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Is Opposition to Genetically Modified Food "Morally Absolutist"? A Consequence-Based Perspective

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Abstract

Genetically modified foods (GMFs) have met with strong opposition for most of their existence. According to one account—the consequence-based perspective (CP)—lay people oppose GMFs because they deem them unsafe as well as of dubious value. The CP is backed by the data and offers a clear solution for easing GMF opposition. However, several scholars have claimed that the CP is faulty, that lay opposition derives from largely nonrational factors and is consequence blind. One recent statement of this, the moral-absolutism perspective (MAP), contends that GMFs' opponents are principled "moral absolutists" who think that GMFs should be banned no matter their value or risk. Herein we critically weigh key arguments for this proposal. We also present five new studies that probed the clearest data that seem to favor the MAP—opponents affirming the statement that GMFs should be "prohibited," no matter their value or risk. These studies jointly show that (a) most presumed absolutists do not understand the key question and/or (b) cannot validly answer it. We show that taking due steps in clarifying the question and screening for those participants who cannot validly answer it cuts down absolutism to near zero. Finally, we demonstrate that helping GMFs' opponents imagine a world wherein GMFs are safe and constructive makes the majority willing to welcome GMFs in this context.

Keywords

GMO, moral judgment, consequences, harm, absolutism

Some 800 million people are currently undernourished (World Health Organization, 2018). As Earth's population expands (United Nations, 2017) and arable land declines (Gomiero, 2016), the crisis is likely to worsen. With their higher yield and resilience (Klümper & Qaim, 2014), genetically modified (GM) foods have long been viewed as essential to tackling food insecurity. The expert consensus suggests that GM foods (GMFs) are safe to consume (American Association for the Advancement of Science [AAAS], 2012; DeFrancesco, 2013; European Commission, 2010; Nicolia, Manzo, Veronesi, & Rosellini, 2014) and stand to improve the environment, economies, and human health (e.g., Barfoot & Brookes, 2014; Dubock, 2017; Klümper & Qaim, 2014).

However, per recent analysis, "concerns about health, environmental, and socioeconomic hazards have resulted in a strong public opposition" toward GMFs, with a significant impact "on national and international policies" around the globe (Blancke, Van Breusegem, De Jaeger, Braeckman, & Van Montagu, 2015, p. 1360; see also European Commission, 2010). It certainly stands to reason that someone who thinks that GMFs do not offer palpable benefits while raising the risk of some harm (e.g., cancer, ecological upheavals, corporate hegemony) will hesitate to consume them and will favor having them banned at home as well as abroad.[1]

Indeed, many studies suggest that lay opposition to GMFs is largely based on concerns about perceived

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consequences (e.g., Chen & Li, 2007; Connor & Siegrist, 2010; Frewer et al., 2013; Onyango, Nayga, & Schilling, 2004; Prati, Pietrantoni, & Zani, 2012; Rzymski & Królczyk, 2016). For instance, Prati and colleagues (2012) used structural equation modeling to show that both risks and benefits were strong and unique predictors of people's GMF attitudes (judgments regarding consumption as well as ethical standing), while also factoring in additional candidate variables, such as cultural norms, perceived control over policy, and trust in state institutions[2] (see also Chen & Li, 2007; Connor & Siegrist, 2010). In our recent study, we (Cusimano, Royzman, Leeman, & Metas, 2018) found that, when they were prompted to think about GMF production, opponents were mostly reflecting on GMFs' consequences, and their predominant feelings were those of worry or suspicion regarding GMFs' ill effects, especially for human health. In total, this work indicates that people resist GMFs because they regard them as risky as well as of dubious value. As Zhu and Xie summarized across a number of studies, "researchers have widely agreed that perceived risks and benefits directly affect consumer attitudes toward GM foods" (2015, p. 792).

We will refer to this view as the *consequence-based perspective* (henceforth, the CP). To elaborate on this view, though both lay people and scientists are guided by similar reasons (GMFs' impact on the world), they work with different facts or "informational assumptions" (Wainryb, 1991): namely, their underlying beliefs about GMFs' consequences. Indeed, according to a poll released by the Pew Research Center (see Funk, 2015), "more than any other issue, the public [a representative sample of U.S. adults] and scientists had very different views about the safety of eating genetically modified (GM) foods" (para. 4): 88% of the members of the AAAS but only 37% of the public believed that GMFs were "generally safe" (para. 4) to eat—67% of the public expressed a further belief that "scientists do not have a clear understanding about the health effects of GM crops" (para. 4). How does this divergence arise?

The same national surveys that document "low GM knowledge" across a number of countries report that the people in question rely on the Internet, radio, and magazines for information about GMFs and their risks (a pattern that holds even when one has some medical training; Wunderlich & Gatto, 2015) and that these sources are skewed toward negative news (e.g., GMF recalls). Accordingly, a recent survey of Chinese consumers (Cui & Shoemaker, 2018) found that most respondents obtained their knowledge of GMFs via the Internet and that the majority (64%) felt that GMFs were presented in a negative light. Though various media sources are not always evidence-based, they often cite actual data, including empirical findings that speak to GMFs' likely risks (see Nicolia et al., 2014, and Saletan, 2015, for discussion), as well as government bans on GM imports and production and scientific dissent regarding GMFs' current safety (Hilbeck et al., 2015; Krimsky, 2015; Tsatsakis et al., 2017[3]). Anti-GMO "factoids" are commonly represented in a visually striking manner (e.g., tomato with claws or fish scales; Ventura, Frisio, Ferrazzi, & Siletti, 2016) that renders them highly "available" (Tversky & Kahneman, 1973).

In sum, as would be predicted by negativity bias (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001), the news shared through media is likely to be more negative than actual data would warrant and, indeed, most consumers appear to perceive it this way (e.g., Blancke et al., 2015; Cui & Shoemaker, 2018; Ventura et al., 2016). This bias may help to explain why, though there are many more studies that find GMFs to be safe than those that find otherwise, these many "positive" studies (that scientists bear in mind and draw on in their conclusions) routinely "go unnoticed in [GMF] public debate" (Sánchez & Parrott, 2017, p. 1227).

To complicate matters some more, a number of major food chains (e.g., Chipotle, Inc.) have publicly "banned" GMFs from their food preparation (Saletan, 2015). These steps are clearly tied to the informational climate that breeds consumer unease; yet many people may view these steps as further support for their prior belief that GMFs are unsafe.

Another factor is trust (e.g., Prati et al., 2012). As one recent report—the National Academies of Sciences, Engineering, and Medicine's (2016) statement on GM agriculture—has pointed out at length, the scientists should be aware that "lack of public access to the health and safety data submitted by [GM] developers creates distrust in . . . stakeholders [i.e., the public]" (p. 505). The report goes on to acknowledge that, since the "public cannot judge for itself the quality, objectivity, and comprehensiveness of the materials submitted" and, given "a developer's self-interest in getting a product approved and its control over [the findings], this lack of access creates" (p. 505) more doubts about the data, thus nurturing safety concerns.

The issue of safety aside, a number of media sources (including *The New York Times*) asserted that key GM crops do not clearly offer more value than so-called conventional crops[4] and thus may be needlessly risky (for discussion, see Taleb, Read, Douady, Norman, & Bar-Yam 2014). These claims gain further prestige from anti-GMF campaigns of various public pundits (e.g., Michael Pollan, as documented by Genetic Literacy Project, 2019) with excellent public outreach.

Combined with flawed risk assessment (e.g., overweighing small odds: Kahneman & Tversky, 1979; and preference for the status quo: Kahneman, Knetsch, & Thaler, 1991), these factors collude to create an informational climate that grounds GMF skepticism and nurtures GMF opposition. A person immersed in this climate would simply not have the same view of what GMFs have to offer as a food scientist would (nor would they be able to judge the studies in terms of their rigor). In this informational climate, one could form a *rational preference* to shun and oppose GMFs until "the debate" is resolved.

The CP, as stated above, provides an exhaustive account of lay opposition to GMFs, addressing all relevant facets, including (a) why people oppose it and may prefer to prohibit it (because they perceive it as risky as well as of dubious benefit); (b) why scientists largely accept it (because they perceive it as safe as well as of critical value to mitigating food shortages); (c) why "people" and scientists differ in their GM-linked beliefs (because they gain information through different sources and channels, have varied trust in the "data," and differ in their understanding of or their approach to risk); and (d) what we can do to move forward (a large educational effort combined with greater transparency and more proactive engagement; please see the Discussion for more). But although the CP is compelling as well as empirically backed, it is not without a challenge.

In a much-publicized open letter, 123 Nobel laureates suggested that GM opponents are not just naive but immoral. The letter's concluding remarks call for immediate action: "Opposition *based on emotion and dogma* [emphasis added] contradicted by data must be stopped. How many poor people in the world must die before we consider this a '**crime against humanity**'?" (Agre et al., 2016; para. 8). In line with this powerful language, some authors' recent reports have claimed that GMF opposition is based on nonrational factors (e.g., disgust, aversion to artifice; Blancke et al., 2015; Bredahl, 2001; Mallinson et al., 2018) that render it consequence blind (Blancke et al., 2015; Kovacheff, Schwartz, Inbar, & Feinberg, 2018; Mallinson et al., 2018; Scholderer & Bredahl, 2003), akin to a moral taboo (Blancke et al., 2015; Kovacheff et al., 2018; Kwieciński, 2009), and highly resistant to change (e.g., Frewer, Howard, & Shepherd, 1998; Frewer, Scholderer, & Bredahl, 2003; Kovacheff et al., 2018); Kwieciński, 2009). A recent prominent statement and synthesis of these ideas is the *moral absolutism perspective* (MAP; Scott, Inbar, & Rozin, 2016; Scott, Inbar, Wirz, Brossard, & Rozin, 2018)—a view that, through some deep aversion, "the process of genetic modification *itself* [emphasis added] appears to violate some basic moral principles such that it is [deemed] unacceptable regardless of the consequences," making rejection of GMFs "refractory to cost-benefit evidence" (Scott et al., 2018, p. 12).

