



Universiteit
Leiden
The Netherlands

Neural correlates of the motivation to be moral

Nunspeet, F. van

Citation

Nunspeet, F. van. (2014, May 27). *Neural correlates of the motivation to be moral*. Kurt Lewin Institute Dissertation Series. Ridderprint B.V., Ridderkerk. Retrieved from <https://hdl.handle.net/1887/25829>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/25829>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/25829> holds various files of this Leiden University dissertation.

Author: Nunspeet, Félice van

Title: Neural correlates of the motivation to be moral

Issue Date: 2014-05-27

Appendices

Appendix A

Supplementary data Chapter 2

Pretest: Testing the Target Stimuli

Stimuli that represented the target concepts in our IAT consisted of 10 pictures of female faces without a headscarf and 10 pictures of female faces with a headscarf. All pictures were pretested by 67 participants (11 males), none of whom participated in the main study. Participants were asked to rate the pictures – that were presented as two groups: i.e., pictures of women with a headscarf and pictures of women without a headscarf were presented all on one screen – on personal characteristics, and ingroup (women without a headscarf) vs. outgroup (women with a headscarf) resemblance on a 7-point scale ranging from “not at all” to “to a great extent”. Results showed that, although participants did not evaluate the women in the two groups differently concerning their perceived kindness, intelligence, competence, friendliness, genuinely, and trustworthiness, $M(\text{outgroup}) = 5.00$, $SD = 0.63$; $M(\text{ingroup}) = 4.91$, $SD = 0.64$; $t(66) = -1.33$, ns ; they did report to perceive the women with headscarves to differ less from each other and to be more similar to each other than the women without headscarves; $M(\text{outgroup}) = 3.74$, $SD = 1.51$; $M(\text{ingroup}) = 2.81$, $SD = 1.22$; $t(66) = -5.41$, $p < .001$. Moreover, as intended, participants reported that they identified more with women without headscarves (the ingroup) than with women with headscarves (the outgroup); $M(\text{outgroup}) = 2.60$, $SD = 1.03$; $M(\text{ingroup}) = 3.94$, $SD = 1.16$; $t(66) = 7.96$, $p < .001$. The results thus indicated that, as intended, participants identified more with the ingroup. Furthermore, we found a clear ingroup/outgroup differentiation for women with and without a headscarf that is consistent with existing insights that outgroups tend to be perceived as more homogeneous than ingroups. This confirms that the stimuli we developed are suitable for our IAT.

A Pilot Study: Testing the IAT

Using two different task instructions, we framed the IAT as either a test of participant’s morality or competence. However, although we argue that the IAT is an appropriate measure for the aim of our study, it is also possible that the test itself (without any additional information) raises morality concerns. After all, it could be evident for participants that a task concerning women with versus women without a headscarf has to do with prejudice or discrimination). We therefore first conducted a pilot study to test our new version of the IAT and to assess how the

test is interpreted by participants.

Method

Participants.

Twenty-six non-Muslim students from Leiden University (11 males, M age = 23.2 years, $SD = 4.8$) participated in the pilot study for money or course credits.

The implicit association test.

Stimuli. Besides the stimuli that represented the target concepts of the IAT (i.e., pictures of women with and without a headscarf; described in the pretest), there were also stimuli that represented the attributes. These consisted of 5 pictures of positive scenes (e.g., sun flowers), and 5 pictures of negative scenes (e.g., a tornado), selected from the International Affective Picture System (IAPS; Lang, Bradley, Cuthbert, 2005). The stimuli were selected based on the scores for pleasure (i.e., negative pictures with scores < 4 and positive pictures with scores > 7).

Experimental design.

The design of the IAT was identical to the design used by Greenwald, McGhee, and Schwartz (1998) in which the IAT consisted of 5 blocks. Congruent trials in test block 3 or 5 were trials for which female faces without a headscarf shared the same response key as positive pictures and female faces with a headscarf the same response key as negative pictures. Incongruent trials were trials for which female faces without a headscarf shared the same response key as negative pictures and female faces with a headscarf the same response key as positive pictures. The order of the congruent and incongruent trial blocks (3 and 5) was counterbalanced between participants. Blocks 1, 2, and 4 consisted of 26 trials and blocks 3 and 5 consisted of 156 trials each. Each trial started with a fixation point (with a duration that varied between 500-1500 ms), followed by stimulus presentation to which participants were supposed to respond (680 ms), and a feedback screen (500 ms). The feedback screen indicated whether participants responded correctly (indicated by a green check mark), incorrectly (i.e., a red cross), or whether they responded too late. Stimuli alternated between female faces and positive or negative pictures and the presentation order of stimuli was random. Participants could start each

block themselves and were thus able to take a short break in between. The experiment took approximately 25 minutes.

