing about riding in cars or working at construction sites or
74 in coal mines. An explanation located in harm requires an account of why using
75 recreational drugs, but not other sorts of potentially harmful modern activities, elicits
76 condemnation.

77 Second, as we mentioned, unlike moral intuitions regarding many other domains
78 (like unprovoked assault, theft, etc.), views on recreational drugs are highly variable.
79 Even if one were to think that perceptions of the harmfulness of recreational drugs
80 ultimately drive views on the morality and preferred legality of recreational drugs, one is
81 still left in need of an explanation of the tremendous variability in views.

82 **1.2. Variability**

83 *1.2.1. Abstract Political Commitments as Causes*

84 The predominant model regarding the origin of variation in political and moral
85 views, including views surrounding recreational drugs, suggests that the source of
86 individuals' opinions are their more basic commitments to higher level liberal-
87 conservative ideology, political party affiliation, values, religious views, and related
88 “symbolic” items. Drawing largely on the Standard Social Science Model's (Tooby &
89 Cosmides 1992) view of culture and domain-general learning, this view suggests that
90 people develop emotional attachments to these relatively abstract factors through social
91 learning (Bardes & Oldendick 2003; Erikson & Tedin 2005; Jacoby 2002; Janda *et al.*
92 2002; Sears & Levy 2003). Views on recreational drugs, along with many other kinds of
93 issues, are seen as being downstream effects of these abstract political commitments.

94 Haidt and colleagues have expanded the standard political models with their
95 account of the five “foundations” of morality (Graham *et al.* 2009). This view begins
96 with the idea that there are individual differences, including important aspects of
97 personality, as measured by the Big Five inventories, and other kinds of variation, such as
98 disgust sensitivity. These differences give rise to different weights to the five key areas of
99 morality, which Haidt and Joseph (2007) identify as harm, fairness, purity, ingroup
100 loyalty, and hierarchy.

101 On Haidt and colleagues' account, variations in ideological commitments are
102 driven by underlying variations in personality variables and moral foundations, with
103 political liberals placing weight on only harm and fairness and political conservatives
104 valuing all five moral foundations (Haidt & Kesebir 2010). Haidt and colleagues do not
105 argue with the primary claims of standard political models insofar as both view
106 individual issue opinions as derived from more basic ideological and other abstract items.

107 One of the fundamental claims flowing from the standard political model is that
108 self-interest is rarely a strong factor in accounting for political attitudes. The claim has
109 been most forcefully advanced by defenders of the “symbolic politics” approach (e.g.
110 Sears & Funk 1990) and has become an often-repeated truism in political science (e.g.
111 Caplan 2007; Graham *et al.* 2009; Kinder 1998), though we give some reasons below to
112 doubt the stronger versions of the claim.

113 The view of abstract political commitments as causes makes a number of familiar
114 predictions. Specifically, this view implies that self-interest is likely to be of little
115 relevance. Instead, more abstract political differences will matter. In particular, compared
116 with those people who do not oppose the use of recreational drugs, those who do will be
117 more conservative, more religious, and, following the framework of Haidt and
118 colleagues’ work, more driven by the moral salience of ingroup loyalty, hierarchy, and
119 perhaps most important, purity, as well as, at a deeper level, higher disgust sensitivity,
120 less openness to experience, and related personality dimensions.

121 1.2.2. *Reproductive Strategy as Causes*

122 Our model of individual differences differs from these approaches and is closely
123 linked to the idea that the central phenomenon to be explained in the context of morality
124 is condemnation, rather than conscience. If moral rules are construed as specifying
125 classes of activities or behaviors that, when someone engages in them, lead to
126 punishment without the possibility of subsequent reprisal (DeScioli 2008; DeScioli &
127 Kurzban 2009a), then moral rules are like economic institutions, the rules that govern
128 transactions (Kurzban, in press). And, like economic institutions, the contents of these
129 rules have important consequences that, crucially, differ from one individual to the next.