Accordingly, a recent study (Scott et al., 2016) of GMF opposition employing an online sample of roughly 1,000 adults discovered that most opponents affirmed a desire to "prohibit" GM food "absolutely"[5]—for any conceivable balance of GMF risks or benefits (Scott et al., 2016, p. 317). Key evidence for this claim came from people's agreeing that GMFs "should be prohibited no matter how great the benefits and minor the risks from allowing it" (p. 317, based on Baron & Spranca, 1997). Here, we refer to this statement as *the absolutism probe* or simply *the probe*. Scott et al.'s (2016) self-report evidence seems clear and strong and fits well with other research, including a number of studies in which serving relevant facts has not led to more benign views regarding GM food or process (Frewer et al., 2003; Scholderer & Frewer, 2003; Scott et al., 2016, pilot study) and research in which opposition appeared to be based more strongly on people's anti-GM feelings than on perceived consequences (Mallinson et al., 2018; see also Blancke et al., 2015).

The claim that GMF opposition is absolutist in nature fits well with a broader tradition that views moral judgment as based on nonrational factors (e.g., rapid, affective reactions; Ayer, 1936/1948, pp. 108–109; Haidt, 2001; Haidt, Bjorklund, & Murphy, 2000; Hume, 1739–1740/1978; McDougall, 1908/1960, pp. 185–186; Nichols, 2004; Prinz, 2005; Westermarck, 1906, p. 4) that make judgments hard to revise by speaking to reason alone (Haidt, 2001; Haidt et al., 2000; Westermarck, 1906). For instance, some studies suggest that people's disgust at incest (involving two adult siblings who had protected sex once) will keep condemnations alive no matter the act's consequences—with people admitting that, though there is no harm from the act and though both parties "enjoyed" it, they still consider it wrong (e.g., Haidt, 2001; Haidt et al., 2000; for a critique; see Royzman, Kim, & Leeman, 2015).

Deciding which view is correct will matter for policymaking. Assuming the MAP is correct, it would be unwise to attempt what the CP would prescribe: a large multimedia effort to counter fallacious beliefs regarding GMFs' risks and benefits combined with far greater transparency on GMF safety concerns. Instead, the MAP would advise the quelling of absolutism, perhaps through reducing disgust by making GMFs seem more natural. But this is not easy to do in view of the process involved. As Scott et al. (2016) observed, if taken "literally, moral absolutism poses *severe* [emphasis added] problems for governmental and institutional policymaking" (p. 320). This leads to the somber conclusion that, if the MAP is the theory that best accounts for the data, a change would be hard to effect.

Auxiliary Evidence for the Absolutism Thesis

The absolutism probe to the side, the thesis that the GM process (transforming an entity's genome), more than perceived consequences, informs GMF opposition draws credence from several sources. These sources encompass (a) some evidence that one's opposition to GMFs is rooted in negative feelings (e.g., disgust; coupled with prior evidence that feelings of disgust are linked to moral impurity and non-harm-based disapproval e.g., Haidt, 2012); (b) apparent resistance to consequence-based counter reasons (see Frewer et al., 2003; Scholderer & Frewer, 2003; Scott et al., 2016, pilot study); and (c) rhetoric of unnaturalness (i.e., a propensity to cite violations of "naturalness" rather than "risk" or "harm" when arguing against GM; e.g., descriptions of GMFs as "Frankenfoods," McWilliams, 2015; see also Are et al., 2016; Kwieciński, 2009). In the discussion that follows, we critically weigh and consider the items listed above. We find that these are too weak to threaten the CP on their own. We then more closely examine what may be the MAP's "best foot forward"—the finding that most participants who claimed to oppose GMFs (Scott et al., 2016) explicitly took the position that GMFs should be proscribed "no matter" their value or risk.

Affective influences and disgust

A number of scholars have argued that GMF opposition is best predicted by feelings (Blancke et al., 2015; Mallinson et al., 2018; Scott et al., 2016). Thus, drawing on prior research, Blancke and colleagues (2015) proposed that GMF opposition is strongly rooted in affect (especially disgust). However, no evidence linking GMFs and affect was presented. More recently, Mallinson et al. (2018) claimed that a measure described as "emotion"/"emotional dislike of GM-food" was the predominant factor in people's GMF attitudes (p. 1152). However, a look at the items ("GM food could damage future generations," "GM could harm nature," "GM food is unnecessary," "GM food is immoral," "Using GM technology to produce food will only benefit multinational corporations," "GM food is unnatural," "GM food is alien"; Mallinson et al., 2018, Supplemental Materials, p. 4) suggests that the constructs assessed were harm and ethical standing.[6]

Perhaps the clearest evidence for the causal role of affect in GMF opposition was offered by Scott et al. (2016), who found some association between GMF absolutism and measures of so-called trait disgust. Scott et al.'s interpretation of this intriguing result was strongly informed by a claim that disgust plays a key role in prompting moral disapproval. However, there is now strong evidence that this claim is misguided (Johnson et al., 2016; Landy & Goodwin, 2015; Royzman, Atanasov, Landy, Parks, & Gepty, 2014; Royzman, Kim, & Leeman, 2015; Royzman, Leeman, & Baron, 2009). In a meta-analysis including more than 50 studies, Landy and Goodwin (2015) determined that the effect of experimentally induced disgust on moral judgment was weak, with an effect size (Cohen's *d*) of .11 at best, and was not observed in a large-scale replication (Johnson et al., 2016). Similar in spirit were several past studies that found no significant association between disgust sensitivity (DS) and "purity-based" evaluations when special design precautions (e.g., time delay, misdirection, appropriate controls) were in effect (e.g., Fessler, Arguello, Mekdara, & Macias, 2003; Royzman et al., 2009; Royzman, Kim, & Leeman, 2015). In general, it appears that disgust plays little role in people's moral appraisals; nor is it selectively tied to certain "impure" acts (Cameron, Lindquist, & Gray, 2015; Landy & Goodwin, 2015).

Most relevant to this topic, Royzman, Cusimano, and Leeman (2017) carried out a conceptual replication of the Scott et al. (2016) study and failed to detect any link (r = .03) between a discriminantly valid measure of trait disgust (i.e., an oral-inhibition response, Angyal, 1941; Darwin, 1872/1965; Nabi, 2002; Olatunji & Sawchuk, 2005; Royzman, Leeman, & Sabini, 2008; Rozin & Fallon, 1987) and opposition toward GMFs. Indeed, this study (Royzman et al., 2017) found that the only "affective" trait that was uniquely predictive of people's GMF opposition was that of feeling "creeped out"—a proneness to feel uneasy at a potential threat. In another study, Cusimano et al. (2018) found that worry and suspicion (both related to perceptions of harm and risk) were the most common affective states people felt while thinking about GMFs. Indeed, only about 5% of opponents reported feeling disgust. Just as in other domains, disgust seems to play little role in people's resistance to GMFs.

Argument sensitivity

Although researchers in several studies reported that people's GMF attitudes relate to people's beliefs about the food's risks and benefits (e.g., Chen & Li, 2007; Connor & Siegrist, 2010; Onyango et al., 2004; Prati et al., 2012; Rzymski & Królczyk, 2016), other, earlier studies appear to have found otherwise: Pro-GMF information does not lead to greater acceptance (Frewer et al., 2003; Scholderer & Frewer, 2003). However, it is unclear how one should interpret these findings, given that none of the studies in question addressed risk-related concerns (the risks for environment or health). For instance, Scholderer and Frewer (2003) provided some information that spoke to possible benefits of certain GM merchandise (e.g., sustainability, affordable

price related to yogurt or beer) but did not address perceived risks.

Accordingly, in a new study reported by Scott et al. (2016, pilot study), participants were assigned to read arguments in favor of GMFs before or after responding to the absolutism probe. Participants who read the information before responding to the probe endorsed the probe at a rate (29%) similar to that of participants who read the information after they saw the probe (35%). This evidence may be construed as lending support to the MAP. However, as in Scholderer and Frewer (2003), the arguments Scott et al. used related almost exclusively to GMFs' varied benefits (9 out of 10 arguments were purely benefit-based).

Consistent with negativity bias (Baumeister et al., 2001; Rozin & Royzman, 2001), previous research indicates that citing risk information has a substantially stronger and more enduring impact on attitudes toward GMFs than does benefit information (Zhu & Xie, 2015). Indeed, Scott and colleagues' (2016) own work has shown that perceived risks of GMFs were considerably stronger predictors of support for restrictions than perceived benefits. Moreover, the one risk-related "argument" was merely a declaration that "there is widespread consensus among scientists that consuming genetically modified food is no riskier than consuming food modified by conventional plant improvement techniques," a statement that, as one might expect (see above for the evidence of the public's distrust of the scientific establishment on this issue), GMFs' opponents have found to be unpersuasive (mean rating below the 4-point midpoint of the "persuasiveness scale"; see pp. 23–24 of the Supplemental Materials for Scott et al., 2016). Because people's beliefs did not change in the wake of having considered the statement, the fact that they were still opposed is just as in line with the CP as it is with the MAP. In contrast, one classic study that asked people to accept specific configurations of benefit and risk reported significant shifts in people's desire to act and sanction new GM wheat despite their prior endorsement of absolute opposition (Baron & Leshner, 2000, Study 6).

Dialogue of "naturalness"

Finally, there are common appeals to GMFs' "unnatural" origins in popular or media discourse, including the vivid description of GMFs as "Frankenfood" (McWilliams, 2015; see also Kwieciński, 2009, and Blancke et al., 2015). Appeals such as these do exist, but do not entail absolutism; "unnatural" often denotes "unhealthy" or "bad for the planet" (e.g., Petrescu & Petrescu-Mag, 2015; Roininen, Lähteenmäki, & Tuorila, 1999; Schuldt & Schwarz, 2010). Thus, the same metaphor (e.g., a reference to "Frankenfoods") may be viewed as either an evocation of GMFs' unnatural bearings or a means of channeling one's anxiety about GMFs' dire consequences for the environment and public health.