The IAT effect (*D* score).

The dependent measure was the IAT effect – indicated by the *D* score – calculated as the difference in reaction times on incongruent and congruent trials divided by a pooled standard deviation of all correct trials. This IAT effect was computed based on the scoring algorithm described by Greenwald, Nosek, and Banaji (2003). However, in contrast to IAT trials of Greenwald et al., where participants are asked to respond as quickly as possible but the stimuli only disappeared after a response was made, we used a limited presentation time of the stimuli (i.e., participants had to respond within 680ms after which the stimulus disappeared from the screen). We therefore did not have trials with extreme long or short latencies and we thus included them all, replaced error latencies with a replacement value (the mean plus two times the standard deviation of the correct latencies) and replaced zero latencies of the trials on which participants did not respond in time with the maximum response time of 680 ms.

Interpretation of the IAT.

After finishing the IAT we asked participants two questions (both positively and negatively formulated) concerning their interpretation of the IAT (i.e., “I think this test can assess my moral values concerning the equal treatment of different groups of people” / “I think this test cannot assess whether I am good in processing [new] information”). Participants could respond on a 7-point scale ranging from 1 “completely disagree” to 7 “completely agree”.

Results and Discussion

Interpretation of the IAT.

Participants reported they were more inclined to think the test measured how well they are able to process new information ($M = 4.27$, $SD = 1.34$) than that the test measured their moral values concerning the equal treatment of different groups of people ($M = 3.14$, $SD = 1.80$); $t(25) = 3.44$, $p = .002$. This result thus negates our concern that the IAT raises morality concerns even though this is not made explicit.

IAT effect.

Participants showed the standard IAT effect (i.e., a negative implicit bias towards women with a headscarf); $t(25) = 2.61, p = .015$: Responding was more difficult on incongruent than on congruent trials (as was shown by increased reaction times and erroneous responses on incongruent compared to congruent trials). Our test thus revealed the typical IAT effect as it was first introduced by Greenwald et al. (1998).

The Instruction Manipulation

In the main manuscript, we shortly describe the difference between the two instruction conditions of our IAT. Here, we report the complete translation of these instructions.

Morality instruction.

“Is it important to you to treat people from different groups equally? Or do you have discriminating conceptions? Are you convinced that it is good to judge every individual, despite his or her gender, religion or ethnicity, in the same way? Or do you think it is right that some groups have a lower status in the Dutch society? People have different values concerning egalitarianism and discrimination. The test that you are about to do will show what kind of values you have and indicates whether your conceptions are discriminating against certain groups of people. The test is thus about important values you have and to what extent you strive for egalitarianism. The time to respond is limited, try to respond as quickly and as accurately as possible.”

Competence instruction.

“Are you able to quickly and accurately respond to new information? Can you assess things very rapidly? Or, are you not able to quickly evaluate and respond to new information? People differ in how well they are able to pick up new information and how easy they can learn new tasks. The test that you are about to do will show how well you are able to process new information and indicates whether you can rapidly and accurately sort different types of pictures. This test is thus about sorting different types of images, a good performance and fast reaction times. The time to respond is limited, try to respond as quickly and as accurately as possible.”

Appendix B

Supplementary data Chapter 4

Additional ERP results Study 4.2

Effects of Electrode Site

N1.

A main effect of electrode site for the N1 revealed that the N1 was greater at Cz ($M = -7.44 \mu\text{V}$, $SE = 0.37$) than at FCz ($M = -6.66 \mu\text{V}$, $SE = 0.35$); $F(1,56) = 14.84$, $p < .001$, $\eta^2 = .21$. There was also a significant interaction between electrode, face and congruency; $F(1,56) = 3.92$, $p = .05$, $\eta^2 = .07$. Separate follow-up analyses revealed that there was a significant interaction between electrode and face on incongruent (and not on congruent) trials; $F(1,56) = 4.43$, $p = .04$, $\eta^2 = .07$, indicating that for incongruent trials the N1 modulation of viewing outgroup compared to ingroup faces was significant at Cz; $M_{\text{difference}} = -0.55$, $SE = 0.26$, $F(1,56) = 4.34$, $p = .04$, $\eta^2 = .07$, but not at FCz; $M_{\text{difference}} = -0.07$, $SE = 0.21$, $F < 1$.

