The Varieties of Repugnance and How to Deal with Repugnance about Betting on Matters of Life and Death

Dan Weijers

Philosophy Programme
Victoria University of Wellington

Dan.Weijers@vuw.ac.nz
www.danweijers.com

Abstract

The varieties of repugnance and the role each type of repugnance should play in moral debates about new technologies is explained and applied to new and recent technologies that encourage betting on matters of life and death. Betting on matters of life and death is widely considered to be repugnant. Prediction markets are marketplaces in which traders bet on potential real-world outcomes, such as whether Hillary Clinton will be the next president of the United States. Prediction markets can and do encourage traders to bet on a number of matters life and death, including medical diagnoses, epidemics, and terrorist attacks. In this paper, these three kinds of prediction market are explained, and it is argued that repugnance felt about these three kinds of prediction markets is likely to be either mistaken or legitimate but outweighed by other moral considerations. It is concluded that these three types of PM should not be considered immoral.

Keywords: repugnance, prediction markets, betting on death, terrorism, CrowdMed, Iowa Electronic Health Markets
1. Betting on matters of life and death

Betting on matters of life and death is widely considered to be repugnant, which is to say that the idea of such betting causes many people to feel morally charged revulsion. Consider celebrity death pools, in which people bet (and win real money) on lists of famous people that they expect to die in the next year. Breitbart and Ebner (2004) identify the death pool website www.stiffs.com\(^1\) as the most extreme case of schadenfreude that they have seen, pointing out that the website is replete with jokes at the expense of the deceased. For example, the site announced the death of Albert Broccoli with the quip: “Just as well. It’s awful to think of anyone spending the rest of his days as a vegetable.” Indeed, to say that the site is unashamedly disrespectful of the dead is an understatement. The site’s homepage informs us that: “We've got multiple games, email alerts when the famous ones hit the dirt, and tons of other sick fun for the whole family. Come on in and have a look around ...” (www.stiffs.com).

Clearly not everyone finds betting on matters of life and death repugnant, since some people bet on death pool websites. But small minorities of people do many strange and, in the eyes of the vast majority, immoral things. Important here, is that the vast majority of people find betting on matters of life and death repugnant and they judge it to be immoral. Furthermore, widespread repugnance about betting on matters of life and death occurs even when the betting will not influence those life and death matters in any way. Of course, if the betting is thought to influence the life and death matters, then it is even more widely viewed as repugnant.\(^2\)

\(^1\) If you want to know if you are famous enough to be (to quote from www.stiffs.com) “good to go”, then you can check the celebrity database here: www.stiffs.com/celebrity/directory/.

\(^2\) Some forms of death pools, such as a death pool in Taiwan about when local elderly people will die, plausibly influence the deaths of the people who are bet on because those who care for the elderly can
Modern prediction markets (PMs) are websites in which anonymously registered traders buy and sell shares in predictions about real-world outcomes (Weijers 2013a). PMs usually pay out a set fee (e.g., $10) to traders who hold shares in a prediction that turns out to be true. For example, a trader might purchase shares in the prediction that ‘there will be a power outage affecting at least 1 million people in the United States in 2013’ for $2 per share because she thinks that the shares are under-priced—that such a power outage is more likely than 20% ($2/$10 = 20% chance). If the trader holds on to the shares (instead of selling them to another trader), then she stands to make $8 per share if the prediction is true, or lose $2 per share if the prediction turns out to be false. PMs can and do encourage traders to bet on matters life and death in a number of ways. In this paper several types of PM that encourage traders to bet on matters of life and death are discussed. It is argued that repugnance felt about these three kinds of prediction markets is likely to be either mistaken or legitimate but outweighed by other moral considerations. Therefore, it is concluded that these three types of PM should not be considered immoral.

The structure of the paper proceeds as follows. In Section 2, the varieties of repugnance, and the role each should type should play in moral debate about new technologies, is discussed. Then, the three kinds of PM that encourage betting on matters of life and death are explained, and it is argued that any repugnance felt about these three kinds of prediction markets should not make us see them as immoral.

participate and have considerable financial incentives to withhold life-saving care. See: “Betting on when late-stage cancer patients would die, doctors and family members wagered over 1 billion [TWD]” for a discussion and comments by readers expressing repugnance. Available from: http://www.chinasmack.com/2013/stories/underground-gambling-on-when-cancer-patients-will-die-exposed.html.
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because that repugnance is likely to be either mistaken or legitimate but outweighed by other moral considerations: PMs that predict medical diagnoses are discussed in Section 3, PMs that predict epidemics are discussed in Section 4, and PMs that predict terrorist attacks are discussed in Section 5. Finally, Section 6 summarises the paper and discusses the implications.

