

Criminalization, Fast and Slow?
Intuition Predicts Criminalization of Virtual Child Pornography

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Abstract

This study is the first to propose and provide empirical evidence for a dual-process theory of criminalization, a corollary of Joshua Greene's dual-process theory of moral judgment (Greene, 2013, 2014). The norm in criminalization theory is slow, reasoned argumentation. Our study demonstrates that fast, intuitive processes (in this case: a dispositional proneness to experience disgust, measured by disgust sensitivity) are associated with the decision to criminalize behavior, particularly virtual child pornography. Several studies have linked disgust sensitivity to harsher moral condemnation. However, no previous study has empirically investigated whether individual differences in disgust sensitivity also influence the *criminalization* of behavior. We tested this hypothesis in an online study (N = 1,175), using several vignettes in which harmfulness and disgustingness were varied orthogonally. In line with our hypothesis, 1) the vignette low in harm, high in disgust (virtual child pornography) was criminalized more readily than the vignette high in harm, low in disgust (financial harm), and 2) disgust-sensitivity was significantly associated with the decision to criminalize virtual child pornography, in both lay participants and legal professionals, such that more sensitive individuals were more inclined to criminalize. Ultimately, this could result in a criminalization bias. Limitations and implications are discussed.

Keywords: criminalization, dual-process theory, disgust sensitivity, intuition, moral decision-making.

Criminalization, Fast and Slow?**Intuition Predicts Criminalization of Virtual Child Pornography**

One of the most fundamental questions in criminal legal theory is: what type of behavior should we bring under the scope of criminal law? This is a moral question, and answering it is a moral decision (Stanton-Ife, 2022). In law and philosophy, the answer to this question is traditionally considered to be found through slow, system 2 thinking (to use Kahneman's [2011] term), guided by rational deliberation and legal reasoning (Alexander & Sherwin, 2021; Dickson, 2016; Duff, 2014; Dworkin, 1977; Edwards, 2018; Feinberg, 1984-1988; Hart, 1963; Husak, 2008; Levi, 1949/2013; Simester & Von Hirsch, 2011; Tadros, 2016). In their reasoning, legal scholars make use of various normative concepts (Stanton-Ife, 2022), such as *the harm principle* (Mill, 1859/2005), *moral wrongfulness* (Devlin, 1959), and *legal goods* (Birnbaum, 1834). The harm principle—simply put: if the conduct causes harm to others—is often considered the most important basis for criminalization (Feinberg, 1984; Hart, 1963).¹ However, studies in moral psychology and cognitive (neuro)science have found that moral decision-making encompasses not only slow, reasoned processes (system 2) but also fast, intuitive processes (system 1); the latter often occur without people being aware of them and they can result to rationalization (Greene, 2013; Haidt, 2012; see also Cushman, 2020). This view is grounded in dual-process thinking (Kahneman, 2011; Sherman et al., 2014).² In this study, we aim to empirically investigate whether this also applies to the *criminalization of behavior*: to what extent do intuitive, system 1 processes (measured

¹ This is a topic of debate: most notably between defenders of the harm principle and “legal moralists”. For now, the harm principle is characterized as the most well-known and central limiting principle within criminalization theory (Stanton-Ife, 2022).

² First, it is important to note that “system 1” and “system 2” do not describe distinct areas in the brain or fixed constructs in our cognition: they are metaphorical categorizations at the behavioral level, classifying many underlying cognitive mechanisms. Second, “intuitive processes” do not simply translate as “emotions”: they cover a much wider spectrum of fast, automatic processes in our cognition. (Cushman, 2013; Crockett, 2013; Greene & Young, 2020; Kahneman, 2011).

by disgust sensitivity) affect the decision to criminalize behavior?³ To investigate this, we focus on the case of virtual child pornography (i.e., images of *virtual* children engaging in *virtual* sexual conduct).⁴

Virtual Child Pornography

Technological developments are confronting legislators with novel types of behavior that are not easy to characterize in ethical terms. One example is virtual child pornography (Gillespie, 2018). This topic is controversial and has sparked much debate: the arguments pro and contra criminalization range from the harm principle to legal moralism (Gillespie, 2018; Levy, 2002; Luck, 2009; Ost, 2010; Strikwerda, 2011, 2014).⁵ Over recent decades, many countries have brought realistic virtual child pornography under the scope of the criminal law, including the United States, Canada, Australia, South Africa, and many EU member states (Bird, 2011; Gillespie, 2018; Witting, 2020).⁶ In good legal tradition (Edwards, 2018), argumentation for this is based on deliberative, legal reasoning. That is, legislators and legal scholars try to find arguments based on their system 2 reasoning.

The central argument refers to the harm principle (Mill, 1859/2005), with legislators claiming that virtual child pornography is—directly or indirectly—harmful to real children (Bird, 2011; Gillespie, 2018; McLelland & Yoo, 2007; Witting, 2020). This claim has met with criticism (Ashcroft v. Free Speech Coalition, 2002; Bell, 2012; Bird, 2011; Burke, 1997; Gillespie, 2018; Gray, 2021; Ost, 2010; Witting, 2020). It is not certain that virtual child pornography is harmful to children, for example that online child offenses “fuel” offline child abuse; clear evidence for this is absent and/or debated (Babchishin et al., 2015, 2018; Endrass et al., 2009; Gottfried et al., 2020; Gray, 2021; Houtepen et al.,

³ Of course, scholars in legal philosophy are well aware that intuitive processes *can* have an impact on criminalization (e.g., Hart, 1963; Nussbaum, 2004); some even find justification in them (Devlin, 1959; Moore 1997). However, the vast majority of legal scholars still regard rational deliberation and legal reasoning as doing most of the work, and intuitive processes as having a minor role or at least being within our awareness (Alexander & Sherwin, 2021; Sunstein, 2008). This differs from dual-process models, which consider intuitive processes to be doing most of the work, and slow, reasoned processes to often be a *rationalization* (Greene, 2008, 2013, 2014; Haidt, 2001; Kahneman, 2011; see also Cushman, 2020).

⁴ In this paper, we narrow the definition of “virtual material” to material that is produced entirely without the use of any real children (e.g., computer-animated drawings, paintings, sculptures, dolls). Virtual child pornography is also called “virtual child sexual exploitation material”, with reference to its potentially harmful effects. For more on the definition, see Gillespie (2018).

⁵ Legal moralism is the view that (*prima facie*) it can be morally legitimate to prohibit conduct on the ground that it is inherently immoral, i.e., “morally wrong”, even though it causes neither harm nor offense to the actor or to others (Stanton-Ife, 2022; Feinberg, 1984). For present purposes, we will leave aside discussions about “the offense principle” as grounds for criminalization (Feinberg, 1985).

⁶ E.g., Child Pornography Prevention Act 1996 (invalidated by Ashcroft v. Free Speech Coalition, 2002); PROTECT Act 2003; Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse 2007 (Lanzarote Convention); Coroners and Justice Act 2009; Combating sexual abuse and sexual exploitation of children and child pornography (Directive 2011/93/EU).

2014; Ost, 2010; Gillespie, 2018; Nair, 2019; Seto, 2013, 2018; Seto et al., 2011; but see Christensen et al., 2021). Moreover, it is suggested that the availability of virtual child pornography makes people *less* prone to child sexual abuse by providing an outlet or a means of treatment (Cisneros, 2002; Diamond, 2009; Levy, 2002; Seto, 2013). Here, we sidestep this debate. If future evidence (clearly) shows that virtual child sexual material poses a threat to children, then obviously it should be a criminal offense. For present purposes, however, we will follow the most prominent claims in the literature and assume that the harmfulness of virtual child sexual material is— at most—low.

Another line of argumentation is based on *legal moralism* (Bartel, 2012; Strikwerda, 2011, 2017; Patridge, 2013). However, arguments of this kind are deemed abstract and “rickety” (Ost, 2010), below the consensus standard (Luck, 2009; Patridge, 2013), and generally not a legitimate reason, in themselves, to criminalize conduct (Feinberg, 1988; Nair, 2019; Ost, 2010). As Luck (2009) expresses it in his gamer’s dilemma: while “virtual murder scarcely raises an eyebrow, (...) most people think that virtual paedophilia is not morally permissible”.

This raises the question: what makes legislators and legal scholars criminalize virtual child pornography? Arguments are mainly based on unfounded claims about harmfulness or abstract legal moralism (Ost, 2010), which makes the basis of this criminalization unclear. What is clear, however, is that both legal scholars and legislators try to find arguments based on traditional “deliberative, legal reasoning”. Given the controversial nature of virtual child pornography, we hypothesize that it is not deliberative, system 2 reasoning that makes people criminalize this behavior, but rather intuitive, system 1 thinking.

Moral Decision-Making and Dual-Process Thinking

To explore this idea, we turn to Greene’s dual-process theory of moral judgment (Greene, 2013, 2014; see also Cushman, 2013; Crockett, 2013; Graham et al., 2013; Haidt, 2001).⁷ Greene proposes, first, that our moral decisions are grounded in both slow, reflective processes (system 2) and fast,

⁷ Greene’s theory contains much more than the statements made in this paragraph, including his Central Tension Principle (Greene, 2013, 2014). For present purposes, we will limit ourselves to the three propositions presented here.

intuitive processes (system 1). Second, intuitive processes are especially prevalent in evaluating “personal” types of threatening behavior; that is, conduct resembling the threatening behavior found in *Homo sapiens*’ *personal* environment during thousands of years of evolution, such as hitting, killing, rape and other forms of prototypically violent behavior (Greene 2009a, 2013).⁸ Third, he proposes that our intuitions are not always “reliable” in guiding moral decisions, making them open to so-called debunking arguments (Greene 2014). The evolutionary origins of our intuitions mean they are quite well attuned to dealing with “familiar” moral problems, such as murder and rape. However, they are much less attuned to evaluating “unfamiliar” modern moral problems: problems that are far away and abstract (e.g., climate change) or result from (bio)technological advancements and intercultural differences.⁹ Greene concludes that when evaluating modern, “unfamiliar” moral problems, our intuitive moral thinking is often unreliable and could contain bias (Greene 2013, 2014; Singer, 2005). Virtual child pornography is characterized as personal because it strongly resembles *real* sexual child abuse: behavior that was certainly threatening in *Homo sapiens*’ personal environment. It is therefore assumed to trigger a strong intuitive response. Virtual child pornography also resembles an “unfamiliar moral problem”: it is an extremely recent technological invention, *simulating* sexual abuse, so it is quite conceivable that our intuitions exhibit bias in evaluating this conduct.

Support for Dual-Process Theories

There is considerable evidence to support dual-process theories of moral judgment (Cushman, 2013; Greene, 2014; Greene & Young, 2020; Sherman et al., 2014). Much empirical work has focused specifically on the role of intuitive processes in moral cognition (Atari et al., 2022; Greene, 2011; May & Kumar, 2018; Prinz, 2007; Slovic et al., 2002; Valdesolo, 2018). As to whether these intuitive processes are best described in terms of distinct emotions, such as anger and fear (Adolphs & Andersen,

⁸ It is important to note that, first, not only evolutionary mechanisms but also cultural and individual (learning) mechanisms influence our emotional reaction to moral cases (Graham et al., 2013, 2018; Greene, 2013). Second, the personal/impersonal distinction is not the *only* characterization of behavior that is expected to elicit a strong, negative emotional response. Other—more specific—characterizations exist as well, such as behavior that is “active” (rather than passive), “near” (rather than far away), “intentional” (rather than unintentional), and the consequence of “personal force” (Greene 2009b, 2013).

⁹ “Unfamiliar problems” are defined as ones with which we have inadequate evolutionary, cultural, or personal experience (Greene, 2014). For example: driving a car is an unfamiliar problem.