P150.

The main effect of electrode site for the P150 showed that this ERP was greater at FCz ($M = 5.13 \mu\text{V}$, $SE = 0.47$) than at Cz ($M = 4.08 \mu\text{V}$, $SE = 0.43$); $F(1,56) = 75.65$, $p < .001$, $\eta^2 = .58$. There was also a significant interaction between electrode, face, congruency, task domain, and evaluator; $F(1,56) = 5.93$, $p = .02$, $\eta^2 = .10$. Follow-up analyses showed that (1) on incongruent (and not on congruent) trials there was an interaction between electrode, face, task domain, and evaluator; $F(1,56) = 7.04$, $p = .01$, $\eta^2 = .11$; (2) only at Cz (and not at FCz) there was a marginally significant interaction between face, task domain, and evaluator; $F(1,56) = 3.57$, $p = .06$, $\eta^2 = .06$. Separate analyses per task domain revealed a marginally significant face*evaluator interaction in the moral domain; $F(1,31) = 3.39$, $p = .08$, $\eta^2 = .10$, but not in the competence domain; $F < 1$. Separate analyses per evaluator type revealed a marginally significant interaction between face and task domain in case of an outgroup evaluator; $F(1,27) = 3.14$, $p = .09$, $\eta^2 = .10$, but not in case of an ingroup evaluator; $F(1,27) = 1.02$, $p = .32$. Simple main effects revealed that the P150 modulation of enhanced social categorization was significant in the morality/ingroup condition ($F[1,31] = 12.84$, $p = .001$, $\eta^2 = .29$), but not in the morality/outgroup condition ($F < 1$). And significant in the competence/outgroup condition ($F[1,27] = 9.91$, $p = .004$, $\eta^2 = .27$), but not in the competence/ingroup condition ($F < 1$). Note that, besides the fact that we found these effects only at Cz

and incongruent trials, the increased P150 modulation in the morality/ingroup condition is consistent with our hypotheses and previous research (Van Nunspeet et al., 2014).

N450.

Results of the N450 also showed a main effect of electrode site; $F(1,56) = 86.49, p < .001, \eta^2 = .61$, indicating that the N450 was larger at CPz ($M = -0.44 \mu\text{V}, SE = 0.37$) than at Pz ($M = 0.95 \mu\text{V}, SE = 0.31$). There was also an interaction between electrode site and face; $F(1,56) = 22.05, p < .001, \eta^2 = .28$, indicating that the difference in the N450 between viewing non-Muslim (ingroup) compared to Muslim (outgroup) women was greater at Pz; $M_{\text{difference}} = -0.77, SE = 0.24, F(1,56) = 39.27, p < .001, \eta^2 = .41$, than at CPz; $M_{\text{difference}} = -1.38, SE = 0.22, F(1,56) = 22.05, p < .001, \eta^2 = .16$. Moreover, there was an interaction between electrode, congruency, and task domain; $F(1,56) = 4.42, p = .04, \eta^2 = .07$. However, follow-up analyses –separately for each electrode site and for each task domain condition– revealed no significant two-way interactions with congruency; F 's $< 2.29, p$'s $> .14$.

ERN.

For the ERN there was only a main effect of electrode site, revealing that the ERN modulation was greater at FCz ($M = -2.95 \mu\text{V}, SE = 0.47$) than at Cz ($M = -0.99 \mu\text{V}, SE = 0.46$); $F(1,44) = 76.20, p < .001, \eta^2 = .63$. There were no interaction effects with this factor.

The N450 Modulation of Viewing (non-)Muslim Faces

N450.

As the described in the main manuscript, we found a significant four-way interaction between congruency, face, domain and evaluator; $F(1,56) = 5.75, p = .02, \eta^2 = .09$. Since we were interested in the modulation of congruency, we included follow-up analyses examining this particular factor. However, we also found a main effect of faces: The N450 was larger for pictures of non-Muslim ($M = -0.28 \mu\text{V}, SE = 0.37$) compared to Muslim women ($M = 0.79 \mu\text{V}, SE = 0.33$); $F(1,56) = 24.06, p < .001, \eta^2 = .30$. We therefore also conducted analyses for the N450 modulations of faces: Separate analyses for the task domain conditions revealed a significant interaction between face, congruency, and evaluator in the morality condition; $F(1,31) = 5.36, p < .03, \eta^2 = .15$, but not in the competence

condition; $F(1,25) = 1.30, p = .27$. Furthermore, within the morality condition, there was an interaction between face and congruency in the ingroup evaluator condition; $F(1,16) = 10.26, p = .006, \eta^2 = .39$, but not in the outgroup evaluator condition; $F(1,15) < 1$. Simple main effects revealed that the N450 modulation of viewing non-Muslim compared to Muslim women in the morality/ingroup condition was significant on incongruent trials; $F(1,16) = 15.68, p = .001, \eta^2 = .50$, but not on congruent trials; $F < 1$.