In all, the items above, those listed in (a) through (c), do not selectively strengthen the MAP over the CP. This leaves us with the MAP's strongest evidence—, most (71%) who opposed GMFs opposed them "absolutely" (no matter their value or risk). This finding was replicated using Mechanical Turk, most GMF opponents (74%)[7] opposing them "absolutely." At face value, these findings provide a powerful challenge to the CP, as we stated it. Yet it is precisely the wisdom of taking this all at face value that needs to be closely examined.

The Validity of Self-Reported Moral Absolutism

Imagine: It is a chilly winter night and, having had a leisurely dinner, you and your partner are reclining on a cruelty-free bearskin rug near a crackling fire when one of you pops the question: "Would you love me, no matter what?" As you respond "Yes, of course!" your partner gazes into your eyes tenderly and comments on how lucky you are to have found each other. Professions of absolute love such as these are lovely and even enchanting; but how convinced should we be? Do people pledging such love indeed mean what they say (at least at the moment of pledging it)?

In the situation above, two key conditions must be met if the affirmative answer is to have any merit: The person must understand the question (call this the *comprehension requirement*) and he or she must be able to meet the cognitive demands that the question—essentially a thought experiment—imposes on the questionee (call this the *task-acceptance requirement*). Regarding the former, it is clear that the appropriate way to understand the question is counterfactually: Would one continue to love and cherish the inquiring party even in a hypothetical universe where they lacked all "superficially lovable" qualities; for example, status, beauty, requited affection, and health (with one's love persisting and thriving amid it all)? Regarding task acceptance, there is the matter of having the cognitive aptitude (and the relevant motivation) to execute the task in question. Thus, if our fictional questionee were to go on to confess that he or she "could never imagine you as anything less than perfect," then we would have to infer that the task was never duly accepted (the pledge has no probative value).

People's statements that they would prohibit GMFs irrespective of their risks and benefits are subject to these same requirements; being able to meet these requirements would make one *epistemically qualified*

to claim or affirm absolutism and would make the ensuing claims *validly absolutist*. To satisfy such requirements, one would need to first understand the task that the question entails, then carry out the task—successfully imagine a counterfactual world in which GMFs bear great benefits and pose no serious risk (then affirm one's views in that world). There are reasons to doubt that these conditions were met.

First, the absolutism probe leaves some basis for misunderstanding. Though it is a fair bet that the "no matter how" construction could be interpreted counterfactually, it encourages another plausible reading; namely, that the speaker shows one's awareness that GMFs' benefits are very great and their risks are very minor *here and now*, then urges the prohibition in spite of that. The alternative stems from the fact that, in everyday language, the "no-matter-how" locution is frequently used in a manner that belies Scott et al.'s (2016) intent. Its common use is to soften rejections or criticisms (e.g., "I don't think he will be a good candidate for this job, no matter how skilled and experienced he may be"; "She should not be invited to speak on campus, no matter how great the publicity from allowing it") or to give credence to the opposing point of view (e.g., "The committee should oppose Proposition X no matter how great the tax savings and how minor the complications from allowing it"). In either case, the content following "no matter how" would not be read as a postulate, but as a statement of fact (e.g., there are publicity and savings to be extracted or gained).

A small pilot study that we carried out showed that this "here and now" reading of the absolutism probe might have been commonplace. Even with people's attention drawn to possible conflicting interpretations, only 29 out of 60 respondents thought the speaker behind the probe was making a specifically counterfactual claim, with most of remaining participants interpreting the statement as being either about their assessment of the current risks and benefits (20 of 60) or as being ambiguous between the latter and the counterfactual meaning (10 of 60; see Supplemental Material available online for details).

This misunderstanding could lead to a conflict for a typical participant, inflating agreement with the probe. On this view, a GMF opponent reading the probe is faced with two interlocking components: an attitudinal component that they agree with (GMFs should be prohibited) and a factual component that they do not agree with (GMFs are greatly beneficial and minimally risky). But the response options ("Agree" or "Disagree") do not allow them to deny or confirm these independently (e.g., deny the presumed facts while affirming their opposition to GMFs). Indeed, neither option allows them to disagree with strongly worded, presumed risk–benefit facts. Thus, from their point of view, if they disagree with the probe, it may just appear that they wish to embrace GMFs. To solve this dilemma and advance through the experiment, most GM food opponents (absolutist or otherwise) may opt to "agree" with the probe to at least affirm their anti-GMF attitude, thereby inflating the rate of theorized absolutism.

But what if the task in question was properly understood? A sizable body of work suggests that people are poor at casting off extant beliefs (for a review, see, e.g., Anderson, Lepper, & Ross, 1980; Birch & Bloom, 2007; Camerer, Loewenstein, & Weber, 1989; Fischhoff, 1975; Royzman, Cassidy, & Baron, 2003. In one classic experiment, Anderson et al. (1980) presented people with evidence suggesting either a positive or negative correlation between risk taking and success as a firefighter. The reputed evidence was then "totally discredited" and expected to be ignored. Yet it continued to have an impact on subsequent judgments (despite participants' stated best efforts), which were made as if the once-stipulated link between risk taking and firefighting was still in effect. If GMF opponents did fail the requisite task (e.g., because they never attempted it or because they tried and failed), the force of their "agreement" would be very strongly in doubt; if one simply cannot allow that GMFs could be risk-free, one cannot report a position that is independent of risk.

Cross-cutting the issues of task comprehension and task acceptance is the need to control for some basic procedural confounds—such as response acquiescence (a tendency to agree when faced with complex true/false statements; Cronbach, 1941, 1942) and one's preference to respond consistently throughout a study. A long-standing view within social psychology holds that individuals have a strong predisposition to construct and express their attitudes in a cognitively coherent manner (Aronson, 1969; Cialdini, Trost, & Newsom, 1995; Festinger, 1957; Gawronski & Brannon, 2016; see Gamliel & Davidovitz, 2005, and Peer & Gamliel, 2011, for the evidence of inflated estimates of response agreement within a survey because people "cross-check" their responses against those given to previous questions). It is plausible that consistency alone would move at least some of Scott et al.'s (2016) participants who chose to "take a negative stance" earlier in the survey (Question 1, the opposition probe) to "go negative" once again later (Question 2, the absolutism probe), saying "yes" to absolute prohibition as an expression of a valence-congruent response toward GMFs or as a statement of taking some regulatory action, because such a response pattern would make them seem more coherent than its converse (Cialdini et al., 1995; Tedeschi & Rosenfeld, 1981; Tedeschi, Schlenker, & Bonoma, 1971). Addressing these concerns would mark an

important step forward. It was our general guess that, with all the issues addressed, the findings would strongly support the CP over the MAP

The Current Studies

For reasons mentioned above, we deem it a plausible view that most study participants who claim to oppose GMFs could choose to agree with the probe (thus, seeming to be absolutist) and yet oppose GMFs for consequence-based reasons. We tested this view in five studies. In Studies 1a and 1b, we used the original probe (Scott et al., 2016) to identify "absolutists," who were then asked to explain why they agreed with the probe (agreed that GMFs should be banned independent of harm), either in their own words (Study 1a) or by selecting from options (with half being purity-based; Study 1b). We thought that most of these people would cite GMFs' harmful effects, thus making it clear that they did not read the probe as intended. This would indicate that the probe did not diagnose absolutism and that reassessment was warranted.

We offered such reassessment in Studies 2a and 2b. In Study 2a, all opponents performed either a task that featured the standard probe or a four-item alternative (including a clarified variant of the original probe) that allowed participants to classify their opposition in a much more nuanced manner; respondents were then assessed for their capacity to imagine GMFs as carrying very little risk and very great benefit. This protocol therefore corrected for both task-comprehension and task-acceptance deficiencies in the original study and was expected to yield far fewer true absolutists. Study 2b was like Study 2a, with some procedural changes that made the choice less complex while also assessing the role of socially desirable responding.

Finally, in Study 3, participants were to consider a brief counterfactual narrative (combined with a subsequent check on whether the task was accepted); we thought that helping opponents to think or imagine themselves in an informational climate that belies their attitudes (GMFs as minimally risky as well as of critical value) would lead most to welcome GMFs in this informational context. If true, this result would suggest that most study participants who seem to oppose GMFs do not oppose them because of what they essentially are, but rather, as claimed by the CP, because of what they can do.

Transparency

For each of the studies presented, we report all measures and conditions included in these studies. Recruitment for the studies took place between the summer of 2017 and the summer of 2019 on Amazon's Mechanical Turk. We removed all participants who had a duplicate IP address either within that study or within a prior study (5.6% of all people recruited). Including these individuals had no appreciable effect on either estimated rates of absolutism or other analyses. Below, we report on all remaining recruited individuals and, within this set, report all data exclusions (e.g., on the basis of attention-check failure). Data for each study are posted on the Open Science Framework at https://osf.io/mrvx3/

Study 1a

One reason that people's endorsement of the absolutism probe may fail to be diagnostic of absolute opposition is a failure to understand the statement that they are endorsing. In Study 1a, we assessed this by asking those participants who did agree with the probe why they agreed with the probe. If properly understood, the probe should rule out appeals to benefits, dangers, and risks and draw out appeals to "impurity" (e.g., the wrongness of "playing" with nature; Scott et al., 2016). One could even condemn GMFs as being "plain wrong" (as people occasionally do in studies that Scott et al. cited; e.g., Haidt & Hersh, 2001; Haidt, Koller, & Dias, 1993). But, finding that people cite harm (when asked why they would oppose GMFs, assuming no harm) would seem to suggest that the query was misunderstood or ignored.

Method

Participants. We recruited 295 unique participants (159 female; mean age = 34.5 years) from Amazon's Mechanical Turk.[8] On the basis of Scott et al.'s (2016) Mechanical Turk sample (total $N = 355$, with 156 involved in the direct replication of the original Qualtrics.com study), we assumed that roughly 40% of our participants would report opposing GMFs, yielding a final sample of 120 opponents, and that about 80% of those individuals would report being absolutely opposed. This would yield a usable sample of roughly 100 participants whose responses could then be manageably coded.