2018), “constructed” emotions based on active inference theory (Feldman Barrett, 2017; Seth & Friston, 2016), or computational mechanisms such as model-based (versus model-free) reinforcement learning (Cushman, 2013; Crockett, 2013), the debate continues (Fox, 2018; Cushman & Gershman, 2019). For now, we will focus on one specific line of research that has received much attention, namely disgust (Giner-Sorolla, 2018; Inbar & Pizarro, 2022; Piazza et al., 2018; Tybur et al., 2013).

Disgust is characterized as a powerful, negative emotion and one of the primary outputs of the so-called behavioral immune system, a set of behavioral adaptations to mitigate pathogen threats (Ackerman et al., 2018; Schaller & Park, 2011). Disgust is also argued to underlie moral condemnation (Rozin et al., 2008; Tybur et al., 2013), particularly when pathogen threats are involved (Inbar & Pizarro, 2022) and for acts involving physical or spiritual “purity”¹⁰ (Atari et al., 2022; Graham et al., 2013). People experience disgust along with anger and other negative emotions following moral transgressions (Cannon et al., 2011; Chapman et al., 2009; Danovitch & Bloom, 2009; Haidt et al., 1997). Some experiments even suggest that manipulations of disgust alter moral decision-making (e.g., Horberg et al., 2009; Schnall et al., 2008; Seidel & Prinz, 2013; Tracy et al., 2018; Van Dillen et al., 2012; Wheatley & Haidt, 2005). It should be noted, however, that attempts to replicate Eskine et al. (2011) and Schnall et al. (2008, Study 3) could not reproduce the experimental effects (Ghelfi et al., 2020; Johnson et al., 2016). In addition, a meta-analysis reported an average effect size near zero after correcting for publication bias, although specifically gustatory/olfactory disgust inductions did produce a robust and relatively large amplification effect, $d = .37$ (Landy & Goodwin, 2015). Hence, the role of incidental disgust in moral cognition is still undecided. One of the more replicable effects within the domain of disgust is the association between individual differences in disgust sensitivity and attitudes to (morally) deviant behavior (Inbar & Pizarro, 2022).

¹⁰ Meaning: intuitions about avoiding bodily and spiritual contamination and degradation, including virtues such as chastity and wholesomeness (Atari et al., 2022; Graham et al., 2013).

Disgust Sensitivity

Disgust sensitivity is an individual's propensity to experience disgust (Haidt et al., 1994). While *state* disgust refers to someone's current emotional experience, *trait* disgust sensitivity refers to their stable tendency to experience disgust over time. Many studies report an association between disgust sensitivity and moral decision-making: people who are more easily disgusted will more readily convict a suspect in a murder, burglary, or sexual assault case (Jones & Fitness, 2008), punish purity violations more harshly and reward purity virtues more strongly (Horberg et al., 2009), and show a preference for order, hierarchy, and deontological judgment (Robinson et al., 2019). They also demonstrate more negative attitudes to organ donation (Mazur & Gormsen, 2020), vaccination (Clifford & Wendell, 2016; Kempthorne & Terrizzi, 2021; Reuben et al., 2020), immigrants and foreign ethnic groups (Aarøe et al., 2017; Brenner & Inbar, 2015; Hodson & Costello, 2007), gays and lesbians (Inbar et al., 2009; Kiss et al., 2018; Olatunji, 2008; Terrizzi et al., 2010; Wang et al., 2019), and groups that threaten traditional sexual morality more generally (Crawford et al., 2014; Van Leeuwen et al., 2022). Furthermore, people who are more easily disgusted judge violations of moral and social conventions more harshly, both within the purity domain (Wagemans et al., 2018; Liuzza et al., 2019) and outside of this domain (Chapman & Anderson, 2014; Karinen & Chapman, 2019). However, it should be noted that sensitivity to several affective states (not only disgust but also anxiety and anger) predicts extremity in evaluative judgments (Cheng et al., 2013; Landy & Piazza, 2019). This suggests that the relationship between disgust and moral condemnation could be a specification of a broader relationship between (negative) affect and (negative) evaluation (Inbar & Pizarro, 2022; Piazza et al., 2018).

Criminalization and Dual-Process Thinking

Given the evidence that intuitive processes contribute to the (moral) condemnation of behavior, it is reasonable to hypothesize that intuitive processes also contribute to the *criminalization* of behavior. At the theoretical level, this has been proposed earlier (Bandes & Blumenthal, 2012; Faassen, 2013; Nussbaum 2004; Patrick, 2021; Patrick & Liebermann, 2018; Sunstein, 2008). We aim to investigate this hypothesis empirically by correlating disgust sensitivity with the criminalization of behavior. We

expect intuitive processes to contribute to criminalization, especially for violations that are *personal* and can be categorized within the domain of purity, with virtual child pornography being a prime example. We expect this to a lesser extent for violations that are *abstract and impersonal* (Greene 2009, 2013), with high-risk financial behavior as an example (contingent convertible bonds). The interesting aspect of these two cases is an anticipated “*criminalization bias*”, assuming that the main reason for criminalization is the harm principle: virtual child pornography is not particularly harmful, but is expected to induce a very strong, aversive intuitive response; resulting in a decision to criminalize this conduct. On the other hand: high-risk financial behavior could harm individuals and society at large (Berg & Kaserer, 2015; Goncharenko et al., 2021; Van Wijnbergen et al., 2022), but typically does not arouse a strong, aversive intuitive response: often resulting in a decision *not* to criminalize this conduct.

A Dual-Process Theory of Criminalization

From a broader perspective, our findings could provide preliminary evidence for a *dual-process theory of criminalization* (Faassen, [in press](#)); a corollary of Greene's dual-process theory of moral judgment (2013, 2014). A dual-process theory of criminalization would be both descriptive and normative, stating that our thinking about criminalization contains intuitive, system 2 and reflective, system 1 processes; that intuitive processes are especially triggered in “personal” (criminal) offenses, and that our thinking about criminalization is often “unreliable”: it may contain a *criminalization bias* (see Discussion below for more on this theory and its normative implications).

Support for a Dual-Process Theory of Criminalization: Disgust Sensitivity

To substantiate such a theory, we first have to establish that affective and intuitive processes do indeed contribute to criminalization decisions. To test this hypothesis, we will investigate whether disgust sensitivity predicts the decision to criminalize the behavior described in several vignettes adapted from criminal law. We will use four different vignettes in which we orthogonally varied the level of harmfulness (low, high) and disgustingness (low, high). These are virtual child pornography (low harm, high disgust), actual child pornography (high harm, high disgust), wearing a sweater with clashing colors (low harm, low disgust) (Feinberg, 1985), and the use of contingent convertible bonds,

which are high-risk financial instruments (high harm, low disgust; Berg & Kaserer, 2015; Goncharenko et al., 2021; Van Wijnbergen et al., 2022). We hypothesize an effect of both vignette characteristics (harm, disgust) and participant characteristics (disgust sensitivity) on criminalization ratings, such that highly disgusting vignettes (the virtual and actual child pornography) are more likely criminalized than the highly harmful vignette (the high-risk financial instrument). We predict that these effects will be further enhanced for participants who score high on trait disgust sensitivity, both lay participants and legal experts; according to our theoretical framework, this would especially be the case for the virtual child pornography vignette.

Method

Participants and Design

The survey was filled out by 1,725 individuals. We excluded participants who indicated being younger than 16 years old ($N = 38$), who did not rate any of the vignettes ($N = 285$), and who did not fill out all disgust sensitivity items ($N = 227$). This left us with a final sample of 1,175 participants (426 males, 742 females, 7 not reported, $M_{\text{age}} = 33.71$ years, $SD = 13.32$ years, with 4 missings). Of this sample, a smaller subset of 90 participants have expertise in the legal domain (i.e., officials in legislature, lawyers, judges, and master students criminal law) and were considered ‘experts’ regarding formal, law-based criminalization decisions. The remaining sample ($N = 1085$) was considered to have a lay perspective. The two subsets were matched on age and gender distribution.

The study was designed to investigate whether participants’ criminalization decisions depend on vignette characteristics (harm and disgustingness) and/or respondent characteristics (disgust sensitivity). It involved a 2(harm; high versus low) x 2(disgustingness; high versus low) within-participant design with disgust sensitivity as a between-participant variable. The focal dependent variables involved participants’ continuous estimations and binary decisions of criminalization.

Measures

Based on the dimensions of harm and disgustingness, four different vignettes were created, each describing a specific type of behavior: wearing an extremely contrasting sweater (low harm, low

disgustingness). the use of contingent convertible bonds, which is a high-risk financial instrument (high harm, low disgustingness), virtual child pornography (low harm, high disgustingness), and actual child pornography (high harm, high disgustingness) (see Appendix A).

Each vignette contains a short description of the behavior, directly followed by a statement: 'this type of behavior should be brought under the scope of the criminal law'. Participants were asked to 'agree' or 'disagree'. After this statement, participants were asked to again rate their agreement with the statement, but this time on a 7-point Likert scale, ranging between 1 ('fully disagree') and 7 ('fully agree').

Following, the Dutch version of the 25-item Disgust Scale-Revised was presented (DS-R-NL; Haidt et al., 1994; modified by Olatunji et al., 2007, Dutch version: M. van Overveld). To measure individual differences in disgust sensitivity, Cronbach's alpha of the scale in the current study sample was $\alpha = .78$. The psychometric features of the DS-R-NL are comparable to the English version (Olatunji et al., 2009). Participants were asked to rate their agreement or disagreement with 13 statements, and how disgusted the participants would be in 12 particular situations. Each item is rated on a 5-point scale, ranging from 0 ("strongly disagree" or "not at all disgusting") to 4 ("strongly agree" or "very disgusting"). An example of a statement is: 'I might be willing to try eating monkey meat, under some circumstances', an example of a situation is: 'you see maggots on a piece of meat in an outdoor garbage pail'. Higher scores indicate stronger disgust sensitivity. The scale contains two 'catch questions' that were excluded from the analyses.

Procedure

For this study, data were collected from February 2017 until February 2018. The questionnaire was administered online, participants were approached via Quest Braintainment (a popular-science magazine) and social media. After informed consent was obtained, participants answered questions in three parts. They first answered questions about demography (age, gender, education), their legal expertise, their profession, and whether this was in the domain of criminal law. They then proceeded to the four vignettes, with two questions on criminalization directly following each vignette

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(criminalization means: whether the behavior should be brought under the scope of the criminal law).

The four vignettes were presented in random order to counterbalance carryover effects. Next, participants answered the 25-item DS-R-NL, after which they were debriefed. All procedures were approved by the Psychology Research Ethics Committee (CEP), protocol number CEP17-0803_260, at Leiden University. Whereas we did not formally pre-register our hypotheses and study set up at the time, the time-stamped approved ethics protocol contains all relevant information, as well as our hypotheses regarding the effects of disgust sensitivity, and can be found in our OSF project folder. This folder also contains the raw data, analysis code, and a Word document of the Qualtrics survey. See <https://osf.io/nc6mz/>.

(for Results, see below)

Results

Data Analytic Strategy

Linear mixed-effects models and mixed-effects logistic regression models were applied to estimate the effects of vignette type and disgust sensitivity on the continuous and dichotomous criminalization variables, respectively. For this, the “lmer” function in the “lme4” and “lmerTest” packages of R was used (Bates et al., 2015; Kuznetsova et al., 2013). Confidence intervals were obtained using the “confint” function in the “stats” package using Monte Carlo simulations with 1000 bootstrap samples (R Core Team, 2019). Simple effects were obtained using the “lstrends” function in the “lsmeans” package (REF). All models include random intercepts so that individuals are given their own starting points on the dependent variable and, when this increased the fit further and the model did not fail to converge, random slopes for participants, to account for individual differences in the effect of disgust sensitivity on the dependent variable. For the analyses, disgust sensitivity scores were standardized (generating z-scores). The exact coefficients of all outcomes of the regression models can be found in *Tables 1-3*. The analysis code and the raw data can be retrieved at the study’s open science framework page: <https://osf.io/nc6mz/>.