2. The Varieties of repugnance and how repugnance should be used in moral debates

Leon Kass (1998, p. 687) described repugnance as: “[when] ... we intuit and feel, immediately and without argument, the violation of things that we rightfully hold dear.” Kass famously defended repugnance as a source of wisdom by arguing: “Revulsion is not an argument; and some of yesterday's repugnances are today calmly accepted—though, one must add, not always for the better. In crucial cases, however, repugnance is the emotional expression of deep wisdom, beyond reason's power fully to articulate it.” (Kass 1998, p. 687; emphasis added). For the purposes of this paper, repugnance will be defined as follows:

Repugnance occurs when person X feels morally charged revulsion about thing T.

The morally charged aspect of repugnance comes from the fact that the feeling of revulsion is about a moral issue, such as what someone (including ourselves) has or hasn’t done, or may or may not do (Haidt 2001). So, repugnance is an intuitive feeling of revulsion that is cognitively associated with a phenomenon (the target of the repugnance), when that phenomenon is considered to lie in the moral domain by the person experiencing the revulsion. For example, thinking about a manager who knowingly disregarded safety advice in order to raise short-term profits is likely to elicit
repugnance; in response to considering this case, we likely experience an intuitive feeling of revulsion and attribute that revulsion to the behaviour of the manager (which we consider to lie in the moral domain).

Despite being based on intuitive feelings, which are notoriously opaque (Weijers 2013b), repugnance can be morally justified. For example, Kass (1998) argues that cloning is elicits repugnance because it is an affront to human nature and normal human reproduction. However, Kass (1998) also argues that, even when it cannot be justified, widespread repugnance by itself is a strong, prima facie winning, moral argument. I.e. when the majority of people find something repugnant, then the burden of moral argument falls on the proponent of the thing in question.

However, there are cases in which even widespread repugnance is clearly not wise, such as when it is based on widespread false beliefs. Therefore, anyone experiencing repugnance about something should be open to receiving new information about it. For example, people now find the idea of slavery repugnant. But why did they not previously find it repugnant? It seems that false beliefs about human beings from other races being biologically and psychologically inferior, or more animal-like, than fellow people were mainly to blame. Furthermore, in some areas, people still feel repugnance at the idea of interracial marriage. If professed justifications are anything to go on, then these feelings of repugnance seem to be based on false beliefs about what is “natural” or about some races being “purer” or otherwise “greater” than others (Turner 2004). Since repugnance that is based on false beliefs seems clearly mistaken, the following definition will be used for mistaken repugnance in this paper:

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3 See Kimberly (2002) and Niemela (2011) for further opposition to the wisdom of repugnance.
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*Mistaken repugnance* occurs when person X feels moral revulsion about thing T, but careful analysis finds that X’s moral revulsion about T is based on a false belief about T (such that, if X held sufficient true, and no false, beliefs about T, then X would not feel moral revulsion about T).

So, repugnance is revealed to be mistaken repugnance when further information about T, changes the way X feels about T in one of two ways. First, the morally charged aspect might disappear, while an amoral revulsion remains, such as when a child with no knowledge of modern medicine witnesses a surgery and then has it explained to them that the surgeons are helping and not torturing the patient. Or second, the whole feeling of revulsion might dissipate, such as when someone who finds interracial sex repugnant is tutored by and falls in love with a biology teacher from another race. Either way, the end results of mistaken repugnance (no revulsion or amoral revulsion) should not play any role in support of a new technology *not* being permitted.

Even when all of the relevant facts about the thing in question are known, unjustified repugnance might stall the moral debate about its permissibility. Cautioning against the wisdom of repugnance, Roache and Clarke (2009) have pointed out that using unjustified repugnance as an argument in a moral debate can stymie the discussion by making arguments without enough substance to object to. For (at least) this reason, repugnance should be investigated by those experiencing it to see if they can justify it. For the purposes of this paper, legitimate repugnance will be defined as follows:

