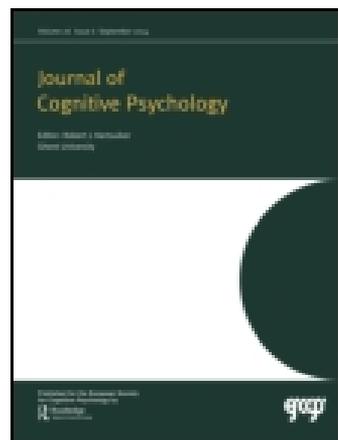


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Trait psychopathy and utilitarian moral judgement: The mediating role of action aversion

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Although past research has established that the utilitarian bias (increased willingness to agree to personally kill someone for the greater good) in psychopathy on moral dilemmas stems from weaker negative affect at the prospect of harming others due to reduced harm aversion, it remains to be seen if this is owing to reduced aversion to witnessing harmful outcomes (outcome aversion) or performing harmful actions (action aversion). In this study, we show that trait psychopathy is associated with both reduced outcome and action aversion and that only action aversion negatively mediates the influence of trait psychopathy on utilitarian moral judgement. Thus, the increased tendency in psychopathy to make utilitarian moral judgements is in part due to reduced aversion to carrying out harmful actions.

Keywords: Action aversion; Empathy; Harm aversion; Psychopathy; Utilitarianism.

Moments like this require someone who will act.
Who will do the unpleasant thing, the necessary
thing. (Frank Underwood, *House of Cards*, 2013)

Imagine the so-called footbridge dilemma (Thomson, 1985) where a trolley speeding down the track threatens to kill five people if nothing is done. You can save these people by pushing a large person standing next to you off of a footbridge to his death so that his weight would stop the trolley on collision. In such a situation, agreeing to sacrifice one to save many is said to be a utilitarian choice because utilitarianism (Mill, 1863/1998) entails that only consequences of moral actions matter and consequences which

lead to maximisation of well-being for maximum number of agents ought to be preferred. On the other hand, the school of deontology evaluates actions based not just on consequences but also the actions themselves and forbids those actions that transgress some universal rights, duties, and obligations (Kant, 1785/2005). Thus, deontology forbids using individuals as a means to achieve the greater good. From a psychological point of view, the interesting question is what kind of personality traits would predispose an individual to accomplish this necessary evil for the greater good? We will explore this question by studying a personality trait that is well known to be associated with utilitarian bias, namely psychopathy.

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1.1. Dual-process model of moral judgement

Recent research with moral dilemmas like the footbridge dilemma has led Joshua Greene and colleagues (Greene, 2007; Greene et al., 2009; Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Greene, Nystrom, Engell, Darley, & Cohen, 2004; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Shenhav & Greene, 2014) to formulate the dual-process model of moral judgements which posits two sets of computational processes that underlie moral decision-making: (1) emotional intuitions that arise in response to the aversive nature of personal harm that such dilemmas feature and subserve deontological responses; (2) conscious, deliberative processes that engage in cost-benefit analysis and support the utilitarian solution. This model reasons that because dilemmas like the footbridge dilemma feature emotionally aversive harm carried out in a personal manner (referred to as “personal moral dilemma”), most people would face a stronger cognitive conflict and decline to endorse utilitarian solutions on these dilemmas. This is exactly what is observed (Cushman, Young, & Hauser, 2006; Gleichgerrcht & Young, 2013; Greene et al., 2001, 2004, 2008, 2009; Hauser, Cushman, Young, Jin, & Mikhail, 2007; Mikhail, 2007). Additionally, it also maintains that dilemmas with less emotionally salient harm carried out in an impersonal manner (called as impersonal moral dilemma) would lead to a relatively weaker cognitive conflict and most people would find utilitarian solution acceptable for such dilemmas. One example of such dilemma would be the Standard Fumes dilemma (Greene et al., 2004) where toxic fumes in a hospital threaten to kill five patients in one room and can be diverted, by pressing a switch, to another room where there is just one patient. Indeed, most people agree that the best course of action in such impersonal moral dilemmas is sacrificing one to save many (Cushman et al., 2006; Gleichgerrcht & Young, 2013; Greene et al., 2001, 2004, 2008, 2009; Hauser et al., 2007; Mikhail, 2007). Note that the dual-process model posits two independent processes that contribute to the final moral judgement and they are not inversely proportional to each other (Conway & Gawronski, 2013). What this means is that someone can endorse utilitarian solution on personal moral dilemma either because she has predilection for enhanced cognitive deliberation (for a nuanced analysis, see Royzman, Landy, & Leeman, 2014)

or because she has reduced negative emotional reaction to the prospect of harming someone personally. Although previous research shows that both of these routes are taken when people make utilitarian moral judgements, in this study, we will exclusively focus on the path of reduced negative affect since it is more relevant for studying utilitarian bias in psychopathy. We will return to the enhanced deliberation path in the Section 4 when we explore alternative interpretations.

1.2. Reduced negative affect and utilitarian moral judgements

There is converging evidence to support the claim that when people contemplate personal moral dilemmas like the footbridge dilemma, they experience reflexive, prepotent negative emotional responses (for a review, see Miller & Cushman, 2013) stemming from a deep-seated human aversion to harming others (Haidt & Joseph, 2004). Neuroimaging studies show that brain regions involved in emotional processing are more active when people face personal moral dilemmas (Greene et al., 2001, 2004; Shenhav & Greene, 2014) and increased skin conductance activity (Moretto, Lådavas, Mattioli, & di Pellegrino, 2010; also see Patil, Cogoni, Zangrando, Chittaro, & Silani, 2014), which indexes arousal of the autonomic nervous system, also attests to this fact. Additionally, people are consciously aware of this emotional arousal when they contemplate personal moral dilemmas and report being more aroused on self-report measures (Szekely & Miu, 2014). Although this evidence corroborates the role of reduced negative affect in utilitarian moral judgements, a more nuanced analysis is in order because negative affect can derive from two different psychological mechanisms, namely outcome and action aversion which respectively stem from victim and agent perspective-taking (Cushman, Gray, Gaffey, & Mendes, 2012; Hannikainen, Miller, & Cushman, 2015; Miller, Hannikainen, & Cushman, 2014). Therefore, it needs to be determined which of these sources are responsible for reduced negative affect that underlies increased utilitarian tendencies. We will discuss the origin of and evidence for each of these sources in turn.

1.2.1. Outcome aversion

Moral condemnation of harmful behaviour can arise from the consideration of the harmful outcomes because harmful actions clearly target a victim. Empathising with the victim can lead to personal

distress in the observer, which motivates the observer not to carry out such actions and also to condemn such actions when carried out by others (Pizarro, 2000). In other words, when observers engage in mental simulation of situations featuring harmful actions, taking the perspective of the *victim* can lead them to be apprehensive of victim distress (and vicarious experience of that distress) and to their condemning the behaviour of those responsible for this negative outcome. Thus, according to the outcome aversion model, people refuse to endorse utilitarian moral judgements in personal moral dilemmas because they take into account the suffering and pain that such action would elicit in the proximal victim, e.g., death of the man that needs to be sacrificed in the footbridge dilemma. There is plenty of evidence to show that reduction in empathic response can increase the likelihood of utilitarian response for personal moral dilemmas.

Meta-analysis of brain imaging studies show that moral cognition recruits a relatively small subset of the brain areas (as compared to the theory of mind network) involved in empathy (Bzdok et al., 2012) and damage to these areas results in aberrant empathic skills and moral judgements. Those patient populations with developmental- and adult-onset ventromedial prefrontal cortex (vmPFC, a brain region essential for proper emotional processing) lesion and frontotemporal dementia (bvFTD, which also results in deterioration of prefrontal cortex) are well known for their emotional and empathic dysfunctions (e.g., see Mendez, 2009). Both of these populations show elevated levels of utilitarian moral judgements on personal moral dilemmas (Chiong et al., 2013; Ciaramelli, Muccioli, Làdavas, & di Pellegrino, 2007; Gleichgerrcht, Torralva, Roca, Pose, & Manes, 2011; Koenigs et al., 2007; Mendez, Anderson, & Shapira, 2005; Schroeter, Bzdok, Eickhoff, & Neumann, 2014; Taber-Thomas et al., 2014) as compared to brain-damaged and neurotypical control populations. This is arguably due to reduced prosocial concern for welfare of others and callous unemotionality, as shown by reduced autonomic arousal in vmPFC lesion patients (Moretto et al., 2010) and reduced emotional empathy on self-report measures in bvFTD patients (Gleichgerrcht et al., 2011) when endorsing utilitarian moral judgement on personal moral dilemmas. People who score highly on trait emotional empathy also show a reduced tendency to endorse personal harms as morally acceptable and resort to deontological responses (Choe & Min, 2011), whereas self-reported low scores on dispositional empathic

concern (which gauges individual's propensity to experience feelings of warmth, compassion, and concern for other people) predict higher proportion of utilitarian moral judgements (Gleichgerrcht & Young, 2013; Jack, Robbins, Friedman, & Meyers, 2014; McIlwain et al., 2012; Miller et al., 2014; Patil & Silani, 2014). Making people emotionally more averse to perceived harmful acts by pharmacologically enhancing serotonin levels in the brain lessens the frequency of decisions that endorse utilitarian ends and, more interestingly, this effect is more prominent for people scoring higher on empathy (Crockett, Clark, Hauser, & Robbins, 2010).

Thus, one source of negative affect is the extent to which you find it personally upsetting to think about the suffering in victim who needs to be sacrificed in order to achieve the greater good. Reduction in this source of negative affect can predispose people to approve utilitarian moral judgements.

1.2.2. Action aversion

Another source of negative affect that drives moral condemnation of harmful behaviour stems from aversion to harmful actions themselves without further considering outcomes (Crockett, 2013; Cushman, 2013; Miller & Cushman, 2013; Miller et al., 2014). Blair and colleagues offer a developmental framework of morality to explain how we acquire aversion to performing harmful actions (Blair, 1995, 2007, 2013; Blair, White, Meffert, & Hwang, 2013). According to this model, humans (like other social animals) innately find distress cues (facial expressions, body posture, prosody denoting pain, sadness, fear, etc.) in conspecifics aversive because by virtue of empathy (a cognitive ability to correctly identify distress cues in others and experience an affective state which is not necessarily isomorphic, e.g., one can feel pain when perceiving pain in others or feel concern for them), this leads to aversive arousal in the observer. With aversive conditioning involving distress cues as "social punishment" (unconditioned stimulus), mental representations of actions that lead to such distress cues come to be associated with aversive reinforcement in the form of negative emotional arousal even in the absence of any distress cues. Consequently, the mere thought of performing harmful actions (conditioned stimulus) induces negative affect and leads to behavioural suppression. Thus, according to the action aversion model, a proper recognition of distress cues (e.g., correct identification of sad

and fearful facial expressions) and empathic response to these cues are necessary to developmentally acquire harm norms (Blair et al., 2013) but once these norms are acquired, the sensorimotor and perceptual properties of the actions or categorical descriptions of harmful actions (Miller et al., 2014) are sufficient to trigger a negative emotional response. It needs to be noted that actions are associated with aversive arousal only in certain contexts or states depending on the learned values from instrumental conditioning associated with those actions in the past, e.g., pushing a person is aversive but pushing a door is not (Crockett, 2013). It also needs to be mentioned that individuals need not engage in such harmful behaviours first-hand for stimulus-reinforcement learning to associate negative values to canonically harmful actions; these can also be learned via observation and simulation (Miller & Cushman, 2013).