Criminalization Ratings (continuous)

To test whether vignette type influences criminalization of behavior, a model including harm (low and high), disgustingness (low and high), and their interaction was fitted to the criminalization ratings. This yielded main effects for both harm ($b = 2.50$, $SE = .06$, $t[3521.81] = 44.18$, $p < .001$; 95% CI [2.39, 2.61]) and disgust ($b = 3.60$, $SE = .06$, $t[3521.15] = 63.60$, $p < .001$; 95% CI [3.49, 3.71]), such that vignettes that are high in harm resulted in higher criminalization ratings than vignettes low in harm, and vignettes that are high in disgust resulted in higher criminalization ratings than vignettes low in disgust. These main effects were further qualified by a significant interaction effect ($b = -0.50$, $SE = .08$, $t[3521.48] = -6.29$, $p < .001$; 95% CI [-0.65, -0.33]). Whether or not the behavior was harmful determined criminalization ratings to a greater extent depending on whether the vignette also induced disgust. That is, harm increased criminalization ratings of low disgust vignettes more (resp. $M = 1.21$,

$SE = .04$ and $M = 3.72$, $SE = .04$; $b = 2.5$, $SE = .057$, $t[3522] = 44.18$, $p < .001$) than of high disgust vignettes (resp. $M = 4.82$, $SE = .04$ and $M = 6.82$, $SE = .04$; $b = -2.0$, $SE = .06$, $t[3521] = 35.29$, $p < .001$). Likewise, disgust affected the criminalization ratings of low harm vignettes more ($b = 3.6$, $SE = .06$, $t[3521] = 63.60$, $p < .001$) than of high harm vignettes ($b = 3.1$, $SE = .06$, $t[3522] = 54.68$, $p < .001$). Means and standard deviations are depicted in *Figure 1*.

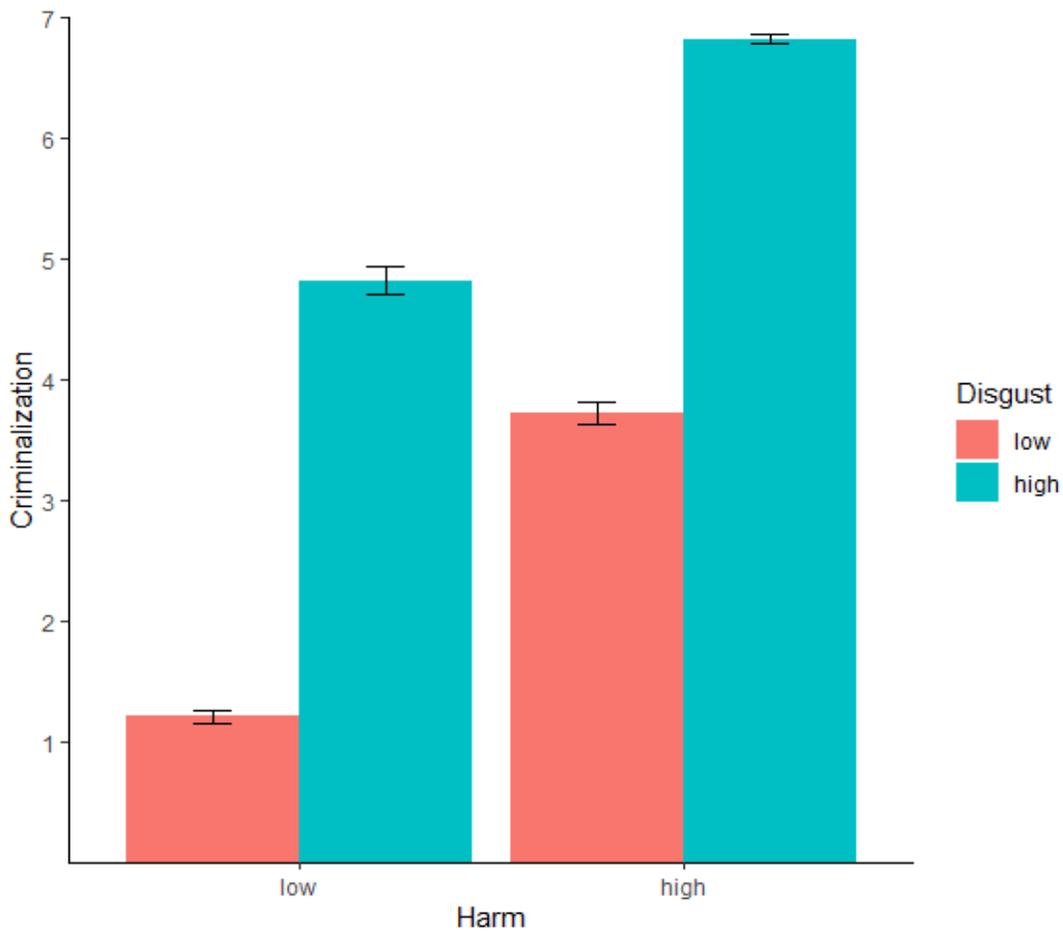


Figure 1. Mean criminalization ratings (1 totally disagree to 7 totally agree) of vignettes low or high in harm and disgust. Error bars depict standard errors.

Criminalization Decisions (dichotomous)

To determine to what extent the level of disgust and harm affected participants’ decisions to criminalize (yes/no) the behavior described in the vignette we fitted a similar model to the dichotomous criminalization variable. Comparable main effects were observed for the vignettes’ level of disgust (b

= 5.13, $SE = .30$, $z = 17.01$, $p < .001$; 95% CI [4.59, 5.86]) and harm ($b = 3.99$, $SE = .30$, $z = 13.41$, $p < .001$; 95% CI [3.48, 4.76]). Participants were more inclined to criminalize behavior high compared to low in disgust or harm. Contrary to the analysis of continuous criminalization ratings, there was no significant interaction effect between disgust and harm level on criminalization, $b = 0.20$, $SE = .42$, $z = 0.47$, $p = .64$; 95% CI [-0.76, 1.15]. *Table 2* depicts the decision frequencies for the various vignettes.

Disgust Sensitivity as a Moderator of the Effects of Vignette Characteristics on Criminalization

Next, we examined whether individual differences in disgust sensitivity further moderated the effects of disgust and harm levels of the vignette on criminalization. To do so, a full-factorial model including disgust level (low and high), harm level (low and high), and disgust sensitivity (standardized scores), was fitted to the data. For the continuous outcome of criminalization, this analysis revealed in addition to the above reported effects, an interaction effect of the vignette's disgust level and disgust sensitivity ($b = 0.50$, $SE = .06$, $t[3518.22] = 8.84$, $p < .001$; 95% CI [0.38, 0.60]), and the vignette's harm level and disgust sensitivity ($b = 0.19$, $SE = .06$, $t[3518.65] = 3.28$, $p = .001$; 95% CI [0.07, 0.29]). These two-way interactions were moreover qualified by a three-way interaction between disgust level, harm level, and disgust sensitivity ($b = -0.67$, $SE = .08$, $t[3518.43] = -8.75$, $p < .001$; 95% CI [-0.86, -0.54]). Disgust sensitivity did not affect criminalization ratings of vignettes low in both harm and disgust ($b = 0.01$, $SE = .04$, 95% CI [-0.07, 0.09]) or high in both harm and disgust ($b = -0.002$, $SE = .04$, 95% CI [-0.08, 0.08]). However, individual differences in disgust sensitivity did affect criminalization ratings for the low disgust, high harm vignette ($b = 0.20$, $SE = .04$, 95% CI [0.12, 0.28]), and, even more so, for the low harm, high disgust vignette ($b = 0.51$, $SE = .05$, 95% CI [0.43, 0.60]). In both cases, more disgust-sensitive individuals gave higher criminalization ratings than less disgust-sensitive individuals (see *Figure 2*).

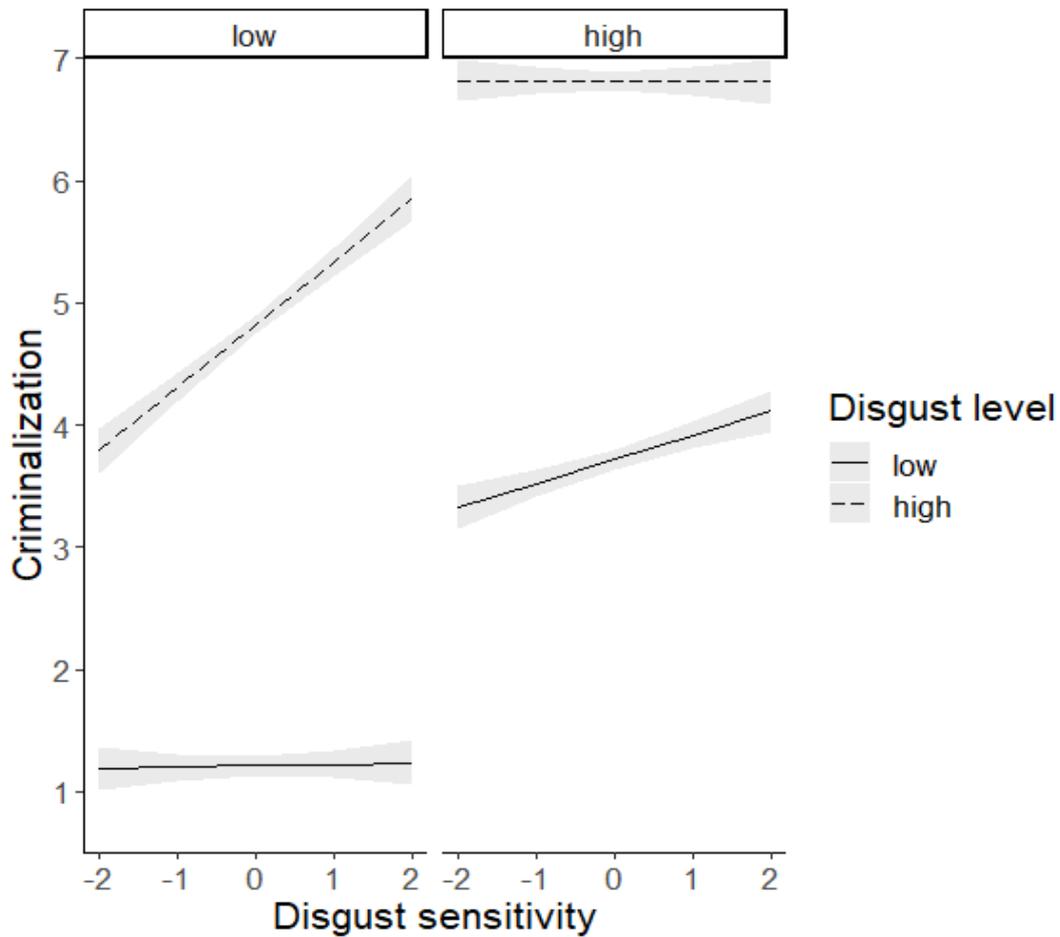


Figure 2. Interaction between disgust level and disgust sensitivity on criminalization ratings for vignettes low and high in harm level.

This pattern was not fully replicated when we fitted a similar model to the dichotomous criminalization decisions. Here, we only observed a significant main effect of disgust sensitivity ($b = 0.60$, $SE = .28$, $z = 2.17$, $p = .030$; 95% CI [0.10, 1.13]), in addition to the previously reported main effects of the vignette’s levels of disgust and harm. Thus, participants were overall more inclined to decide that behavior should be criminalized, the greater their disgust sensitivity. However, none of the higher-order interaction effects reached significance ($p > .054$; see Table 1).