130 Just as institutions affect outcomes depending on one's position in an economy – for
131 example, import duties help domestic producers of particular goods by increasing prices,
132 and harm consumers of those goods for the same reason – the content of moral rules has
133 different effects on individuals' outcomes depending on the details of the strategy one is
134 implementing in the context of the social world.

135 The idea that strategic interests matter in affecting opinions has been
136 demonstrated in political science. Evidence in favor of this view comes from widely
137 cited facts that socioeconomic status is often a major predictor of views on governmental
138 redistribution of wealth through social welfare programs (Erikson & Tedin 2005; Janda *et*
139 *al.* 2002). That is, people who disproportionately benefit from redistribution programs –
140 the poor – tend to support them while people who disproportionately pay for such
141 programs – the rich – tend to oppose them. Similarly, race is often a major predictor of
142 views on the desirability of public and private preferences in favor of racial minorities
143 (Erikson & Tedin 2005; Flanigan & Zingale 2002).

144 To these often-cited axes of societal conflict, we add another dimension driven by
145 evolutionary analysis. This axis is the conflict between those who pursue a committed
146 reproductive strategy with high levels of investment by fathers in their children and
147 others who pursue a more promiscuous reproductive strategy involving males who devote
148 substantially more of their time and resources to obtaining additional mates rather than
149 raising children. Humans, like other species (e.g. Shuster 2010), deploy different
150 reproductive strategies depending on variation in individual and ecological variables
151 (Buss & Schmitt 1993; Gangestad & Simpson 2000). What is less often emphasized is
152 the strategic conflict inherent in these diverse responses.

153 The primary point of conflict rests with the general level of promiscuous sexual
154 activity in a given social group (see Weeden 2003; Weeden *et al.* 2008). The interests of
155 those pursuing a more committed strategy are threatened by high levels of promiscuity.
156 Committed husbands bear a higher cuckoldry risk (given their high levels of investment
157 in within-pair children). Committed wives bear higher mate-abandonment risks,
158 particularly when they have larger numbers of young children combined with reduced
159 education and work-place participation. The interests of committed strategists are
160 advanced to the extent they can impose larger social costs on promiscuous strategists.
161 Promiscuous strategists, in contrast, find their interests advanced by minimizing these
162 social costs and increasing their number of potential mates.

163 Different people, then, depending on their own properties and opportunities, stand
164 to lose or gain by virtue of the moral institutions that govern sexual behavior. This pattern
165 of gains and losses might have constituted a selective pressure giving rise to a contingent
166 psychology that is designed to adopt – and attempt to cause others to adopt – moral rules
167 that facilitate one's own competitive reproductive strategy.

168 Note that these ideas begin to explain why there is relative homogeneity in some
169 areas of moral condemnation. In some cases, moral rules are more or less what we might
170 call Rawlsian (Rawls 1971), benefitting the large majority of people. For instance, rules
171 that specify punishment for intentional physical harm – and therefore disincentivize
172 intentional harm – benefit almost all people because everyone is vulnerable to being
173 harmed. Some rules, however, more clearly help some and hurt others. This generates an
174 incentive for individuals to adopt, and try to cause others to adopt, rules that work in
175 favor of their interests.

176 A key context for moralistic conflicts over sexual matters in developed societies is
177 found with respect to religious commitments. Political discussions often mention
178 religiosity as a major predictor of social or cultural issues (like premarital sex, abortion,
179 or pornography) (e.g. Corbett & Corbett 1999; Erikson & Tedin 2005; Flanigan &
180 Zingale 2002). It is usually assumed that differences in socialization lead to adult
181 differences in religiosity, which themselves lead to different issue opinions. However,
182 Weeden, Cohen, and Kenrick (2008) tested the model that claims causality running from
183 religiosity to sexual and family attitudes and behaviors against an evolutionarily
184 motivated model that reversed the usual causal assumption, viewing differences in
185 reproductive strategy as a key determinant of individuals' decisions to increase or reduce
186 affiliation with religious groups. They found, consistent with the evolutionary model,
187 that differences in reproductive strategies almost fully mediated well-known relationships
188 between religiosity on the one hand and gender, age, cohort, and Big 5 personality
189 variables on the other hand, suggesting strongly that the causal arrow runs at least in
190 substantial part from reproductive lifestyles to religiosity.