Thus, on the action aversion model, when people think about personal moral dilemmas where they have to imagine carrying out harmful actions, they put themselves in the shoes of the *agent* and mentally simulate actions that have aversive reinforcement history associated with them which leads to increased negative arousal. This motivates them to condemn such actions and resort to non-utilitarian moral judgements. Indeed, people who show increased psychophysiological aversive reactivity to carrying out simulated harmful actions (e.g., thrashing a realistic-looking baby doll) find utilitarian moral actions to be less acceptable (Cushman et al., 2012). People with greater scores on trait harm avoidance show suppressed corticospinal excitability selectively when they simulate an agent's immoral actions (e.g., stealing a wallet) versus non-moral actions (e.g., picking up a notepad; Liuzza, Candidi, Sforza, & Aglioti, 2014). Greene and colleagues (2009) also show that people find utilitarian trade-offs more aversive not because of spatial proximity or physical contact with the victim, but because the agent intentionally uses muscular force to push the victim. This underscores the importance of simulation of agent's motor behaviour and goals (action aversion) over victim suffering (outcome aversion) when condemning harmful actions. People show increased arousal when performing pretend harmful actions in a "typical" way (e.g., pulling the trigger of the gun with a finger) as compared to when the same actions are performed in an "atypical" manner (e.g., pulling the trigger of the gun using a string). Although both are harmful

actions and are supposed to produce equally harmful "imagined" outcomes, one is found to be more aversive than the other due to sensorimotor properties of typical actions which have commonly been associated with aversive reinforcement in the past (Cushman & Dillon, 2015). An elevated level of action aversion on self-report measures also predicts a reduced tendency to endorse utilitarian moral judgements on both impersonal and personal moral dilemmas (Miller et al., 2014). Also, people who report themselves as more focused on actions than outcomes when deciding on moral appropriateness of harmful behaviour and who prefer taking perspective of the agent (over that of the victim) when judging third-party harmful behaviours condemn utilitarian course of action more (Hannikainen et al., 2015). Finally, people exhibit more autonomic arousal when they *act* to sacrifice one person for the greater good of saving five lives than when they *omit* to act and let the same outcome materialise (Navarrete, McDonald, Mott, & Asher, 2012). Taken together, these findings demonstrate that certain canonically violent actions are imbued with an aversive arousal independent of any consideration of harm.

Thus, action aversion arising from taking the perspective of the agent who needs to sacrifice one individual for the benefit of many is another source of negative affect. Diminution in the capacity to experience this negative affect (due to improper moral development) can prompt people to approve utilitarian moral judgements.

1.3. Psychopathy and utilitarian moral judgements

After discussing sources of negative affect that portray utilitarian options on personal moral dilemmas in a negative light, we now turn to a personality trait which is associated with increased utilitarian tendencies, namely psychopathy. Both incarcerated, clinical psychopaths (Koenigs, Kruepke, Zeier, & Newman, 2012; but see Rosas & Koenigs, 2014) and non-incarcerated, subclinical individuals with psychopathic tendencies show a preference for utilitarian solutions on emotionally aversive moral dilemmas (Arvan, 2013; Bartels & Pizarro, 2011; Djeriouat & Trémolière, 2014; Gao & Tang, 2013; Glenn, Koleva, Iyer, Graham, & Ditto, 2010; Kahane, Everett, Earp, Farias, & Savulescu, 2015; Langdon & Delmas, 2012; McIlwain et al., 2012; Seara-Cardoso, Dolberg, Neumann, Roiser, & Vid-ing, 2013; Tassy, Deruelle, Mancini, Leistedt, &

Wicker, 2013). We acknowledge that there are other studies with clinical/incarcerated psychopaths (Cima, Tonnaer, & Hauser, 2010; Pujol et al., 2012) and community samples (Glenn, Raine, & Schug, 2009; Seara-Cardoso, Craig, Roiser, McCrory, & Viding, 2012) which do not find any such association, but this has been argued to be due to differences in the type of question (judgement versus choice of action) asked (Tassy et al., 2013), inherent heterogeneity in the clinical psychopathy group and lenient criteria for identifying criminal psychopaths (Koenigs et al., 2012), lack of “true” (high-scoring) psychopaths (Psychopathy Checklist-Revised scores > 34; Borg & Sinnott-Armstrong, 2013), treating a dimensional construct in a categorical manner (Langdon & Delmas, 2012), insufficient sample size (Glenn et al., 2010) with high variance (Cima et al., 2010), lack of standardised moral dilemma battery (Rosas & Koenigs, 2014), and variability in the scales used to assess psychopathy.

It has been argued that this increased utilitarian bias in trait psychopathy is due to reduced harm aversion (Bartels & Pizarro, 2011). Accordingly, an elevated level of psychopathy is associated with reduced neural activity in the amygdala (Glenn, Raine, & Schug, 2009) which tracks perceived emotional aversiveness of harmful actions in moral dilemmas (Shenhav & Greene, 2014) and reduced self-reported emotional difficulty at a behavioural level (Seara-Cardoso, Craig, et al., 2012) when people contemplate personal moral dilemmas. Thus, psychopathic individuals do not find moral dilemmas with emotionally salient harm to be as morally repugnant as normal individuals do. But it remains unclear if this is attributable to reduced negative affect based in outcome aversion or action aversion or both. Below we review the evidence from past studies which bolsters the claim that reduced empathic aversion is responsible for utilitarian moral judgements in psychopathy.

1.3.1. Reduced outcome aversion in psychopathy and utilitarian moral judgements

Lack of empathy is the core characteristic of psychopathic personalities, especially the callous-unemotional component of psychopathy which distinguishes psychopaths from other antisocial personality types (Blair, 2013). There is overwhelming evidence for empathic deficits associated with psychopathy in both clinical, incarcerated and community adult and youth

populations (for a review, see Blair, 2013; Marsh, 2014). We will briefly review some key findings.

1.3.1.1. Psychopathy and affective empathy. Primary psychopathy is associated with reduced ability to experience others' emotions and pain, in an isomorphic manner (affective empathy). For instance, elevated levels of trait psychopathy are associated with weaker affective response to fearful faces and happy stories (Seara-Cardoso, Craig, et al., 2012; Seara-Cardoso, Dolberg, et al., 2013) and reduced affective resonance with others' emotions in general (Lockwood, Bird, Bridge, & Viding, 2013; Seidel et al., 2013). Psychopathy is associated with inappropriate empathic response to the emotional display of others, for instance, both subclinical and forensic psychopathic personalities report feeling more positive affect when looking at sad and fearful faces and report more negative valence when looking at happy faces (Ali, Amorim, & Chamorro-Premuzic, 2009; Wai & Tiliopoulos, 2012). They are especially impaired on recognising the facial expression conveying fear (for meta-analytic evidence, see Marsh & Blair, 2008) which is one of the most important distress cues in aversive conditioning. Among the Dark Triad of socially aversive personalities (Machiavellians, narcissists, and psychopaths), psychopathy is a unique predictor of impaired affective empathy skills (Jonason & Krause, 2013; Wai & Tiliopoulos, 2012). On a self-report measure of empathy, psychopathic individuals report reduced emotional empathy in general (Jonason, Lyons, Bethell, & Ross, 2013) and in particular, reduced feelings of compassion and sympathy for the unfortunate others, also known as empathic concern (Glenn, Raine, & Schug, 2009; McIlwain et al., 2012; Seara-Cardoso, Craig, et al., 2012; Seara-Cardoso, Dolberg, et al., 2013). At a neural level, adult criminal psychopaths (Decety, Skelly, & Kiehl, 2013) and children with high levels of callous-unemotional traits (Jones, Happe, Gilbert, Burnett, & Viding, 2010; Lockwood et al., 2013; Marsh et al., 2013) display reduced brain activity in empathy circuits (primarily anterior insula and anterior cingulate cortex) when viewing stimuli featuring others experiencing pain. Individuals with higher levels of psychopathy also show reduced psychophysiological arousal in response to others' distress (Anastassiou-Hadjicharalambous & Warden, 2008a; Blair, 1999; Blair, Jones, Clark, & Smith, 1997).

1.3.1.2. Psychopathy and cognitive empathy. In addition to affective empathy, psychopathy is also associated with dysfunctional cognitive empathy (also known as affective theory of mind), which is

an ability to correctly identify others' feeling states (e.g., emotion, pain, etc.) without necessarily experiencing them. This association has been found, at behavioural level, in adult forensic psychopaths (Shamay-Tsoory, Harari, Aharon-Peretz, & Levkovitz, 2010; Brook & Kosson, 2012; but see Richell, Mitchell, Newman, Leonard, Baron-Cohen, & Blair, 2003), in callous-unemotional children (Anastassiou-Hadjicharalambous & Warden, 2008b), and in subclinical psychopathic individuals (Jonason & Krause, 2013; Wai & Tiliopoulos, 2012).

1.3.1.3. Psychopathy and cognitive theory of mind. In contrast to deficits in cognitive and affective empathy, psychopathy is *not* associated with reduced cognitive theory of mind ability, which represents the capacity to encode mental states (e.g., beliefs, desires, intentions, etc.) of others. This lack of association has been found in criminal psychopaths (Blair et al., 1996), children with high callous-unemotional traits (Anastassiou-Hadjicharalambous & Warden, 2008b; Jones et al., 2010; O'Nions et al., 2014), and subclinical psychopathic personalities (Lockwood, Bird, et al., 2013). This fits with the manipulative nature of psychopathy, which requires them to be good at reading the inner states of others' so that this sensitive information can subsequently be used to formulate an exploitation strategy (Wai & Tiliopoulos, 2012).