Note though, that those criminalization decisions for the vignettes that were either both low or both high in harm and disgust showed very little variation (i.e., 99% decided against, or for, respectively), which problematizes the fitting of more complex models including interaction terms with

a continuous between-participant variable. Hence, we followed up this analysis with a more focal model that only included the high harm, low disgust and low harm, high disgust vignettes, which, according to our analysis of the continuous criminalization measure, should be most affected by individual differences in disgust sensitivity (given that these vignettes yielded more variation, to begin with). In addition to a main effect of vignette similar to the previously observed pattern of results ($b = 1.18$, $SE = .09$, $z = 12.61$, $p < .001$; 95% CI [1.00, 1.36]), this analysis yielded an interaction effect of disgust sensitivity and vignette ($b = 0.51$, $SE = .09$, $z = 5.41$, $p < .001$; 95% CI [0.34, .69]). This indicates that, in line with the pattern of results for the continuous criminalization measure, disgust sensitivity was more strongly associated with criminalization tendencies of the low harm, high disgust vignette, than the low disgust, high harm vignette.

Moderation by Expertise

As a final step, we examined whether the above-reported effects of the vignette's levels of harm and disgust and individual differences in disgust sensitivity were mitigated by professional expertise. To this end, we fitted a full-factorial model including disgust level (low and high), harm level (low and high), disgust sensitivity (standardized), and expertise level (1 = layman, 2 = expert). For the continuous criminalization ratings, in addition to the previously reported effects, we observed a significant two-way interaction of the vignette's harm level and expertise level that was further qualified by a three-way interaction between the vignettes' disgust and harm levels, and expertise ($b = 0.95$, $SE = .30$, $t[3509.25] = 3.21$, $p = .001$; 95% CI [0.37, 1.53]), see *Figure 3*).

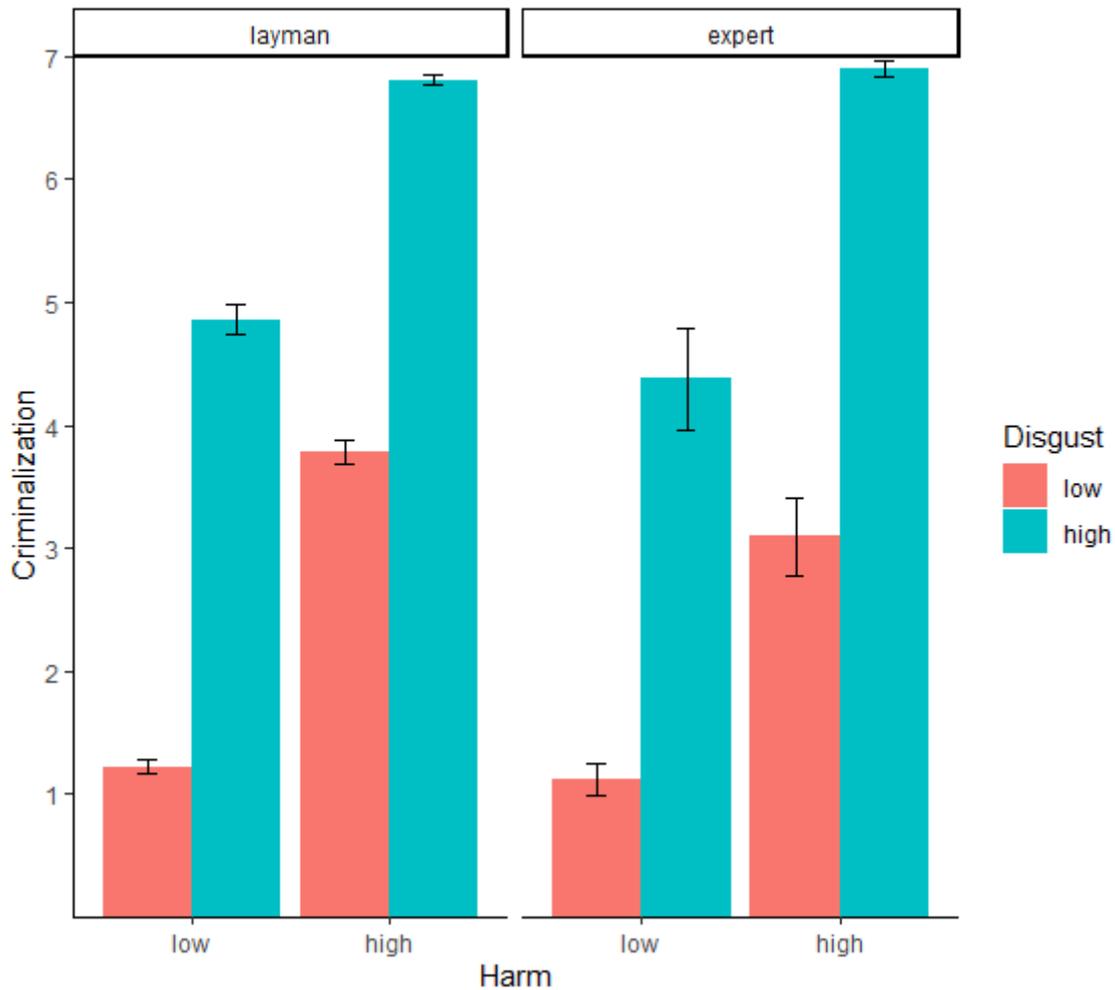


Figure 3. Interaction between harm and disgust level on criminalization by expertise level.

As depicted in *Figure 3*, focused comparisons of the estimated means showed that whereas experts and laypeople displayed overall similar rating patterns, laypeople. However, laypeople criminalized the high harm low disgust vignette ($M = 3.77$, $SE = .04$) more than experts ($M = 3.20$, $SE = .04$, $b = .58$, $SE = .15$, $t[4635] = 3.79$, $p < .001$). The four-way interaction between disgust level, harm level, disgust sensitivity, and expertise level was not significant, $t[3509.25] = .65$, $p = .52$, suggesting that both groups were equally affected by this individual difference variable. See for an overview of the effects, *Table 3*.

A similar model fitted to the dichotomous criminalization decisions did not yield any additional significant effects.

Post Hoc Manipulation Check

To test whether participants indeed perceived the high disgust vignettes to be more disgusting than the low disgust vignettes and the high harm vignettes to be more harmful than the low harm vignettes, we conducted a post hoc manipulation check in a different sample of lay participants. Two hundred and thirty-three individuals started the survey; participants were approached via social media (mostly different groups on Facebook). Twenty-five individuals were excluded because they did not provide ratings of any of the vignettes. This left us with a final sample of 208 participants (74 males, 134 females, $M_{\text{age}} = 23.50$, $SD = 7.13$, with 4 missings). They indicated two items to which extent they agreed that each of the behaviors in the vignettes was disgusting and harmful on a scale from 1 = 'Completely disagree' to 7 = 'Completely agree'.

As intended, both high disgust vignettes (VCP: $M = 5.71$, $SD = 1.50$; CP: $M = 6.80$, $SD = 0.64$) were rated as significantly more disgusting than both of the low disgust vignettes (financial crime: $M = 3.07$, $SD = 1.52$; sweater: $M = 1.86$, $SD = 1.49$; all t 's < -19.86 , all p 's $< .001$). The high harm, high disgust vignette (i.e., CP: $M = 6.76$, $SD = 0.72$), moreover, was seen as more harmful than both low harm vignettes (VCP: $M = 5.26$, $SD = 1.66$; sweater: $M = 1.36$, $SD = 0.97$, both t 's < -12.86 , both p 's $< .001$). The high harm, low disgust vignette (i.e., coco's: $M = 4.62$, $SD = 1.25$) was perceived to be more harmful than the sweater vignette ($t(593.79) = -27.86$, $p < .001$), but *less* harmful than virtual child pornography ($t(593.70) = 5.45$, $p < .001$), suggesting that participants weighed the vignettes differently when considering harm versus disgust, where the latter seemed to be impacted both by the disgust and harm level.

Discussion

This study investigated whether intuitive processes, measured by disgust sensitivity, influence the decision to criminalize behavior. We investigated what type of behavior was more likely to be criminalized (scored in terms of harmfulness and disgustingness), and to what extent disgust sensitivity correlated with this decision. Our results largely confirm what we expected. Participants were more likely to criminalize behavior that was highly disgusting (child pornography), even when it was relatively low in harm (virtual child pornography), compared with highly harmful but less disgusting behavior (high-risk financial behavior), see *Figure 1*. This is remarkable from a theoretical point of view, where you would expect that harmful behavior would be criminalized more readily than disgusting behavior, especially since the harm principle is such a dominant normative principle (Feinberg, 1984; Hart, 1963; Mill, 1859/2005). Individual differences in disgust sensitivity further moderated this pattern, so that disgust sensitivity correlated positively with criminalization ratings for the high-risk financial behavior vignette (low disgust/high harm), and even more so with criminalization ratings for the virtual child pornography vignette (low harm/high disgust). In both cases, highly disgust-sensitive individuals—both legal experts and lay participants—gave higher criminalization ratings than less disgust-sensitive individuals (see *Figure 2*).

These findings are consistent with existing literature, where disgust is linked to (harsher) moral judgment (Giner-Sorolla et al., 2018; Karinen & Chapman, 2019) and disgust sensitivity is positively correlated with moral condemnation (Chapman & Anderson, 2014; Jones & Fitness, 2008; Inbar & Pizarro, 2022; Karinen & Chapman, 2019; Van Leeuwen et al., 2022; Wagemans et al., 2018; Wang et al., 2019). The fact that highly disgust-sensitive individuals gave higher criminalization ratings for the virtual child pornography vignette than for the high-risk financial vignette can also be explained by existing literature. In line with both Haidt's and Greene's dual-process theories (Atari et al. 2022; Graham et al., 2013; Greene 2013, 2014), virtual child pornography can be described as a *personal* scenario, within the domain of purity, to which our intuitive processes react very strongly. The high-risk financial instrument is an *abstract and impersonal* scenario and is less likely to elicit a strong

intuitive response (Greene 2009, 2013). It is therefore not surprising that the effect found in the virtual child pornography vignette is stronger than the effect found in the financial instrument vignette.

Disgust sensitivity did not affect criminalization ratings for the sweater (low in harm and disgust) and the *actual* child pornography (high in harm and disgust). This is probably due to strong floor and ceiling effects (*Figure 2*). Wearing a sweater with highly clashing colors is not behavior that any individual (whether low or high in disgust sensitivity) would want to bring under the scope of the criminal law (Feinberg 1985). And even a low disgust-sensitive individual would see the sense in criminalizing *actual* child pornography, because it is both extremely harmful and extremely disgusting. Comparing these cases (the sweater and actual child pornography) with the other scenarios (virtual child pornography and financial crime) could give us information on whether individual differences in disgust sensitivity are especially relevant in cases where the relationship between harm and disgust is more *ambiguous*. To investigate which conduct specifically displays a relationship between disgust sensitivity and criminalization, further research is recommended.

Theoretical Implications

Our observations could have important implications for legal theory. Scholars in legal theory are generally assumed to rely on slow, reasoned, system 2 processes (Alexander & Sherwin, 2021; Dickson, 2016; Dworkin, 1977; Duff, 2014; Edwards, 2018; Levi, 1949/2013; Posner, 2010; Simester & Von Hirsch, 2011; Sunstein, 2008; Tadros, 2016). The question is whether this assumption is correct. Our findings show that fast, intuitive, system 1 processes contribute to the criminalization of behavior (Nussbaum, 2004; Sunstein, 2008). Combining these findings with existing literature could give rise to the hypothesis that legal scholars generally do not rely on slow, reasoned, system 2 processes but *mostly* rely on fast, intuitive, system 1 processes when theorizing and deciding about criminalization (Atari et al., 2022; Greene, 2014; Haidt, 2012; Liebermann & Patrick, 2018). A further hypothesis could be that while doing so, they often *rationalize* their intuitive decisions, rather than *reason* toward a reflective outcome (Cushman, 2020; Greene, 2014; Haidt, 2001; Kahan, 2013; Liebermann & Patrick, 2018). This should be further investigated. As a note of nuance, legal scholars are generally well aware that feelings

can have a role in criminalization (e.g., Hart, 1963; Dworkin, 1974):¹¹ some even find justification in it (Devlin, 1959; Moore, 2008). However, they generally consider that fast, intuitive processes influence their decisions to only a small extent, or at least that this is within their awareness (Sunstein, 2008). Slow, reasoned argumentation (system 2) is considered to be doing most of the work (Alexander & Sherwin, 2021). Our results provide a first step in the other direction; further research is welcome, to shed more light on this.