Procedure. Participants first reported if they opposed "genetically engineering plants and animals for food production." After answering this question and responding to an attention check, those who reported that they did not oppose GMFs were directed to the demographics survey and debriefed, whereas those who opposed GMFs continued through the study and received the absolutism probe ("Genetically engineering plants and animals for food production should be prohibited no matter how great

the benefits and minor the risks from allowing it") with "Agree" and "Disagree" as response options. Participants who reported agreeing with Scott et al.'s (2016) absolutism probe were then prompted to say why they did so. To do this, we kept Scott et al.'s probe at the top of the screen, along with the "Agree" and "Disagree" options showing that they had checked the "Agree" option. Below this, participants read the following (emphasis in the original, with sentences separated by line breaks):

> Now we would like you to elaborate on the response you just gave. Please use the space below to express why you **Agree** with the statement above. Specifically, we would like you to complete the following statement: "I **agree** with the statement above because . . ." **Please write clearly and thoroughly, so we know exactly where you are coming from**.

Below this prompt was a text box for participants to type their answers. On the next page, as a secondary attention check, participants were instructed to leave a text box blank. Participants who disagreed with the absolutism probe were not prompted to explain their answer but were instead redirected to the demographics survey and debriefed.

Open-response coding. Two naive coders gave their judgments on what they thought to be each participant's "fundamental concern" underlying his or her endorsement of the absolutism probe To minimize reactivity, the coders were told only that "Each individual statement was generated by asking participants to complete the sentence "I agree with the statement above because. . .", where "the statement above" expressed a negative attitude toward genetic engineering in food production or GM food. Coders sorted participants' responses into one of three categories:

1. "Harmful and risky," when "the author's fundamental concern is GM food's harmful effects on human or animal health, taste, nutritional value of food, the ecosystem, and/or the technology's yet unknown safety/environmental risks going forward."
2. "Unnatural and unholy," when "the author's fundamental concern is GM food's unnatural or impure origins, its unholiness, its tendency to make nature less pure, and/or the technology disrespecting the perfection/sanctity of divine creation."
3. "Other," when "the author's overall response is either un-codable (due to being incoherent or lacking information) or does not belong in either of above categories."

After completing the coding process, the coders were asked to independently judge and rank what they perceived to be the respondents' most central harm-related concerns. Intercoder reliability was good ($\kappa = .72$), and all disagreements were resolved by a third naive coder. All three coders were college undergraduates, blind to the research hypothesis and unfamiliar with the psychological literature on GMFs. All three were subsequently debriefed and asked for comments.[9]

Results

Forty-eight participants (16%) failed at least one of the two attention checks and were removed from the study, leaving us with 248 participants. Of these, 145 (58%) indicated that they did not oppose GMFs. Of the 102 who reported opposing GMFs, 81 (79%) agreed with the absolutism probe, replicating the results of Cusinamo et al. (2018) and Scott et al. (2016). These 81 were asked to expand on why they endorsed the absolutist position. Six out of 81 (7%) responses were coded as "other/uncodable," leaving a final sample of 75 who cited either harm or risk concerns or concerns about unnaturalness or impurity.

Consistent with our expectations, but contrary to Scott et al.'s (2016) key theoretical premise, harm or risk of harm was the dominant issue: 58 of the 75 participants (77%) cited harm or risk, $\chi^2(1, n = 76) = 22.41$, $p < .001$. Some typical statements included: "It has yet to be proven safe. There have not been long term trials. . . . I think you air [sic] on the side of caution without more information." "They don't know enough about it. It could be harmful to the general public." Had the probe been construed the way its authors intended it, such answers would be incoherent (Grice, 1975)—akin to people affirming that they would work free of charge, and when asked why they would, responding, "Because of the paycheck!" In everyday conversation, this type of response would suffice for us to presume or infer a serious misunderstanding—unless the person was aiming to flout the cooperative principle (Grice, 1975) or reveled in non sequiturs.

In sum, these findings suggest that those endorsing the probe did not fully grasp what it meant, and thus their apparent assent did not diagnose absolutism. Our findings also suggest that GMFs' strongest opponents (all those who side with the probe) are largely consequence-minded—most worried about their impact on human health and the environment.

Study 1b

A weighty potential concern regarding the findings above is that what participants said was not what they actually thought. Appeals to pain-/harm-based reasons

are most statistically common (Schein & Gray, 2015, 2018) and, thus, in a way, better "practiced," which could have made alternate reasons (e.g., the wrongness of "messing with nature") more difficult to articulate. This could have encouraged some people to take "the easy way out" by speaking of GMFs as "harmful." Moreover, if "harm" and its cognates are just used to mean "something bad,"[10] at least some participants' statements (e.g., those that did not mention "harm's" object) construed as appealing to "harm" could in fact be based on purity —the referenced "harm" in the statement could be the unnatural states that GM production entails. Presumably, solving these problems could radically alter our findings.

Method

Participants. We recruited 306 unique participants from Amazon's Mechanical Turk (155 identified as female, mean age = 36.4 years).

Procedure. All relevant details of the study were identical to those of Study 1a, with the exception that, upon endorsing the absolutism probe, participants were asked to take some time to think why they agreed with the probe, then "indicate which of the statements below" was the best match for their thoughts. The statements were matched for word count and given in randomized order. The statements aimed to express key harm- and purity reasons for GMF opposition (e.g., Blancke et al., 2015; Kwieciński, 2009; Mallinson et al., 2018; Scott et al., 2016). The two harm-based statements read (a) "I agreed with the statement above because genetically engineering plants and animals for food is unsafe—poses risks to human and animal health," and (b) "I agreed with the statement above because genetically engineering plants and animals for food is unsafe—is a danger to the Earth's environment." The purity statements read (a) "I agreed with the statement above because genetically engineering plants and animals for food is impure—goes against the natural way of being," and (b) "I agreed with the statement above because genetically engineering plants and animals for food is impure—spurns the will of our Divine Creator." These statements provided participants with clear, articulate ways to cite MAP-compatible reasons that they should have strongly preferred had they understood that the probe (the referenced "statement above") prescribed that GMFs should be banned, assuming they threatened no harm.

Results and discussion

Forty-three participants (14%) failed the attention check and were removed, leaving 263 participants. Of these, 152 (58%) reported that they did not oppose GMFs. Of the 111 (42%) who did report opposing GMFs, 84 (76%) agreed with the absolutism probe. Our principle interest was how those who endorsed the probe explained their agreement. Consistent with our predictions, 62 (74%) of them explained that they agreed because they judged GMFs to be unsafe—either posing a risk to human and animal health (n = 50) or posing an environmental risk (n = 12). This left 22 participants (26%) reporting that they agreed with the probe because they judge GMFs to be impure—either going against the natural way of being (n = 18) or going against the will of God (n = 4).

Thus, even when they were provided with clear, articulate reasons to back their "absolute judgment" (a judgment supposed to be rendered as if GMFs were harm-free), participants still cited harm (specifically, risk to one's health) as their predominant reason, confirming that the standard probe was not understood as intended. But if the absolutism probe does not diagnose absolutism, how many of those who oppose GM are true absolutists? This question was explored in Studies 2a and 2b.

Study 2a

Studies 1a and 1b suggest that a person endorsing the probe is taking a stance, but it need not be moral absolutism. Some may in fact fear GMFs (but do not wish to prohibit them), yet others may want to prohibit them (subject to their consequences). To explore these points in depth, GMF opponents were sorted into either the standard condition (that used the original probe) or the four-item alternative. The latter contained a new variant of the absolutism probe that eschewed the semantically ambiguous "no matter how" construction in favor of the clearly hypothetical "even if" construction (as in "I oppose them here and now and I would oppose them even if they carried no risk"). This revised absolutism probe was presented alongside three contrasting response options (see below for further details). We reasoned that this more nuanced menu of options should further aid comprehension by calling attention to the unique features of the absolutism position versus alternative but related positions and allow participants to convey their position in a more precise manner, resulting in lower rates of self-diagnosed absolutism. Furthermore, acquiescence and consistency biases should have been limited because the four-item arrangement eschewed the yes/no (agree/disagree) response format, and all four options allowed for a negative stance on GMFs. Immediately after selecting from the menu of options, participants in that condition were queried about task acceptance by being explicitly asked if they could in fact imagine GMFs as carrying (a) very little risk and (b) very great benefit for the environment

and human health (key points of concern for GMF opponents in general and two key points of concern reported in Study 1a).

Method

Participants. We recruited 950 unique participants (443 reported being female; mean age = 37.2 years) from Amazon's Mechanical Turk.

Procedure. As in previous studies, participants were instructed that we were conducting a survey about their views of "genetically engineering plants and animals for food production." Furthermore, the participants were advised that the terms "risk" or "benefit", as used throughout the study, should be taken to mean total risk or benefit resulting from genetically engineering plants and animals for food production. (The singular forms of "risks" and "benefits" were adopted to avoid the stylistic awkwardness of speaking of "little risks" in subsequent parts of the study. The adjective "little" was, in turn, adopted in lieu of "minor" as the appropriate antonym of "great" in the sense that this term was intended by Baron & Spranca, 1997.)[11]

As in previous studies, all participants began by reporting whether they opposed GMFs. Those who reported that they did not oppose GMFs (n = 537) were directed to the demographics survey and debriefed. Those who reported opposing GMFs (n = 346) were randomly assigned to one of the two conditions. The standard probe condition was adopted from Scott et al. (2016; see Study 1 for the phrasing of the absolutism probe). The modified probe condition began with the following prompt:

> Please indicate which of the following statements does ***the best job*** of describing your **position on genetically engineering plants and animals for food production**" (emphasis in the original). The four statements (randomly ordered) were as follows (all typefaces replicated per the original), with the opposition-type label in brackets at the end:
>
> 1. I believe that genetically engineering plants and animals for food production **should be** prohibited at this time, *and* I **would** want to prohibit it *even if* I knew with certainty that there would be very little risk and very great benefit from allowing it. [absolutist prohibitionist]
> 2. I believe that genetically engineering plants and animals for food production **should be** prohibited at this time, *but* I **would not** want to prohibit it if I knew with certainty that there would very little risk and very great benefit from allowing it. [nonabsolutist prohibitionist]
> 3. I oppose genetically engineering plants and animals for food production **and** I believe that it should be much more carefully monitored and supervised, *but* I **do not believe** that it should be prohibited at this time. [nonprohibitionist (greater monitoring)]
> 4. I oppose genetically engineering plants and animals for food production, *but* I **do not believe** that it should be prohibited at this time. [nonprohibitionist (without greater monitoring)]

In line with Scott et al.'s (2016) meaning, participants opting for Statement 1 were viewed as absolutists.