Given the role of reduced empathy in promoting utilitarian moral judgements (see Section 1.2.1), we can thus expect that one source of utilitarian bias in psychopathy must be reduced empathy for the victim that needs to be sacrificed. Accordingly, an fMRI study shows that these increased utilitarian dispositions in psychopathy are due to reduced activity in the subgenual anterior cingulate cortex (Wiech, Kahane, Shackel, Farias, Savulescu, & Tracey, 2013), which is implicated in empathic concern for others. Empathic concern is a prototypical moral emotion that motivates evolutionarily acquired moral intuitions about protecting physical integrity of others and being apprehensive of any actions that result in harm to others. Indeed, higher levels of trait psychopathy are associated with reduced endorsement of moral norms about harm (Aharoni, Antonenko, & Kiehl, 2011; Glenn, Iyer, Graham, Koleva, & Haidt, 2009), and this association is negatively mediated by self-professed empathic concern for others (Glenn, Iyer, et al., 2009). Furthermore, this inability to be concerned about moral norms about harm mediates the increased utilitarian resolution in psychopathy

(Djeriouat & Trémolière, 2014). In other words, reduced empathic concern leads to decline in perceived significance of harm norms which in its turn facilitates utilitarian moral judgements. Additionally, another behavioural study shows that justifications given by psychopathic personalities for utilitarian moral judgements tend to be removed from any empathic discourse (assessed by frequency of emotional words like "pain" and "sad") about victim suffering and feature less personal distress (McIlwain et al., 2012), e.g., justifying the choice to sacrifice the fat person in the footbridge dilemma one psychopathic character wrote: "The large person will probably die of diabetes anyway".

To summarise, past research supports the claim that reduced negative affect stemming from empathic aversion leads to a more markedly utilitarian moral profile in trait psychopathy.

1.3.2. Reduced action aversion in psychopathy and utilitarian moral judgements

Previously (Section 1.2.2), we discussed how the normal course of moral development cultivates action aversion and the crucial role outcome aversion plays in acquiring it. Here we explore what implications reduced empathy has for moral development of harm norms in psychopathy. During normal moral development, the amygdala is engaged in stimulus-reinforcement learning which associates representations of actions and objects which lead to distress cues in others (fear, sadness, etc.) with punishment in the form of these distress cues. These aversive reinforcement associations are then represented in vmPFC as expected action values and are accessed by decision-making systems, including moral decision-making systems, to prevent individuals from engaging in harmful actions (Blair, 2007, 2013). In short, the amygdala equips individuals to *learn* goodness and badness of actions and vmPFC *represents* this expected value information to inform moral decision-making (cf. Decety, Michalska, & Kinzler, 2012). Because psychopathy is associated with a hypoactive amygdala, this has deleterious effects on processing distress cues in others (see Section 1.3.1) and aversive unconditioned stimuli like fearful or sad facial expressions cannot condition mental representation of contextualised motor plans with aversive reinforcement values. Consequently, in psychopathy, the aversive value of harmful transgressions is not learned due to decreased amygdala responsiveness. The amygdala then cannot feed-forward to the vmPFC the

expected reinforcement contingencies, e.g., anticipated punishment in the form of distress in the victim or anticipated reward in the form of positive facial expression (e.g., happiness), which usually guides healthy individuals away from harmful actions. Additionally, psychopathy is associated with diminished functional connectivity between amygdala and vmPFC at rest (Motzkin, Newman, Kiehl, & Koenigs, 2011). Thus, a neurobiological model of psychopathy predicts that trait psychopathy will be linked to a reduced aversion to carrying out harmful actions due to impaired aversive conditioning (e.g., see Rothmund et al., 2012) owing to dysfunctional amygdala, vmPFC, and their interaction.

Although aversion to harmful actions has not been studied at depth in psychopathy at a self-report level, some earlier studies do provide hints. For instance, neuroimaging studies have shown that neural activity in the amygdala indexes the perceived aversiveness of harmful actions (Luo et al., 2006; Shenhav & Greene, 2014) and increased amygdala–vmPFC connectivity varies with the extent to which this emotional aversion contributes to final integrative moral judgement (Shenhav & Greene, 2014). Also, imagining being the agent who intentionally harms others or exhibits aggressive behaviour towards a violent assailant elicits increased activity in vmPFC (Decety & Porges, 2011; King, Blair, Mitchell, Dolan, & Burgess, 2006). In light of these findings and given the discussion so far, we would expect individuals high on trait psychopathy to show reduced activity in these key regions for harm-related morality. Indeed, psychopathic youths with conduct disorder show reduced functional connectivity between the amygdala and vmPFC when making judgements about the legality of actions (legal: *help*, *comfort*, etc.; illegal: *steal*, *hurt*, etc.; Marsh et al., 2011). They show the inverse of what is observed in a healthy comparison group. Higher scores on psychopathy are also associated with aberrant amygdala activity when rating severity of violent moral transgressions (C. L. Harenski, Edwards, K. A. Harenski, & Kiehl, 2014; C. L. Harenski, K. A. Harenski, Shane, & Kiehl, 2010) and when contemplating about emotionally aversive moral dilemmas (Glenn, Raine, & Schug, 2009). Psychopaths also judge actions (framed in first-person) that cause fear in others (e.g., “I could easily hurt you”) to be more morally acceptable (Marsh & Cardinale, 2012) and show reduced activity in right amygdala when making these judgements (Marsh & Cardinale, 2014). At a

behavioural level, violent psychopaths exhibit less of an association between violent actions and unpleasantness and peaceful actions and pleasantness as compared to non-violent psychopaths (Gray et al., 2003). Another recent behavioural study shows that psychopathic adults have reduced harm aversion for both the self and others, as assessed by the amount of money they were ready to forgo in order to reduce the number of shocks delivered to the self and others (Crockett, Kurth-Nelson, Siegel, Dayan, & Dolan, 2014).

Thus, prior evidence suggests that improper development of care-based morality renders trait psychopathy less adept in representing the appropriate valence (goodness or badness) of actions,¹ and this has implications for the way they make moral judgements.

We would thus expect that trait psychopathy will be associated with reduced action aversion in addition to reduced outcome aversion. Additionally, we expect that when psychopathic individuals mentally simulate personal moral dilemmas and take the perspective of the agent, they would experience less arousal in response to performing the required sacrificial action. Thus, reduced action aversion can be expected to mediate the link between psychopathy and utilitarian moral judgements. No previous study has explored the role of action aversion in promoting a utilitarian bias in psychopathy.

1.3.3. Current study

To summarise the discussion so far, reduced harm aversion due to deflated empathic concern for the victim and/or due to impaired aversion to performing harmful actions can lead people to make utilitarian moral judgements about emotionally aversive moral dilemmas where the agent needs to sacrifice the victim in a personal manner. Psychopathy is linked with impaired empathic skills and a utilitarian bias. Previous research sheds light on the mediating role of empathic deficits in the psychopathy–utilitarianism association. In this study, we explore whether psychopathy also exhibits reduced action aversion and, if so, what role action aversion plays in elevated affinity in psychopathy for utilitarian moral judgements.

¹Although it needs to be mentioned that adolescents with psychopathic traits do not differ from control population in terms of how moral valence of an action affects its perceived intentional status; they deem immoral actions to be more intentional than neutral and moral actions (Cardinale et al., 2014).

2. METHODS

2.1. Participants

Four hundred and four (259 women) Italian-speaking participants between the ages of 18 and 60 ($M = 23.83$, 95% CI [23.33, 24.41]) voluntarily logged on to fill out a web survey. The survey web page was promoted through discussion on online forums, social networking, and word of mouth.

2.2. Measures and procedure

All participants gave informed consent before starting the survey. They then progressed through a series of self-report measures that assessed variables of interest and answered two moral dilemmas (one impersonal and one personal). Since we were not interested in studying transfer effects between dilemmas, the order in which participants completed the various questionnaires was randomised across participants but the order of moral dilemmas was fixed such that personal moral dilemma always succeeded the impersonal moral dilemma (e.g., Wiegmann & Waldmann, 2014). There was no time limit to answer any of the questionnaires or dilemmas. All the questionnaires and dilemmas provided were in Italian and the translated documents are available upon request to the author.

2.2.1. Action and outcome aversion

To assess two different types of aversions, namely aversion to harmful outcomes and harmful actions, we used slightly modified version of the action/outcome aversion questionnaire designed by Miller et al. (2014). This questionnaire (see [Supplementary Text S1](#)) operationalizes aversion as the extent to which people find it upsetting to *perform* pretend harmful actions or to *witness* harmful outcomes or to *experience* certain unfortunate events. There are five action items (e.g., “How much would it upset you to hold an empty gun, which both you and your friend know is empty, to your friend’s head and pull the trigger?”) and five outcome items (e.g., “How much would it upset you to listen to somebody have a tooth pulled when there is no anaesthetic available?”). These were interspersed amongst nine control items (e.g., “How much would it upset you if you lose electrical power to your home for a day?”). Items were rated using a 7-point Likert scale (1: *not at all*, 7: *very much so*). Three

aversion scores were created for each participant by averaging the items within each subscale and higher scores indicated more aversion. Since the purpose of the control aversion was to distract participants from the action/outcome aversion items, it is not discussed further in the paper.

2.2.2. Levenson Self-Report Psychopathy scale

Recent taxometric research suggests that psychopathy is a dimensional construct rather than a qualitatively distinct category of personality and hence can be studied as a trait that varies on a continuum in community samples using self-report measures (for a more detailed argument, see Lilienfeld & Fowler, 2006). Thus, trait psychopathy was assessed using the self-report measure of the Levenson Self-Report Psychopathy (LSRP) scale (Levenson, Kiehl, & Fitzpatrick, 1995). The LSRP was designed to measure primary and secondary psychopathy, mirroring Hare’s Psychopathy Checklist-Revised (Hare, 2003) Factors 1 (callous-unemotional) and 2 (lifestyle-antisocial). Accordingly, LSRP has two subscales which tap into these two components, LSRP-1 (16-items: e.g., “Success is based on survival of the fittest; I am not concerned about the losers.”) indexing primary psychopathy and LSRP-2 (10-items: e.g., “I find myself in the same kinds of trouble, time after time.”) indexing secondary psychopathy. The primary psychopathy (or callous-unemotional) subscale assesses the core personality traits of psychopathy, including manipulativeness, callousness, and lack of guilt or remorse; the secondary psychopathy (or lifestyle-antisocial) assesses features of the antisocial lifestyle, including impulsiveness, irresponsibility, and antisocial behaviour. Participants had to rate each item on a 4-point Likert scale (0: *strongly disagree*, 1: *disagree*, 2: *agree*, 3: *strongly agree*). Higher scores on each subscale indicated higher prevalence of that component.