A Dual-Process Theory of Criminalization

Theorizing this further, our findings provide preliminary evidence for a *dual-process theory of criminalization* (Faassen, *in press*), which builds on Greene’s dual-process theory of moral decision-making (Greene, 2013, 2014). A dual-process theory of criminalization as proposed here would be both descriptive and normative, and would place much more emphasis on fast, intuitive processes than is usual in legal theory (e.g., Duff, 2014; Dworkin, 1974; Edwards, 2018; Feinberg, 1984-1988; Hart, 1965; Husak, 2008; Posner, 2010; Simester & Von Hirsch, 2011). It would posit, first, that criminalization decisions and theory are grounded in both fast, intuitive, system 1 processes and slow, reasoned, system 2 processes.¹² Second, that intuitive processes are especially present in evaluating “personal” types of criminal behavior.¹³ Third, that our thinking about criminalization is not always “reliable”: it may be biased. That is to say, the deep evolutionary origins of our justice intuitions (Sznycer & Patrick, 2020) make it conceivable that these intuitions are very well attuned to dealing with “*traditional criminal offenses*” (such as murder, burglary, aggressive behavior, or sexual abuse: so-called *malum in se* crimes)—simply because our intuitions have thousands of years of experience with them.¹⁴ The intuitive, automatic mechanisms in our cognition have learned to give a strong aversive signal when confronted with behavior that was threatening in our personal environment during

¹¹ Although they tend to think this is a minor role, which will not affect their reasoning (Sunstein, 2008).

¹² These cognitive processes are increasingly characterized in computational terms, such as *model-based* and *model-free learning mechanisms* (Cushman, 2013; Crockett, 2013).

¹³ See *supra* note 8.

¹⁴ This could also explain why certain crimes are called *malum in se*, i.e., “evil or wrong in themselves.” They simply *feel* wrong, because our justice intuitions have had experience with them for thousands of years (Greene, 2013; Sznycer & Patrick, 2020).

evolutionary history (Greene, 2013); often colored by cultural influences (Atari et al., 2022; Graham et al., 2013). However, our intuitions are much less attuned to deal with “*modern criminal offenses*”: offenses that are extremely recent on an evolutionary timescale, and certainly were certainly not personally threatening during our evolutionary history, such as environmental harm (climate change, ecocide), abstract financial harm (white-collar crime, tax evasion, high-risk financial behavior), offenses that stem from (bio)technological developments (genetic engineering, stem cell research, abortion, euthanasia, robot sex, virtual child pornography, child sex dolls, and virtual animal pornography) or cultural differences (wearing a burqa, forced marriages). A dual-process theory of criminalization proposes that our thinking about specifically these “modern criminal offenses” *can* be biased—simply because our intuitive processes have very little experience with them (Faassen, *in press*).

The Criminalization Bias

Such a criminalization bias (Faassen, *in press*) can go two possible ways: First, our intuitions could “overreact” to personal, emotion-provoking offenses that, in reality, are quite harmless (e.g., incest while using contraceptives [Haidt, 2001], abortion, euthanasia, child sex dolls, virtual child pornography). Second, our intuitions could “underreact”, that is, react very weakly or not at all, to abstract and impersonal, non-emotion-provoking offenses that, in reality, are quite harmful (e.g., climate change or abstract financial harm; Greene, 2013).

Ultimately, if we are willing to accept these descriptive findings, they lead to the normative question: *should* we trust our intuitive decisions when evaluating “modern criminal offenses”? And if not, are we willing to debunk our “legal reasoning” and exclude our intuitions from our argumentation (Faassen, *in press*; Greene, 2013, 2014; Singer, 2005)?¹⁵ Thus, a dual-process theory of criminalization can have both descriptive and normative implications, offering many opportunities for further research in criminalization theory, both empirically and theoretically.

¹⁵ This is called a *debunking explanation* (Greene, 2014), which we will not go into further here.

Limitations and Future Directions

It is useful to point out some limitations of our research design. First, we used unstandardized and ad hoc scenarios. Second, the high-risk financial scenario (the contingent convertible bonds) could be too complex and unknown for participants, which may have influenced our results. Further research could benefit from a simpler abstract and impersonal scenario (Greene 2013, 2014); for example, tax evasion by large corporations, growing global inequality, or privacy-infringing data policies of large social media companies. Third, our study places great emphasis on the emotion of disgust (Giner-Sorolla et al., 2018; Rozin et al., 2008; Russell & Giner-Sorolla, 2013), although other emotions may also play a role in criminalization decisions. It has been suggested that sensitivity to several affective states (not only disgust but also anxiety and anger) predicts extremity in evaluative judgments more broadly (Cheng et al., 2013; Landy & Piazza, 2019). This would mean that the relationship between disgust and moral condemnation is a corollary of a broader relationship between affect and moral evaluation (Piazza et al., 2018), which would not contradict a dual-process theory of criminalization. Further research could focus on how these various affective states contribute to the criminalization process (Atari et al., 2022; Crockett, 2013; Cushman, 2013; Greene & Young, 2020).

Fourth, it has been argued by Gray et al. (2022)—in their Affective Harm Account (formerly the theory of dyadic morality)—that harm should be redefined as an intuitively perceived continuum (i.e. *perceived harm*) that mediates the relation between disgust and moral decision-making. Instead of postulating a direct link between disgust and moral condemnation, they assert that the most important variable in determining whether or not we condemn certain behavior is perceived harm (Schein et al., 2016). This shows an important limitation of our design: we did not ask participants about their perceptions of harm in the four vignettes; the harmfulness was determined by the researchers, on the basis of existing literature (Berg & Kaserer, 2015; Endrass et al., 2009; Goncharenko et al., 2021; Gottfried et al., 2020; Gray, 2021; Houtepen et al., 2014; Ost, 2010; Gillespie, 2018; Nair, 2019; Seto, 2013, 2018; Seto et al., 2011; Van Wijnbergen et al., 2022). In further research, it is advisable to ask participants about their perceptions of the harm in moral wrongdoing scenarios. In line with this,

empirical research on criminalization could benefit from a more qualitative research component, with participants asked to give their specific reasons for criminalizing scenarios. For example, in the virtual child pornography vignette, it would be interesting to know whether highly disgust-sensitive people more frequently mention the disgustingness of the behavior as a reason for criminalization, or its harmfulness, or something else.

Practical Implications

Finally, our findings could have practical implications. They show that intuitive processes (such as disgust) are likely to influence the decision to criminalize behavior, in particular virtual child pornography. This is important to the legislature. As mentioned above, several countries have brought realistic virtual child pornography under the scope of the criminal law (Bird, 2011; Gillespie, 2018; Witting, 2020), reasoning that the conduct is harmful to children. Our study offers another, preliminary, explanation: the decision to criminalize *virtual* child pornography is the result of an intuitive, aversive reaction to *real* child sexual abuse. According to a dual-process theory of criminalization, this descriptive finding has normative implications (that is, if the finding holds up). Virtual child pornography resembles a so-called “modern criminal offense: it is a consequence of recent technological developments. The longstanding evolutionary origins of our justice intuitions (Sznycer & Patrick, 2020) mean it is quite conceivable that our intuitions are not well attuned to evaluating *virtual* child pornography. During thousands of years of evolution, sex with children was only very real and very harmful: it was never “virtual”.¹⁶ It can be argued that during these thousands of years, our intuitions “learned: to react strongly to anything that merely resembles *real* sex with children. Unsurprisingly, this leads to bias when evaluating the legitimacy of *virtual* child pornography: our intuitions simply do not have experience with this digital version, and therefore react with extreme aversion—although, in reality, the conduct is not particularly harmful. If we are willing to accept these descriptive hypotheses, the normative question arises: do we consider our intuitions—which very likely evolved in order to prevent *real* child sex abuse—to be a morally relevant factor when evaluating *virtual*

¹⁶ At least not *visibly* virtual.

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child sex abuse? And if not, are we willing to accept that we should “bite the virtual bullet” (Luck, 2009)? That is, setting our intuitions aside and taking a more nuanced approach to virtual child sexual material—where no children are involved: should it perhaps be legalized for certain populations, under certain restrictions, for example with product certification or as a means for research/treatment (Malamuth & Huppin, 2007; McLelland, 2012; McLelland & Yoo 2007; Seto, 2013)? The answer is up to us, empirical and normative scholars alike.

Tables and Figures

Table 1

Multilevel full-factorial models testing the effects of the vignette’s disgust and harm level without (Model 1), and with individual difference scores in disgust sensitivity (Model 2), on continuous ratings (1 = totally disagree to 7 = totally agree) and dichotomous (yes/no) decisions of criminalization of behavior.

	Model 1					Model 2				
	<i>b (SE)</i>	<i>t</i>	<i>df</i>	<i>p</i>	(95% CI)	<i>b (SE)</i>	<i>t</i>	<i>df</i>	<i>p</i>	95% CI
<u>Criminalization – Continuous</u>										
Disgust	3.60 (.06)	63.60	3521	< .001	(3.49, 3.71)	3.61 (.06)	64.66	3518.22	< .001	(3.50, 3.72)
Harm	2.50 (.06)	44.18	3522	< .001	(2.39, 2.61)	2.51 (.06)	44.88	3518.90	< .001	(2.39, 2.62)
Disgust Sensitivity (DS)						0.01 (.04)	0.30	4645.62	.76	(-0.06, 0.09)
Disgust x Harm	-0.50 (.08)	-6.29	3521.4	< .001	(-0.65, -0.33)	-0.51 (.08)	-6.46	3518.56	< .001	(-0.67, -0.37)
			8							
Disgust X DS						0.50 (.06)	8.84	3518.22	< .001	(0.38, 0.59)
Harm X DS						0.19 (.06)	3.28	3518.65	.001	(0.07, 0.29)

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	<i>b (SE)</i>	<i>z</i>	<i>p</i>	(95% CI)	<i>b (SE)</i>	<i>z</i>	<i>p</i>	(95% CI)	
Disgust X Harm X DS					-0.70 (.08)	-8.75	3518.43	< .001	(-0.86, -0.54)
<u>Criminalization - Dichotomous</u>									
Disgust	5.13 (.30)	17.00	< .001	(4.59, 5.86)	5.34 (.35)	15.43	< .001	(4.89, 6.50)	
Harm	3.99 (.30)	13.41	< .001	(3.48, 4.76)	4.16 (.34)	12.18	< .001	(3.73, 5.31)	
Disgust Sensitivity (DS)					0.59 (.27)	2.17	.03	(0.09, 1.29)	
Disgust x Harm	0.20 (.43)	0.47	.64	(-0.76, 1.15)	-0.01 (.46)	-0.03	.98	(-1.13, 0.92)	
Disgust X DS					-0.04 (.28)	-0.14	.89	(-0.75, 0.45)	
Harm X DS					-0.54 (.28)	-1.92	.054	(-1.24, -0.03)	
Disgust X Harm X DS					0.03 (.42)	0.06	.95	(-0.70, 1.07)	

Note: df = degrees of freedom, CI = Confidence Interval

Table 2

Frequencies and proportions of (N = 1175) participants' criminalization decisions (yes/no), as a function of the vignettes' levels of harm (low or high) and disgust (low or high).

