

Invited Spotlight for *Trends in Cognitive Sciences*
Submitted 8th August 2016, accepted 19th August 2016.
Number of Words: 1000 words

Judging the Ability of Friends and Foes

Jennifer L Cook¹, Jennifer Murphy², & Geoffrey Bird^{2,3*}

¹School of Psychology, University of Birmingham
Edgbaston, Birmingham, U.K.

²MRC Social, Genetic and Developmental Psychiatry Centre, Institute of Psychiatry,
Psychology, and Neuroscience, King's College London, London, U.K.

³Institute of Cognitive Neuroscience, University College London, London, U.K.

*Corresponding author: geoff.bird@kcl.ac.uk
Social, Genetic and Developmental Psychiatry Centre (MRC)
Institute of Psychiatry, Psychology and Neuroscience - PO80
De Crespigny Park,
Denmark Hill, London,
United Kingdom, SE5 8AF

Abstract

Collaboration leads us to judge our own ability to be more similar to our collaborator and their ability to be more similar to our own, while competition leads us to exaggerate the gap between our abilities. How does this happen and what does it mean?

As a social species, humans are continually tracking the states of our conspecifics. We monitor states of knowledge, emotion, and physical condition in order to better predict and control our interactions with others, and in order to learn about our physical and social environment. Representation of others also allows information to be garnered about the self; knowledge of my previous attempts to run 100 metres enables me to predict how long it will take the next time I do so, but doesn't enable me to answer the question "Am I fast?"; only comparison with others allows us to answer such relational questions.

Representation of others introduces a requirement to keep self- and other-related representations distinct. For example, if I am preparing to return your tennis serve I need to form as complete a representation of your action as possible in order to predict the flight of the ball, but keep the representation of your action distinct from representation of my motor plan to return the ball [1]. A similar 'self-other distinction' is necessary when attempting to adopt the perspective of another, or to represent their emotions or attitudes, especially when they are in conflict with one's own [1]. Interestingly, the degree to which a self-other distinction is maintained can be impacted by task demands and social factors. Although we tend to imitate individuals from our in-group more than from out-groups (a result of blurring the distinction between self and other for in-group members), this tendency can be nullified, or even reversed, when our aim is to engender cooperation with out-group members and to compete with in-group members [2].

A recent paper made important contributions to our understanding of self-other distinction by demonstrating that judgements of our own ability can be influenced by our judgements of the ability of others, and that this influence is modulated by the context within which such judgements occur. Wittmann and colleagues [3] demonstrated that, when asked to judge their own performance on a task, participants' judgments were influenced by their judgments of others in a context dependent fashion. Specifically, when participants chose to collaborate with another individual, they judged their ability to be more similar to that of the other, yet when they decided to compete with the other, they judged their ability to be further from that of the other. Judgments concerning the ability of the other were also influenced by judgement of the self in a complementary fashion. This finding is reminiscent of previous findings within social psychology that cooperative attitudes promote attention to similarities between group members whereas competitive attitudes promote attention to differences between group members [4], but extends these findings to demonstrate that cooperation vs competition can influence judgements themselves, not just whether those judgments are attended to.

Wittman and colleagues [3] used fMRI to identify neural correlates of their behavioural effect. A model-based analysis revealed that representation of one's own ability was associated with activity in perigenual Anterior Cingulate Cortex, whereas activity in dorsomedial frontal area 9 tracked the other's ability, and also likely integrated self- and other-related information according to context. It is likely that the temporoparietal junction is then involved in selecting whether self or other is attended to [5,6]. Although these results point to a potential neural mechanism by which representations of the self and other may interact, the psychological mechanisms are less well understood. While not the focus of the paper, the authors did note that their results are consistent with the 'anchoring' effect [7], whereby individuals produce biased estimates of uncertain values because they base or 'anchor' their estimates on an initial value. For example, imagine that two groups are presented with a new piece of technology and asked to estimate its value. If one group is told that the technology had been reduced from £100 and the other that it had been previously reduced to £50, then the former group is likely to assign it a higher value. The suggested explanation is that the values assigned by the groups are anchored by the values of £100 and £50, respectively, and that participants tend not to move too far from these values. When judging their own ability and that of the other, participants in Wittmann and colleagues' experiment may focus on the difference between abilities when asked to compete and on the average of their abilities when asked to collaborate; the difference between these values biases their estimates of their own ability and that of the other according to context.

The anchoring explanation raises important questions about the domain-generalty of effects such as those observed by Wittmann and colleagues. Future studies may build on their findings by investigating whether comparable effects are observed if participants are asked to estimate the performance of an algorithm or robot instead of another human. A non-social control condition [6,8] such as this would clarify the extent to which such effects can be described as social in nature and identify whether they reflect the degree of distinction between self and other representations specifically, or whether they might be obtained via the same mechanism that produces anchoring effects in non-social contexts. This question is not merely of academic interest; failures of self-other distinction and selective representation of self or others are thought to characterise some clinical groups such as those with autism [9], while studies suggest self-other processing is likely still developing into adulthood [10]. If judgements of our own ability also fit into the same framework, then this may underlie the difficulties with interpersonal coordination during joint tasks experienced by some clinical populations, and the atypical risk behaviour exhibited by adolescents, particularly in social situations. The latter possibility is consistent with the high accident rate among teenage drivers when with their peers – teens may overestimate their degree of control at high speeds and put themselves in danger. It is therefore interesting that the ability to selectively represent self and other can be modulated by brain stimulation, providing the potential for intervention should this prove necessary [5].

References

- [1] de Guzman, M., Bird, G., Banissy, M. J., & Catmur, C. (2016). Self–other control processes in social cognition: from imitation to empathy. *Philosophical Transactions of the Royal Society B*, (1686), 20150079.
- [2] LaFrance, M. (1985). Postural mirroring and intergroup relations. *Personality and Social Psychology Bulletin*, 11(2), 207-217.
- [3] Wittmann, M. K., Kolling, N., Faber, N. S., Scholl, J., Nelissen, N., & Rushworth, M. F. (2016). Self-other mergence in the frontal cortex during cooperation and competition. *Neuron*, 91(2), 482-493.
- [4] Gaertner, S. L., Dovidio, J. F., & Bachman, B. A. (1996). Revisiting the contact hypothesis: The induction of a common ingroup identity. *International Journal of Intercultural Relations*, 20(3), 271-290.
- [5] Santiesteban, I., Banissy, M. J., Catmur, C., & Bird, G. (2012). Enhancing social ability by stimulating right temporoparietal junction. *Current Biology*, 22(23), 2274-2277.
- [6] Sowden, S., & Catmur, C. (2015). The role of the right temporoparietal junction in the control of imitation. *Cerebral Cortex*, 25(4), 1107-1113.
- [7] Tversky, A., & Kahneman, D. (1974). Heuristics and biases: Judgement under uncertainty. *Science*, 185, 1124-1130.
- [8] Garvert, M. M., Moutoussis, M., Kurth-Nelson, Z., Behrens, T. E., & Dolan, R. J. (2015). Learning-induced plasticity in medial prefrontal cortex predicts preference malleability. *Neuron*, 85(2), 418-428.
- [9] Spengler, S., Bird, G., & Brass, M. (2010). Hyperimitation of actions is related to reduced understanding of others' minds in autism spectrum conditions. *Biological psychiatry*, 68(12), 1148-1155.
- [10] Cook, J., & Bird, G. (2011). Social attitudes differentially modulate imitation in adolescents and adults. *Experimental brain research*, 211(3-4), 601-612.