2.2.3. Moral judgement

Participants were presented with a pair of moral dilemmas, each of which presented people with an opportunity to sacrifice one individual so that five others can be saved (see [Supplementary Text S2](#)). The personal moral dilemma used was the foot-bridge dilemma, which featured emotionally aversive harm (pushing the person to his death). The impersonal moral dilemma used was the Standard Fumes dilemma (Greene et al., 2004), which featured less emotionally salient harm (hitting a switch

which would divert toxic fumes from a room with five patients to a room with just one patient). Both dilemmas were framed in first-person and asked the question “How appropriate is it for you to [nature of action] in order to [outcome of action]?” Participants could register their answer using a 7-point Likert scale (1: *not at all*, 7: *very much*). Higher appropriateness scores denoted more utilitarian inclination.

2.3. Data analysis

Statistical analysis was conducted using SPSS 22.0 software. For all the analyses performed, we present the recommended confidence intervals for estimators and effect sizes (Cumming, 2014) generated using resampling and bootstrapping methods. When discussing results of logistic regression analysis, we report odds ratios which were computed using exponential function as e^B , where B is the unstandardized logit coefficients.

3. RESULTS

3.1. Descriptive statistics

Both LSRP and action/outcome aversion questionnaire subscales showed good internal reliability ($\alpha > 0.60$), see Table 1.

Participants reported to be more averse to harmful outcomes than to harmful actions (Related-samples Wilcoxon Signed Rank test: $Z = 13.156, p < .001, r$ (effect size) = .655, Hodges–Lehmann (HL) median difference = 1.100 [1.000, 1.200]). Additionally, people found utilitarian

options to be more appropriate for impersonal than for personal moral dilemmas (Related-samples Wilcoxon signed rank test: $Z = 14.101, p < .001, r = .702$, HL median difference = 2.000 [2.000, 2.500]). As expected, there was more disagreement amongst participants for judgement on the personal (coefficient of variation = 74.7%) than on the impersonal (coefficient of variation = 40.9%) moral dilemma (non-parametric Levene’s test: $F(1, 806) = 158.12, p < .001$).

Men showed elevated levels of primary psychopathy as compared to women ($r = .163$, HL median difference = 2.000 [1.000, 3.000]), but no such difference was found for secondary psychopathy. On the other hand, women were more averse to both performing harmful actions ($r = .318$, HL median difference = 1.000 [0.800, 1.400]) and witnessing harmful outcomes ($r = .254$, HL median difference = 0.800 [0.400, 1.000]).

3.2. Regression analysis

Ordinal logistic regression showed (see Table 2) that total psychopathy score was associated with both reduced action aversion (odds ratio, OR = 0.9465 [0.9324, 0.9277], Wald’s $\chi^2 = 28.931, p < .0001$) and outcome aversion (OR = 0.9427 [0.9231, 0.9579], Wald’s $\chi^2 = 32.740, p < .0001$) after controlling for age and gender. Additionally, a higher score on psychopathy was associated with increased likelihood of higher acceptability rating for both impersonal (OR = 1.0284 [1.0050, 1.0533], Wald’s $\chi^2 = 7.538, p = .006$) and personal (OR = 1.0387 [1.0131, 1.0629], Wald’s $\chi^2 = 12.878, p < .0001$) moral dilemmas.

TABLE 1

Means with 95% confidence interval values, medians, minimum–maximum spread, gender differences, and Cronbach alphas for variables of interest

| Item | Cronbach alpha | Mean [95% CI] | Median | Min, max | Gender effects (Z) |
|------------|----------------|----------------------|--------|----------|--------------------|
| LSRP | 0.800 | 25.69 [24.83, 26.52] | 25 | 5, 55 | -2.293* |
| LSRP-1 | 0.792 | 15.04 [14.40, 15.69] | 15 | 2, 43 | -3.269*** |
| LSRP-2 | 0.679 | 10.65 [10.26, 11.08] | 10 | 1, 25 | 0.520 |
| Action | 0.767 | 3.80 [3.66, 3.94] | 3.8 | 1, 7 | 6.399*** |
| Outcome | 0.810 | 4.93 [4.80, 5.07] | 5.2 | 1, 7 | 5.100*** |
| Control | 0.793 | 4.81 [4.71, 4.91] | 4.9 | 1.6, 7 | 2.992** |
| Impersonal | - | 4.59 [4.41, 4.76] | 5 | 1, 7 | -3.568*** |
| Personal | - | 2.49 [2.30, 2.66] | 2 | 1, 7 | -1.780 |

Positive value of Z signifies that women scored higher on this variable than men.
 LSRP = Levenson Self-Report Psychopathy scale; LSRP-1 = the callous-unemotional factor of psychopathy; LSRP-2 = the lifestyle-antisocial factor of psychopathy; CI = confidence interval; Z = standardised statistic from Mann–Whitney U test.
 * $p < .05$; ** $p < .01$; *** $p < .001$.

Downloaded by [Indrajeet Patil] at 04:16 11 May 2015

TABLE 2

Psychopathy (LSRP) scores predicting moral judgements on moral dilemmas, action aversion, and outcome aversion, without controlling for age and gender

| Predictor variable | Logit coefficient [95% CI] | | | |
|---------------------|----------------------------|----------------------------|------------------------|-------------------------|
| | Action | Outcome | Impersonal | Personal |
| LSRP ^a | -0.055 [-0.075, -0.036]*** | -0.059 [-0.080, -0.043]*** | 0.028 [0.005, 0.052]** | 0.038 [0.013, 0.061]*** |
| LSRP-1 ^a | -0.105 [-0.134, -0.076]*** | -0.103 [-0.137, -0.076]*** | 0.046 [0.011, 0.077]** | 0.068 [0.033, 0.103]*** |
| LSRP-2 ^a | 0.031 [-0.012, 0.077] | 0.012 [-0.031, 0.053] | -0.003 [-0.049, 0.047] | -0.011 [-0.059, 0.039] |

LSRP = Levenson Self-Report Psychopathy scale; LSRP-1 = the callous-unemotional factor of psychopathy; LSRP-2 = the lifestyle-antisocial factor of psychopathy; CI = confidence interval.

^aThe logit coefficient for the total score LSRP is from regression including total psychopathy score as predictor variables, whereas logit coefficient values for the two factors LSRP-1, 2 are from multiple regression *simultaneously* including both psychopathy factor scores to predict moral judgements and harm aversion scores. 95% bias corrected and accelerated confidence intervals for unstandardized logit coefficients were generated using 1000 bootstrap samples. Positive or negative value of logit coefficient denotes that increase in value of predictor variable is associated with increased odds for *higher* or *lower* value of criterion variable, respectively. Also see [Supplementary Table S1](#) for the same analysis with age and gender as additional predictor variables.

p* < .01; *p* < .001.

But when shared variance between primary and secondary psychopathy scores was controlled for, only primary psychopathy was associated with reduced action aversion (OR = 0.9003 [0.8745, 0.9268], Wald’s $\chi^2 = 47.234, p < .0001$) and outcome aversion (OR = 0.9021 [0.8719, 0.9268], Wald’s $\chi^2 = 45.613, p < .0001$). Primary psychopathy was associated with greater endorsement of utilitarian option for both impersonal (OR = 1.0471 [1.0111, 1.0800], Wald’s $\chi^2 = 9.547, p = .002$) and personal (OR = 1.0704 [1.0335, 1.1085], Wald’s $\chi^2 = 18.476, p < .0001$) moral dilemmas. In other words, increased callous-unemotional traits were associated with higher propensity to endorse utilitarian solutions on moral dilemmas and reduced aversion to witnessing harmful outcomes and performing harmful actions. Secondary psychopathy did not show any association with any of the variables of interest (*ps* > .05). Identical results were obtained after entering age and gender as additional predictor variables to the model (see [Supplementary Table S1](#)).

When moral judgements for impersonal and personal moral dilemmas were regressed on action and outcome aversion in separate regression models (see [Table 3](#)), the model including outcome aversion as the predictor variable did not show any significant associations (*ps* > .05). On the other hand, reduced action aversion was associated with increased likelihood for higher acceptability of utilitarian option on both impersonal (OR = 0.8781 [0.7695, 0.9970], Wald’s $\chi^2 = 4.845, p = .028$) and personal (OR = 0.8073 [0.7111, 0.9085], Wald’s $\chi^2 = 11.782, p = .001$) moral dilemmas. Thus, as expected, reduced action aversion predicted

more acceptability of utilitarian option not only on personal moral dilemma featuring concrete, low-level sensorimotor and perceptual representations of “typically harmful actions” but also on impersonal moral dilemma featuring abstract categorical descriptions of such actions (e.g., “murder”, “kill”, etc.). After entering age and gender as additional predictor variables to the model, similar results were obtained with the notable exception that action aversion no longer predicted ratings for impersonal moral dilemmas (*p* = .279; see [Supplementary Table S2](#)).

TABLE 3

Action and outcome aversion scores predicting moral judgements on moral dilemmas without controlling for age and gender

| | Logit coefficient [95% CI] | |
|---------|----------------------------|----------------------------|
| | Impersonal | Personal |
| Action | -0.130 [-0.262, -0.003]* | -0.214 [-0.341, -0.096]*** |
| Outcome | -0.026 [-0.173, 0.117] | -0.125 [-0.282, 0.034] |

The logit coefficient for the action and outcome aversion scores are from *separate* simple regression models including either action or outcome aversion scores as predictor variables to predict moral judgements. 95% bias corrected and accelerated confidence intervals for unstandardized logit coefficients were generated using 1,000 bootstrap samples. Positive or negative value of logit coefficient denotes that increase in value of predictor variable is associated with increased odds for *higher* or *lower* value of criterion variable, respectively. Also see [Supplementary Table S2](#) for the same analysis with age and gender as additional predictor variables.

p* < .05; **p* < .001.

3.3. Mediation analysis

Since total psychopathy scores predicted reduced action aversion and reduced action aversion in its turn predicted higher acceptability judgements for the utilitarian option on both impersonal and personal moral dilemmas, we assessed if the influence of trait psychopathy on moral judgements was mediated by the indirect effect of action aversion. Mediation analysis was carried out using Preacher–Hayes’ bootstrapping algorithm (Preacher & Hayes, 2004) to measure indirect effects by using 20,000 resamples to create a distribution of point estimates for indirect effect and testing its statistical significance. This analysis showed that action aversion significantly and partially mediated the effect of total psychopathy on the personal moral dilemma (0.0075 [0.0016, 0.0144]) but not the impersonal moral dilemma (0.0032 [−0.0025, 0.0093]; see Table 4) and these results held even after controlling for age and gender (see Figure 1 and Supplementary Table S3). Note that the asymmetry in 95% bias corrected and accelerated confidence intervals reflects asymmetry of the underlying sampling distribution of point estimates for indirect effect.