Criminalize	Low harm		High harm	
	Low disgust	High disgust	Low disgust	High disgust
Yes	12 (1%)	732 (62%)	412 (35%)	1164 (99%)
No	1163 (99%)	443 (38%)	760 (65%)	11 (1%)

Note: observations were missing for the high harm low disgust vignette for N=3 participants.

Table 3

Multilevel full-factorial model testing the effects of the vignette's disgust and harm level, individual differences in disgust sensitivity, and professional expertise (yes/no) on continuous ratings (1 = totally disagree to 7 = totally agree) criminalization of behavior.

Model 3					
	<i>b (SE)</i>	<i>t</i>	<i>df</i>	<i>p</i>	(95% CI)
<u>Criminalization – Continuous</u>					
Disgust	3.63 (.058)	62.38	3509	< .001	(3.51-3.74)
Harm	2.55 (.06)	43.83	3509	< .001	(2.435-2.66)
Disgust Sensitivity (DS)	0.005 (.04)	0.12	4635	0.907	(0.07-0.08)
Expertise	-0.088 (.15)	-0.573	4635	0.567	(0.40-0.21)
Disgust x Harm	-0.60 (.08)	-7.25	3509	< .001	(0.74-0.415)
Disgust X DS	0.50 (.06)	8.61	3509	< .001	(0.39-0.61)
Disgust X Expertise	-0.28 (.21)	-1.43	3509	0.179	(0.73-0.17)
Harm X DS	0.16 (.06)	2.75	3509	0.006	(0.05-0.26)
Harm X Expertise	-0.48 (.21)	-2.31	3509	0.021	(0.89-0.08)
Disgust X Harm X DS	-0.67 (.08)	-8.10	3509	< .001	(0.83-0.49)
Disgust X Harm X Expertise	0.95 (.30)	3.21	3509	0.001	(0.31-1.54)
Disgust X DS X Expertise	-0.09 (.24)	-0.42	3509	0.677	(0.66-0.32)
Harm X DS X Expertise	0.24 (.24)	1.03	3509	0.303	(0.22-0.66)
Disgust X Harm X DS X Expertise	-0.22 (.33)	0.648	3509	0.517	(0.81-0.51)

Note: df = degrees of freedom, CI = Confidence Interval

Appendix A

The vignettes are translated to English, the original study was in Dutch.

Case: Contingent convertible bonds

A contingent convertible bond ('coco') is a loan from a financial institution or private individual to a bank. This loan is converted into shares if the bank's financial situation deteriorates. Coco's have advantages for banks (they count as equity) and providers (they offer a high-interest rate). They also contain risks: the moment the loan is converted into shares can be interpreted as a signal that the bank is not doing well and could lead to the massive withdrawal of bank balances. It could also lead to a systemic crisis: between them, banks and other financial institutions have many coco's in circulation, as a result of which problems at one bank can lead to problems at another. These risks are complex and cannot be easily assessed.

Case: Sweater with clashing colors

People wear different kinds of clothes. Some people prefer colorful combinations, for example, a sweater with bright purple and orange elements. People wear this so-called 'cursing sweater' in public places, such as the bus, the park, or cycling to the supermarket.

Case: Virtual child pornography

Virtual child pornography is material on which virtual (non-real) children perform sexual acts. This material is drawn or painted by hand, but can also be produced digitally with computer software. The material looks very realistic, but it is certain that no real children are involved in creating this material.

Case: Child pornography

Child pornography is material that depicts children performing sexual acts. This material is produced with, for example, a photo- or video camera. It is undisputed that real children are involved in creating this material.

References

- Aarøe, L., Petersen, M. B., & Arceneaux, K. (2017). The behavioral immune system shapes political intuitions: why and how individual differences in disgust sensitivity underlie opposition to immigration. *American Political Science Review*, *111*(2), 277-294. <https://doi.org/10.1017/S0003055416000770>
- Ackerman, J. M., Hill, S. E., & Murray, D. R. (2018). The behavioral immune system: Current concerns and future directions. *Social and Personality Psychology Compass*, *12*, Article e12371. <https://doi.org/10.1111/spc3.12371>
- Adolphs, R., & Anderson, D. J. (2018). *The neuroscience of emotion: A new synthesis*. Princeton University Press.
- Alexander, L. & Sherwin, E. (2021). *Advanced introduction to legal reasoning*. Edward Elgar Publishing.
- Ashcroft v. Free Speech Coalition 2002*, 122 S.Ct. 1389.
- Atari, M., Haidt, J., Graham, J., Koleva, S., Stevens, S. T., & Dehghani, M. (2022). Morality beyond the WEIRD: How the nomological network of morality varies across cultures. PsyArXiv. <https://doi.org/10.31234/osf.io/q6c9r>
- Babchishin, K.M., Hanson, R.K. & VanZuylen, H. (2015). Online child pornography offenders are different: A meta-analysis of the characteristics of online and offline sex offenders against children. *Archives of Sexual Behaviour*, *44*, 45–66. <https://doi.org/10.1007/s10508-014-0270-x>

- Babchishin, K. M., Merdian, H. L., Bartels, R. M., & Perkins, D. (2018). Child sexual exploitation materials offenders. *European Psychologist*, 23(2), 130–143. <https://doi.org/10.1027/1016-9040/a000326>
- Bandes, S. A., & Blumenthal, J. A. (2012). Emotion and the law. *Annual Review of Law and Social Science*, 8, 161-181.
- Bandes, S. A., Madeira, J. L., Temple, K. D., & White, E. K. (Eds.). (2021). *Research Handbook of Law and Emotion*, Edward Elgar Publishing. <https://doi.org/10.4337/9781788119085>
- Bartel, C. (2012). Resolving the gamer's dilemma. *Ethics and Information Technology*, 14, 11–16. <https://doi.org/10.1007/s10676-011-9280-8>
- Bates, D., Machler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 67, 1-48. [Http://dx.doi.org/10.18637/jss.v067.i01](http://dx.doi.org/10.18637/jss.v067.i01)
- Bell, R. E. (2012). Reconciling the PROTECT Act with the First Amendment. *New York University Law Review*, 78(6), 1878-1917.
- Berg, T., & Kaserer, C. (2015). Does contingent capital induce excessive risk taking? *Journal of Financial Intermediation*, 24(3), 356-385. <https://doi.org/10.1016/j.jfi.2014.11.002>
- Bird, P. (2011). Virtual child pornography laws and the constraints imposed by the First Amendment. *Barry Law Review*, 16(1), 161-177.
- Birnbaum, J. (1834). Über das Erforderniß einer Rechtsverletzung zum Begriffe des Verbrechens. In J. Abegg et al. (Eds.), *Archiv des Criminalrechts, Neue Folge* (pp. 149-194). C. A. Schwetschke & Sohn.

Brenner, C. J., & Inbar, Y. (2015). Disgust sensitivity predicts political ideology and policy attitudes in the Netherlands. *European Journal of Social Psychology, 45*(1), 27-38. <https://doi.org/10.1002/ejsp.2072>

Burke, D. D. (1997). The criminalization of virtual child pornography: A constitutional question. *Harvard Journal on Legislation, 34*(2), 439-472.

Cannon, P. R., Schnall, S., & White, M. (2011). Transgressions and expressions: Affective facial muscle activity predicts moral judgments. *Social Psychological and Personality Science, 2*(3), 325–331. <https://doi.org/10.1177/1948550610390525>

Chapman, H. A., Kim, D. A., Susskind, J. M., & Anderson, A. K. (2009). In bad taste: Evidence for the oral origins of moral disgust. *Science (New York, N.Y.), 323*(5918), 1222–1226. <https://doi.org/10.1126/science.1165565>

Chapman, H. A., & Anderson, A. K. (2014). Trait physical disgust is related to moral judgments outside of the purity domain. *Emotion, 14*(2), 341–348. <https://doi.org/10.1037/a0035120>

Child Pornography Prevention Act (1996) 18 U.S.C. §2252A.

Christensen, L. S., Moritz, D. & Pearson, A. (2021). Psychological Perspectives of Virtual Child Sexual Abuse Material. *Sexuality & Culture, 25*, 1353-1365. <https://doi.org/10.1007/s12119-021-09820-1>

Cisneros, D. (2002). ‘Virtual child’ pornography on the internet: A ‘virtual’ victim? *The Law and Technology Review, 19*, 1-7.

Clifford, S., & Wendell, D. G. (2016). How disgust influences health purity attitudes. *Political Behavior*, 38(1), 155-178. <https://doi.org/10.1007/s11109-015-9310-z>

Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse (Lanzarote Convention 2007), opened for signature 25 November 2007, CETS 201 (entered into force 01 July 2010). www.coe.int/en/web/children/lanzarote-convention

Coroners and Justice Act 2009 (c. 25).

Crawford, J. T., Inbar, Y., & Maloney, V. (2014). Disgust sensitivity selectively predicts attitudes toward groups that threaten (or uphold) traditional sexual morality. *Personality and Individual Differences*, 70, 218–223. <https://doi.org/10.1016/j.paid.2014.07.001>

Crockett, M. J. (2013). Models of morality. *Trends in cognitive sciences*, 17(8), 363-366. <https://doi.org/10.1016/j.tics.2013.06.005>

Cushman, F. A., Young, L., & Greene, J. D. (2010). Multi-system moral psychology. In J. M. Doris, T. M. P. R. Group (Eds.), *The Oxford handbook of moral psychology* (pp. 47-71). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199582143.003.0003>

Cushman, F. (2013). Action, outcome, and value: A dual-system framework for morality. *Personality and social psychology review*, 17(3), 273-292. <https://doi.org/10.1177/1088868313495594>

Cushman, F., & Gershman, S. (2019). Editors' introduction: Computational approaches to social cognition. *Topics in cognitive science*, 11(2), 281-298. <https://doi.org/10.1111/tops.12424>

Cushman, F. (2020). Rationalization is rational. *Behavioral and Brain Sciences* 43(28), 1–59.
<https://doi.org/10.1017/S0140525X19001730>

Danovitch, J., & Bloom, P. (2009). Children's extension of disgust to physical and moral events. *Emotion*, 9(1), 107–112. <https://doi.org/10.1037/a0014113>

Diamond, M. (2009). Pornography, public acceptance and sex related crime: A review. *International Journal of Law and Psychiatry*, 32(5), 304-314. <https://doi.org/10.1016/j.ijlp.2009.06.004>

Devlin, P. (1965). *The enforcement of morals*. Oxford University Press.

Dickson, J. (2016). Interpretation and Coherence in Legal Reasoning. In E. N. Zalta (Ed.) *The Stanford Encyclopedia of Philosophy* (Winter 2016 ed.). Stanford University.
<https://plato.stanford.edu/archives/win2016/entries/legal-reas-interpret/>

Directive 2011/93. *Combating sexual abuse and sexual exploitation of children and child pornography*. European Parliament and Council of the European Union. <http://data.europa.eu/eli/dir/2011/93/oj>

Duff, R. A. (2014). Towards a modest Legal Moralism. *Criminal law and philosophy*, 8(1), 217-235.
<https://doi.org/10.1007/s11572-012-9191-8>

Dworkin, R. (1977) *Taking rights seriously*. Gerald Duckworth & Co.

Edwards, J. (2018). Theories of Criminal Law. In E. N. Zalta (ed.), *The Stanford encyclopedia of Philosophy* (Fall 2021 ed.). Stanford University. <https://plato.stanford.edu/archives/fall2021/entries/criminal-law/>

Endrass, J., Urbaniok, F., Hammermeister, L. C., Benz, C., Elbert, T., Laubacher, A., & Rossegger, A. (2009). The consumption of Internet child pornography and violent and sex offending. *BMC Psychiatry*, 9, Article 43, 1-7. <https://doi.org/10.1186/1471-244X-9-43>.

