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Koenigs et al. reply

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Kahane and Shackel argue¹, on the basis of a re-classification of the moral scenarios used in our study², that our conclusion of a utilitarian bias among patients with ventromedial–prefrontal–cortex (VMPC) damage is unwarranted. Here we provide a re-analysis of our data based on precisely the classification scheme that Kahane and Shackel suggest. This re-analysis confirms our conclusion that damage to the VMPC results in an increase in utilitarian judgements.

Kahane and Shackel propose a classification scheme based solely on assessments of the scenario content. They suggest that utilitarian responses pertain only to those scenarios that pit “consequences” versus “duty.” We neither endorse nor disagree with this view; both their and our classification schemes are defensible.

In a re-analysis of our original data on the basis of the classification scheme suggested by Kahane and Shackel, we find that VMPC patients generated the “utilitarian” judgement (as defined by Kahane and Shackel) in a substantially greater proportion than did either control group (71% by the VMPC group compared to 51% and 49% by the healthy and brain-damaged control groups, respectively; multinomial logistic regression, $P = 0.012$). Furthermore, among the 15 scenarios that present a utilitarian option, there was not one case where either control group endorsed a greater proportion of “utilitarian” responses than the VMPC group. We should note that this pattern of greater endorsement by the VMPC group was specific to the “consequence versus duty” scenarios: for the 9 “self-interest versus duty” moral scenarios in Kahane and Shackel's scheme, VMPC patients endorsed the proposed action in similar proportions to control groups (6% by the VMPC group compared to 2% and 10% by the healthy and brain-damaged control groups, respectively; $P = 0.31$). Likewise, in all 9 of the “self-interest versus duty” scenarios in Kahane and Shackel's scheme, at least one control group endorsed the proposed action in the same or greater proportion than did the VMPC group.

Kahane and Shackel also suggest that our results fail to demonstrate a causal role for emotion in moral judgements, because low- and high-conflict scenarios do not differ in emotional salience yet show differential effects of VMPC damage on moral judgements. Although the harms described in low- and high-conflict scenarios may be similarly

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emotionally salient, we reiterate that only in the high-conflict scenarios do these emotionally salient harms constitute morally ambiguous actions—in the low-conflict scenarios the emotionally aversive harms are quickly and unanimously condemned. In these scenarios, VMPC patients give normal responses, relying, we propose, on their capacity to use learned social rules, such as rules against harming others purely for self-interest.

This pattern of findings, together with VMPC patients' defects in processing social emotions, makes a causal role for emotion in moral judgement a plausible interpretation. This interpretation is consistent with studies showing that independent manipulations of emotion can influence moral judgement^{3,4}. Furthermore, the main result from our original study (a selective effect of VMPC damage on moral judgement) has recently been replicated⁵. A final piece of data that is so far missing is concurrent monitoring of psychophysiological indices of emotion while subjects respond to moral scenarios, a technically challenging approach given the complex and temporally extended nature of the stimuli.

In summary, the re-analysis supports our original conclusion that VMPC patients are abnormally utilitarian in their moral judgement, regardless of how “utilitarian” is defined. Although we disagree with Kahane and Shackel about the conclusions of our original study, we certainly share the view that precise characterizations of distinct brands of moral judgement will prove fruitful in future studies of normal and pathological moral cognition^{6–8}.

References

1. Kahane G, Shackel N. Do abnormal responses show utilitarian bias? *Nature* 2008;452:1038–1041. [PubMed: 18320678]
2. Koenigs M, et al. Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature* 2007;446:908–911. [PubMed: 17377536]
3. Wheatley T, Haidt J. Hypnotic disgust makes moral judgments more severe. *Psychol Sci* 2005;16:780–784. [PubMed: 16181440]
4. Valdesolo P, DeSteno D. Manipulations of emotional context shape moral judgment. *Psychol Sci* 2006;17:476–477. [PubMed: 16771796]
5. Ciaramelli E, Muccioli M, Ladavas E, di Pellegrino G. Selective deficit in personal moral judgment following damage to ventromedial prefrontal cortex. *Social Cogn Affect Neurosci* 2007;2:84–92.
6. Hauser, MD. *Moral Minds: How Nature Designed a Universal Sense of Right and Wrong*. Harper Collins; New York: 2006.
7. Cushman FA, Young L, Hauser MD. The role of conscious reasoning and intuitions in moral judgment: testing three principles of harm. *Psychol Sci* 2006;17:1082–1089. [PubMed: 17201791]
8. Young L, Cushman F, Hauser M, Saxe R. The neural basis of the interaction between theory of mind and moral judgment. *Proc Natl Acad Sci USA* 2007;104:8235–8240. [PubMed: 17485679]