191 Taken together, these ideas suggest that one component of evolved moral
192 psychology is designed to increase or decrease the chances that particular moral regimes
193 operate in one's social environment, involving centrally one's own adoption or rejection
194 of a given moral view. We propose that there are mechanisms designed to make
195 inferences about the costs and benefits to oneself of different rule regimes, and endorse
196 those rules that benefit oneself.

197 Why should recreational drugs elicit such differences in views about wrongness?
198 Our answer is that it is linked to promiscuity, which itself is an important focal point of a

199 range of passionate moral conflicts in most large-scale societies. Among young
200 Americans, for example, the substantial link between promiscuous sexual behavior and
201 recreational drug usage is well established (e.g. Lammers *et al.* 2000; Weeden & Sabini
202 2007; Whitaker *et al.* 2000). On our view, efforts to limit recreational drug usage flow in
203 large part from attempts by committed reproductive strategists to reduce levels of sexual
204 promiscuity, because promiscuity interferes with committed strategies. Thus, we expect
205 the relationship between attitudes towards recreational drugs and attitudes towards
206 promiscuity to be very large, and to dominate other correlates of opinions on recreational
207 drugs, including more abstract items like religiosity and political ideology.

208 *1.2.3. Predictions of the Models*

209 These two models make different predictions regarding the relationships among
210 individuals' 1) abstract political views and commitments, 2) attitudes and behaviors
211 surrounding sexuality, and 3) attitudes toward drugs.

212 Suppose that abstract political views are the causal antecedents of views toward
213 various sociopolitical realms, including those associated with both sexual behavior and
214 drug use. If this were the correct causal account, then the variation in views surrounding
215 sexuality would have similar causal antecedents to the variation in views surrounding
216 recreational drug use. There should be strong relationships between abstract political
217 views and both attitudes surrounding sex and attitudes towards drugs. We should also
218 expect strong relationships between attitudes toward sex and attitudes toward drugs, since
219 they have similar causal antecedents. In addition, and crucially, if this is the correct
220 causal account, if we look at the relationship between abstract political views and drugs,
221 *controlling for abstract political commitments*, then the relationship between abstract

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222 political views and sexual attitudes should be reduced to a substantial degree (see the first
223 model in Figure 1).

224 Compare this prediction to what one would expect if attitudes about recreational
225 drugs are driven by sexual strategies. Such a view makes some predictions that are both
226 counterintuitive and distinct from other individual difference models. If this view is
227 correct, then there will be relationships between political views (e.g., liberalism) and
228 drugs, but this relationship will be driven by the fact that they share a common
229 underlying cause, located in sociosexuality. This leads to the prediction that the
230 relationship between sexual attitudes and drug-related views *will not* be substantially
231 diminished when one controls for abstract political commitments. In addition, this view
232 predicts that the relationship between opinions on recreational drug use and abstract
233 political commitments *will* be substantially reduced when one controls for sexual
234 attitudes. That is, if sexual attitudes are the common causal antecedent of both abstract
235 political views and drug attitudes, controlling for sexual attitudes should strongly
236 attenuate this relationship (see the second model in Figure 1).

237 This view cannot be distinguished in our study from the view that abstract
238 commitments causally influence attitudes towards promiscuity which in turn causally
239 influence attitudes towards drugs (see the third model in Figure 1). However, this model
240 and our model both share the fundamental premise that sociosexual differences largely
241 drive differences in moral opinions regarding recreational drug usage, with little direct
242 influence from abstract commitments to recreational drug attitudes.