Since secondary psychopathy was not uniquely associated with reduced action aversion or increased propensity to endorse utilitarian solution on impersonal and personal moral dilemmas (see Table 2), mediation analysis was not conducted for this factor. The primary psychopathy factor showed all associations which held for total psychopathy (see Table 2) and therefore the same mediation analysis was run with primary psychopathy score as the independent variable and produced similar

results: Action aversion mediated the influence of primary psychopathy score on personal moral dilemma (0.0112 [0.0005, 0.0225]) but not impersonal (0.0047 [−0.0057, 0.0152]) and these results held even after controlling for age and gender (see Supplementary Table S3). The mediation was partial since primary psychopathy was a significant predictor of utilitarian tendencies on personal dilemmas even after accounting for the variance contributed by action aversion (OR = 1.056, Wald’s $\chi^2 = 12.159, p < .001$).

4. DISCUSSION

4.1. Two sources of negative affect in moral judgement

Past research has shown that people find the idea of sacrificing someone personally emotionally aversive (Greene et al., 2001, 2004; Koeings et al., 2007; Moretto et al., 2010, Szekely & Miu, 2014) even if not acting means producing worse overall outcomes. Although it is not contentious that the source of this negative affect lies in intuitive human aversion to harming others in any way, shape, or form (Haidt & Joseph, 2004), the exploration of the psychological basis of this negative affect is a mystery that has only recently begun to unravel. This research shows that the two sources of negative affect that support harm aversion stem from different evaluative foci of perspective-taking in mental simulations of harmful situations (Hannikainen et al., 2015; Miller & Cushman, 2013): (1) Adopting the victim’s psychological frame of reference elicits

TABLE 4
Mediation analysis results with action aversion as the mediator variable, psychopathy scores as independent variable, and moral judgements for impersonal and personal moral dilemmas as dependent variable without controlling for age and gender

| Independent variable | Mediator variable | Dependent variable | Sobel’s | | Index of mediation [95% CI] |
|----------------------|-------------------|---|---------|--------------------------|-----------------------------|
| | | | Z | Bootstrap [95% CI] | |
| LSRP | Action aversion | Moral acceptability of utilitarian option for <i>personal</i> moral dilemma | 2.413* | 0.0075 [0.0016, 0.0144] | 0.0353 [0.0080, 0.0676] |
| LSRP-1 | | Moral acceptability of utilitarian option for <i>impersonal</i> moral dilemma | 2.129* | 0.0112 [0.0005, 0.0225] | 0.0375 [0.0011, 0.0758] |
| LSRP | | Moral acceptability of utilitarian option for <i>personal</i> moral dilemma | 1.107 | 0.0032 [−0.0025, 0.0093] | 0.0148 [−0.0117, 0.0439] |
| LSRP-1 | | Moral acceptability of utilitarian option for <i>impersonal</i> moral dilemma | 0.913 | 0.0047 [−0.0057, 0.0152] | 0.0157 [−0.0191, 0.507] |

Mediation analysis was carried out using Preacher–Hayes bootstrapping method (Preacher & Hayes, 2004). Bias corrected and accelerated 95% CIs from 20,000 bootstrap samples are reported for specific indirect effects. Index of mediation (Preacher & Hayes, 2008) is a standardised effect size measure of mediation. Also see Supplementary Table S3 for the same analysis with age and gender as covariates.

* $p < .05$.

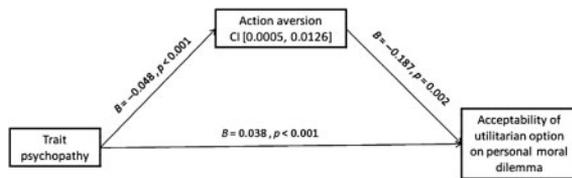


Figure 1. Mediation analysis results. Negative logit coefficient from ordinal regression denotes reduced action aversion and increased moral acceptability of utilitarian option on personal moral dilemma. Bias corrected and accelerated 95% CIs from 20,000 bootstrap samples are reported for specific indirect effects without controlling for effects of age and gender. The increased tendency to find utilitarian option more acceptable on personal moral dilemma in trait psychopathy was partially due to reduced aversion to harmful actions.

empathic arousal in the simulator (Pizarro, 2000); and (2) assuming the agent's perspective activates contextualised motor action plans that have been associated with behavioural suppression due to the history of aversive conditioning (Crockett, 2013; Cushman et al., 2012). Thus, people seem to condemn utilitarian actions on moral dilemmas that involve personally hurting someone for the greater good not only because they are apprehensive of the distress such action would elicit in the prospective victim but also because they find performing certain actions inherently aversive. Accordingly, individual differences in empathic/outcome aversion (see Section 1.2.1) and action aversion (see Section 1.2.2) predict the likelihood of making a utilitarian moral judgement on personal moral dilemmas. The current study provides additional support in favour of the action aversion model: People with higher action aversion scores were less willing to endorse utilitarian option on impersonal and personal moral dilemmas.

At first blush, it might seem surprising that outcome aversion did not predict utilitarian moral judgements on either impersonal or personal moral dilemma. But, as argued by others (Hannikainen et al., 2015; Miller et al., 2014) who have observed similar patterns of responses, this is probably due to the idiosyncratic nature of moral dilemmas where both action and omission produce bad outcomes. Since harmful outcome would materialise for either the distal (the five people that need to be saved) or the proximal (the one person that needs to be sacrificed) victim/s irrespective of the choice the agent makes, outcome aversion would not preferentially recommend either alternative. A measure of empathy which is less contaminated by outcome concerns and which indexes warm feelings towards others and a dispositional tendency to care for others' well-

being in a more subtle manner is empathic concern and indeed individual differences in empathic concern have been shown to be a good predictor of utilitarian moral judgement (e.g., Gleichgerrcht & Young, 2013).

4.2. Psychopathy and harm aversion

Psychopathy is characterised by lack of empathy, callous unemotionality, lack of remorse and guilt and people with psychopathic tendencies show increased propensity to resort to instrumental aggression to achieve their goals (Hare, 1999). In other words, psychopathy is associated with reduced aversion to inflicting harm upon others. Developmental and neurobiological models of psychopathy have implicated empathic deficits as the fountainhead of behavioural problems in psychopathy. During the proper course of moral development, humans learn goodness and badness of actions based on the consequences such actions produce for the rights and welfare of others. Thus, empathy plays a crucial role in developmental acquisition of moral norms about harm. This is because harmful actions lead to distress in the victim and vicariously experiencing distress by empathising with the victim leads actors and observers to associate such actions with negative valence. Consequently, deficits in affectively resonating with others' distress in psychopathy can lead to impaired learning of the aversiveness of such actions (Blair, 2007, 2013; Blair et al., 2013). Since a core characteristic of psychopathy is empathy deficits (Blair, 2013; Marsh, 2014), individuals who are high on this trait lack the vicarious awareness of others' suffering and thus do not develop the normal inner signals which upon self-reflection lead them to cultivate moral emotions like shame and guilt. This in turn attenuates aversive conditioning which normally associates actions with reward or punishment contingencies (also see cascading constraints model, McIlwain, 2008; McIlwain et al., 2012). Therefore, according to these models, psychopaths engage in harmful actions because (1) they lack the moral barometer in the form of moral emotions stemming from empathic aversion that usually informs and motivates individuals to avoid imposing harm on others; and (2) they miss inner sanctions that are usually coupled with sensorimotor and perceptual representations of contextualised harmful actions.

In this study, we validate this prediction by showing that elevated level of trait psychopathy in

community population is indeed associated with a reduced ability to find performing pretend harmful actions (e.g., shooting at a friend behind a bullet-proof glass) less upsetting at self-report level. We further show that this reduced action aversion mediates the link between psychopathy and utilitarian moral judgements. Thus, psychopathic individuals with callous unemotionality make utilitarian moral judgements on moral dilemmas not only because they feel less empathic concern for the victim that needs to be sacrificed (as has been convincingly shown in the past research, see [Section 1.3.1](#)), but also because they do not find it disturbing to perform harmful actions (e.g., pushing, stabbing, etc.).

4.3. Alternative explanations

As noted in the introduction, people can endorse utilitarian moral judgements either because they have reduced aversion to harm or because they are better at deliberative reasoning involving cost-benefit analysis of the situation that supports a utilitarian solution. In this study, we have reviewed and added to the converging evidence supporting the claim that psychopathic individuals utilise the reduced harm aversion path to utilitarian moral judgements. But there is evidence that people with a motivational tendency to enjoy engaging in effortful thinking, known as need for cognition, also tend to be more utilitarian ([Bartels, 2008](#); [Conway & Gawronski, 2013](#)). Since we did not have a need for cognition measure, we cannot completely rule out the possibility that psychopathic individuals can also be more utilitarian as a result of enhanced reasoning skills. But this seems unlikely given that a previous study has shown that although both psychoticism (which lies on continuum with psychopathy; [Corr, 2010](#)) and need for cognition are positively correlated with utilitarian judgements, these two personality traits are independent of each other ([Wiech et al., 2013](#); but see [Glenn, Raine, Schug, Young, & Hauser, 2009](#)). In other words, psychopathic individuals do not show an augmented tendency to undertake cognitive deliberation and thus are unlikely to make utilitarian moral judgements for this reason.

Another alternative explanation is provided by [Koenigs et al. \(2012\)](#) who observed that only low-anxious psychopaths showed elevated levels of utilitarian moral judgements on personal moral dilemmas but not high-anxious psychopaths and argued that trait anxiety moderates the relation

between psychopathy and moral judgements. Indeed, anxiety has been known to suppress instrumental aggression by increasing perceived harmfulness of actions ([Raine, 1996](#)) and anti-anxiety drugs like Lorazepam can reduce harm aversion by alleviating anxiety and make people more utilitarian ([Perkins et al., 2013](#)). But this explanation seems unlikely to explain observed findings because a previous study ([Gao & Tang, 2013](#)) showed that dispositional trait anxiety does not moderate relationship between trait psychopathy and amplified propensity to make utilitarian moral judgements on personal moral dilemmas in a non-incarcerated, community sample.