*Legitimate repugnance* occurs when person X feels morally charged revulsion about thing T, and careful analysis using X’s moral framework finds T to be immoral.
Legitimate repugnance If people experiencing repugnance can (reasonably) justify it with their personal moral framework— their integrated set of moral beliefs— then, the repugnance should be considered legitimate and be given more weight in moral debates, especially if the justification is widespread. For example, if nearly everyone finds death pools repugnant, and reflection on their moral frameworks reveals that they find them immoral because of the way that they disrespect weighty matters of life and death, then there would be widespread legitimate repugnance about death pools. Given that there are few benefits from death pools that could not be sourced from elsewhere, the widespread legitimate repugnance about death pools seems to be enough to deem them immoral and therefore not permissible. If there is widespread legitimate repugnance about a new technology, then proponents of the new technology can try to argue in two ways. They might try to persuade all of the people experiencing legitimate repugnance that their moral framework is wrong and that a correct moral framework would not deem the new technology immoral. Or, they could try to show that other moral factors outweigh the repugnance—a strategy that is much more likely to be effective if the other moral factors are part of the moral framework of the people experiencing legitimate repugnance (discussed in more detail below).

But, the nature of our moral intuitions means that we will not always be able to justify our moral feelings, such as repugnance. People’s widespread inability to explain why they find Bjorklund, Haidt, and Murphy’s (2000) case of safe, harmless, consensual, and one-off brother-sister incest repugnant provides a good example of this. After considering the incest case and ruling out all of the potential reasons for why it could be morally objectionable, people are left with a feeling of repugnance but nothing in their personal moral framework that validates their emotional response. Given that most people don’t think that there is anything morally laudable about the brother-sister
incest, they are left trying to reconcile a strong moral feeling with what rationally appears to be an amoral act. For the purposes of this paper, this phenomenon will be referred to as dumbfounded repugnance.

Dumbfounded repugnance occurs when person X feels moral revulsion about thing T, but careful analysis using X's moral framework finds T to be amoral (or has nothing to say about T).

Kass, and many others with faith in the wisdom of repugnance, probably believe that their repugnance about the incest case carries more weight in the argument than their inability to find a fitting reason to morally condone or condemn the act. Indeed, without a strong argument for why the incest is morally praiseworthy, or why the repugnance is misguided, anyone siding with the wisdom of repugnance seems, epistemically speaking, reasonably entitled to do so. One benefit of allowing dumbfounded repugnance play this role in moral debate about new technologies is that it encourages proponents of the new technology to make a stronger and more explicit moral case for why the new technology should be permitted, thereby decreasing the chances of permitting a potentially dangerous new technology. Indeed, like an evolved precautionary principle, our ingrained propensity to be suspicious of (and occasionally undervalue) the unknown is likely to have been adaptive for precisely the same reason—it encourages us to cautiously investigate new and potentially beneficial things. Therefore, if dumbfounded repugnance about a new technology is widespread, then it should play the role of prima facie evidence against permitting the new technology. Of course, this should not signal the end of the debate because there are cases in which repugnance, even when it is widespread, is clearly not wise. Indeed, widespread dumbfounded repugnance should also be seen as a call to investigate the matter further. However, as Kass rightly argues, the onus now falls on the proponents of the new
technology to argue why the repugnance is mistaken. Proponents of the new technology might also argue why the widespread repugnance is legitimate but outweighed.

When people experiencing repugnance about a new technology are trying to justify it with their moral frameworks, and when they are considering arguments from proponents of the new technology, they might find that the new technology receives a mixed verdict from their moral framework. That is to say that they can see reasons why the new technology is immoral (why they might find it repugnant), but also reasons for why it would be morally good to permit it. Three kinds of mixed verdicts deserve closer attention, starting with counterbalanced repugnance.

Counterbalanced repugnance occurs when person X feels moral revulsion about thing T, but careful analysis using X’s moral framework finds T to be both immoral and morally good, and, all thing considered, X’s moral framework finds T to be morally neutral, or it does not pass a clear judgement on X.

Given that different kinds of moral reasons are not always easy for people to accurately weigh up, many people experiencing repugnance about a new technology may find themselves with counterbalanced repugnance. For example, a cancer researcher who believes that the sanctity of life begins at conception might feel that there are incommensurable moral reasons both for and against permitting research on embryonic stem cells. For this researcher, we could say that their repugnance is justified (by the sanctity of life concern), even though they might not have a clear overall moral judgment about the permissibility of embryonic stem cell research. Widespread counterbalanced repugnance about a new technology should be treated like widespread dumbfounded repugnance—it should play the role of prima facie evidence against
permitting the new technology and act as a call for further investigation on the part of the proponents of the new technology.

Another type of repugnance that receives a mixed verdict from a moral framework is mitigated legitimate repugnance.

*Mitigated legitimate repugnance* occurs when person X feels moral revulsion about thing T, and careful analysis using X’s moral framework finds T to be both immoral and morally good, and, all thing considered, X’s moral framework finds T to be immoral.

