



Discussion forum

Appraising value: The role of universal core values and emotions in decision-making



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In an interdisciplinary tour de force, *Emotion and Decision-Making Explained* (Rolls, 2014a) synthesizes a large number of research findings from neurophysiology, neuroimaging, computational modeling, psychiatry, psychology, neuropsychology, economics and neuroeconomics into a unifying perspective on emotion, value and decision-making. The author integrates his influential theory of emotions, based on the idea that emotions are states elicited by rewards and punishers, with research in neuroeconomics that investigates neurocognitive mechanisms underlying valuation and decision-making (e.g., Levy & Glimcher, 2012). The brain is assumed to be designed around specific reward and punishment value systems, enabling the integration of multiple value computations to produce flexible behavior that increases fitness and reproductive success. This view thus offers an alternative to classical economic models of decision-making centered on rational actors interested in the maximization of economic utility value.

We very much agree that a theoretical perspective on decision-making that is based on affective processes is bound to be very fruitful and will be able to explain a larger range of decisions and behaviors than rational-actor models (see, e.g., Brosch, Patel, & Sander, 2014; Brosch, Scherer, Grandjean, & Sander, 2013). For example, economic approaches are not very powerful when it comes to the question of why different people (or different brains) value different things. The theory presented in *Emotion and Decision-Making Explained* tackles this issue from a biological perspective: “the reward value placed on different rewards and the punishment value placed on different non-rewards or punishers will be different between different individuals, as a result of genetic variation for natural selection” (Rolls, 2014b, p.?, emphasis added by the authors).

Here we want to outline a complementary perspective anchored in appraisal theory of emotion. Appraisal theory holds that emotions are elicited when an organism evaluates an event as relevant for his/her needs, goals, or values (Ellsworth & Scherer, 2003). The underlying evaluation mechanisms are specified as consisting of a sequence of appraisals of an event’s relevance, its implication, the organism’s coping potential, and finally the event’s significance for one’s core values and social norms (Brosch et al., 2013; Scherer, 2001). In *Emotion and Decision-Making Explained* the author argues – and we agree – that the two theories offer fairly complementary perspectives, as the “assessment of whether stimuli are instrumental reinforcers” may be situated in early appraisals of relevance and implication, and the evaluation of the “actions that are available in a specific situation” may be subsumed under the coping potential appraisal (see Rolls, 2014a, p. 34). However, one key aspect of appraisal theory that is not represented in the theory outlined in *Emotion and Decision-Making Explained* is the fact that the significance of an event for an individual’s core values is an important determinant of emotional responses and decisions (Brosch & Sander, 2013b).

Core values refer to an individual’s beliefs about the desirable, about what is important in life. They transcend specific situations and guide the selection or evaluation of behaviors and events (Rohan, 2000). Intrinsically linked to the self, they provide organization for one’s self-schema and identity (Roccas & Brewer, 2002). Interestingly, cross-cultural research has identified ten universal core values that are recognized across numerous different cultures: self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism (Schwartz, 1992). These core values are organized along two

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dimensions reflecting conflicts between opposing classes of human interests. The first dimension is labeled “self-enhancement versus self-transcendence”, reflecting the conflict between outcome maximization for the individual versus outcome maximization for the social group. The second dimension is labeled “openness to change versus conservation”, reflecting the conflict between following one’s interests in uncertain directions versus preserving the status quo. The fact that these core values are observed across different cultures is taken to reflect their grounding in universal requirements of human existence: (a) the needs of individuals as biological organisms, (b) the requisites of coordinated social interaction, and (c) the survival and welfare needs of social groups (Schwartz, 1992). Interindividual differences in the relative importance of these core values have been shown to be related to differences in emotion elicitation (Nelissen, Dijkster, & de Vries, 2007) as well as to determine a large number of decisions, ranging from consumer choices to electoral decisions (Bardi & Schwartz, 2003). At the proximal level, the effects of core values on decisions are exerted by guiding attention in the search for decision-relevant information (Verplanken & Holland, 2002) as well as by increasing the perceived valence of value-congruent options (Feather, 1995).

We have recently begun a line of research aimed at outlining the neurocognitive mechanisms underlying appraisal processes (Brosch & Sander, 2013a) and linking the concept of core values to neuroeconomic valuation and decision research (Brosch, Coppin, Scherer, Schwartz, & Sander, 2011; Brosch, Coppin, Schwartz, & Sander, 2012; Brosch & Sander, 2013b). In one fMRI study, we had participants with varying core value hierarchies participate in a donation task where they were asked to distribute a financial amount between themselves and a charitable organization (Brosch et al., 2011). In some of the trials, participants could gain money for themselves, in other trials they could decide whether they wanted to donate some of their money to charity. We observed a consistent modulation of brain regions involved in reward processing by an individual’s core values. Participants with self-enhancement oriented core values did not only donate less money compared to participants with more altruistically oriented core values, but also showed increased activation in the striatum and in the amygdala when given the option to receive money for themselves, suggesting that egoistic behavior may be more rewarding for participants with self-centered core values than for less self-centered participants. In contrast, altruistic behavior was related to increased activation of social cognition regions, which have been shown to modulate value computations of charitable donations in ventromedial prefrontal regions (Hare, Camerer, Knoepfle, O’Doherty, & Rangel, 2010).