243 In sum, our hypothesis is that the intuition that recreational drug use should be
244 prohibited derives primarily (though, we are careful to note, not exclusively) from the

245 relationship between these drugs and sexual promiscuity. People's moral intuitions are (in
246 part) designed to control and constrain others' sexual activity in accordance with one's
247 own reproductive strategy. Because recreational drug usage is strongly associated with
248 greater promiscuity, people oppose recreational drugs as one part in a larger effort to
249 control others' sexual activity. Therefore, we predict that moral attitudes toward drugs
250 will closely relate to variables such as liberalism/conservatism, religiosity, and so on, but
251 that these relationships will be strongest with respect to items that measure correlates of
252 one's sexual strategy. Further, controlling for promiscuity attitudes, we predict that other
253 relationships between views about drugs and abstract variables will be substantially
254 diminished, or even disappear entirely.

255 **2. Method**

256 *2.1. Undergraduate sample*

257 We analyzed data from two samples. The first was an undergraduate sample
258 consisting of students from a large Southeastern University in the United States.
259 Responses were collected from 516 undergraduate students. The average age was 19.5
260 ($SD = 2.16$) and the sample was 69% female. The sample contained 70% European
261 Americans, 13% Latino Americans, 9% African Americans, 5% Asian Americans, and
262 3% other. All students were enrolled in at least one undergraduate psychology course.
263 Participants received extra credit for participating in the study.

264 *2.2. Mturk sample*

265 Participants in the second sample were 471 individuals recruited from a web-
266 based recruitment site, Amazon's "Mechanical Turk," or mturk. Mturk is a
267 "crowdsourcing" web site that allows people to do short tasks for small amounts of

268 money. Anyone over 18 may use the site. The survey was restricted to residents of the
269 United States. In other work, this site has generated results comparable to other samples
270 (e.g. DeScioli & Kurzban 2009b). The average age was 32.9 ($SD = 11.8$) and the sample
271 was 65% female. The sample contained 81% European Americans, 5% African
272 Americans, 5% Asian Americans, 4% Latino Americans, and 5% other.

273 *2.2. Questionnaire items*

274 Our measure of recreational drug attitudes consisted of nine items, including
275 attitudes towards the morality and legal status of using marijuana, cocaine, and Ecstasy,
276 as well as general attitudes towards recreational drugs. The exact items differed
277 somewhat for the two samples and are provided in Appendix A. The recreational drug
278 scale was coded such that opposition to recreational drugs is indicated by larger values.
279 The scale had a Cronbach's alpha of .87 in the undergraduate sample and .88 in the
280 Mturk sample.

281 We used a modified version of the Sociosexual Orientation Index (Simpson &
282 Gangestad 1991), for which we eliminated the item regarding how many one-night stands
283 they have had (we find that participants are confused by the wording of this item), and
284 added an item on participants' number of non-intercourse (hook-up) partners in the past
285 three years, in addition to breaking out number of past sexual partners into heterosexual
286 and homosexual partners. The resulting scale ("Sociosexuality") had a Cronbach's α of
287 .83 in the undergraduate sample and .80 in the Mturk sample.

288 Participants completed the Three-Domain Disgust Scale (Tybur *et al.* 2009),
289 which produces three sub-scales involving sexual disgust ("Disgust – sexual";
290 Cronbach's α of .84 in the undergraduate sample and .86 in the Mturk sample), moral

291 disgust (“Disgust – moral”; Cronbach’s α of .86 in the undergraduate sample and .88 in
292 the Mturk sample), and pathogen disgust (“Disgust – pathogen”; Cronbach’s α of .80 in
293 the undergraduate sample and .83 in the Mturk sample).