The cancer researcher from above might also decide that, although embryonic stem cell research could help relieve suffering and save lives, the sanctity of life and the moral rule not to kill are categorical moral rules that allow for no exception. As such, the researcher’s overall moral judgement would be that embryonic stem cell research is immoral. In most respects, widespread mitigated legitimate repugnance will play the same role as widespread legitimate repugnance—it should be given weight in moral debates about new technologies (and more weight than is given to dumbfounded repugnance).

The final type of repugnance that receives a mixed verdict from a moral framework is outweighed legitimate repugnance.

*Outweighed legitimate repugnance* occurs when person X feels moral revulsion about thing T, and careful analysis using X’s moral framework finds T to be both immoral and morally good, and, all thing considered, X’s moral framework finds T to be morally good.

Perhaps in a nearby possible world, the cancer researcher has a family history of several severe cancers and has children with a high chance of contracting cancer during their lives. The researcher still believes that harvesting embryos is morally repugnant
because it is killing a human life (so their repugnance is legitimate), but this time their moral framework allows for comparisons between the good of potentially curing cancer and the bad of killing. As a result, the researcher thinks that, all things considered, it should be morally permissible to conduct embryonic stem cell research. It should be noted that if the new technology is deemed immoral by the moral framework for the same kind of reason that it is deemed morally good, then being able to identify when repugnance is outweighed will be much easier. Any outweighed legitimate repugnance about a new technology should not count against the implementation of that technology in moral debate, unless there are similarly effective alternatives that do not do not elicit as much legitimate repugnance.

It should also be noted that people’s moral frameworks change over time, including as a consequence of moral argument or example (how many life-long moral vegetarians are there?). Any change in moral framework during the moral debate about a new technology should result in the new technology being reassessed using the varieties of repugnance defined above.

Although there are other varieties of repugnance,⁴ the above varieties provide a sufficient framework for assessing the impact that repugnance about betting on death should have on the moral permissibility of the three types of PM mentioned earlier. In

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⁴ *Conflicted repugnance* occurs when person X feels moral revulsion about thing T, but careful analysis using X’s moral framework finds T to be (only) morally good.

*Dominant repugnance* occurs when person X feels moral revulsion about thing T, but careful analysis using X’s moral framework finds T to be morally good, and X revises their moral framework (ensuring that T is deemed immoral) to accommodate their repugnance.

*Repugnance deficit* occurs when person X feels no revulsion about thing T, but careful analysis using X’s moral framework finds T to be immoral.
particular, it will be argued that any repugnance felt about PMs on medical diagnoses, epidemics, and terrorist attacks, is either mistaken, or legitimate but outweighed.

3. Prediction markets on medical diagnoses

CrowdMed ([www.crowdmed.com](http://www.crowdmed.com)) is a new online medical diagnosis prediction market that concerns some doctors (Hall 2013). People with undiagnosed and highly worrying illnesses pay CrowdMed $200 to reveal their personal medical histories to CrowdMed’s M.D.s (“medical detectives”). Anyone can join CrowdMed’s ranks of medical detectives in order to suggest diagnoses and bet on their own or other M.D.s’ suggestions. Upon hearing a brief description of what CrowdMed does, many will find it repugnant—the idea of strangers with no medical expertise suggesting diagnoses of the most painful and deadly kinds of cancer to vulnerable people is likely to elicit feelings of moral revulsion in many, if not most, people.

If people attempted to reconcile these initial feelings of repugnance with their moral frameworks, it is unlikely that they would experience dumbfounded repugnance since most of them would come up with at least one of the two following justifications after consulting their moral frameworks. First, they would likely claim that CrowdMed is repugnant because it recklessly encourages untrained traders to suggest high-stakes medical diagnoses to vulnerable people in a way that puts these people at risk of further emotional and physical damage (e.g., by not pursuing further professional medical advice). This would clearly violate the oath to do no harm taken by many doctors around the world. Second, they would likely claim that CrowdMed is repugnant because whether or not someone has a deadly form of cancer is a weighty life and death issue that should be treated with the utmost respect, not gambled on frivolously by curious strangers. A closer inspection of how CrowdMed works, however, reveals that any
repugnance felt about CrowdMed for these reasons is likely to be mistaken or legitimate but outweighed.