References

- Abraham, A. (2013). The world according to me: Personal relevance and the medial prefrontal cortex. *Frontiers in Human Neuroscience*, 7, 341.
doi:10.3389/fnhum.2013.00341
- Alicke, M. D., Klotz, M. L., Breitenbecher, D. L., Yurak, T. J., & Vredenburg, D. S. (1995). Personal contact, individuation, and the better-than-average effect. *Journal of Personality and Social Psychology*, 68, 804-825.
- Amodio, D. M. (2010). Coordinated roles of motivation and perception in the regulation of intergroup responses: Frontal cortical asymmetry effects on the P2 event-related potential and behavior. *Journal of Cognitive Neuroscience*, 22, 2609-2617.
- Amodio, D. M., Devine, P. G., & Harmon-Jones, E. (2008). Individual differences in the regulation of intergroup bias: The role of conflict monitoring and neural signals for control. *Journal of Personality and Social Psychology*, 94, 60-74.
- Amodio, D. M., Harmon-Jones, E., Devine, P. G., Curtin, J. J., Hartley, S. L., & Covert, A. E. (2004). Neural signals for the detection of unintentional race bias. *Psychological Science*, 15, 88-93.
- Amodio, D. M., & Frith, C. D. (2006). Meeting of minds: the medial frontal cortex and social cognition. *Nature Reviews Neuroscience*, 7, 268-277.
doi:10.1038/nrn1884
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5, 323-370. doi:10.1037//1089-2680.5.4.323
- Beer, J. S., Stallen, M., Lombardo, M. V., Gonsalkorale, K., Cunningham, W. A., & Sherman, J. W. (2008). The Quadruple Process model approach to examining the neural underpinnings of prejudice. *NeuroImage*, 43, 775-783.
- Bengtsson, S. L., Lau, H. C., & Passingham, R. E. (2009). Motivation to do well enhances responses to errors and self-monitoring. *Cerebral Cortex*, 19(4), 797-804. doi:10.1093/cercor/bhn127
- Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychology Review*, 6, 242-261.
- Botvinick, M. M., Braver, T. S., Barch, D. M., Carter, C. S., & Cohen, J. D. (2001). Conflict monitoring and cognitive control. *Psychological Review*, 108, 624.

- Brambilla, M., Rusconi, P., Sacchi, S., & Cherubini, P. (2011). Looking for honesty: The primary role of morality (vs. sociability and competence) in information gathering. *European Journal of Social Psychology, 41*, 135-143.
- Brambilla, M., Sacchi, S., Rusconi, P., Cherubini, P., & Yzerbyt, V. Y. (2011). You want to give a good impression? Be honest! Moral traits dominate group impression formation. *British Journal of Social Psychology, 50*, 1-18.
- Brett, M., Anton, J. L., Valabregue, R., & Poline, J. B. (2002). Region of interest analysis using the MarsBar toolbox for SPM 99. *Neuroimage, 16*, 497.
- Casebeer, W. D. (2003). Moral cognition and its neural constituents. *Nature Reviews Neuroscience, 4*, 840-847.
- Chee, M. W., Sriram, N., Soon, C. S., & Lee, K. M. (2000). Dorsolateral prefrontal cortex and the implicit association of concepts and attributes. *Neuroreport, 11*, 135-140.
- Christensen, J. F., & Gomila, A. (2012). Moral dilemmas in cognitive neuroscience of moral decision-making: A principled review. *Neuroscience & Biobehavioral Reviews, 36*, 1249-1264. doi:10.1016/j.neubiorev.2012.02.008
- Cope, L. M., Borg, J. S., Harenski, C. L., Sinnott-Armstrong, W., Lieberman, D., Nyalakanti, P. K., ... & Kiehl, K. A. (2010). Hemispheric asymmetries during processing of immoral stimuli. *Frontiers in Evolutionary Neuroscience, 2*, 1-14. doi:10.3389/fnevo.2010.00110
- Cocosco, C. A., Kollokian, V., Kwan, R. K. S., Pike, G. B., & Evans, A. C. (1997). Brainweb: Online interface to a 3D MRI simulated brain database. *NeuroImage, 5*, 425.
- Crisp, R. J., & Hewstone, M. (1999). Differential evaluation of crossed category groups: Patterns, processes, and reducing intergroup bias. *Group Processes & Intergroup Relations, 2*(4), 307-333. doi: 10.1177/1368430299024001
- Crisp, R. J., & Hewstone, M. (2007). Multiple social categorization. *Advances in Experimental Social Psychology, 39*, 163-254.
- Crisp, R. J., Hewstone, M., & Rubin, M. (2001). Does multiple categorization reduce intergroup bias? *Personality and Social Psychology Bulletin, 27*(1), 76-89. doi:10.1177/0146167201271007