294 Participants reported their overall liberal/conservative political identification on a
295 7-point scale (“Politics – ideology”). Participants also rated their support/opposition (on
296 a 7-point scale) to a number of current political issues. We broke these out into sexual
297 issues, including restrictions against internet pornography, comprehensive sex education
298 in public schools, banning abortion, and legalized gay marriage (“Politics – sexual
299 items”; Cronbach’s α of .64 in the undergraduate sample and .71 in the Mturk sample),
300 and non-sexual issues, including allowing undocumented immigrants to stay in the U.S.,
301 higher taxes for the wealthy, aggressive military response to dangerous foreign groups,
302 unemployment payments, gun control laws, offshore drilling, and subsidized healthcare
303 for the poor (“Politics – non-sexual items”; Cronbach’s α of .66 in the undergraduate
304 sample and .72 in the Mturk sample). Participants also completed the 16-item Social
305 Dominance Orientation (Pratto *et al.* 1994) (Cronbach’s α of .94 in the undergraduate
306 sample and .93 in the Mturk sample).

307 Participants completed the moral relevance items from Graham *et al.* (2009),
308 which are designed to fall into five subscales: harm (“Moral relevance – harm”;
309 Cronbach’s α of .86 in the undergraduate sample and .80 in the Mturk sample);
310 reciprocity (“Moral relevance – reciprocity”; Cronbach’s α of .83 in the undergraduate
311 sample and .79 in the Mturk sample); ingroup (“Moral relevance – ingroup”; Cronbach’s
312 α of .84 in the undergraduate sample and .86 in the Mturk sample); hierarchy (“Moral
313 relevance – hierarchy”; Cronbach’s α of .83 in the undergraduate sample and .79 in the

314 Mturk sample); and purity (“Moral relevance – purity”; Cronbach’s α of .87 in the
315 undergraduate sample and .88 in the Mturk sample).

316 We measured religiosity with a 5-item scale asking about level of religiosity, level
317 of spirituality, frequency of private prayer, frequency of current church attendance, and
318 expected future frequency of church attendance (“Religiosity”; Cronbach’s α of .92 in the
319 undergraduate sample and .89 in the Mturk sample). We also asked a short version of the
320 Big 5 personality items (Rammstedt & John 2007).

321 **3. Results**

322 Table 1 and Table 2 show relationships between recreational drug attitudes and
323 the other variables, with Table 1 for the undergraduate sample and Table 2 for the Mturk
324 sample. Our primary prediction was that items tracking attitudes towards sexual
325 promiscuity as a group would be larger correlates and would reduce the effects of the
326 other variables to a greater extent than the other variables would reduce the effects of the
327 sexual variables in partial correlations. The predictions held—the largest correlations in
328 both samples involve sociosexuality, sexual disgust, and opinions on sexual political
329 items, and controlling for these sexual variables in partial correlations reduced the size of
330 the relationships between recreational drug attitudes and most of the other variables
331 substantially.

332 As a less formal confirmation that these correlations are largely driven by
333 promiscuity attitudes, we also examined correlations between each individual predictor
334 item (including sexual and non-sexual items) and recreational drug attitudes. For the
335 undergraduate sample, the top three individual item correlates with recreational drug
336 attitudes were the following: “Sex without love is OK” (from the sociosexuality scale; r

337 = -.45); “Bringing someone you just met back to your room to have sex” (from the sexual
338 disgust scale; $r = .44$); and “I can imagine myself being comfortable and enjoying
339 ‘casual’ sex with different partners” (from the sociosexuality scale; $r = -.41$). For the
340 Mturk sample, the top three individual item correlates with recreational drug attitudes
341 were the following: “Bringing someone you just met back to your room to have sex”
342 (from the sexual disgust scale; $r = .51$); “Sex without love is OK” (from the
343 sociosexuality scale; $r = -.50$); and “Tougher restrictions against pornography on the
344 Internet” (from the sexual politics scale; $r = .47$).