CrowdMed does rely on the verdicts of unscreened “medical detectives”, but not in a reckless way or a way that takes advantage of the vulnerable. The end result of medical detectives’ trading on CrowdMed is a short list of possible diagnoses (often of rare diseases) based on the medical detectives’ trading behaviour in the market. CrowdMed is explicit that these potential diagnoses should then be taken to a medical professional to discuss them and possibly arrange for the relevant diagnostic tests. So, CrowdMed does not steer its “patients” away from professional medical care. Indeed, people only tend to use CrowdMed after they come to realise that the medical professionals in their area cannot diagnose the problem. Furthermore, CrowdMed then immediately directs their patients back to professional medical experts.

CrowdMed is not a heartless business that preys on the vulnerable because they charge $200, either. CrowdMed refunds the $200 if none of the suggested diagnoses are correct, making patients’ use of CrowdMed financially guaranteed in some sense. Furthermore, if one of the suggested diagnoses is correct, then CrowdMed has likely saved the patient thousands of dollars in further medical examinations (not to mention the health benefits). CrowdMed claims to be highly accurate (see www.crowdmed.com/faq). Assuming CrowdMed is accurate, and considering the description of CrowdMed above, then any repugnance felt about CrowdMed because of a belief that it is reckless, or takes advantage of the vulnerable, is clearly mistaken. Indeed, the way in which CrowdMed’s prediction market on medical diagnoses to empower the vulnerable, rather than take advantage of them, makes it seem to be the opposite of reckless. Therefore, if people feel that CrowdMed is repugnant because it recklessly endangers vulnerable people, then their repugnance is most likely mistaken.
As discussed above, mistaken repugnance should not be used as a reason to argue against the permissibility of a new technology. So, repugnance based on the belief that CrowdMed recklessly endangers vulnerable people (even if it is widespread) should not be used as a reason to argue against the permissibility of CrowdMed since it is likely to be mistaken.

But even people who believe that CrowdMed’s prediction market on medical diagnoses seems to be beneficial to most patients, might still find the idea of betting on painful and deadly diagnoses repugnant because it does not appropriately respect that this is potentially a matter of life and death for the patient. CrowdMed's medical detectives could be betting for amusement or the glory of being the most accurate predictor—motives that are disrespectful considering that people’s lives are at stake. However, while someone using CrowdMed to suggest frivolous or offensive diagnoses is possible, it seems about as likely as someone treating a seriously ill patient frivolously or offensively in the other parts of the patient’s day-to-day life. For example, jaded doctors and other health professionals probably treat patient’s life and death matters frivolously and enjoy jokes at their expense regularly. Furthermore, CrowdMed has been designed to respect life and death in the best kind of way. Many patients are correctly diagnosed and then cured, ending their suffering and the suffering of their family and friends. Even the CrowdMed patients whose illnesses are diagnosed, but cannot be cured, have gained information that will allow them more control over their death and the final months of their lives than they would have otherwise had. Finally, the points that CrowdMed’s medical detectives win for correctly predicting diagnoses are cashed out, but the money goes to a charity that allocates it to a real patient (of the medical detectives’ choice) who needs financial support to treat their illness. So, the
aim and effect of CrowdMed is also respectful of matters of life and death because it aims to, and actually does, prevent suffering and preserve life.

So, it seems that the betting-on-matters-of-life-and-death aspect of CrowdMed is legitimately repugnant because it does not appropriately respect the lives and potential deaths involved. However, this legitimate repugnance seems to be outweighed by CrowdMed's high level of respect for the matters of life and death involved, not least by helping patients to cure their rare diseases. Assuming that respecting matters of life and death is the only widespread justification for legitimate repugnance about CrowdMed, it can be concluded that the only legitimate repugnance about CrowdMed is outweighed and therefore should not factor into the moral debate about the permissibility of CrowdMed unless there is a similarly effective alternative that is less legitimately repugnant. Given that CrowdMed was established to fill a hole in the existing field of health professionals, and that its strengths come from its unique crowd-sourcing methods, it seems unlikely that such an alternative currently exists.

Therefore, the two most plausible widespread justifications for the repugnance of CrowdMed are either mistaken or legitimate but outweighed. This means that the two most plausible widespread justifications for the repugnance of CrowdMed should not factor into the moral debate about the permissibility of CrowdMed. And therefore, assuming that there are no other plausible widespread justifications for its repugnance, CrowdMed seems morally permissible.