- Crosby, F., Bromley, S., & Saxe, L. (1980). Recent unobtrusive studies of Black and White discrimination and prejudice: A literature review. *Psychological Bulletin*, *87*(3), 546-563.
- Cunningham, W. A., Van Bavel, J. J., Arbuckle, N. L., Packer, D. J., & Waggoner, A. S. (2012). Rapid social perception is flexible: Approach and avoidance motivational states shape P100 responses to other-race faces. *Frontiers in Human Neuroscience*, *6*, 1-7. doi: 10.3389/fnhum.2012.00140
- Dasgupta, N. & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology*, *81*, 800-814.
- Dasgupta, N., DeSteno, D., Williams, L. A., & Hunsinger, M. (2009). Fanning the flames of prejudice: The influence of specific incidental emotions on implicit prejudice. *Emotion*, *9*, 585-591.
- Dawson, M. E., Schell, A. M., & Filion, D. L. (2000). The electrodermal system. In Cacioppo, J. T., Tassinary, L. G., & Berntson, G. G. (Eds.) *Handbook of Psychophysiology*. Cambridge University Press, Cambridge, 200-223.
- 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
- Delgado, M. R., Frank, R. H., & Phelps, E. A. (2005). Perceptions of moral character modulate the neural systems of reward during the trust game. *Nature Neuroscience*, *8*, 1611-1618. doi:10.1038/nn1575
- Dickter, C. L., & Bartholow, B. D. (2007). Racial ingroup and outgroup attention biases revealed by event-related brain potentials. *Social Cognitive and Affective Neuroscience*, *2*, 189-198.
- Does, S., Derks, B., & Ellemers, N. (2011). Thou shalt not discriminate: How emphasizing moral ideals rather than obligations increases Whites' support for social equality. *Journal of Experimental Social Psychology*, *47*, 562-571.
- Does, S., Derks, B., Ellemers, N. & Scheepers, D. (2012). At the heart of egalitarianism: How morality framing shapes cardiovascular challenge versus threat in Whites. *Social Psychological and Personality Science*, *3*, 747-753.

- Dovidio, J. F., Kawakami, K., & Beach, K. R. (2001). Implicit and explicit attitudes: Examination of the relationship between measures of intergroup bias. In R. Brown & S. Gaertner (Eds.), *Blackwell handbook of social psychology: Intergroup processes* (pp. 175-197). Maiden, MA: Blackwell.
- Ellemers, N., Kingma, L., Van de Burgt, J., & Barreto, M. (2011). Corporate Social Responsibility as a source of organizational morality, employee commitment and satisfaction. *Journal of Organizational Moral Psychology, 1*, 97-124.
- Ellemers, N. & Van den Bos, K. (2012). Morality in groups: On the social-regulatory functions of right and wrong. *Social and Personality Psychology Compass, 6*, 878-889. doi: 10.1111/spc3.12001
- Ellemers, N., Pagliaro, S., & Barreto, M. (2013). Morality and behavioural regulation in groups: A social identity approach. *European Review of Social Psychology, 24*(1),160-193.
- Ellemers, N., Pagliaro, S., Barreto, M., & Leach, C. W. (2008). Is it better to be moral than smart? The effects of morality and competence norms on the decision to work at group status improvement. *Journal of Personality and Social Psychology, 95*, 1397-1410.
- European Commission (2005). The business case for diversity. Good practices in the workplace.<http://ec.europa.eu/social/main.jsp?catId=370&featuresId=25&langId=nl>.
- FeldmanHall, O., Mobbs, D., Evans, D., Hiscox, L., Navrady, L., & Dalgleish, T. (2012).What we say and what we do: the relationship between real and hypothetical moral choices. *Cognition, 123*, 434-441. doi:10.1016/j.cognition.2012.02.001
- Fiedler, K., & Bluemke, M. (2005). Faking the IAT: Aided and unaided response control on the implicit association tests. *Basic and Applied Social Psychology, 27*, 307-316.
- Fiske, S. T., Cuddy, A. J. C., Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences, 11*, 77-83.
- Frantz, C. M., Cuddy, A. J. C., Burnett, M., ray, H., & Hart, A. (2004). A threat in the computer: The race implicit association test as a stereotype threat experience. *Personality and Social Psychology Bulletin, 30*, 1611-1624.

