

# Reading literary fiction can improve theory of mind

**To the Editor** — The recent replication study of social science experiments published in *Nature* and *Science* between 2010 and 2015 (ref. <sup>1</sup>) closely replicates the methods of the first experiment we reported in a 2013 article, which found that participants assigned to read literary short stories performed better than those assigned to read non-fiction on a test of theory of mind (ToM)<sup>2</sup>. This experiment was the first of five reported in this study testing the hypothesis that reading literary fiction improves ToM performance. The initial results<sup>2</sup> suggested that it did; however, the present replication<sup>1</sup> did not find better ToM task performance in the fiction condition, despite having much more power to detect an effect. It is critical to understand this null finding in the context of the other experiments in the original publication and other replication studies.

The five experiments reported in the original publication<sup>2</sup> were conducted in the order in which they were reported. After the first experiment, the hypothesis was narrowed to predict that reading fiction that presents complex, nuanced characters (literary fiction) will lead to better ToM task performance than reading fiction that presents relatively more stereotypic or easily understood characters (popular genre fiction). Subsequent experiments also introduced methodological changes, culminating in the fifth experiment, which included a larger sample size, more consistent selection of stimuli (from edited collections of popular genre fiction and literary fiction), and more rigorous checks

on inattentive responding (for example, removing participants who spent less than 30 seconds on each page of text). If these methodological changes made subsequent experiments better tests of the hypothesis, the results of the fifth experiment should be more reliably replicated than those of the first. There is evidence that this is the case.

There have been a number of replications of the five experiments reported in the original publication<sup>2</sup>. Two replication projects yielded null results<sup>3,4</sup>, but both introduced substantial methodological changes. In the one case where data were made available, re-analysis of the data to more closely follow the original methods revealed findings consistent with the original findings<sup>5</sup>. Nonetheless, the findings motivated us to run a series of three pre-registered replications of the original publication's final experiment<sup>6</sup>. The first experiment revealed a positive effect of reading literary fiction only among participants with high levels of reading experience. The second experiment yielded a null effect, but the effect size was not conclusively different from that in the original. The third experiment replicated the original finding, with participants assigned to read literary fiction outperforming those assigned to read popular genre fiction. As the manuscript describing these findings was being revised, an independent team of researchers published a nearly exact replication of the same experiment and also found a significant positive effect of reading literary fiction on ToM performance<sup>7</sup>. The findings of the final experiment reported in

the original publication therefore appear to be more robust than those of the first.

The present project<sup>1</sup> did not replicate the findings of the first experiment in the original publication, suggesting that the original finding is unreliable. However, the successful replications of the more methodologically advanced final experiment in the original publication, along with other converging evidence<sup>8,9</sup>, suggest that the hypothesis that reading literary fiction can improve ToM performance cannot be dismissed by the present null result. □

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## References

1. Camerer, C. F. et al. *Nat. Hum. Behav.* <https://doi.org/10.1038/s41562-018-0399-z> (2018).
2. Kidd, D. C. & Castano, E. *Science* **342**, 377–380 (2013).
3. Panero, M. E. et al. *J. Pers. Soc. Psychol.* **111**, e46–e54 (2016).
4. Samur, D., Tops, M. & Koole, S. L. *Cogn. Emot.* **32**, 130–144 (2018).
5. Kidd, D. C. & Castano, E. *J. Pers. Soc. Psychol.* **112**, e1–e4 (2017).
6. Kidd, D. & Castano, E. *Soc. Psychol. Pers. Sci.* <https://doi.org/10.1177/1948550618775410> (2018).
7. van Kuijk, I., Verkoeijen, P., Dijkstra, K. & Zwaan, R. A. *Collabra Psychol.* **4**, 7 (2018).
8. Kidd, D. & Castano, E. *Psychol. Aesthet. Creat. Arts* **11**, 474–486 (2017).
9. Pino, M. C. & Mazza, M. *PLoS One* **11**, e0160254 (2016).

## Competing interests

The authors declare no competing interests.