4. Prediction markets on epidemics and infectious diseases

The Iowa Electronic Health Markets (IEHMs; http://iehm.uiowa.edu/iehm/main/) is a website that allows anyone to set up their own health-related PM or to bet on the existing health-related predictions. Many of the markets are designed to promote
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betting on epidemics—on the spread and deadliness of viruses and other infectious diseases. For example, traders can bet on “What will be the level of 2009 H1N1 [(also known as Swine Flu)] influenza mortality rate in the U.S. by the end of July 31, 2009?” Since most of the markets run at the IEHMs are for “funny money” (status points) instead of real money, it seems fair to say that the IEHM encourages traders to bet on matters of life and death for the fun of it. Indeed, traders will be playing a betting game in which the real-life occurrence of mass death caused by a virus outbreak could help them win.

No doubt many people find the IEHMs repugnant, and, if they tried to justify those feelings using their moral frameworks, they would probably suggest that the IEHMs are crossing a moral boundary by failing to show appropriate respect for the lives and deaths of those who have been directly or indirectly affected by deadly disease. However, a strong argument can be put forward for the IEHMs being highly respectful of matters of life and death. The IEHMs website is a not-for-profit initiative with the goals of improving knowledge about prediction markets and especially making health-related predictions that help medical professionals better protect the health of people around the world (such as by providing information that enables the timely production and distribution of appropriate vaccines). Furthermore, initial reports (e.g., Polgreen, Nelson, & Neumann 2007; see also http://iehm.uiowa.edu/iehm/main/) suggest that PMs might be a very effective way to quickly identify the danger posed by new infectious diseases, and thereby enable a faster and more accurate response that could result in thousands of lives being saved. Since the IEHMs have the intention and

6 See http://iehm.uiowa.edu/iehm/content/faq/.
likely effect of saving lives, it seems as though they are treating the matters of life and
death to which they are relevant with a high level of respect. Again, certain individuals
might bet frivolously, with a lack of appropriate respect for those whose lives or deaths
have been affected by infectious disease. However, the likelihood of people with
frivolous intentions trading on the IEHMs seems low considering the minimal pay-offs
available compared to trading on the more popularist predictions available on real-
money for-profit PMs. So, while repugnance about the IEHMs based on the disrespect
some traders might show for the matters of life and death involved seems legitimate, it
also seems like a relatively small concern.

So again, the verdict is mixed: while the IEHMs do potentially lead to some
disrespecting of life and death, they also respect matters of life and death by preserving
life. The IEHMs seem morally similar to the example of the provision of health services
from above, in which the nature of the health services profession sometimes creates
jaded health professional whose frivolous behaviour can disrespect matter so life and
death, but that disrespect is outweighed by the way in which health professionals
usually have the intention and effect of respecting matters of life and death. Indeed, on
balance, the IEHMs seem to respect matters of life and death much more than they
disrespect them. But what if some people might think that the likely moral benefits of
the IEHMs are roughly equivalent to their legitimate repugnance? These people will be
experiencing counterbalanced legitimate repugnance and so their views are essentially
neutral in the moral debate about the permissibility of the IEHMs. Therefore, the
prospect of a minority of people experiencing counterbalanced legitimate repugnance
about the IEHMs can effectively be disregarded from the moral debate.

Therefore, assuming that respecting matters of life and death is the only
widespread justification for legitimate repugnance about the IEHMs, it can be concluded
that the only legitimate repugnance about the IEHMs is outweighed and therefore should not factor into the moral debate about the permissibility of the IEHMs unless there is a similarly effective alternative that is less legitimately repugnant. Furthermore, given that the IEHMs were established because they was thought to be able to gather and process data relevant for epidemics much faster and more cheaply than any other method available, and that funding for forecasting epidemics is limited, it seems unlikely that such an alternative currently exists. Therefore, despite their prima facie repugnance and the legitimate repugnance they elicit, the IEHMs seem morally permissible.

5. Prediction markets on terrorism

PMs on terrorism allow participants to trade stocks in predictions about terrorist attacks and other terrorism-related events. For example, a trader might purchase shares in the prediction that ‘there will be a terrorist attack in the United States using biological weapons during 2013’ because she thinks that is more likely to happen than the current price of shares for that prediction indicates. PMs on terrorism could be for the purpose of gathering information that might be useful for preventing terrorist attacks (intelligence-gathering PMs) or, like most existing PMs, they could be for the purpose of making money (for-profit PMs). Based on PMs impressive predictive performance in many domains, several authors have argued that intelligence-gathering PMs on terrorism could help intelligence and security agencies to predict, and thereby prevent, terrorist attacks (Hanson 2006; Looney 2004; Surowiecki 2004; Yeh 2006). The only government-backed intelligence-gathering PM on terrorism ever planned
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(named Policy Analysis Market, or PAM for short)\(^7\) was stopped dead in its tracks when politicians heard about the plan and decried it as “morally repugnant.”\(^8\) This sentiment was echoed by other politicians and in the media, effectively preventing any government seriously considering setting up intelligence-gathering PMs on terrorism again (Hanson 2006).