Thus, the concept of core value may be fruitfully linked to neurocognitive mechanisms underlying decision-making, integrating socio-psychological and biological explanation levels. Of course, more research on the neural mechanisms underlying the effects of core values on emotion and decision processes is clearly needed. For example, is it the case that core values are merely the conscious representation of genetic variation in individual reward sensitivities? Or is there something additional about explicitly considering altruism as

an important core value that may drive behavior even in the absence of immediately rewarding options?

Research based on neurophysiology, neuroimaging, and computational modeling is essential for a thorough understanding of the neural mechanisms underlying the relationship between valuation, emotion, and decision-making. By combining mechanistic descriptions of neurocognitive processes with higher-level socio-psychological concepts, appraisal theory of emotion may open the door to an integration of concepts such as core values, which capture important interindividual differences in decision-making, into more biologically oriented theories.

REFERENCES

- Bardi, A., & Schwartz, S. H. (2003). Values and behavior: strength and structure of relations. *Personality and Social Psychology Bulletin*, 29(10), 1207–1220.
- Brosch, T., Coppin, G., Scherer, K. R., Schwartz, S., & Sander, D. (2011). Generating value(s): psychological value hierarchies reflect context-dependent sensitivity of the reward system. *Social Neuroscience*, 6, 198–208.
- Brosch, T., Coppin, G., Schwartz, S., & Sander, D. (2012). The importance of actions and the worth of an object: dissociable neural systems representing core value and economic value. *Social Cognitive and Affective Neuroscience*, 7, 497–505.
- Brosch, T., Patel, M. K., & Sander, D. (2014). Affective influences on energy-related decisions and behaviors. *Frontiers in Energy Research*, 2, 11.
- Brosch, T., & Sander, D. (2013a). The appraising brain: towards a neuro-cognitive model of appraisal processes in emotion. *Emotion Review*, 5, 163–168.
- Brosch, T., & Sander, D. (2013b). Neurocognitive mechanisms underlying value-based decision-making: from core values to economic value. *Frontiers in Human Neuroscience*, 7, 398.
- Brosch, T., Scherer, K. R., Grandjean, D., & Sander, D. (2013). The impact of emotion on perception, attention, memory, and decision-making. *Swiss Medical Weekly*, 143, w13786.
- Ellsworth, P., & Scherer, K. R. (2003). Appraisal processes in emotion. In R. J. Davidson, H. H. Goldsmith, & K. R. Scherer (Eds.), *Handbook of affective sciences* (pp. 572–595). Oxford: Oxford University Press.
- Feather, N. T. (1995). Values, valences, and choice – the influence of values on the perceived attractiveness and choice of alternatives. *Journal of Personality and Social Psychology*, 68(6), 1135–1151.
- Hare, T. A., Camerer, C. F., Knoepfle, D. T., O’Doherty, J., & Rangel, A. (2010). Value computations in ventral medial prefrontal cortex during charitable decision making incorporate input from regions involved in social cognition. *Journal of Neuroscience*, 30(2), 583–590.
- Levy, D. J., & Glimcher, P. W. (2012). The root of all value: a neural common currency for choice. *Current Opinion in Neurobiology*, 22(6), 1027–1038.
- Nelissen, R. M. A., Dijkster, A. J. M., & de Vries, N. K. (2007). Emotions and goals: assessing relations between values and emotions. *Cognition & Emotion*, 21(4), 902–911.
- Roccas, S., & Brewer, M. B. (2002). Social identity complexity. *Personality and Social Psychology Review*, 6(2), 88–106.
- Rohan, M. J. (2000). A rose by any name? The values construct. *Personality and Social Psychology Review*, 4, 255–277.
- Rolls, E. T. (2014a). *Emotion and decision-making explained*. Oxford: Oxford University Press.
- Rolls, E. T. (2014b). *Emotion and decision-making explained: Prec. Cortex*.

- Scherer, K. R. (2001). Appraisal considered as a process of multilevel sequential checking. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion: theory, methods, research* (pp. 92–120). New York: Oxford University Press.
- Schwartz, S. H. (1992). *Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries*. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25); (pp. 1–65). San Diego, CA: Academic Press.
- Verplanken, B., & Holland, R. W. (2002). Motivated decision making: effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology*, 82(3), 434–447.

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