- Gehring, W. J., Goss, B., Coles, M. G. H., Meyer, D. E., & Donchin, E. (1993). A neural system for error detection and compensation. *Psychological Science*, *4*, 385-390.
- Gonsalkorale, K., Sherman, J. W., Allen, T. J., Klauer, K. C., & Amodio, D. M. (2011). Accounting for successful control of implicit racial bias: The roles of association activation, response monitoring, and overcoming bias. *Personality and Social Psychology Bulletin*, *37*, 1534-1545.
- Gratton, G., Coles, M.G., & Donchin, E. (1983). A new method for off-line removal of ocular artifact. *Electroencephalography & Clinical Neurophysiology*, *55*, 468–484.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, *74*, 1464-1480.
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*, 197-216.
- Hajcak, G., Moser, J. S., Yeung, N., & Simons, R. F. (2005). On the ERN and the significance of errors. *Psychophysiology*, *42*, 151-160.
- Haxby, J. V., Hoffman, E. A., & Gobbini, M. I. (2000). The distributed human neural system for face perception. *Trends in cognitive sciences*, *4*, 223-233.
- Hepper, E. G., Hart, C. M., Gregg, A. P., & Sedikides, C. (2011). Motivated expectations of positive feedback in social interactions. *The Journal of Social Psychology*, *151*, 455-477.
- Ishai, A. (2008). Let's face it: it's a cortical network. *Neuroimage*, *40*(2), 415-419. doi:10.1016/j.neuroimage.2007.10.040
- Ito, T. A., & Urland, G. R. (2003). Race and gender on the brain: Electrocortical measures of attention to the race and gender of multiply categorizable individuals. *Journal of Personality and Social Psychology*, *85*, 616-626.
- Ito, T. A., & Urland, G. R. (2005) The influence of processing objectives on the perception of faces: An ERP study of race and gender perception. *Cognitive, Affective, & Behavioral Neuroscience*, *5*, 21-36.

- Jordan, A. H., & Monin, B. (2008). From sucker to Saint: Moralization in response to self-threat. *Psychological Science, 19*, 809-815. doi: 10.1111/j.1467-9280.2008.02161.x
- Kawakami, K., Dovidio, J. F., Moll, J., Hermsen, S., & Russin, A. (2000). Just say no (to stereotyping): effects of training in the negation of stereotypic associations on stereotype activation. *Journal of Personality and Social Psychology, 78*(5), 871-888. doi: 10.1037//0022-3514.78.5.871
- Korn, C. W., Prehn, K., Park, S. Q., Walter, H., & Heekeren, H. R. (2012). Positively biased processing of self-relevant social feedback. *The Journal of Neuroscience, 32*, 16832-16844. doi:10.1523/JNEUROSCI.3016-12.2012
- Kouzakova, M., Ellemers, N., Harinck, F., & Scheepers, D. (2012). The implications of value conflict: How disagreement on values affects self-involvement and perceived common ground. *Personality and Social Psychology Bulletin, 38*, 798-807.
- Kouzakova, M., Harinck, F., Ellemers, N., & Scheepers, D. (2014). At the heart of a conflict: Cardiovascular and self-regulation responses to value versus resource conflicts. *Social Psychological and Personality Science, 5*, 35-42.
- Kubota, J. T., Banaji, M. R., & Phelps, E. A. (2012). The neuroscience of race. *Nature Neuroscience, 15*, 940-948. doi:10.1038/nn.3136
- Kubota, J. T., & Ito, T. A. (2007). Multiple cues in social perception: The time course of processing race and facial expression. *Journal of Experimental Social Psychology, 43*, 738-752.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2005). International affective picture system (IAPS): Digitized photographs, instruction manual and affective ratings. *Technical Report A-6*. University of Florida, Gainesville, FL.
- Lawrence, N. S., Wooderson, S., Mataix-Cols, D., David, R., Speckens, A., & Phillips, M. L. (2006). Decision making and set shifting impairments are associated with distinct symptom dimensions in obsessive-compulsive disorder. *Neuropsychology, 20*, 409-419. doi:10.1037/0894-4105.20.4.409