The repugnance felt about PMs on terrorism has been mainly justified in two ways. First, that PMs on terrorism will not be effective (i.e. they will not gather any information that would not have already been collected by security and intelligence agencies), making them a morally dubious waste of government resources. And second, that even if PMs on terrorism were effective, they would fail to appropriately respect matters of life and death because they encourage traders to bet on when and where deadly terrorist attacks will happen.

Claims that PMs on terrorism would not work are mainly based on the endogeneity problem faced by some kinds of markets (e.g., Stiglitz 2003, Richey 2005). Market prices are often used to ascertain the actual value of something because it is thought that the actual value of the thing in question sets the market price (in relation to extant supply and demand). For instance, the share price of a firm in a stock market should be set by the real-world value of the firm (in relation to extant supply and demand). The endogeneity problem occurs when the market price affects the thing in question, and often its actual value (Birchler & Facchinetti 2007). This kind of endogeneity can be problematic because it warps the incentives for trading in the market. Indeed endogeneity can sometimes warp the incentives to such an extent that

\(^7\) See Hanson (2007) for more details on PAM.

traders will avoid the market entirely. For example, Richey (2005) argues that if well-informed traders were very confident that a particular prediction about a terrorist attack was accurate, then the endogeneity of the market might dissuade them from buying shares in the prediction because buying shares in the prediction increases the price, and increasing the price will increase the chances that security and intelligence agencies will thwart the attack. Richey’s point is that, while well-informed traders would like to use their evidence of a planned attack to profit, the consequences of them investing in line with their evidence include decreasing the chance that their evidence is useful (that an attack will occur).

This is an important problem for PMs on terrorism, but several experts on PMs have argued that the right market controls will eliminate this and other perceived problems (Hanson 2006; Looney 2004; Pennock 2004; Surowiecki 2004). For example, conditional markets—in which all money is refunded if certain conditions are met—can at least mitigate the endogeneity problem caused by security and intelligence forces thwarting a terrorist attack, by making it known to traders that all bets are refunded in the case of thwarted attacks (Hanson 2006). There is not space to fully defend PMs on terrorism’s potential effectiveness here, but the success of PMs in other areas, and the continued interest security and intelligence researchers have shown in PMs (e.g., Weigle 2007; Yeh 2006) gives reason to believe that PMs on terrorism could probably be created.

If it’s true that PMs on terrorism could be effective, then any repugnance based on the belief that PMs on terrorism would not be effective is mistaken repugnance. Indeed, if people really found the idea of PMs on terrorism repugnant because they believed they would not work, then they should feel no repugnance if they come to believe that PMs on terrorism are effective. Assuming that intelligence-gathering PMs
on terrorism could probably be effective, then repugnance about PMs on terrorism justified by the claim that they won't work is probably mistaken and should, therefore, probably not factor into the moral debate about the permissibility of PMs on Terrorism. However, it should be noted that the for-profit PMs that have predictions on terrorist attacks are very unlikely to be effective and, therefore, might legitimately be considered repugnant for this reason.

Even if PMs on terrorism were effective, however, some people would still find them repugnant. Using their moral frameworks, the only plausible widespread justification for this repugnance is likely to be that PMs on terrorism are repugnant because they fail to appropriately respect the matters of life and death involved by encouraging traders to bet on when and where deadly terrorist attacks will happen. For example, Senator Hillary Clinton’s described PAM as “...a market in death and destruction, and not in keeping with our values” (Biever & Carrington 2003, no page), and in explaining his repugnance about PAM, Senator Ron Wyden claimed: “The federal government is encouraging people to bet on and make money from atrocities and terrorist attacks”.9

Again however, a strong argument can be made that this kind of PM actually shows very high levels of respect for matters of life and death. PAM and other intelligence-gathering PMs on terrorism aim to, and would likely have the effect of, respecting life in the most important way—by helping to thwart terrorist attacks and thereby protect innocent civilians from gruesome and unexpected early deaths. The bets of traders are necessary for PMs on terrorism to be effective, so they are an

indispensable part of a process that respects life by trying to help prevent atrocities. It is true that some individual traders may bet on predictions about terrorist attacks frivolously—without the requisite level of respect for the lives and potential deaths of those involved—but that is not necessarily sufficient to make PMs on terrorism all-things-considered immoral. Consider that frivolous people commit acts of vandalism and make disrespectful jokes when at memorials for terrorist attacks, and that they would not committed those acts of vandalism of have made such jokes if the memorials were never built. Those acts of vandalism and jokes fail to show the appropriate level of respect for the relevant matters of life and death, but on balance the memorials show a very high level of respect for matters of life and death because they solemnly encourage us to remember and consider the causes and effects of the tragic event that they memorialise. It is similar for PMs on terrorism. Despite the frivolous attitude some traders may have when placing bets on terrorist attacks, on balance PMs on terrorism show a high level of respect for life and death because they intend to, and are likely to have the effect of, helping to prevent deadly terrorist attacks.