Another plausible explanation is provided by the finding that descriptively people place moral traits (e.g., honesty, kindness, etc.) at the core of their identity ([Strohlinger & Nichols, 2014](#)) as compared to non-moral traits (e.g., intelligence, memory, etc.), and there are individual differences in the propensity to include moral traits as essential to one's self-concept ([Glenn et al., 2010](#)). Concerns about moral identity elicit self-referential processing that motivates individuals to align moral behaviour with the known moral norms and thus can be expected to play a role in moral decision-making. Indeed, neuroimaging data showing heightened activity in default mode network, which is associated with self-referential processing and introspective appraisal of self-relevance of events ([Sevinc & Spreng, 2014](#)), while people mull over moral dilemmas provides tenuous support for this claim ([Harrison et al., 2008](#)). Additionally, at a behavioural level, it has been known shown that a higher sense of moral identity leads to less utilitarian moral judgements ([Conway & Gawronski, 2013](#)). Since trait psychopathy is associated with reduced moral identity ([Glenn et al., 2010](#)) at a self-report level and less self-referential processing when facing moral dilemmas ([Pujol et al., 2012](#)) at a neural level, it is possible that moral identity mediates the influence of psychopathy on utilitarian moral judgements. In other words, on this account psychopaths make more utilitarian moral judgements due to a weaker sense of moral identity which fails to motivate them to avoid violating moral norms about harm. This possibility has been studied and ruled out in an online study with subclinical sample which showed that moral identity did not mediate the utilitarian bias in trait psychopathy ([Glenn et al., 2010](#)).

4.4. Limitations

One glaring limitation of any study trying to assess psychopathy, empathy, and morality by relying on self-report measures is response bias motivated by social desirability. Indeed, social desirability bias has been shown to affect self-report assessment of psychopathy, empathy, and moral judgements (Warren, 2009), but the same study also showed that social desirability bias does not significantly impact the association between psychopathy and moral judgements about aggressive behaviours. Nonetheless, future studies can rely on more objective measures like skin conductance activity to assess the emotional profile of psychopathy when making moral judgements. Future studies can also use the experimental manipulations adopted by Cushman et al. (2012, Study 2) and Miller et al. (2014, Study 5) which use either personally simulating harmful actions to assess action aversion or independently manipulate action and outcome aversion to see their effect on moral wrongness of harmful actions. Our current results would predict that individuals high on primary psychopathy would be emotionally more at ease when carrying out pretend harmful actions and judge the proposed actions more leniently due to reduced action and outcome aversion.

Another limitation of this and other studies in the past that have explored utilitarian bias in psychopathy is that a single index was used to represent moral judgements on moral dilemmas which treats utilitarian and deontological tendencies as inversely related to each other and conflate disregard for deontic prohibitions and endorsement of utilitarian principles. Conway and Gawronski (2013) have shown, using a process dissociation method, that instead of being inversely related to each other these two processes independently contribute to the moral judgement. Using similar methods, a recent study (Conway, Bartels, & Pizarro, 2015) shows that indeed trait psychopathy is less deontological and not more utilitarian, i.e., psychopathic individuals make utilitarian moral judgements because they have reduced concern for deontic norms about harming others and not because of prevalent orientation towards utilitarian value of maximising aggregate welfare.

Although the current study, along with past research, points to reduction of both empathic concern and action aversion as a source of utilitarian

bias in psychopathy, it did not include an empathic concern scale. Future studies should include both empathic concern and action aversion scales to show that both of them simultaneously mediate the psychopathy–utilitarianism association and would convincingly argue that both sources of negative affect are corroded in psychopathy when making moral judgements. A previous study did find that both action aversion and empathic concern uniquely predicted utilitarian judgements when both measures were simultaneously included in the regression model (Miller et al., 2014, Study 2).

Supplementary material

Supplementary content is available via the “Supplementary” tab on the article’s online page (<http://dx.doi.org/10.1080/20445911.2015.1004334>).

REFERENCES

- Aharoni, E., Antonenko, O., & Kiehl, K. A. (2011). Disparities in the moral intuitions of criminal offenders: The role of psychopathy. *Journal of Research in Personality, 45*, 322–327. doi:10.1016/j.jrp.2011.02.005
- Ali, F., Amorim, I. S., & Chamorro-Premuzic, T. (2009). Empathy deficits and trait emotional intelligence in psychopathy and Machiavellianism. *Personality and Individual Differences, 47*, 758–762. doi:10.1016/j.paid.2009.06.016
- Anastassiou-Hadjicharalambous, X., & Warden, D. (2008a). Physiologically-indexed and self-perceived affective empathy in conduct-disordered children high and low on callous-unemotional traits. *Child Psychiatry and Human Development, 39*, 503–517. doi:10.1007/s10578-008-0104-y
- Anastassiou-Hadjicharalambous, X., & Warden, D. (2008b). Cognitive and affective perspective-taking in conduct-disordered children high and low on callous–unemotional traits. *Child and Adolescent Psychiatry and Mental Health, 2*, 16. doi:10.1186/1753-2000-2-16
- Arvan, M. (2013). Bad news for conservatives? Moral judgments and the Dark Triad personality traits: A correlational study. *Neuroethics, 6*, 307–318. doi:10.1007/s12152-011-9140-6
- Bartels, D. M. (2008). Principled moral sentiment and the flexibility of moral judgment and decision making. *Cognition, 108*, 381–417. doi:10.1016/j.cognition.2008.03.001
- Bartels, D. M., & Pizarro, D. A. (2011). The mismeasure of morals: Antisocial personality traits predict utilitarian responses to moral dilemmas. *Cognition, 121*, 154–161. doi:10.1016/j.cognition.2011.05.010
- Blair, J., Sellars, C., Strickland, I., Clark, F., Williams, A., Smith, M., & Jones, L. (1996). Theory of mind in the psychopath. *The Journal of Forensic Psychiatry, 7*, 15–25. doi:10.1080/09585189608409914
- Blair, R. J. R. (1995). A cognitive developmental approach to morality: Investigating the psychopath.

- Cognition*, 57(1), 1–29. doi:10.1016/0010-0277(95)00676-P
- Blair, R. J. R. (1999). Responsiveness to distress cues in the child with psychopathic tendencies. *Personality and Individual Differences*, 27, 135–145. doi:10.1016/S0191-8869(98)00231-1
- Blair, R. J. R. (2007). The amygdala and ventromedial prefrontal cortex in morality and psychopathy. *Trends in Cognitive Sciences*, 11, 387–392. doi:10.1016/j.tics.2007.07.003
- Blair, R. J. R. (2013). The neurobiology of psychopathic traits in youths. *Nature Reviews Neuroscience*, 14, 786–799. doi:10.1038/nrn3577
- Blair, R. J. R., Jones, L., Clark, F., & Smith, M. (1997). The psychopathic individual: A lack of responsiveness to distress cues? *Psychophysiology*, 34, 192–198. doi:10.1111/j.1469-8986.1997.tb02131.x
- Blair, R. J. R., White, S. F., Meffert, H., & Hwang, S. (2013). Emotional learning and the development of differential moralities: Implications from research on psychopathy. *Annals of the New York Academy of Sciences*, 1299, 36–41. doi:10.1111/nyas.12169
- Borg, J. S., & Sinnott-Armstrong, W. (2013). Do psychopaths make moral judgments? In K. Kiehl & W. Sinnott-Armstrong (Eds.), *The oxford handbook of psychopathy and law* (pp. 107–130). Oxford: Oxford University Press.
- Brook, M., & Kosson, D. S. (2012). Impaired cognitive empathy in criminal psychopathy: Evidence from a laboratory measure of empathic accuracy. *Journal of Abnormal Psychology*, 122, 156–166. doi:10.1037/a0030261
- Bzdok, D., Schilbach, L., Vogeley, K., Schneider, K., Laird, A. R., Langner, R., & Eickhoff, S. B. (2012). Parsing the neural correlates of moral cognition: ALE meta-analysis on morality, theory of mind, and empathy. *Brain Structure and Function*, 217, 783–796.
- Cardinale, E. M., Finger, E. C., Schechter, J. C., Jurkowitz, I. T. N., Blair, R. J. R., & Marsh, A. A. (2014). The moral status of an action influences its perceived intentional status in adolescents with psychopathic traits. In J. Knobe, T. Lombrozo, & S. Nichols (Eds.), *Oxford studies in experimental philosophy* (Vol. 1, pp. 138–154). New York, NY: Oxford University Press.
- Chiong, W., Wilson, S. M., D’esposito, M., Kayser, A. S., Grossman, S. N., Poorzand, P., ... Rankin, K. P. (2013). The salience network causally influences default mode network activity during moral reasoning. *Brain*, 136, 1929–1941. doi:10.1093/brain/awt066
- Choe, S. Y., & Min, K.-H. (2011). Who makes utilitarian judgments? The influences of emotions on utilitarian judgments. *Judgment and Decision Making*, 6, 580–592.
- Ciamarelli, E., Muccioli, M., Ladavas, E., & di Pellegrino, G. (2007). Selective deficit in personal moral judgment following damage to ventromedial prefrontal cortex. *Social Cognitive and Affective Neuroscience*, 2, 84–92. doi:10.1093/scan/nsm001
- Cima, M., Tonnaer, F., & Hauser, M. D. (2010). Psychopaths know right from wrong but don’t care. *Social Cognitive & Affective Neuroscience*, 5, 59–67. doi:10.1093/scan/nsp051
- Conway, P., Bartels, D. M., & Pizarro, D. A. (2015). *An exploration of genuinely utilitarian inclinations: Clarifying the relations between moral judgments, antisocially, and prosociality*. Manuscript in preparation.
- Conway, P., & Gawronski, B. (2013). Deontological and utilitarian inclinations in moral decision making: A process dissociation approach. *Journal of personality and social psychology*, 104, 216–235. doi:10.1037/a0031021
- Corr, P. J. (2010). The psychoticism–psychopathy continuum: A neuropsychological model of core deficits. *Personality and Individual Differences*, 48, 695–703. doi:10.1016/j.paid.2009.12.023
- Crockett, M. J. (2013). Models of morality. *Trends in Cognitive Sciences*, 17, 363–366. doi:10.1016/j.tics.2013.06.005
- Crockett, M. J., Clark, L., Hauser, M. D., & Robbins, T. W. (2010). Serotonin selectively influences moral judgment and behavior through effects on harm aversion. *Proceedings of the National Academy of Sciences*, 107, 17433–17438. doi:10.1073/pnas.1009396107
- Crockett, M. J., Kurth-Nelson, Z., Siegel, J. Z., Dayan, P., & Dolan, R. J. (2014). Harm to others outweighs harm to self in moral decision making. *Proceedings of the National Academy of Sciences*, 111, 17320–17325. doi:10.1073/pnas.1408988111
- Cushman, F. (2013). Action, outcome and value: A dual-system framework for morality. *Personality and Social Psychology Review*, 17, 273–292. doi:10.1177/1088868313495594
- Cumming, G. (2014). The new statistics: Why and how. *Psychological Science*, 25(1), 7–29. doi:10.1177/0956797613504966
- Cushman, F., & Dillon, K. D. (2015). *To kill or not to kill: Self-regulatory affect in moral behavior*. Manuscript in preparation.
- Cushman, F., Gray, K., Gaffey, A., & Mendes, W. B. (2012). Simulating murder: The aversion to harmful action. *Emotion*, 12(1), 2–7. doi:10.1037/a0025071
- Cushman, F., Young, L., & Hauser, M. (2006). The role of reasoning and intuition in moral judgments: Testing three principles of harm. *Psychological Science*, 17, 1082–1089. doi:10.1111/j.1467-9280.2006.01834.x
- Decety, J., Michalska, K. J., & Kinzler, K. D. (2012). The contribution of emotion and cognition to moral sensitivity: A neurodevelopmental study. *Cerebral Cortex*, 22, 209–220. doi:10.1093/cercor/bhr111
- Decety, J., & Porges, E. C. (2011). Imagining being the agent of actions that carry different moral consequences: An fMRI study. *Neuropsychologia*, 49, 2994–3001. doi:10.1016/j.neuropsychologia.2011.06.024
- Decety, J., Skelly, L. R., & Kiehl, K. A. (2013). Brain response to empathy-eliciting scenarios in incarcerated individuals with psychopathy. *JAMA Psychiatry*, 70, 638–645. doi:10.1001/jamapsychiatry.2013.27
- Djeriouat, H., & Trémolière, B. (2014). The Dark Triad of personality and utilitarian moral judgment: The mediating role of honesty/humility and harm/care. *Personality and Individual Differences*, 67, 11–16. doi:10.1016/j.paid.2013.12.026
- Gao, Y., & Tang, S. (2013). Psychopathic personality and utilitarian moral judgment in college students.