Eskine, K. J., Kacinik, N. A., & Prinz, J. J. (2011). A bad taste in the mouth: Gustatory disgust influences moral judgment. *Psychological Science*, 22(3), 295–299. <https://doi.org/10.1177/0956797611398497>

Faassen, J. N. (2013), *Strafbaarstelling, Moraliteit & de Neurowetenschappen* (Unpublished master's thesis, Radboud University Nijmegen). Summary in English. **Url invoegen.**

Faassen, J. N. (**in press**). *Criminalization, fast and slow: The impact of cognitive (neuro)science on morality and criminal law* (Doctoral dissertation, Leiden University). Forthcoming 2023.

Fatou, M., Neamțu, I., & Van Wijnbergen, S. (2022, february). Risk-taking, competition and uncertainty: Do contingent convertible (coco) bonds increase the risk appetite of banks? (Tinbergen Institute Discussion Paper 2022-017/IV). <http://dx.doi.org/10.2139/ssrn.4041589>

Feinberg, J. (1984-1988), *The moral limits of the Criminal Law* (Vols. I-IV). Oxford University Press.

Feinberg, J. (1985), *The moral limits of the Criminal Law. Vol. II: Offense to others*. Oxford University Press.

Feinberg, J. (1988), *The Moral Limits of The Criminal Law. Vol. IV: Harmless wrongdoing*. Oxford University Press.

Feldman Barrett, L. (2017). The theory of constructed emotion: An active inference account of interoception and categorization. *Social Cognitive and Affective Neuroscience*, 12(1), 1–23. <https://doi.org/10.1093/scan/nsw154>

Fox, E. (2018). Perspectives from affective science on understanding the nature of emotion. *Brain and Neuroscience Advances*, 2, 1-8. <https://doi.org/10.1177/2398212818812628>

Ghelfi, E., Christopherson, C. D., Urry, H. L., Lenne, R. L., Legate, N., Ann Fischer, M., Wagemans, F. M. A., Wiggings, B., Barrett, T., Bornstein, M., De Haan, B., Guberman, J., Issa, N., Kim, J., Na, E., [O'Brien, J.](#), [Paulk, A.](#), [Peck, T.](#), [Sashihara, M.](#), ... Sullivan, D. (2020). Reexamining the effect of gustatory disgust on moral judgment: A multilab direct replication of Eskine, Kaciniak, and Prinz (2011). *Advances in Methods and Practices in Psychological Science*, 3(1), 3-23. <https://doi.org/10.1177/2515245919881152>

Gillespie, A. A. (2018). Child pornography. *Information & Communications Technology Law*, 27(1), 30-54. <https://doi.org/10.1080/13600834.2017.1393932>

Giner-Sorolla, R., Kupfer, T., & Sabo, J. (2018). What makes moral disgust special? An integrative functional review. In J. M. Olson (Ed.), *Advances in Experimental Social Psychology*, Vol. 57 (pp. 223-289). Academic Press Inc. <https://doi.org/10.1016/bs.aesp.2017.10.001>

Goncharenko, R., Ongena, S., & Rauf, A. (2021). The agency of CoCos: Why contingent convertible bonds are not for everyone. *Journal of Financial Intermediation*, 48, Article 100882. <https://doi.org/10.1016/j.jfi.2020.100882>

Gottfried, E. D., Shier, E. K. & Mulay, A. L. (2020). Child Pornography and Online Sexual Solicitation. *Current Psychiatry Reports*, 22, Article: 10, 1-8. <https://doi.org/10.1007/s11920-020-1132-y>

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral foundations theory: The pragmatic validity of moral pluralism. In *Advances in experimental social psychology* (Vol. 47, pp. 55-130). Academic Press.

Graham, J., Haidt, J., Motyl, M., Meindl, P., Iskiwitch, C., & Mooijman, M. (2018). Moral foundations theory: On the advantages of moral pluralism over moral monism. In K. Gray & J. Graham (Eds.), *Atlas of moral psychology* (pp. 211–222). The Guilford Press.

Gray, D. (2021). Do you know it when you see it? Using Alaska’s child pornography statute as a nationwide model for proscribing morphed images. *Alaska Law Review*, 38(2), 231–274.

<https://scholarship.law.duke.edu/alr/vol38/iss2/4>

Gray, K., MacCormack, J. K., Henry, T., Banks, E., Schein, C., Armstrong-Carter, E., Abrams, S., & Muscatell, K. A. (2022). The affective harm account (AHA) of moral judgment: Reconciling cognition and affect, dyadic morality and disgust, harm and purity. *Journal of Personality and Social Psychology*. Advance online publication. <https://doi.org/10.1037/pspa0000310>

Greene, J. D. (2008) The secret joke of Kant’s soul. In: W. Sinnott-Armstrong (ed.), *Moral Psychology Vol 3. The neuroscience of morality: emotion, disease and development* (pp. 35-79). MIT Press.

Greene, J. D. (2009a). [Fruit flies of the moral mind](#). In M. Brockman (ed.), *What's next: Dispatches from the future of science* (pp. 105-116). Vintage.

Greene, J. D. (2009b). Dual-process morality and the personal/impersonal distinction: A reply to McGuire, Langdon, Coltheart, and Mackenzie. *Journal of Experimental Social Psychology*, 45(3), 581-584.

Greene, J.D. (2011) [Emotion and Morality: A Tasting Menu](#) *Emotion Review*, 3(3) 227-229.
<https://doi.org/10.1177/1754073911409629>

Greene, J. D. (2013). *Moral Tribes*. The Penguin Press.

Greene, J. D. (2014). Beyond point-and-shoot morality: Why cognitive (neuro)science matters for ethics. *Ethics*, 124(4), 695–726. <https://doi.org/10.1086/675875>

Greene, J. D. & Young, L. (2020). The Cognitive Neuroscience of Moral Judgment and Decision-Making. In D. Poeppel, G. R. Mangun & M. S. Gazzaniga (Eds.), *The Cognitive Neurosciences, Vol. 6* (pp. 1005-1015). MIT Press.

Haidt, J., Mccauley, C., and Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences*, 16, 701–713.
[https://doi.org/10.1016/0191-8869\(94\)90212-7](https://doi.org/10.1016/0191-8869(94)90212-7)

Haidt, J., Rozin, P., Mccauley, C., & Imada, S. (1997). Body, psyche, and culture: The relationship between disgust and morality. *Psychology and Developing Societies*, 9(1), 107–131.
<https://doi.org/10.1177/097133369700900105>

Haidt J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108(4), 814–834.
<https://doi.org/10.1037/0033-295x.108.4.814>

Haidt, J., & Graham, J. (2007). When morality opposes justice: Conservatives have moral intuitions that liberals may not recognize. *Social Justice Research*, 20(1), 98–116
<https://doi.org/10.1007/s11211-007-0034-z>

Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*, Pantheon Books.

Hart, H.L.A. (1963). *Law, liberty and morality*. Stanford University Press.

Hiser, J., & Koenigs, M. (2018). The multifaceted role of the Ventromedial Prefrontal Cortex in emotion, decision making, social cognition, and psychopathology. *Biological psychiatry*, 83(8), 638–647. <https://doi.org/10.1016/j.biopsych.2017.10.030>

Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science*, 18(8), 691–698. <https://doi.org/10.1111/j.1467-9280.2007.01962.x>

Horberg, E. J., Oveis, C., Keltner, D., & Cohen, A. B. (2009). Disgust and the moralization of purity. *Journal of Personality and Social Psychology*, 97(6), 963–976. <https://doi.org/10.1037/a0017423>

Houtepen, J. A. B. M., Sijtsema, J. J., Bogaerts, S. (2014). From child pornography offending to child sexual abuse: A review of child pornography offender characteristics and risks for cross-over, *Aggression and Violent Behavior*, 19, 466-473. <https://doi.org/10.1016/j.avb.2014.07.011>

Husak, D. (2008). *Overcriminalization*. Oxford University Press.

Inbar, I., & Pizarro, D. A. (2022). How disgust affects social judgments. In B. Gawronski (Ed.), *Advances in Experimental Social Psychology*, Vol. 65 (pp. 109-166). Academic Press Inc.

Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion*, 9(3), 435–439. <https://doi.org/10.1037/a0015960>

Johnson, D. J., Wortman, J., Cheung, F., Hein, M., Lucas, R. E., Brent Donnellan, M., Ebersole, C. R., Narr, R. K. (2016). The effects of disgust on moral judgments: Testing moderators. *Social Psychological and Personality Science*, 7(7), 640-647 <https://doi.org/10.1177/1948550616654211>

Jones, A., & Fitness, J. (2008). Moral hypervigilance: the influence of disgust sensitivity in the moral domain. *Emotion*, 8(5), 613–627. <https://doi.org/10.1037/a0013435>

Jenkins, S. (2018) *Virtual child pornography – policing fantasy? A critical evaluation of the justifications for the criminalisation of virtual child pornography (VCP)*. PhD thesis, Middlesex University.

Kahan, D. M. (2013). Ideology, motivated reasoning and cognitive reflection. *Judgment and Decision Making*, 8(4), 407-424.

Kahneman, D. (2011). *Thinking, fast and slow*. Penguin Books.

Karinen, A. K., & Chapman, H. A. (2019). Cognitive and personality correlates of trait disgust and their relationship to condemnation of non purity moral transgressions. *Emotion*, 19, 889–902. <https://doi.org/10.1037/emo0000489>

Kempthorne, J. C., & Terrizzi Jr, J. A. (2021). The behavioral immune system and conservatism as predictors of disease-avoidant attitudes during the COVID-19 pandemic. *Personality and individual differences*, 178, Article 110857. <https://doi.org/10.1016/j.paid.2021.110857>

Kiss, M. J., Morrison, M. A., & Morrison, T. G. (2020). A meta-analytic review of the association between disgust and prejudice toward gay men. *Journal of Homosexuality*, 67(5), 674–696. <https://doi.org/10.1080/00918369.2018.1553349>

Kupfer, T. R., & Tybur, J. M. (2017). Pathogen disgust and interpersonal personality. *Personality and Individual Differences, 116*, 379-384. <https://doi.org/10.1016/j.paid.2017.05.024>

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2013). lmerTest: Tests for random and fixed effects for linear mixed effect. *R package version, 2.0-0*.

Landy, J. F., & Goodwin, G. P. (2015). Does incidental disgust amplify moral judgment? A meta-analytic review of experimental evidence. *Perspectives on Psychological Science, 10*(4), 518-536. <https://doi.org/10.1177/1745691615583128>

Landy, J. F., & Piazza, J. (2019). Reevaluating moral disgust: Sensitivity to many affective states predicts extremity in many evaluative judgments. *Social Psychological and Personality Science, 10*(2), 211–219. <https://doi.org/10.1177/1948550617736110>

Levi, E. H. (2013). *An introduction to legal reasoning*. University of Chicago Press. (Original work published 1949).

Levy, N. (2002). Virtual child pornography: The eroticization of inequality. *Ethics and Information Technology, 4*, 319–323. <https://doi.org/10.1023/A:1021372601566>

Lieberman, D., & Patrick, C. (2018). *Objection*. Oxford University Press.

Liuzza, M. T., Olofsson, J. K., Cancino-Montecinos, S., & Lindholm, T. (2019). Body odor disgust sensitivity predicts moral harshness toward moral violations of purity. *Frontiers in Psychology, 10*, Article 458. <https://doi.org/10.3389/fpsyg.2019.00458>

Luck, M. (2009). The gamer's dilemma: An analysis of the arguments for the moral distinction between virtual murder and virtual paedophilia. *Ethics and Information Technology*, 11(1), 31–36.