Immediately after expressing a preference, the participants were asked to report if they could imagine genetic engineering of plants and animals carrying "very little risk for the environment and human health" and, separately, "very great benefit for the environment and human health" (the two questions were counterbalanced for order).[12] In each case, a participant could select among three response options: "I can imagine this," "I cannot imagine this" (counterbalanced for order), and, finally, "Other (please specify)" (with a text box available for comments), in case their preferred response was not "clearly captured" by the first two options. All participants were then directed to the demographics survey and debriefed.

Results

The analyses are based on 837 participants (88% of the entire sample; 429 reported female, mean age = 38.64 years, SD = 18.6) who passed the attention check. Descriptive statistics are given in Table 1. Neither results from the statistical analyses nor any general observations of our data changed when we included the entire sample. Replicating prior work, 40% (332) of the sample (172 in the standard-probe condition, 160 in the modified-probe condition) reported being opposed to GMFs.

As in Study 1 and in Scott et al.'s (2016) original result, most opponents (80%, or 138 of 172) in the standard-probe condition chose to "agree" with the probe; by contrast, only 28% (45 of 160) chose the comparable "absolute prohibitionist" option in the modified-probe condition, χ^2 (1, N = 332) = 88.89, p < .001 (see Fig. 1, below).

An ordinal logistic regression showed that the participants preferred the nonabsolute prohibition option over the absolute prohibition option, b = 0.43, SE = 0.16, t = 2.67, p = .008, in the modified-probe condition. Combined with the findings from Study 1, this represents further evidence that the high estimate reported

Table 1. Key Descriptive Statistics for Genetically Modified Food Opponents, Including Opposition Type and Task-Acceptance Profile

		Task-acceptance profiles			
		+ Risk		– Risk	
Condition and opposition type	*n* (%)	+ Benefit	–Benefit	+ Benefit	–Benefit
Scott, Inbar, and Rozin (2016) replication ($N = 172$)					
Absolute prohibitionist	138 (80%)				
Nonabsolute prohibitionist	34 (20%)				
Modified probe ($N = 160$)					
Absolute prohibitionist	45 (28%)	1	2	3	36
Nonabsolute prohibitionist	63 (39%)	10	6	6	38
Nonprohibitionist (greater monitoring)	40 (25%)	14	5	6	15
Nonprohibitionist (without greater monitoring)	12 (8%)	5	0	2	4

Note: Values are *n*s with percentages in parentheses. + = can imagine counterfactual; – = cannot imagine counterfactual.

by Scott et al. (2016) was a product of misunderstanding. Overall, most (80%) opponents in the modified-probe condition failed the task-acceptance requirement. Indeed, only 39% reported that they could imagine GMFs as carrying either very little risk or very great benefit.[13]

Most pertinently, only 1 out of 45 participants (2%) who claimed that GMFs should be prohibited "even if there would be very little risk and very great benefit from allowing [them]" stated that he or she could in fact imagine GMFs as carrying very little risk and very great benefit. Because only this one participant would be epistemically qualified to state or affirm absolutism, the rate of true absolutism appears to be near zero (0.6%), a remarkable drop from the 80% we obtained using Scott et al.'s (2016) probe (see Fig. 1), $\chi^2(1, N = 332) = 212.58$, $p < .001$.

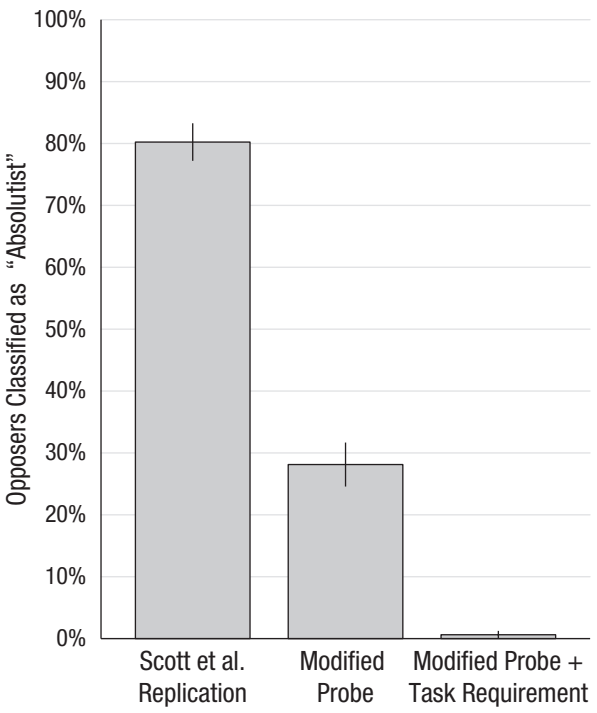

Fig. 1. Results from Study 2a. The graph shows the percentage of genetically modified food opponents classified as "absolutist" under different criteria. Error bars represent standard error.

Study 2b

In Study 2b, we aimed to replicate Study 2a, with two procedural changes: Rather than being asked to choose among four complex options (the feature that could have engendered lax or inattentive responding), opponents were first asked to state whether they thought that GMFs should be banned at this time ("I oppose GE, *and* I believe that it should be prohibited at this time" vs. "I oppose GE, *but* I do not believe that it should be prohibited at this time").[14] Participants who affirmed this prohibitionist view were asked if it was absolute ("It should **still be prohibited** *even if* we were certain that there would be very little risk and very great benefit from allowing it" vs. "It should **not be prohibited** *if* we were certain that there would be very little risk and very great benefit from allowing it"). Crucially, at each juncture, all participants faced a simple binary choice—opposition versus nonopposition at Stage 1, prohibition versus nonprohibition at Stage 2, and absolute prohibition versus nonabsolute prohibition at Stage 3. The morally absolutist opponents were then probed for their capacity to imagine the relevant counterfactual (the probe was taken directly from Study 2a). This approach resulted in statements that were shorter and simpler in structure, with all participants

facing a set of binary choices akin to those used by Scott et al.(2016) in their study.

The second modification was our inclusion of a validated short form of the field's dominant measure of social desirability (Marlowe Crowne Social Desirability Scale, Form C, or MCSDS-C; Reynolds, 1982). The scale consists of 13 true/false items, such as "No matter whom I'm talking to, I'm always a good listener," "I'm always willing to admit it when I make a mistake," and "I have never been irked when people expressed ideas very different from my own." If selecting the nonabsolute option was partly informed by a wish to present oneself in a manner that "may be pleasing to others" (e.g., to present oneself as a person who shuns extreme views), we should expect people's MCSDS-C scores and their endorsement of the absolutist position to be inversely related, telling us that support for the MAP as a theory could have been somewhat stronger had the participants been somewhat more unaffected.

Method

Participants. We recruited 817 unique participants (428 identified as female; mean age = 37.3 years) from Amazon's Mechanical Turk.

Procedure. With the exceptions outlined above, the procedure was identical to that reported for Study 2a.

Results and discussion

The analyses are based on 747 participants (91% of the entire sample; 403 identified as female, mean age = 37.9 years) who passed both attention checks. The key proportions obtained in Study 2b were virtually identical to those obtained in Study 2a: 41% (310 of 747) reported opposition (compared with 39% in Study 2a) and 27% (85 of 747) reported absolutism (compared with 8% in Study 2a). Because only 2 of these putative absolutists stated that they could in fact imagine GMFs as carrying very little risk and very great benefit, the validly absolutist response rate appears to be 0.6% (2 of 310), the same as in Study 2a. Furthermore, contrary to the possibility that this low number understates absolutist beliefs because of social-desirability concerns (making people unwilling to claim a more "extreme" absolutist viewpoint), we found positive associations between MCSDS-C (Cronbach's $\alpha = 0.81$) and negative attitudes toward GMFs (social desirability—oppose: $r = 0.17$, $p < .001$; social desirability—prohibit: $r = 0.09$, $p = .099$; social desirability—absolutism: $r = 0.15$, $p = .045$), suggesting that to the degree that the social- desirability bias had any effect on the data, it was by biasing people toward the absolutist position. The joint findings of Studies 1a and 1b and Studies 2a and 2b indicate that the rigidly moralistic stance against GMFs (a desire to prohibit them no matter the consequences) is far more the exception than it is the rule. To the degree that people appear to take such a stance, it is because they ignore or misunderstand the key question or fail to duly accept the task that the question prescribes.

Study 3

The studies cited above call the MAP's key claim into question. Another potential challenge to the absolutist account is that perceived consequences (perceptions of costs and benefits) and judgments of opposition are rather closely aligned (e.g., Chen & Li, 2007; Gray & Schein, 2016; Inbar, Scott, & Rozin, 2016; Prati et al., 2012). From our point of view, the reason for this is straightforward: Opponents oppose because, in their minds, GMFs do vastly more harm than good; they do not choose to oppose if they believe otherwise. If one subscribes to the MAP (which posits that most opponents are genuine absolutists and thus are consequence blind), this answer is hardly an option. Instead, the MAP's proponents appeal to some previous work suggesting that "moral beliefs can have downstream consequences" to argue that it is "preexisting objections to GM" (due, perhaps, to disgust and/or intuitions of unnaturalness) that lead people "to emphasize the risks and minimize the benefits of GM food" (Inbar et al., 2016, p. 331) in a post hoc manner.

One epistemic advantage of so sharp a divide is that it is easy to test. From the absolutist perspective, which holds that most opponents are (a) consequence blind and unyielding[15] and (b) loathe genetic revision or "messing with Mother nature," a prototypic opponent should still be prepared to oppose in a counterfactual world in which GMFs are risk-free; their take on GMFs should not change because they do little harm and bring about much good. From our point of view, in fact, a change should occur; most initial opponents should "turn into" accepters and most initial accepters should "turn into" opponents once the perceived consequences of GM food have reversed.

