

1 of 1 DOCUMENT

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## The **science of fiction**; Reading novels isn't just entertaining, it helps you navigate the complex social world

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THE Victorians thought that reading Greek and Latin classics, including the stories of Homer, Sophocles and Virgil, would equip them for life. In the 20th century, great novels were considered to be improving. These days, with all the competing attractions of video games, the internet and movies, parents may be happy if their children read anything at all, while adults who enjoy fiction are more likely to view it as purely pleasurable rather than educative or life-enhancing. That is ironic, because for the first time in history there is now scientific evidence that reading fiction really does have psychological benefits.

The findings come from a small group at the University of Toronto in Canada, including Maja Djikic, Raymond Mar and myself. Our research starts with the idea that a piece of fiction should not be thought of as a set of questionable observations and biased opinions. Instead, I have proposed that it is a kind of simulation of the social world (*Review of General Psychology*, vol 3, p 101). If I am correct, then just as people's skills as pilots improve when they spend time in a flight simulator, so people's social skills should improve when they spend time reading fiction.

My colleagues Mar, Jacob Hirsh, Jennifer dela Paz, Jordan Peterson and I devised a study to test this idea and its implications (*Journal of Research in Personality*, vol 40, p 694). First we made an objective assessment of how much fiction people read by adapting the "author recognition checklist" devised by Keith Stanovich from the University of Toronto and Richard West from James Madison University in Virginia. They used a list of names that included authors and non-authors, and scored respondents on the number of names correctly identified as authors minus the number incorrectly identified. Their results closely corresponded to the amount that people actually read, as measured by diaries and behavioural observation (*Reading Research Quarterly*, vol 28, p 35). We adapted their checklist by intermingling the names of writers of fiction and non-fiction with those of non-authors. This allowed us to distinguish between people who knew mainly fiction authors, so probably read mostly fiction, and those who knew mainly non-fiction authors.

Next, we got the subjects to do the "mind-in-the-eyes" test, devised by Simon Baron-Cohen from the University of Cambridge, which measures empathy and social acumen (*Journal of Child Psychology and Psychiatry*, vol 42, p 241).

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Participants looked at photos of people's eyes, as if seen through a letterbox and, for each image, they chose the most appropriate of four words to describe what the person was feeling - for instance, "joking, flustered, desire, convinced" . We also used an "interpersonal perception" test in which subjects watched 15 short video clips of social interactions between ordinary people. The participants then had to say what they thought was going on. After viewing one clip, for example, they were asked which of two children, or neither, was the offspring of the two adults in the scene.

We found that fiction readers had substantially greater empathy as measured by the mind-in-the-eyes test, and also performed somewhat better on the interpersonal perception test than people who read predominantly non-fiction.

Could this result simply reflect the reading preferences of different personality types - might more empathic people be drawn to fiction, for example? To assess this possibility, Mar randomly assigned another group of subjects to read a fictional short story or a non-fiction essay of the same length. Then he gave them all a social reasoning test in which they had to answer multiple-choice questions about the emotions, beliefs and intentions of characters in various scenarios, as well as a similar test to assess analytical reasoning. He found that those who read the story performed better on the social reasoning test than those who read the non-fiction piece, but there was no difference between the two groups in analytical reasoning. As well as confirming the benefits of reading fiction, this also suggests that the effect is immediate.

Intrigued to discover how engaging with fiction might affect a reader's sense of identity, Djikic and I, working with Peterson and Sara Zoeterman, devised a new study. We randomly assigned 166 participants to read either a short story by Anton Chekhov, *The Lady with the Little Dog* , or a control text - a version of the story rewritten in documentary form (*Creativity Research Journal* , vol 20, in press). The texts were the same length and had the same characters, content and reading difficulty as well as the same level of interest for the readers.

Before and after reading, our subjects completed questionnaires that assessed their personality traits and their emotions. We found that people who read the Chekhov story underwent larger changes in personality than those who read the control text - although the types of changes varied from person to person. Results from the emotions questionnaire indicated that the personality changes were mediated by the emotions experienced while reading: a person's emotional state is known to influence their scores on personality tests.

We think that readers found it easier to identify with the characters in the literary story than in the documentary version. By empathising with these characters, they became a bit more like them - but each in their own way. It seemed as though readers' personalities loosened up. Although the changes we measured were probably temporary, repeated reading of fiction may have more lasting effects.

It is fascinating that the same information can elicit different responses simply because of the form in which it is written. Perhaps this has something to do with the way the brain processes fiction. In our daily lives we use mental models to work out the possible outcomes of actions we take as we pursue our goals. Fiction is written in a way that encourages us to identify with at least some of the characters, so when we read a story, we suspend our own goals and insert those of a protagonist into our planning processors. The story tells us what actions are taken. When outcomes fulfil the goals we have taken on, we feel happy. When a protagonist's goals are thwarted, we feel negative emotions such as anger, sadness and anxiety.

This is why I liken fiction to a simulation that runs on the software of our minds. And it is a particularly useful simulation because negotiating the social world effectively is extremely tricky, requiring us to weigh up myriad interacting instances of cause and effect. Just as computer simulations can help us get to grips with complex problems such as flying a plane or forecasting the weather, so novels, stories and dramas can help us understand the complexities of social life.

So should we worry about the development of social skills in societies where reading is on the wane? Perhaps not. As yet, we have investigated only reading, but we suspect people derive similar benefits from movies, and perhaps also

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computer games, that offer simulations of social worlds. In its many guises, fiction continues to be a primary source of entertainment. Our research shows it is far more than that.

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