345 **4.0. Discussion**

346 The principle result is that we find evidence that differences in sociosexuality are
347 central to explaining differences in attitudes toward recreational drugs. The best
348 predictors of drug attitudes were not responses to abstract political items, but rather items
349 that asked about matters relating to promiscuity. This provides evidence that views on sex
350 and views on drugs are very closely related.

351 Moreover, the relationship between sex and drugs tended to mediate items that,
352 from the perspective of canonical views in political science, might have been thought to
353 be driving views on drugs. For instance, while it is true, as one might have expected, that
354 people who are more religious and those who are more politically conservative tend to
355 oppose recreational drugs, in both our samples the predictive power of these religious and
356 ideological items was reduced nearly to zero by controlling for items tracking attitudes
357 toward sexual promiscuity.

358 These reductions are difficult to reconcile with a model in which abstract political
359 views are the underlying causal variable driving attitudes toward drugs (Fig. 1, Panel A).

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360 They are, however, consistent with the model we propose, in which individuals' sexual
361 strategies drive views on recreational drugs (Fig. 1, Panel B).

362 It is also plausible given our results that abstract commitments drive sexual
363 attitudes and sexual attitudes drive drug attitudes (Fig. 1, Panel C). In both models sexual
364 attitudes directly influence drug attitudes, with the difference being that our model views
365 sexual strategy as a major causal influence in determining abstract commitments while
366 the other model takes the opposite causal position, viewing items like religiosity and
367 ideology as major influences in determining sexual attitudes. We note that recent work
368 with regard to religiosity shows substantial evidence that the causal arrow runs at least in
369 significant part from sexual lifestyles and attitudes to religious commitments (Li *et al.*
370 2009; McCullough *et al.* 2005; Weeden *et al.* 2008). In addition, though not the
371 preferred model, political scientists occasionally view liberal-conservative identifications
372 not as generative ideological systems, but as post hoc descriptions of preexisting views
373 on a range of political items (e.g. Conover & Feldman 1981).

374 Of course, the present results should be treated with the usual caution. Although
375 our results replicated with two distinct sample populations, it would be of value to
376 determine if other samples, perhaps in a cultural milieu with different mores surrounding
377 sex and recreational drugs, would be of use. In places in which sexual behavior and drug
378 use are not closely linked, we would predict that the effects we observed here would
379 diminish.

380 As with all correlational studies, we cannot directly infer causation from our data.
381 We believe that the results undermine particular causal accounts, and our view resonates
382 with other findings, but we look forward to experimental work that can address issues of

383 causality more directly. For instance, it could be that by manipulating people's own
384 perceptions of their mate value, their moral intuitions surrounding sexuality – but not
385 other moral domains – could be affected.

386 In closing, we believe that the results presented here speak to a broad biological
387 puzzle. Humans monitor third party behavior, and work to have costs imposed on third
388 parties, even when individuals' own interests are not obviously at stake (DeScioli &
389 Kurzban 2009a). While activities such as recreational drug usage are often viewed as
390 "victimless" misdemeanors, our analysis implies that individuals' competing interests are
391 nonetheless involved. The results described here imply that third-party morality in
392 contexts like condemnation of recreational drug usage might be best understood in the
393 context of strategic dynamics, with individuals influencing moral rules in a way that
394 favors their own competitive reproductive strategies.

395 This is not to say that *reproduction* is the only strategic dynamic that is relevant.
396 There are many domains of life in which interests diverge, and advantage can be gained
397 through influencing the rules that govern behavior. Future work might benefit from
398 approaching moral commitments as deriving less from abstract political and religious
399 views, and more from the perspective of strategic conflicts faced by an extremely social
400 species.

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For Review Only

550 Appendix A

551 Text of Recreational Drug Items

552

553 *Undergraduate sample:*

554

555 John is on vacation and is considering taking cocaine, an illegal mood-altering substance.

556 [Item1:] Using cocaine in this way is morally wrong. [answered on a 7-point scale]

557 [Item 2:] Using cocaine in this way should be legally permitted. [answered on a 7-point

558 scale; reverse coded]

559

560 Megan is hanging out with friends and is considering smoking marijuana, an illegal

561 mood-altering substance.