Method

Participants. We recruited 741 unique participants (399 reported being female; mean age = 37.08 years, *SD* = 11.57) from Amazon's Mechanical Turk.

Design. Participants were randomly assigned to one of three conditions. One was a direct replication of Scott et al. (2016; see below for procedural modifications). Two other counterfactual narrative conditions required participants to imagine either "another Earth" in a parallel universe ("Earth X") or Earth of a distant future ("Future

Earth"), each described in detail, with either narrative followed by a manipulation check allowing a participant to voice a judgment of whether he or she accepted the task. The "Earth X"/"Future Earth" variation was introduced to determine whether one of these would lead to a more effective (less imaginative-resistance-prone) instantiation of the counterfactual state and if the findings would vary as a result of that.

Procedure. At the beginning of the study, all participants were instructed that we were conducting a survey about their views on the use of genetic engineering in food production. The participants were also informed that, when we spoke of "genetic engineering doing more 'good' than 'bad,'" this assessment would have already "taken into account both the different types of good and bad effects (e.g., transforming the ocean habitat, saving lives, causing illness, and so on) as well as the chances that these effects will come about." This change of nomenclature—from "risks" and benefits" to "bad" and "good" effects—was motivated by prestudy discussions that led us to conclude that speaking of "costs" and "benefits" or "risks" and "benefits" would potentially narrow the scope of perceived consequences to those that are monetary or economic in nature, whereas the term "risk" was also ambiguous as to whether it described some type of a consequence (as in "the risk of this surgery is paralysis or death") or the probability weight attached to that consequence (as in "the risk of death or paralysis is small: 1 in 1,000"). To the extent that a participant interpreted "risk" in the latter sense, and to the extent that the same participant came to associate GMFs with existential threats (e.g., a low-probability catastrophic event), it could be normative for them to oppose GMFs on expected utility grounds even if the risks were specified to be small.

Participants were then randomly assigned to one of three conditions. These included a replication of Scott et al. (2016), as well as two key conditions comprising the computerized interview protocol.

Scott et al. replication. Participants first indicated whether they currently opposed or did not oppose the production of GMFs. If they indicated that they opposed GMFs, they then responded to the absolutism probe taken from Scott et al. (2016). If participants indicated that they did not oppose GMFs, they were asked whether they agreed or disagreed with the "permissive" variant of the absolutism statement that "the use of genetic engineering in food production should be permitted no matter how great the risks and minor the benefits from allowing it." Following these questions, all participants responded to an attention check (see Study 1).

Counterfactual narrative interview protocols. Figure 2 offers a diagrammatic overview of the structured interview protocol (see Supplemental Material for the exact text of the prompts). Participants first indicated whether they currently opposed or did not oppose the production of genetically modified foods, followed by whether they currently believed GMFs did, on balance, more bad than good or more good than bad. Following this, participants responded to the above-mentioned attention check. Participants whose attitudes matched their cost–benefit perceptions (i.e., who opposed GMFs and believed that they did more bad than good, or did not oppose GMFs and believed that they did more good than bad) were considered belief-congruent. They continued with the study.

Each of these participants was then asked to consider a counterfactul state in which their current assessment of the relative good and bad was reversed, one about "an Earth-like planet" in a parallel universe ("Earth X"), and one about Earth 250 years from now ("Future Earth"). The text of "Earth X" is reproduced below. (For belief-incongruent participants, who made up a small minority—see Tables 2 and 3—the interview protocol ended after they verified the mismatch between their beliefs and their attitudes.)

> Now, we would like you to imagine something. Imagine that you are no longer on this Earth but **on an Earth-like planet in a parallel universe called "Earth X"** where human culture and society is much the same as it is here on Earth but where scientists and policy makers are **100 percent certain** that the use of genetic engineering does significantly more **good than bad**. Not only has it been shown conclusively not to harm Earth X's environment, biodiversity, or human health, but it has been shown to be highly beneficial to all of the above.

Following the counterfactual, participants were asked whether they had been successful in imagining this new balance of risks and benefits. The interview protocol ended if participants did not report success. If participants reported success, they were asked whether they would oppose or not oppose the use of genetic engineering within this world. Following this, participants verified that their attitudes corresponded to the series of answers they had given so far. After completing the interview protocol, all participants completed a demographics survey and were debriefed.

Results and discussion

Fourteen percent of the sample failed the attention check, leaving 636 participants. Within the counterfactual narrative-interview protocol (CNIP) conditions, we observed that the vast majority of participants showed

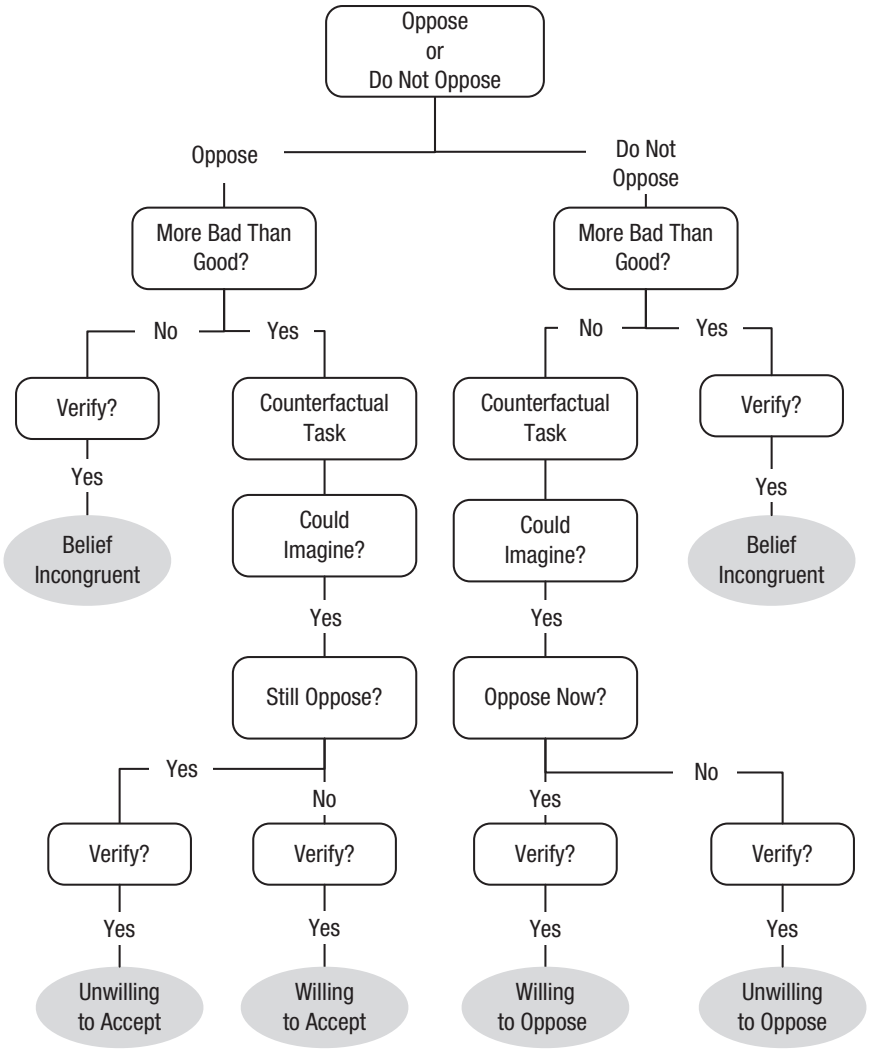

Fig. 2. Diagrammatic overview of the interview protocol in Study 3.

a match between their position toward GMFs (opposed vs. not opposed) and their cost–benefit beliefs ("does more bad than good" or vice versa). In the "Future Earth" condition, 86 of 91 (95%) people who opposed GMFs believed that they did more bad than good, and 114 of 121 (94%) people who did not oppose GMFs believed that they did more good than bad. In the "Earth X" condition, all 83 opponents (100%) reported believing that GMFs did more bad than good, and 116 of 121 (96%) people who did not oppose GMFs believed that they did more good than bad. In line with Scott et al. (2016) and our Studies 1 and 2, 70% of opponents in the replication condition endorsed the absolutism probe,[16] thus replicating the result that led Scott et al. to conclude that most opponents are refractory to cost–benefit information.

Opponents were not refractory across the four CNIP conditions. Once they successfully imagined that GMFs do much good coupled with little harm (i.e., AAAS's current position), opponents (79% and 81% for "Earth X" and "Future Earth," respectively) affirmed that they would not oppose GMFs in this context. Accepters followed suit: Once they successfully imagined that GMFs do much harm coupled with little good, they affirmed that, with that in mind, they would want to oppose them (93% and 94% for "Earth X" and "Future Earth," respectively). Among GMF opponents, the willingness-to-accept rate was virtually the same regardless of whether the self-reported acceptance of the task was relatively high ("Earth X") or relatively low ("Future Earth"; see Table 2). In sum, not only did people's base attitudes closely match their benefit–cost perceptions,

Table 2. Rates of Opposition, Task Completion, and Counterfactual Reappraisal in Study 3

	Condition	
Response categories	"Future Earth" (N = 212)	"Earth X" (N = 204)
Initial appraisal		
Oppose GMFs (%)[a]	91 (43%)	83 (41%)
Participants initially opposed...		
With consequence-incongruent beliefs (% oppose)	5 (5%)	0 (0%)
With consequence-congruent beliefs[b] (% oppose)	86 (95%)*	83 (100%)*
Counterfactual reappraisal		
Success (% of participants initially opposed with consequence-congruent beliefs)	53 (62%)	71 (85%)
Accept GMFs (% of participants reporting success in imagining the counterfactual)	43 (81%)*	56 (79%)*
Maintain opposition (% of participants reporting success in imagining the counterfactual)	10 (19%)	15 (21%)

Note: Values are *n*s with percentages in parentheses.
[a]In the Scott, Inbar, and Rozin (2016) replication (N = 220), 93 participants (42%) opposed GMFs. [b]Participants exposed to the counterfactual.
*$p < .001$ (by χ^2 test).

but changing these beliefs made most of them willing to change their pro and con attitudes.