- Leach, C. W., Bilali, R., & Pagliaro, S. (2012). Groups and Morality. In J. Simpson & J. F. Dovidio (2013) (Eds.) *APA Handbook of Personality and Social Psychology, Vol. 2: Interpersonal Relationships and Group Processes*. Washington, DC: American Psychological Association.
- Leach, C. W., Ellemers, N., & Barreto, M. (2007). Group virtue: The importance of morality (vs. competence and sociability) in the positive evaluation of in-groups. *Journal of Personality and Social Psychology, 93*, 234-249.
- Lowery, B. S., Hardin, C. D., & Sinclair, S. (2001). Social influence effects on automatic racial prejudice. *Journal of personality and social psychology, 81*(5), 842-855. doi:10.1037//0022-3514.81.5.842
- Lupfer, M. B., Weeks, M., & Dupuis, S. (2000). How pervasive is the negativity bias in judgments based on character appraisal?. *Personality and Social Psychology Bulletin, 26*, 1353-1366. doi:10.1177/0146167200263004
- MacDonald, A. W., Cohen, J. D., Stenger, V. A., & Carter, C. S. (2000). Dissociating the role of the dorsolateral prefrontal and anterior cingulate cortex in cognitive control. *Science, 288*, 1835-1838.
- Martijn, C., Spears, R., Van der Pligt, J., & Jakobs, E. (1992). Negativity and positivity effects in person perception and inference: Ability versus morality. *European Journal of Social Psychology, 22*, 453-463.
- Monin, B., & Miller, D. T. (2001). Moral credentials and the expression of prejudice. *Journal of Personality and Social Psychology, 81*, 33-43.
- Moran, J. M., Macrae, C. N., Heatherton, T. F., Wyland, C. L., & Kelley, W. M. (2006). Neuroanatomical evidence for distinct cognitive and affective components of self. *Journal of Cognitive Neuroscience, 18*, 1586-1594.
- Nieuwenhuis, S., Ridderinkhof, K. R., Blom, J., Band, G. P. H., & Kok, A. (2001). Error-related brain potentials are differentially related to awareness of response errors: Evidence from an antisaccade task. *Psychophysiology, 38*, 752-760.
- Nigam, A., Hoffman, J. E., Simons, R. F. (1992). N400 to semantically anomalous pictures and words. *Journal of Cognitive Neuroscience, 4*, 15-22.

- Northoff, G., & Bermpohl, F. (2004). Cortical midline structures and the self. *Trends in cognitive sciences*, *8*, 102-107. doi:10.1016/j.tics.2004.01.004
- Northoff, G., & Panksepp, J. (2008). The trans-species concept of self and the subcortical-cortical midline system. *Trends in Cognitive Sciences*, *12*, 259-264. doi:10.1016/j.tics.2008.04.007
- Ochsner, K. N., Beer, J. S., Robertson, E. R., Cooper, J. C., Gabrieli, J. D., Kihlstrom, J. F., & D'Esposito, M. (2005). The neural correlates of direct and reflected self-knowledge. *Neuroimage*, *28*, 797-814. doi:10.1016/j.neuroimage.2005.06.069
- Pagliaro, S., Ellemers, N., & Barreto, M. (2011). Sharing moral values: Anticipated ingroup respect as a determinant of adherence to morality-based (but not competence-based) group norms. *Personality and Social Psychology Bulletin*, *37*, 1117-1129.
- Pitcher, D., Walsh, V., & Duchaine, B. (2011). The role of the occipital face area in the cortical face perception network. *Experimental Brain Research*, *209*(4), 481-493. doi:10.1007/s00221-011-2579-1
- Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of Personality and Social Psychology*, *75*, 811-832.
- Poldrack, R. A. (2007). Region of interest analysis for fMRI. *Social Cognitive and Affective Neuroscience*, *2*, 67-70. doi:10.1093/scan/nsm006
- Ratner, K. G., Kaul, C., & Van Bavel, J. J. (2013). Is race erased? Decoding race from patterns of neural activity when skin color is not diagnostic of group boundaries. *Social Cognitive and Affective Neuroscience*, *8*, 750-755. doi:10.1093/scan/nss/063
- Rebai, M., Bernard, C., & Lannou, J. (1997). The Stroop's test evokes a negative brain potential, the N400. *International Journal of Neuroscience*, *91*, 85-94.
- Reed II, A., & Aquino, K. F. (2003). Moral identity and the expanding circle of moral regard toward out-groups. *Journal of personality and social psychology*, *84*, 1270-1286. doi:10.1037/0022-3514.84.6.1270