- Journal of Criminal Justice*, 41, 342–349. doi:10.1016/j.jcrimjus.2013.06.012
- Gleichgerrcht, E., Torralva, T., Roca, M., Pose, M., & Manes, F. (2011). The role of social cognition in moral judgment in frontotemporal dementia. *Social Neuroscience*, 6, 113–122. doi:10.1080/17470919.2010.506751
- Gleichgerrcht, E., & Young, L. (2013). Low levels of empathic concern predict utilitarian moral judgment. *PLoS ONE*, 8, e60418. doi:10.1371/journal.pone.0060418
- Glenn, A. L., Iyer, R., Graham, J., Koleva, S., & Haidt, J. (2009). Are all types of morality compromised in psychopathy? *Journal of Personality Disorders*, 23, 384–398. doi:10.1521/pedi.2009.23.4.384
- Glenn, A. L., Koleva, S., Iyer, R., Graham, J., & Ditto, P. H. (2010). Moral identity in psychopathy. *Judgment and Decision Making*, 5, 497–505.
- Glenn, A. L., Raine, A., & Schug, R. A. (2009). The neural correlates of moral decision-making in psychopathy. *Molecular Psychiatry*, 14(1), 5–6. doi:10.1038/mp.2008.104
- Glenn, A. L., Raine, A., Schug, R., Young, L., & Hauser, M. (2009). Increased DLPFC activity during moral decision-making in psychopathy. *Molecular Psychiatry*, 14, 908–911. doi:10.1038/mp.2009.71
- Gray, N. S., MacCulloch, M. J., Smith, J., Morris, M., & Snowden, R. J. (2003). Forensic psychology: Violence viewed by psychopathic murderers. *Nature*, 423, 497–498. doi:10.1038/423497a
- Greene, J. D. (2007). The secret joke of Kant's soul. In W. Sinnott-Armstrong (Ed.), *Moral psychology, Vol. 3: The neuroscience of morality: Emotion, disease, and development* (pp. 35–79). Cambridge, MA: MIT Press.
- Greene, J. D., Cushman, F. A., Stewart, L. E., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2009). Pushing moral buttons: The interaction between personal force and intention in moral judgment. *Cognition*, 111, 364–371. doi:10.1016/j.cognition.2009.02.001
- Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, 107, 1144–1154. doi:10.1016/j.cognition.2007.11.004
- Greene, J. D., Nystrom, L. E., Engell, A. D., Darley, J. M., & Cohen, J. D. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, 44, 389–400. doi:10.1016/j.neuron.2004.09.027
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293, 2105–2108. doi:10.1126/science.1062872
- Haidt, J., & Joseph, C. (2004). Intuitive ethics: How innately prepared intuitions generate culturally variable virtues. *Daedalus*, 133, 55–66. doi:10.1023/A:1017186710699
- Hannikainen, I. A., Miller, R. M., & Cushman, F. A. (2015). *Act versus impact: Conservatives and liberals exhibit different structural emphases in moral judgment*. Manuscript in preparation.
- Hare, R. D. (1999). *Without conscience: The disturbing world of the psychopaths among us*. New York, NY: The Guilford Press.
- Hare, R. D. (2003). *Hare psychopathy checklist-revised (PCL-R)* (2nd ed.). Toronto, ON: Multi-Health Systems.
- Harenski, C. L., Edwards, B. G., Harenski, K. A., & Kiehl, K. A. (2014). Neural correlates of moral and non-moral emotion in female psychopathy. *Frontiers in Human Neuroscience*, 8, 741. doi:10.3389/fnhum.2014.00741
- Harenski, C. L., Harenski, K. A., Shane, M. S., & Kiehl, K. A. (2010). Aberrant neural processing of moral violations in criminal psychopaths. *Journal of Abnormal Psychology*, 119, 863–874. doi:10.1037/a0020979
- Harrison, B. J., Pujol, J., Lopez-Sola, M., Hernandez-Ribas, R., Deus, J., Ortiz, H., ... Cardoner, N. (2008). Consistency and functional specialization in the default mode brain network. *Proceedings of the National Academy of Sciences, USA*, 105, 9781–9786.
- Hauser, M., Cushman, F., Young, L., Jin, R., & Mikhail, J. (2007). A dissociation between moral judgment and justification. *Mind and Language*, 22(1), 1–21. doi:10.1111/j.1468-0017.2006.00297.x
- Jack, A. I., Robbins, P. A., Friedman, J. P., & Meyers, C. D. (2014). More than a feeling: Counterintuitive effects of compassion on moral judgment. In J. Sytma (Ed.), *Advances in experimental philosophy of mind: Continuum* (pp. 102–125). New York, NY: Bloomsbury.
- Jonason, P. K., & Krause, L. (2013). The emotional deficits associated with the Dark Triad traits: Cognitive empathy, affective empathy, and alexithymia. *Personality and Individual Differences*, 55, 532–537. doi:10.1016/j.paid.2013.04.027
- Jonason, P. K., Lyons, M., Bethell, E. J., & Ross, R. (2013). Different routes to limited empathy in the sexes: Examining the links between the Dark Triad and empathy. *Personality and Individual Differences*, 54, 572–576. doi:10.1016/j.paid.2012.11.009
- Jones, A. P., Happe, F. G., Gilbert, F., Burnett, S., & Viding, E. (2010). Feeling, caring, knowing: Different types of empathy deficit in boys with psychopathic tendencies and autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, 51, 1188–1197.
- Kahane, G., Everett, J. A. C., Earp, B. D., Farias, M., & Savulescu, J. (2015). 'Utilitarian' judgments in sacrificial moral dilemmas do not reflect impartial concern for the greater good. *Cognition*, 134, 193–209. doi:10.1016/j.cognition.2014.10.005
- Kant, I. (1785/2005). *The moral law: Groundwork of the metaphysics of morals* (2nd ed.). London: Routledge.
- King, J. A., Blair, R. J. R., Mitchell, D. G. V., Dolan, R. J., & Burgess, N. (2006). Doing the right thing: A common neural circuit for appropriate violent or compassionate behavior. *Neuroimage*, 30, 1069–1076. doi:10.1016/j.neuroimage.2005.10.011
- Koenigs, M., Kruepke, M., Zeier, J., & Newman, J. P. (2012). Utilitarian moral judgment in psychopathy. *Social Cognitive and Affective Neuroscience*, 7, 708–714. doi:10.1093/scan/nsr048
- Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., & Damasio, A. (2007). Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature*, 446, 908–911. doi:10.1038/nature05631
- Langdon, R., & Delmas, K. (2012). Moral reasoning and psychopathic tendencies in the general community. In R. Langdon & C. Mackenzie (Eds.), *Emotions, imagination, and moral reasoning: Macquarie*