General Discussion

Genetically modified organisms, including GM foods, have met with strong opposition for most of their existence. The roots of this opposition continue to be hotly debated. The CP offers one way to understand the resistance: Lay people oppose GMFs because they deem them unsafe as well as of dubious value (the informational climate in which lay people reside encourages these beliefs and makes them hard to revise). The CP is empirically backed and offers a clear solution for easing GMF opposition. However, a number of scholars have claimed that the CP is faulty, that lay opposition is based on largely nonrational factors (e.g., aversion toward the unnatural) and is independent of facts about GMFs' risks and benefits (e.g., Agre et al., 2016; Blancke et al., 2015; Kovacheff et al., 2018; Kwieciński, 2009; Mallinson et al., 2018; Scott et al., 2016). A recently prominent statement and synthesis of these ideas (the MAP) has claimed that GMF opponents are largely consequence blind and thus immune to the evidence that is consequence based.

Herein we critically weighed the arguments for this proposal and found them seriously lacking. First, work that presumptively links GMF opposition to affect (e.g., feelings of disgust, presumed to be tied to "impurity"/non-harm-based disapproval; Mallinson et al., 2018; Scott

Table 3. Rates of Nonopposition, Task Completion, and Counterfactual Reappraisal in Study 3

	Condition	
Response categories	"Future Earth" (N = 212)	"Earth X" (N = 204)
Initial appraisal		
Accept GMFs	121 (57%)	121 (59%)
Participants initially nonopposed...		
With consequence-incongruent beliefs (% oppose)	7 (6%)	5 (4%)
With consequence-congruent beliefs[b] (% oppose)	114 (94%)*	116 (96%)*
Counterfactual reappraisal		
Success (% participants initially nonopposed with consequence-congruent beliefs)	96 (84%)*	104 (90%)*
Oppose GM (% of participants reporting success in imagining the counterfactual)	90 (94%)*	97 (93%)*
Maintain acceptance (% of participants reporting success in imagining the counterfactual)	6 (6%)	7 (7%)

Note: Values are *n*s with percentages in parentheses.
[a]In the Scott, Inbar, and Rozin (2016) replication (N = 220), n = 127 participants (58%) accepted GMFs. [b]Participants exposed to the counterfactual.
*$p < .001$ (by χ^2 test).

et al., 2016) has either failed to use a valid measure of affect (Mallinson et al., 2018) or failed to replicate (Scott et al., 2016) when more valid measures were used (Cusimano et al., 2018; Royzman et al., 2017). The studies that show that opponents do not, by and large, change their views when faced with brief counter arguments (e.g., Frewer et al., 2003; Scott et al., 2016, pilot study) relied on weak interventions that largely included appeals to varied GMFs' benefits and did not convincingly soothe lay people's deep-seated concerns that many GMFs are unsafe and will have long-term ill effects. And, finally, common appeals to GMFs' unnatural essence are also in line with the CP in that "unnatural" things are often construed as "unhealthy" or harmful to the environment (e.g., Petrescu & Petrescu-Mag, 2015; Roininen et al., 1999; Schuldt & Schwarz, 2010). Thus, although very intriguing, the evidence cited above does not support absolutism more strongly than its counterpart.

However, some recent research (Scott et al., 2016) produced one clear result that seems to provide such support. The authors asked "GM opponents" if GMFs "should be prohibited no matter how great the benefits and minor the risks from allowing it" (Scott et al., 2016, p. 317, based on Baron & Spranca, 1997) and found that most did "agree." Primarily on the basis of this self-report evidence, Scott et al. have argued that most GM food opponents (in the United States at least) are genuine "moral absolutists" and "would maintain their opposition" no matter the consequence (Scott et al., 2016, p. 320). Herein we presented new studies that (a) found this evidence lacking and (b) bolster the CP instead.

Among our major concerns was that, because of the wording employed in some parts of the probe (e.g., the polysemous meaning of "no matter"), not all those endorsing the probe did fully grasp what it meant, and thus their apparent assent did not indicate absolutism. Our findings support this position. In Studies 1a and 1b, participants answered the question of why they "agreed" with the probe (whose proper construal assumes that no real harm would occur) by citing GMFs' harms and risks, suggesting that this standard probe did not diagnose absolutism and that reassessment was called for.

We offered such reassessment in Studies 2a and 2b. The first of these studies (2a) revealed that, given a choice between GMF absolutism (a clarified statement thereof) and nonabsolutist alternatives, the latter were strongly preferred. About one quarter of all participants chose absolutism; among them, just 2.3% (one person) claimed to have possessed the skill to validly answer the question. And even this low number is likely an overestimate. The people who make up this number *believe* they have the capacity to set aside current beliefs to simulate converse beliefs (e.g., GMFs are helpful and safe). This does not entail, however, that one exercised this capacity while making the judgment in question. Moreover, as mentioned above, past studies have made it quite clear that people lack full insight into their failure to discount knowledge, even while their judgments continue to be greatly affected (Baron & Hershey, 1988; Camerer et al., 1989; Fischhoff, 1975; Hasher, Attig, & Alba, 1981; see Royzman et al., 2003; for discussion). The converse cognitive error—a pattern of judgment in which effective discounting took place but one falsely reports that in fact it did not occur—is yet to be documented. That is, people's stated opinion of their presumptive capacity to shed their current beliefs tends to inflate this capacity. This raises the strong possibility that even the one individual who stated that she could imagine the counterfactual state might not have been able to do so.

The follow-up (Study 2b) confirmed all of these results while offering more streamlined options and simplifying the choice. It also tested a link between GMF opposition and socially desirable responding, suggesting that if such a bias has any effect whatsoever, it is by biasing people toward absolutist endorsement.

These studies seem to suggest that genuine moral absolutism (at least when it comes to GMFs) is largely a fictional posit, with very few cases on offer. It may be worthy of wonder and theoretical study but has little practical weight. For one thing, it cannot explain why so many oppose and wish to prohibit GMFs.

In our ultimate study, participants were to consider a brief counterfactual narrative (and went through a subsequent check on whether the task was accepted). We found that moving opponents into an informational climate reflecting the mainstream consensus among GMF science experts (GMFs are minimally risky as well as of critical value) led most to accept GMFs in this informational context (with parallel findings uncovered for self-professed nonopponents). This finding strongly suggests that most GMF opponents do not resist them because of something they are or not (which did not change through the study), but rather, as claimed by the CP, because of something they do.

Prior work on protected values and its relation to present findings

The views expressed in this article are closely related to those presented by Baron and Leshner (2000). They pointed out, long before us, that one should be cautious in taking apparent claims of absolutism as literal statements of someone's uncompromising position. For instance, as they demonstrated, the very same people

who would endorse claims of this kind ("This should not be allowed no matter how great the benefits") may later think of examples that qualify their judgment. And, with benefits certain (1.0) and risks exceedingly low (1/10,000,000), a self-proclaimed absolutist could favor pro-GMF action approving GM produce (Baron & Leshner, 2000, Study 6). These findings led Baron and Leshner to conclude that most protected values (PVs; defined as moral absolutism) are hasty generalizations or, wording it more concisely, "strong opinions, weakly held." They are said to be strong opinions in that people seem to be serious in voicing PV-like positions at some point in the process (e.g., at the time of endorsing them); they are said to be weakly held in that they are subject to change—up to 43% in one case (Baron & Leshner, 2000, Table 4) deciding to change their mind with "benefits" said to be high and "risks" said to be low.

The work we presented above suggests that, at least for GMFs, some putative absolute statements in fact represent "weak opinions" that are "quite weakly held." They seem to be weak in the sense that virtually none are endorsing a statement of moral absolutism as a statement of moral absolutism at any point in the process; the seeming endorsement results from serious misunderstanding about what one is affirming when one makes the choice to "agree" (Studies 1a–2b). They are weakly held because, screening for the capacity to think counterfactual thoughts, most people are willing to change their very stance on the issue (from anti to pro and vice versa) contingent on risks and benefits (Study 3).

But though our findings suggest that lay opposition to GMFs is largely consequence-based, we do not mean to imply that all PVs are like that. Some people may still choose to hold dogmatic, hidebound positions about, for instance, incest (e.g., Haidt, 2001; though see Royzman, Kim, & Leeman, 2015), child labor, enhancement of humans, electing racist officials, and killing some species of animals (e.g., Baron & Leshner, 2000; Baron & Spranca, 1997). This work does not strictly address these very prominent issues; however, it offers a template for future endeavors that will.

Limitations of the current empirical work

One limitation of the present studies is that our samples consisted exclusively of Mechanical Turk workers residing in the United States. At least at the policy level, the United States appears to be more tolerant of GMFs and GMF production than other industrialized nations (Davison, 2010). For example, unlike the United States, many European countries have explicit bans on new (often GM) food absent case-by-case evaluation.[17] It is therefore possible that, despite the low rates of absolutism we have documented herein, there are true GMF absolutists residing in these other countries. However, the key word is "possible". As our results make clear, the standard absolutism probe does not diagnose absolutism. Thus, given our current perspective, there is no positive evidence of absolutism anywhere. This marks an important direction for possible future research, with our approach as the blueprint. Among other things, this involves (a) being very explicit about what "absolutism" means, (b) designing surveys and tasks that are properly understood and properly used by participants, and (c) ensuring that people provide us with valid responses (which may involve some capacity for counterfactual thinking). It is also worth taking note that, insofar as some countries look to the United States and its social policies to set their own priorities, it is of some global import what most Americans think (and how they cast their vote).[18]

Another potential critique is how we gauged absolutism. Our methodological focus was on one putative measure: the so-called absolutism probe. However, some prior research that sought to assess absolutism explored other judgments (Baron & Leshner, 2000; Baron & Spranca, 1997; Scott et al., 2016) as well, including a person's agreement with statements such as (a) "It is equally wrong to allow some of this to happen as to allow twice as much to happen," or (b) "This would be wrong even in a country where everyone thought it was not wrong." But, as we discuss below, agreeing with these types of statements does not truly gauge absolutism.