562 [Item 3:] Using marijuana in this way is morally wrong. [answered on a 7-point scale]

563 [Item 4:] Using marijuana in this way should be legally permitted. [answered on a 7-point

564 scale; reverse coded]

565

566 Eric is going to a dance party and is considering taking Ecstasy, an illegal mood-altering

567 substance.

568 [Item 5:] Using Ecstasy in this way is morally wrong. [answered on a 7-point scale]

569 [Item 6:] Using Ecstasy in this way should be legally permitted. [answered on a 7-point

570 scale; reverse coded]

571

572 *Mturk sample:*

573

574 [Item 1:] How morally wrong is use of marijuana? [answered on a 7-point scale]

575 [Item 2:] Do you think marijuana should be legal? [possible responses: Never; Yes, but

576 only with a doctor's prescription; Yes, over-the-counter but with age restrictions; Yes,

577 over-the-counter, no restrictions]

578

579 [Item 3:] How morally wrong is use of cocaine? [answered on a 7-point scale]

580 [Item 4:] Do you think cocaine should be legal? [possible responses: Never; Yes, but only

581 with a doctor's prescription; Yes, over-the-counter but with age restrictions; Yes, over-

582 the-counter, no restrictions]

583

584 [Item 5:] How morally wrong is use of MDMA (Ecstasy)? [answered on a 7-point scale]

585 [Item 6:] Do you think MDMA (Ecstasy) should be legal? [possible responses: Never;

586 Yes, but only with a doctor's prescription; Yes, over-the-counter but with age

587 restrictions; Yes, over-the-counter, no restrictions]

588

589 *Both samples:*

590

591 For the following items, please rate your agreement or disagreement.

592 [Item 7:] People who use recreational drugs are dirty. [answered on a 7-point scale]

593 [Item 8:] It is ok to obtain drugs for the purpose of making you feel good. [answered on a

594 7-point scale; reverse coded]

595

596 Imagine a drug that causes mild euphoria and relaxation. Please rate to what extent you
597 feel the following items are morally wrong.
598 [Item 9:] Gaining access to the drug for weekend recreational use [answered on a 7-point
599 scale]
600
601
602

For Review Only

1 Table 1
 2 Correlations and partial correlations between recreational drug attitudes and other items
 3 from undergraduate sample ($N = 516$)

		Correlations with recreational drug attitudes	Partial correlations (controlling for non-sexual items)	Partial correlations (controlling for sexual items)
Sexual items	Sociosexuality	-.49**	-.40**	---
	Disgust – sexual	.45**	.31**	---
	Politics – sexual issues	.35**	.23**	---
Non- sexual items	Moral relevance – purity	.25**	---	.14*
	Moral relevance – hierarchy	.10	---	.06
	Moral relevance – ingroup	.07	---	.04
	Moral relevance – harm	.14*	---	.10
	Moral relevance – reciprocity	.09	---	.08
	Disgust – moral	.27**	---	.16**
	Disgust – pathogen	.18**	---	.07
	Religiosity	.25**	---	-.02
	Politics – ideology	.19**	---	.05
	Politics – non-sexual issues	-.01	---	-.04
	Social dominance orientation	-.17**	---	-.15*
	Conscientiousness	.17**	---	.14*
	Agreeableness	.20**	---	.07
	Openness	-.07	---	-.03
	Extraversion	.02	---	.09
	Neuroticism	-.08	---	-.11

4 * $p < .01$; ** $p < .001$.