McLelland, M., & Yoo, S. (2007). The International yaoi boys' love fandom and the regulation of virtual child pornography: The implications of current legislation. *Sexuality Research & Social Policy*, 4(1), Article 93, 93-104. <https://doi.org/10.1525/srsp.2007.4.1.93>

McLelland, M. (2012). Australia's 'child-abuse material' legislation, internet regulation and the juridification of the imagination. *International Journal of Cultural Studies*, 15(5), 467–483.
<https://doi.org/10.1177/1367877911421082>

Malamuth, N., & Huppin, M. (2007). Drawing the line on virtual child pornography: Bringing the law in line with the research evidence. *NYU Review of Law & Social Change*, 31, 773-827.

May, J., & Kumar, V. (2018). Moral reasoning and emotion. In K. Jones, M. Timmons & A. Zimmerman (Eds.), [*Routledge Handbook on Moral Epistemology*](#) (pp. 139-156). Routledge.

Mazur, L. B., & Gormsen, E. (2020). Disgust sensitivity and support for organ donation: Time to take disgust seriously. *Journal of general internal medicine*, 35(8), 2347–2351. <https://doi.org/10.1007/s11606-020-05734-0>

Mill, J. S. (2005). *On liberty*. Boom. (Original work published 1859).

Moore, M. S. (1997). *Placing blame: A theory of criminal law*. Oxford University Press.

Nair, A. (2019). *The Regulation of Internet Pornography: Issues and challenges*. Routledge.

Nussbaum, M. C. (2004). *Hiding from humanity: Disgust, Shame and the Law*. Princeton University Press.

<https://doi.org/10.1515/9781400825943>

Olatunji, B. O., Williams, N. L., Tolin, D. F., Abramowitz, J. S., Sawchuk, C. N., Lohr, J. M., & Elwood, L. S. (2007). The Disgust Scale: Item analysis, factor structure, and suggestions for refinement. *Psychological assessment*, 19(3), 281-297. <https://doi.org/10.1037/1040-3590.19.3.281>

Olatunji, B. O. (2008). Disgust, scrupulosity and conservative attitudes about sex: Evidence for a mediational model of homophobia. *Journal of Research in Personality*, 42(5), 1364-1369.

<https://doi.org/10.1016/j.jrp.2008.04.001>

Olatunji, B. O., Moretz, M. W., McKay, D., Bjorklund, F., de Jong, P. J., Haidt, J., Hursti, T. J., Imada, S., Koller, S., Mancini, F., Page, A. C., & Schienle, A. (2009). Confirming the three-factor structure of the disgust scale—Revised in eight countries. *Journal of cross-cultural psychology*, 40(2), 234-255. <https://doi.org/10.1177/0022022108328918>

Ost, S. (2010). Criminalising fabricated images of child pornography: A matter of harm or morality? *Legal Studies*, 30(2), 230-256. <https://doi.org/10.1111/j.1748-121X.2010.00161.x>

Patrick, C. (2021). When souls shudder: A brief history of disgust and the law. In S. A. Bandes, J. L. Madeira, K. D. Temple, & E. K. White (eds.), *Research Handbook on Law and Emotion*. (pp. 80-93). Edward Elgar Publishing. <https://doi.org/10.4337/9781788119085>

Patrick, C., & Lieberman, D. (2018). How Disgust Becomes Law. In N. Strohminger, & V. Kumar (eds.), *The Moral Psychology of Disgust* (pp. 121-138). Rowman & Littlefield.

Patridge, S. L. (2013). Pornography, ethics and videogames. *Ethics and Information Technology*, 15(1).
<https://doi.org/10.1007/s10676-012-9310-1>

Piazza, J., Landy, J. F., Chakroff, A., Young, L., & Wasserman, E. (2018). What disgust does and does not do for moral cognition. In N. Strohminger, & V. Kumar (Eds.), *The Moral Psychology of Disgust* (pp. 53-81). Rowman & Littlefield.

Prinz, J. (2007). *The emotional construction of morals*. Oxford University Press

Posner, R. A. (2010). *How Judges Think*. Harvard University Press.

Prosecutorial Remedies and Other Tools to end the Exploitation of Children Today Act (PROTECT Act) 2003, 117 Stat. 650.

Reuben, R., Aitken, D., Freedman, J. L., & Einstein, G. (2020). Mistrust of the medical profession and higher disgust sensitivity predict parental vaccine hesitancy. *PLoS One*, 15(9), e0237755.

<https://doi.org/10.1371/journal.pone.0237755>

Robinson, J. S., Xu, X., & Plaks, J. E. (2019). Disgust and deontology: Trait sensitivity to contamination promotes a preference for order, hierarchy, and rule-based moral judgment. *Social Psychological and Personality Science*, 10(1), 3–14. <https://doi.org/10.1177/1948550617732609>

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Rozin, P., Haidt, J., & McCauley, C. R. (2008). Disgust. In M. Lewis & J. Haviland (Eds.), *Handbook of Emotions* (pp. 757-776). Guilford.

Russell, P. S., & Giner-Sorolla, R. (2013). Bodily moral disgust: What it is, how it is different from anger, and why it is an unreasoned emotion. *Psychological Bulletin*, *139*(2), 328–351.
<https://doi.org/10.1037/a0029319>

Schaller, M., & Park, J. H. (2011). The behavioral immune system (and why it matters). *Current Directions in Psychological Science*, *20*, 99–103. <https://doi.org/10.1177/0963721411402596>

Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as Embodied Moral Judgment. *Personality and Social Psychology Bulletin*, *34*(8), 1096–1109.
<https://doi.org/10.1177/0146167208317771>

Seidel, A., & Prinz, J. (2013). Sound morality: Irritating and icky noises amplify judgments in divergent moral domains. *Cognition*, *127*(1), 1-5. <https://doi.org/10.1016/j.cognition.2012.11.004>

Seth, A. K., & Friston, K. J. (2016). Active interoceptive inference and the emotional brain. *Phil. Trans. R. Soc.* *371*(1708). Article 20160007. <https://doi.org/10.1098/rstb.2016.0007>

Seto, M. C., Karl Hanson, R., & Babchishin, K. M. (2011). Contact sexual offending by men with online sexual offenses. *Sexual Abuse*, *23*(1), 124–145. <https://doi.org/10.1177/1079063210369013>

Seto, M. C. (2013). *Internet sex offenders*. American Psychological Association.
<https://doi.org/10.1037/14191-000>

- Seto, M. C. (2018). *Pedophilia and sexual offending against children: Theory, assessment, and intervention*. American Psychological Association. <https://doi.org/10.1037/0000107-000>
- Sherman, J. W., Gawronski, B., & Trope, Y. (Eds.). (2014). *Dual-process theories of the social mind*. The Guilford Press.
- Simester, A. P., & Von Hirsch, A. (2011). *Crimes, harms, and wrongs: On the principles of criminalisation*. Bloomsbury Publishing.
- Singer, P. (2005). Ethics and Intuitions. *The Journal of Ethics*, 9, 331–352.
<https://doi.org/10.1007/s10892-005-3508-y>
- Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: the psychology of intuitive judgment* (pp. 397-420). Cambridge University Press.
- Stanton-Ife, J. (2022). The Limits of Law. In E. N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2022 ed.). Stanford University. <https://plato.stanford.edu/archives/spr2022/entries/law-limits/>
- Strikwerda, L. (2011). Virtual child pornography: Why images do harm from a moral perspective. In C. Ess, & M. Thorseth (Eds.), *Trust and Virtual Worlds: Contemporary Perspectives* (Vol. 63, pp. 139-161). Peter Lang Publishing Group.
- Strikwerda, L. (2014). *Virtual acts, real crimes? A legal-philosophical analysis of virtual cybercrime* (Doctoral dissertation, University of Twente). <https://doi.org/10.3990/1.9789036537131>

Strikwerda, L. (2017). Legal and moral implications of child sex robots. In J. Danaher & N. McArthur (Eds.), *Robot sex. Social and Ethical implications* (pp. 133-151). The MIT Press.

<https://doi.org/10.7551/mitpress/9780262036689.001.0001>

Sunstein, C. R. (2008). Some Effects of Moral Indignation on Law. *Vermont Law Review*, 33, 405-433.

Sznycer, D., & Patrick, C. (2020). The origins of criminal law. *Nature human behaviour*, 4(5), 506-516.

<https://doi.org/10.1038/s41562-020-0827-8>

Tadros, V. (2016). *Wrongs and Crimes*. Oxford University Press.

Terrizzi Jr, J. A., Shook, N. J., & Ventis, W. L. (2010). Disgust: A predictor of social conservatism and prejudicial attitudes toward homosexuals. *Personality and individual differences*, 49(6), 587-592.

<https://doi.org/10.1016/j.paid.2010.05.024>

Terrizzi Jr, J. A., Shook, N. J., & McDaniel, M. A. (2013). The behavioral immune system and social conservatism: A meta-analysis. *Evolution and Human Behavior*, 34(2), 99-108.

<https://doi.org/10.1016/j.evolhumbehav.2012.10.003>

Tracy, J. L., Steckler, C. M., & Heltzel, G. (2019). The physiological basis of psychological disgust and moral judgments. *Journal of Personality and Social Psychology*, 116(1), 15–32.

<https://doi.org/10.1037/pspa0000141>

Tybur, J. M., Lieberman, D., Kurzban, R., & DeScioli, P. (2013). Disgust: Evolved function and structure.

Psychological Review, 120(1), 65–84. <https://doi.org/10.1037/a0030778>

Van Dillen, L. F., van der Wal, R. C., & van den Bos, K. (2012). On the role of attention and emotion in morality: Attentional control modulates unrelated disgust in moral judgments. *Personality and Social Psychology Bulletin*, 38(9), 1222-1231. <https://doi.org/10.1177/0146167212448485>

Van Leeuwen, F., Inbar, Y., Petersen, M. B., Aarøe, L., Barclay, P., Barlow, F. K., de Barra, M., Becker, D. V., Borovoi, L., Choi, J., Consedine, N. S., Conway, J. R., Conway, P., Adoric, V. C., Demirci, E., Fernández, A. M., Ferreira, D. C. S., Ishii, K., Jakšić, I., ... Tybur, J. M. (2022). Disgust sensitivity relates to attitudes toward gay men and lesbian women across 31 nations. *Group Processes & Intergroup Relations*, 1-23. <https://doi.org/10.1177/13684302211067151>

Valdesolo, P. (2018). Getting emotions right in moral psychology. In K. Gray & J. Graham (Eds.), *Atlas of moral psychology* (pp. 88-95). The Guilford Press.

Wagemans, F., Brandt, M. J., & Zeelenberg, M. (2018). Disgust sensitivity is primarily associated with purity-based moral judgments. *Emotion*, 18(2), 277–289. <https://doi.org/10.1037/emo0000359>

Wang, R., Yang, Q., Huang, P., Sai, L., & Gong, Y. (2019). The association between disgust sensitivity and negative attitudes toward homosexuality: The mediating role of moral foundations. *Frontiers in Psychology*, 10, Article 1229, 1-8. <https://doi.org/10.3389/fpsyg.2019.01229>

Wheatley, T., & Haidt, J. (2005). Hypnotic disgust makes moral judgments more severe. *Psychological Science*, 16(10), 780–784. <https://doi.org/10.1111/j.1467-9280.2005.01614.x>

Williams, K. S. (2004). Child pornography law: Does it protect children? *The Journal of Social Welfare & Family Law*, 26(3), 245-261. <https://doi.org/10.1080/01418030412331297065>

Witting, S. K. (2020). *Child sexual abuse in the digital era: Rethinking legal frameworks and transnational law enforcement collaboration* (Doctoral dissertation, Leiden University).

<https://hdl.handle.net/1887/96242>