So, repugnance about PMs on terrorism because they encourage betting on matters of life and death seems to be legitimate as it fits well with most people’s moral frameworks. However, intelligence-gathering PMs on terrorism also have the overall intention to and the likely effect of strongly respecting the associated matters of life and death. Indeed, this strong respecting of matters of life and death seems to outweigh the legitimate, but less significant, problem of disrespecting matters of life and death by encouraging traders to bet on them. Of course, it is possible that a few people might think that the likely benefits of PMs on terrorism are morally relevant, but not significant enough to outweigh their legitimate repugnance. These people will be experiencing mitigated legitimate repugnance and would likely argue that their
repugnance should be taken seriously in the moral debate about the permissibility of PMs on Terrorism. And so they should, but those views would likely be outnumbered by the majority view that PMs on terrorism would, on balance, show more respect for matters of life and death than disrespect.

Since the legitimate repugnance about PMs on terrorism’s disrespecting matters of life and death by encouraging traders to bet on terrorist attacks is likely to be outweighed by the ways in which PMs on terrorism show high levels of respect for matters of life, this kind of repugnance should not be used a reason to argue against the permissibility of PMs on terrorism, even if that repugnance is widespread. The only notable exception to this conclusion would be if there were a similarly effective alternative to PMs on terrorism that did not arouse any repugnance at all. Given that most intelligence-gathering involves some aspects that people find repugnant (e.g., violating people’s privacy, lying, stealing, and torture), it is unlikely that a different intelligence-gathering technique could harness the untapped wisdom of the crowds for anti-terrorism purposes without inducing at least a similar amount of repugnance.

Therefore, since the repugnance felt about PMs on terrorism is likely to be either mistaken or legitimate but outweighed, the two main candidate justifications for why PMs on terrorism are repugnant should probably not factor into the moral debate about the permissibility of PMs on Terrorism. And, given their potential benefits, effective intelligence-gathering PMs on terrorism should be deemed morally permissible.

6. Conclusion and Implications

Widespread repugnance (morally charged revulsion), has been used as an argument in debates about the morality of new and potential technologies (e.g., Kass 1998). But widespread repugnance can be mistaken, such as when it is based on false beliefs, which
makes it inappropriate for use as an argument against the permissibility of a new technology. Even widespread fully informed legitimate (successfully justified) repugnance should not play much, if any, of a role in such moral debates if it can be shown that those who are experiencing the legitimate repugnance also think that (based on their moral frameworks) the new technology is morally good in a manner that outweighs the repugnance. Precisely these versions of repugnance (mistaken and outweighed legitimate repugnance), were used to argue that any widespread repugnance felt about three kinds of betting on death facilitated by PMs was likely to be inappropriate to use as an argument against permitting their implementation.

Repugnance about the PM for medical diagnoses, CrowdMed, was argued to be either mistaken or legitimate but outweighed, since CrowdMed did not recklessly endanger patients’ lives and, on balance, treated matters of life and death with a high level of respect. Repugnance about the PM for epidemics and infectious diseases, the IEHMs, was argued to be legitimate but outweighed since, on balance, the IEHMs treated matters of life and death with a high level of respect. Repugnance about intelligence-gathering PMs on terrorism, such as PAM, was argued to be either mistaken or legitimate but outweighed because it is likely that PMs on terrorism will be effective and that, on balance, they would treat matters of life and death with a high level of respect.

Given that these new and potential kinds of PMs could prevent thousands from suffering and save thousands of lives (such as by helping to diagnose rare illnesses, respond more quickly to potential outbreaks of infectious diseases, and prevent terrorist attacks), misguided barriers to their implementation and use are effectively bringing suffering and death to innocent people. The implications for individuals and governments could not be clearer; even widespread repugnance about new initiatives should be considered a reason to delve further into the moral issues involved, not to
abandon potentially useful technologies that could help us show the highest level of respect for matters of life and death by helping to save the lives of innocent people who do not want to die.

**References**


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