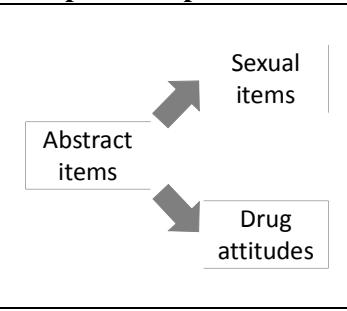
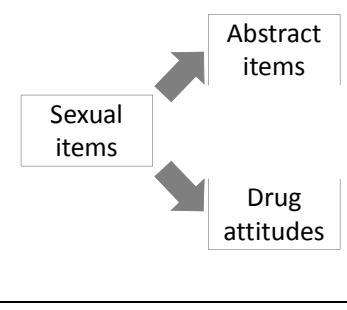
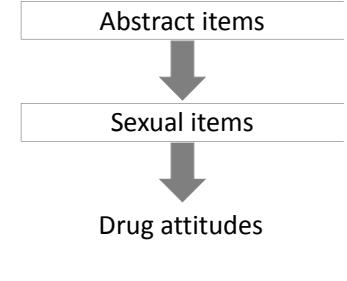
1 Table 2
 2 Correlations and partial correlations between recreational drug attitudes and other items
 3 from Mturk sample ($N = 471$)

		Correlations with recreational drug attitudes	Partial correlations (controlling for non-sexual items)	Partial correlations (controlling for sexual items)
Sexual items	Sociosexuality	-.47**	-.32**	---
	Disgust – sexual	.53**	.34**	---
	Politics – sexual issues	.54**	.25**	---
Non- sexual items	Moral relevance – purity	.42**	---	.16*
	Moral relevance – hierarchy	.19**	---	.08
	Moral relevance – ingroup	.19**	---	.08
	Moral relevance – harm	.11	---	.08
	Moral relevance – reciprocity	.11	---	.04
	Disgust – moral	.31**	---	.12
	Disgust – pathogen	.20**	---	.06
	Religiosity	.41**	---	.04
	Politics – ideology	.30**	---	.02
	Politics – non-sexual issues	.16*	---	.05
	Social dominance orientation	.04	---	-.02
	Conscientiousness	.22**	---	.09
	Agreeableness	.15*	---	.08
	Openness	-.17**	---	-.10
	Extraversion	.08	---	.06
	Neuroticism	-.01	---	.03

4 * $p < .01$; ** $p < .001$.
 5

1 Figure 1. Graphical representations of three different causal pathways that might
2 give rise to variation in people's views regarding recreational drugs. Boxes
3 correspond to categories of cognitive representations (e.g., beliefs and attitudes),
4 and arrows correspond to causal processes that give rise to other categories of
5 representation. One possibility (Panel A) is that abstract political views (e.g.,
6 conservatism) are causal, giving rise to particular views about sexuality and drugs. A
7 second possibility (Panel B) is that representations associated with sexuality are
8 causal, giving rise to abstract political views and views surrounding sexuality. A
9 third possibility (Panel C) is that sexual attitudes are mediators, such that abstract
10 political views strongly influence sexual items and sexual items strongly influence drug
11 attitudes, with no direct causal link between abstract political views and drug attitudes.
12 Empirical predictions of each causal pathway are indicated. These models are not
13 intended to be exhaustive.

14

Graphical Representation	Predictions
 <pre> graph TD A[Abstract items] --> S[Sexual items] S --> D[Drug attitudes] </pre>	<p>When controlling for abstract items, partial correlations between sexual items and drug attitudes <i>will</i> be substantially diminished.</p> <p>When controlling for sexual items, partial correlations between abstract items and drug attitudes <i>will not</i> be substantially diminished.</p>
 <pre> graph TD S[Sexual items] --> A[Abstract items] A --> D[Drug attitudes] </pre>	<p>When controlling for abstract items, partial correlations between sexual items and drug attitudes <i>will not</i> be substantially diminished.</p> <p>When controlling for sexual items, partial correlations between abstract items and drug attitudes <i>will</i> be substantially diminished.</p>
 <pre> graph TD A[Abstract items] --> S[Sexual items] S --> D[Drug attitudes] </pre>	<p>Same as above for sexual items as causes.</p>

15
16