- Richeson, J. A., & Ambady, N. (2003). Effects of situational power on automatic racial prejudice. *Journal of Experimental Social Psychology, 39*(2), 177-183. doi:10.1016/S0022-1031(02)00521-8
- Robinson, G. & Dechant, K. (1997). Building a business case for diversity. *The Academy of Management Executive, 11*, 21 – 31.
- Rudman, L. A., Dohn, M. C., & Fairchild, K. (2007). Implicit self-esteem compensation: automatic threat defense. *Journal of Personality and Social Psychology, 93*(5), 798-813. doi:10.1037/0022-3514.93.5.798
- Scheepers, D., Ellemers, N., & Derks, B. (2013). The “nature” of prejudice: What neuroscience has to offer to the study of intergroup relations. In: B. Derks, D. Scheepers, & N. Ellemers (Eds.). *The neuroscience of prejudice and intergroup relations*. New York: Psychology Press.
- Schmitz, T. W., & Johnson, S. C. (2007). Relevance to self: A brief review and framework of neural systems underlying appraisal. *Neuroscience & Biobehavioral Reviews, 31*, 585-596. doi:10.1016/j.neubiorev.2006.12.003
- Skowronski, J. J., & Carlston, D. E. (1987). Social judgment and social memory: The role of cue diagnosticity in negativity, positivity, and extremity biases. *Journal of Personality and Social Psychology, 52*, 689-699.
- Stanley, D., Phelps, E., & Banaji, M. (2008). The neural basis of implicit attitudes. *Current Directions in Psychological Science, 17*, 164-170. doi:10.1111/j.1467-8721.2008.00568.x
- Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American, 223*, 96-102.
- Tajfel, H. (1978). *Differentiation between social groups*. London: Academic Press.
- Urada, D., Stenstrom, D. M., & Miller, N. (2007). Crossed categorization beyond the two-group model. *Journal of Personality and Social Psychology, 92*(4), 649-664. doi:10.1037/0022-3514.92.4.649
- Van Bavel, J. J., Packer, D. J., & Cunningham, W. A. (2011). Modulation of the fusiform face area following minimal exposure to motivationally relevant faces: Evidence of in-group enhancement (not out-group disregard). *Journal of Cognitive Neuroscience, 23*(11), 3343-3354.

- Van der Lee, R. (2013). Moral motivation within groups. Doctoral thesis. Leiden University.
- Van der Meer, L., Costafreda, S., Aleman, A., & David, A. S. (2010). Self- and the brain: A theoretical review and meta-analysis of neuroimaging studies with implications for schizophrenia. *Neuroscience & Biobehavioral Reviews*, *34*, 935-946. doi:10.1016/j.neubiorev.2009.12.004
- Van Nunspeet, F., Derks, B., Ellemers, N., & Nieuwenhuis, S. (*Manuscript under review*). Moral impression management: Evaluation by an ingroup member during a moral IAT enhances perceptual attention and conflict-monitoring.
- Van Nunspeet, F., Ellemers, N., & Derks, B., (*Manuscript under review*). Reducing implicit prejudice against Muslim women: The effects of moral concerns, intra- and intergroup motives.
- Van Nunspeet, F., Ellemers, N., Derks, B., & Nieuwenhuis, S. (2014). Moral concerns attention and response monitoring during IAT performance: ERP evidence. *Social, Cognitive, and Affective Neuroscience*, *9*, 141-149. doi:10.1093/scan/nss118
- Wegner, D. M. (2011). Setting free the bears: escape from thought suppression. *American Psychologist*, *66*, 671-680.
- Williams, J. K., & Thémanson, J. R. (2011). Neural correlates of the implicit association test: Evidence for semantic and emotional processing. *Social Cognitive and Affective Neuroscience*, *6*, 468-476.
- Willis, J., & Todorov, A. (2006). First impressions: making up your mind after 100-ms exposure to a face. *Psychological Science*, *17*, 592-598.