- monographs in cognitive science* (pp. 91–118). New York, NY: Psychology Press.
- Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a non-institutionalized population. *Journal of Personality and Social Psychology*, *68*, 151–158. doi:10.1037/0022-3514.68.1.151
- Lilienfeld, S. O., & Fowler, K. A. (2006). The self-report assessment of psychopathy: Problems, pitfalls, and promises. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 107–132). New York, NY: Guilford Press.
- Liuzza, M. T., Candidi, M., Sforza, A. L., & Aglioti, S. M. (2014). Harm avoiders suppress motor resonance to observed immoral actions. *Social Cognitive and Affective Neuroscience*, *10*(1), 72–77. doi:10.1093/scan/nsu025
- Lockwood, P. L., Bird, G., Bridge, M., & Viding, E. (2013). Dissecting empathy: High levels of psychopathic and autistic traits are characterised by difficulties in different social information processing domains. *Frontiers in Human Neuroscience*, *7*, 760. doi:10.3389/fnhum.2013.00760
- Lockwood, P. L., Sebastian, C. L., McCrory, E. J., Hyde, Z. H., Gu, X., De Brito, S. A., & Viding, E. (2013). Association of callous traits with reduced neural response to others' pain in children with conduct problems. *Current Biology*, *23*, 901–905. doi:10.1016/j.cub.2013.04.018
- Luo, Q., Nakic, M., Wheatley, T., Richell, R., Martin, A., & Blair, R. J. R. (2006). The neural basis of implicit moral attitude—An IAT study using event-related fMRI. *Neuroimage*, *30*, 1449–1457. doi:10.1016/j.neuroimage.2005.11.005
- Marsh, A. (2014). Empathic and moral deficits in psychopathy. In H. Maibom (Ed.), *Empathy and morality* (pp. 138–154). Oxford: Oxford University Press.
- Marsh, A. A., & Blair R. J. R. (2008). Deficits in facial affect recognition among antisocial populations: A meta-analysis. *Neuroscience & Biobehavioral Reviews*, *32*, 454–465. doi:10.1016/j.neubiorev.2007.08.003
- Marsh, A. A., & Cardinale, E. M. (2012). Psychopathy and fear: Specific impairments in judging behaviors that frighten others. *Emotion*, *12*, 892–898. doi:10.1037/a0026260
- Marsh, A. A., & Cardinale, E. M. (2014). When psychopathy impairs moral judgments: Neural responses during judgments about causing fear. *Social Cognitive & Affective Neuroscience*, *9*(1), 3–11. doi:10.1093/scan/nss097
- Marsh, A. A., Finger, E. C., Fowler, K. A., Adalio, C. J., Jurkowitz, I. T., Schechter, J. C., ... Blair, R. J. (2013). Empathic responsiveness in amygdala and anterior cingulate cortex in youths with psychopathic traits. *Journal of Child Psychology and Psychiatry*, *54*, 900–910. doi:10.1111/jcpp.12063
- Marsh, A. A., Finger, E. C., Fowler, K. A., Jurkowitz, I. T., Schechter, J. C., Yu, H. H., ... Blair, R. J. R. (2011). Reduced amygdala–orbitofrontal connectivity during moral judgments in youths with disruptive behavior disorders and psychopathic traits. *Psychiatry Research: Neuroimaging*, *194*, 279–286. doi:10.1016/j.psychresns.2011.07.008
- McIlwain, D. (2008). Cascading constraints: The development of Machiavellianism and psychopathy. In S. Boag (Ed.), *Personality down under: Perspectives from Australia*. New York, NY: Nova Science.
- McIlwain, D., Evans, J., Caldis, E., Cicchini, F., Aronstan, A., Wright, A., & Taylor, A. (2012). Strange moralities: Vicarious emotion and moral emotions in Machiavellian and psychopathic personality styles. In R. Langdon & C. Mackenzie (Eds.), *Emotions, imagination, and moral reasoning: Macquarie monographs in cognitive science* (pp. 117–146). New York, NY: Psychology Press.
- Mendez, M. F. (2009). The neurobiology of moral behavior: Review and neuropsychiatric implications. *CNS Spectrums*, *14*, 608–620.
- Mendez, M. F., Anderson, E., & Shapira, J. S. (2005). An investigation of moral judgment in frontotemporal dementia. *Cognitive and Behavioral Neurology*, *18*, 193–197. doi:10.1097/01.wnn.0000191292.17964.bb
- Mikhail, J. (2007). Universal moral grammar: Theory, evidence and the future. *Trends in Cognitive Sciences*, *11*, 143–152. doi:10.1016/j.tics.2006.12.007
- Mill, J. S. (1863/1998). *Utilitarianism*. New York, NY: Oxford University Press.
- Miller, R. M., & Cushman, F. A. (2013). Aversive for me, wrong for you: First-person behavioral aversions underlie the moral condemnation of harm. *Social and Personality Psychology Compass*, *7*, 707–718. doi:10.1111/spc3.12066
- Miller, R. M., Hannikainen, I., & Cushman, F. A. (2014). Bad actions or bad outcomes? Differentiating affective contributions to the moral condemnation of harm. *Emotion*, *14*, 573–587. doi:10.1037/a0035361
- Moretto, G., Ladavas, E., Mattioli, F., & di Pellegrino, G. (2010). A psychophysiological investigation of moral judgment after ventromedial prefrontal damage. *Journal of Cognitive Neuroscience*, *22*, 1888–1899. doi:10.1093/cercor/bhn080
- Motzkin, J. C., Newman, J. P., Kiehl, K. A., & Koenigs M. (2011). Reduced prefrontal connectivity in psychopathy. *Journal of Neuroscience*, *31*, 17348–17357. doi:10.1523/JNEUROSCI.4215-11.2011
- Navarrete, C. D., McDonald, M. M., Mott, M. L., & Asher, B. (2012). Virtual morality: Emotion and action in a simulated 3-D “trolley problem.” *Emotion*, *12*, 364–370. doi:10.1037/a0025561
- O’Nions, E., Sebastian, C., McCrory, E., Chantiluke, K., Happé, F., & Viding, E. (2014). Neural bases of theory of mind in children with autism spectrum disorders and children with conduct problems and callous-unemotional traits. *Developmental Science*, *17*, 786–796. doi:10.1111/desc.12167
- Patil, I., Cogoni, C., Zangrando, N., Chittaro, L., & Silani, G. (2014). Affective basis of judgment–behavior discrepancy in virtual experiences of moral dilemmas. *Social Neuroscience*, *9*(1), 94–107. doi:10.1080/17470919.2013.870091
- Patil, I., & Silani, G. (2014). Reduced empathic concern leads to utilitarian moral judgments in trait alexithymia. *Frontiers in Psychology*, *5*, 501. doi:10.3389/fpsyg.2014.00501
- Perkins, A. M., Leonard, A. M., Weaver, K., Dalton, J. A., Mehta, M. A., Kumari, V., ... Ettinger, U. (2013). A dose of ruthlessness: Interpersonal moral judgment

- is hardened by the anti-anxiety drug Lorazepam. *Journal of Experimental Psychology: General*, *142*, 612–620. doi:10.1037/a0030256
- Pizarro, D. (2000). Nothing more than feelings? The role of emotions in moral judgment. *Journal for the Theory of Social Behaviour*, *30*, 355–375. doi:10.1111/1468-5914.00135
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, *36*, 717–731.
- Preacher, K. J., & Hayes, A. F. (2008). Contemporary approaches to assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13–54). Thousand Oaks, CA: Sage.
- Pujol, J., Batalla, I., Contreras-Rodríguez, O., Harrison, B. J., Pera, V., Hernández-Ribas, R., ... Cardoner, N. (2012). Breakdown in the brain network subserving moral judgment in criminal psychopathy. *Social Cognitive and Affective Neuroscience*, *7*, 917–923. doi:10.1093/scan/nsr075
- Raine, A. (1996). Autonomic nervous system factors underlying disinhibited, antisocial, and violent behaviour: Biosocial perspectives and treatment implications. *Annals of the New York Academy of Sciences*, *794*, 46–59. doi:10.1111/j.1749-6632.1996.tb32508.x
- Richell, R. A., Mitchell, D. G. V., Newman, C., Leonard, A., Baron-Cohen, S., & Blair, R. J. R. (2003). Theory of mind and psychopathy: Can psychopathic individuals read the ‘language of the eyes’? *Neuropsychologia*, *41*, 523–526. doi:10.1016/S0028-3932(02)00175-6
- Rosas, A., & Koenigs, M. (2014). Beyond “utilitarianism”: Maximizing the clinical impact of moral judgment research. *Social Neuroscience*, *9*, 661–667. doi:10.1080/17470919.2014.937506
- Rothmund, Y., Ziegler, S., Hermann, C., Gruesser, S. M., Foell, J., Patrick, C. J., & Flor, H. (2012). Fear conditioning in psychopaths: Event-related potentials and peripheral measures. *Biological Psychology*, *90*(1), 50–59. doi:10.1016/j.biopsycho.2012.02.011
- Royzman, E. B., Landy, J. F., & Leeman, R. F. (2014). Are thoughtful people more utilitarian? CRT as a unique predictor of moral minimalism in the dilemmatic context. *Cognitive Science*. Advance online publication. doi:10.1111/cogs.12136
- Schroeter, M. L., Bzdok, D., Eickhoff, S. B., & Neumann, J. (2014). Frontomedian cortex is central for moral deficits in behavioural variant frontotemporal dementia. *Journal of Neurology, Neurosurgery & Psychiatry*. Advance online publication. doi:10.1136/jnnp-2014-308387
- Seara-Cardoso, A., Dolberg, H., Neumann, C., Roiser, J. P., & Viding, E. (2013). Empathy, morality and psychopathic traits in women. *Personality and Individual Differences*, *55*, 328–333. doi:10.1016/j.paid.2013.03.011
- Seara-Cardoso, A., Neumann, C., Roiser, J., McCrory, E., & Viding, E. (2012). Investigating associations between empathy, morality and psychopathic personality traits in the general population. *Personality and Individual Differences*, *52*(1), 67–71. doi:10.1016/j.paid.2011.08.029
- Seidel, E.-M., Pfabigan, D. M., Keckeis, K., Wucherer, A. M., Jahn, T., Lamm, C., & Derntl, B. (2013). Empathic competencies in violent offenders. *Psychiatry Research*, *210*, 1168–1175. doi:10.1016/j.psychres.2013.08.027
- Sevinc, G., & Spreng, R. N. (2014). Contextual and perceptual brain processes underlying moral cognition: A quantitative meta-analysis of moral reasoning and moral emotions. *PLoS ONE*, *9*(2), e87427. doi:10.1371/journal.pone.0087427
- Shamay-Tsoory, S. G., Harari, H., Aharon-Peretz, J., & Levkovitz, Y. (2010). The role of the orbitofrontal cortex in affective theory of mind deficits in criminal offenders with psychopathic tendencies. *Cortex*, *46*, 668–677. doi:10.1016/j.cortex.2009.04.008
- Shenhav, A., & Greene, J. D. (2014). Integrative moral judgment: Dissociating the roles of the amygdala and the ventromedial prefrontal cortex. *Journal of Neuroscience*, *34*, 4741–4749. doi:10.1523/JNEUROSCI.3390-13.2014
- Strohlinger, N., & Nichols, S. (2014). The essential moral self. *Cognition*, *131*, 159–171. doi:10.1016/j.cognition.2013.12.005
- Szekely, R. D., & Miu, A. C. (2014). Incidental emotions in moral dilemmas: The influence of emotion regulation. *Cognition & Emotion*, *29*(1), 64–75. doi:10.1080/02699931.2014.895300
- Taber-Thomas, B. C., Asp, E. W., Koenigs, M., Sutterer, M., Anderson, S. W., & Tranel, D. (2014). Arrested development: Early prefrontal lesions impair the maturation of moral judgement. *Brain*, *137*, 1254–1261. doi:10.1093/brain/awt377
- Tassy, S., Deruelle, C., Mancini, J., Leistedt, S., & Wicker, B. (2013). High levels of psychopathic traits alters moral choice but not moral judgment. *Frontiers in Human Neuroscience*, *7*, 229. doi:10.3389/fnhum.2013.00229
- Thomson, J. J. (1985). The trolley problem. *The Yale Law Journal*, *94*, 1395–1415. doi:10.2307/796133
- Wai, M., & Tiliopoulos, N. (2012). The affective and cognitive empathic nature of the dark triad of personality. *Personality and Individual Differences*, *52*, 794–799. doi:10.1016/j.paid.2012.01.008
- Warren, G. C. (2009). *The relationship between psychopathy and indirect aggression in a community sample* (Doctoral of philosophy thesis). University of York, UK.
- Wiech, K., Kahane, G., Shackel, N., Farias, M., Savulescu, J., & Tracey, I. (2013). Cold or calculating? Reduced activity in the subgenual cingulate cortex reflects decreased emotional aversion to harming in counterintuitive utilitarian judgment. *Cognition*, *126*, 364–372. doi:10.1016/j.cognition.2012.11.002
- Wiegmann, A., & Waldmann, M. R. (2014). Transfer effects between moral dilemmas: A causal model theory. *Cognition*, *131*(1), 28–43. doi:10.1016/j.cognition.2013.12.004