For instance, with respect to (a), whereas Baron and Spranca (1997) asserted that absolutism is "PVs' defining property" (p. 13), the same authors discussed quantity insensitivity (along with wishful thinking, anger, and agent relativity) as a *correlate* of absolutism, something that one is "more likely" (p. 13) to observe when a value is "absolute" but that has other causes as well (see Baron & Greene, 1996, for a list). Moreover, some later work found that a measure of quantity insensitivity such as that used by Scott et al. (2016) is somewhat framing-dependent, with absolutist opponents being more and less "consequence-minded" (i.e., more or less quantity sensitive) depending on how things were presented (Bartels & Medin, 2007; Sachdeva & Medin, 2008; but see Baron & Ritov, 2009, for a detailed critique). More fundamentally still, there is no innate contradiction between being "quantity insensitive" (according to the measure above) and making judgements on the basis of results, thus barring true absolutism.[19]

With respect to (b) ("This would be wrong even in a country . . . "), the statement is meant to uncover a nonconventional judgment, a pattern of judging events

that is largely consequence-based (Royzman, Goodwin, & Leeman, 2011; Royzman et al., 2009; Turiel, 1983). A long line of work demonstrates that judgments against certain acts (committing assault and battery) tend to remain in effect without perceived social sanctions precisely because these acts are thought to have consequences for their putative victims (Nucci, 2001; Royzman et al., 2014; Royzman et al., 2011; Royzman et al., 2009; Turiel, 1983; Turiel, Killen, & Helwig, 1987). Within this tradition, the link between harm and moralization has been shown to hold even when an act (e.g., violation of table manners, incest) seems to exemplify a consequence-free violation (Royzman et al., 2014; Royzman et al., 2011; Royzman et al., 2009).

Policy implications and future directions

With these concerns aside, we turn to the issues of policy. Informed by their recent research regarding GMF opposition, Scott et al. (2016) have ventured a claim that to address opposition one must first address absolutism (p. 322). As we speculated before, assuming that the MAP is correct, attempting to quell absolutism would be a formidable task. However, our findings suggest that targeting moral absolutism (at least with respect to GMFs) would not work for yet other reason: It is a research artifact, with numbers of true absolutists appearing to be next to none. In light of our findings, we think that a better approach would be that proposed elsewhere: a large, multimedia campaign that aims "to educate the public on GM technology and GM food by providing balanced, evidence-based perspectives of the technology to consumers through presentations, written materials, documentaries and educational courses that are made widely available through various media" (Cui & Shoemaker, 2018, p. 4). The scientists–public engagement must feature feedback mechanisms—online and face-to-face forums where people can reach out to experts with their questions and worries, thus further promoting trust (and more nuanced understanding of people's beliefs and concerns; Nadkarni et al., 2019). Like Cui and Shoemaker (2018), we think that governments should play a role by backing various efforts to educate consumers. We also fully endorse the claim that it is "crucial to put in place [public] safeguards and the communication needed to ensure to the public that GM foods are thoroughly tested and regarded as safe" (Cui & Shoemaker, 2018, p. 4), demonstrating said safety in a "transparent manner." This may not be easy to do, but there is no easier path.

Psychologists, too, have a role: conducting rigorous surveys of people's GMF attitudes (to understand where interventions are most urgently needed and how to make interventions of interest most effective), as well as studying the process that leads to the attitude change. This latter type of inquiry, which was well beyond our scope, is something that could be of value to policy-making at large.

Conclusion

Our findings strongly suggest that most of the public resistance to GM is not absolutist, that most of the strongest opponents are strongly consequence-minded, and that a large-scale intervention contingent on these suppositions is our best course of action. We also stress the importance of preparatory analysis ("What, in fact, is absolutism?") and methodological caution when complex ideas are staked. That being said, our claim is *not* that all absolutism explored in the past is illusory. But this is precisely what this project has to contribute—a thought-out conceptualization and methodological blueprint for future research to discover where true absolutism begins (and faux absolutism ends) on a case-by-case basis. GM food opposition is just not one of those cases.

Action Editor

Laura A. King served as action editor for this article.

Author Contributions

E. B. Royzman conceived the project. E. B. Royzman, C. Cusimano, S. Metas, and R. F. Leeman designed the studies. E. B. Royzman, C. Cusimano, S. Metas, and R. F. Leeman wrote the manuscript. C. Cusimano and E. B. Royzman collected the data. C. Cusimano and E. B. Royzman analyzed the data, with additional input from S. Metas and R. F. Leeman. All of the authors approved the final manuscript for submission.

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The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/1745691619873550

Notes

1. Indeed, even someone holding a less-disconsolate view may still hesitate if he or she feels that the evidence is inconclusive enough to warrant caution in the face of potentially catastrophic effects. This is the gist of the precautionary principle, which stipulates that if an activity threatens "serious or irreversible harm . . . precautionary measures shall be taken even if the causal link between the activity and the possible harm has not been proven or the causal link is weak and the harm is unlikely to occur" (Harris & Holm, 2002, p. 358).
2. Trust, in turn, was a significant predictor of people's antecedent perceptions of risks and benefits. Similarly, Onyango et al. (2004) found that trust in government and science tended to improve GMF acceptance by allaying fears of risks related to its consumption.
3. For instance, the article by Hilbeck et al. (2015) was widely covered online and features a statement cosigned by more than 300 scholars. The statement "concludes that the scarcity and contradictory nature of the scientific evidence published to date prevents conclusive claims of safety, or of lack of safety, of GMOs" (Hilbeck et al., 2015, p. 1). We view the media's focus on scientific dissent (the controversy within the scientific establishment) as part of its negative tilt.
4. The authors of the article in question ("Doubts About the Promised Bounty of Genetically Modified Crops") asserted that "an extensive examination by *The New York Times*," based on UN data, has led to a conclusion that "the debate [over the relative safety of GM crops] has missed a more basic problem—genetic modification in the United States and Canada has not accelerated increases in crop yields or led to an overall reduction in the use of chemical pesticides" (Hakim, 2016, para. 2). Similar types of reports have been circulated before (Gurian-Sherman, 2009).
5. Broadly speaking, moral absolutism means a tendency to commit to a moral point of view "irrespective of anything else" (for discussion, see Royzman, Landy, & Leeman, 2015). For the purposes of this discussion, we adopt Scott et al.'s (2016) primary criterion for being a "moral absolutist"—the willingness to prohibit GMFs "for any balance of risks and benefits" (p. 320) "no matter how great the benefits and minor the risks from allowing [them]" (p. 317). They referred to such individuals as "moral absolutists," "absolutist opponents," or simply "absolutists," and we use the same terms interchangeably.
6. Mallinson et al.'s (2018) justification for treating the items as if they were measuring affect is that "such malevolent terminology is emotive" and fits with the "populist" narrative of "GM-foods as Frankenfoods" (p. 1152; also addressed below).
7. The corresponding number was 80.6% for those who responded to the probe prior to seeing the arguments. The experience of these participants closely mirrored that of participants in Scott et al.'s (2016) main sample; thus, the number in question was adopted as our benchmark in subsequent studies.
8. Participants were classified as "unique" insofar as they did not take part in an earlier study or in the same study. All exclusions were based on IP addresses. Since IP addresses could be shared by two or more individuals, this approach errs on the side of caution (please see the Transparency section above for further details). In all five studies, recruitment was limited to workers from the United States, with a 93% or greater HIT success rate. Please contact the authors for further study details (for complete project data, see https://osf.io/mrvx3/).
9. We additionally carried out a text-based analysis investigating what content participants were most likely to raise in their statements. The findings were consistent with the aforementioned results (please contact the authors for further details).
10. We thank Laura King for suggesting this as a risk.
11. In English, "great" has at least two separate meanings as an adjective, (a) that signifying superior magnitude or amount (the meaning most relevant in this context) and (b) that signifying superiority in ability, quality, or significance (in which case "minor," the term used by Scott et al., 2016, would be the appropriate antonym to consider).
12. Our approach was similar to that of Greene et al. (2009; see also Royzman & Baron, 2002), who expressed a concern that those weighing in on the trolley-problem vignettes could be led by "unconscious realism"; in other words, "a tendency to unconsciously replace a moral dilemma's unrealistic assumptions with more realistic ones" (Greene et al., 2009, p. 365). Part of Greene et al.'s solution was to directly ask their participants to suspend their disbelief while reading the scenarios, then to eliminate those who reported lack of success.
13. Four percent of the participants were excluded from these counts because they selected "Other" for one of the imagine questions. Their elaborations (when prompted to "please specify") were not informative, ignored the prompt to elaborate, or suggested that they rejected the task.
14. Following Scott et al. (2016), "GE" was predefined as "genetically engineering plants and animals for food production."
15. As Scott et al. (2016) pointed out in their Discussion section, because "moral absolutists by definition have infinite utility for certain values," a genuine moral absolutist "would see the cost–benefit trade-offs . . . as irrelevant or even offensive" (Scott et al., 2016, p. 321).
16. Twenty-six percent was the corresponding number for "absolutist permissivists" (a category not examined in Scott et al., 2016).
17. Though bans and strict regulations index strong opposition, they should not be treated as evidence of absolute opposition. Indeed, many GMF bans were explicitly passed in response to concerns regarding risks to human health, and many debates about removing the bans in question, or expediting reviews, are based around discussions of cost–benefit trade-offs.
18. We thank Jonathan Baron for this point.
19. To illustrate, imagine a case in which someone believes that Country X getting a hold of one nuclear warhead or City Y licensing one adult emporium would increase the probability of regional conflict or marital discord, respectively, by the same amount that it would if Country X acquired four warheads and City Y licensed four adult emporiums. This consequence-driven reasoner may thus go on to say that it is equally wrong to allow Country X to have four nuclear heads or any nuclear warheads (or for City Y to have four or any adult emporiums) because, to their mind, they are quite indistinguishable in their risk of producing the feared target event.

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