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Reading other minds

Effects of literature on empathy

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The potential of literature to increase empathy was investigated in an experiment. Participants ($N = 100$, 69 women) completed a package of questionnaires that measured lifelong exposure to fiction and nonfiction, personality traits, and affective and cognitive empathy. They read either an essay or a short story that were equivalent in length and complexity, were tested again for cognitive and affective empathy, and were finally given a non-self-report measure of empathy. Participants who read a short story who were also low in Openness experienced significant increases in self-reported cognitive empathy ($p < .05$). No increases in affective empathy were found. Participants who were frequent fiction-readers had higher scores on the non-self-report measure of empathy. Our results suggest a role for fictional literature in facilitating development of empathy.

Keywords: literature, art, empathy, perspective taking, theory of mind

Introduction

Is fiction capable of prompting empathy in readers? In this paper we hope to take a step towards answering this question with an experiment in which we measured changes of empathy in people who were asked to read a literary text that was either a fictional short-story or a non-fictional essay. At the same time we measured readers' personalities, to see whether particular traits were associated with any changes that occurred.

Our study concerns the function of fiction (Mar & Oatley, 2008), so to introduce it we need first to discuss what fiction is, and how it differs from non-fiction. We suggest that four principles characterize fiction, as follows.

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Subject matter

Fiction is often taken to be description that has been made-up (the etymology of the word "fiction" is "something made"). It is generally distinguished from non-fiction, which implies a subject matter of fact. For psychology, the distinction made in this way is not very helpful. More helpful is a study by Appel and Malakar (2012) who asked people to read a piece of text, which they were randomly assigned to be told was fiction, non-fiction, or fake (a story purporting to be true, but with facts that had been fabricated). Engagement in reading, measured by a scale of transportation, was lower for the text presented as fake than for texts presented as either fiction or non-fiction, and readers were more critical of the text they were told was fake. So readers were well aware of properties of fiction, and differentiated it from fake. An issue studied by Prentice, Gerrig, and Bailis (1997) is whether fiction encourages people to believe things that are not true. They found that, as compared with people who read about circumstances with which they were familiar, people who read about circumstances with which they were not familiar were more liable to believe assertions that were weak or unsupported. Fiction writers are, however, usually careful to ensure factual material in their writings is correct, and they should be. So despite fiction tending to encourage belief in its imagined worlds, it is different from texts in which facts have been falsified, or simply made up.

Non-fiction has become closer to fiction in recent times because techniques of fiction have been introduced into journalism to make it more engaging. Wolfe (1975) has identified four such techniques: scene-by-scene construction, point of view, concentration on dialogue, and depiction of what Wolfe calls status life, meaning the ways in which individuals express their status in the various hierarchies in which they live.

We propose that rather than thinking of it as made-up, fiction is better characterized in terms of subject matter: the social world. In an experimental study of this subject matter Mar (2007) compared effects of reading a short story and an essay from the *New Yorker*. Participants who read the story, though not those who read the essay, improved on a test of social reasoning. All participants performed the same on a test of analytical reasoning.

The typical subject matter of fiction is selves and their interactions in the social world. By contrast non-fiction can be about many things: about the history of warfare, about genetics, about the relation between economics and justice in society, and so on. Published stories of either a fictional or non-fictional kind that are based on deliberate falsification are a matter for the police rather than for the psychologist.

Narrative

Bruner (1986) proposed that narrative is a distinctive mode of thinking about agents, their intentions, and the vicissitudes these intentions meet. It contrasts with the mode he calls paradigmatic, which is about explanations of how mechanisms and processes work.

Mar, Oatley, and Eng (2003) tested differences between narrative and expository prose, by randomly assigning people to read a piece of prose text in narrative form or a piece that was of the same length, semantic content, and reading difficulty in expository form. Participants were asked to notice when memories came to mind during their reading, and to mark the margin when this occurred. After reading, they wrote brief summaries of these memories. For those who read the narrative, as compared with the exposition, the memories that came to mind were significantly more vivid, and more frequently involved the participant as an actor or observer in a detailed scene.

Except for some lyric poetry, fiction tends to be written in the narrative mode. Paradigmatic issues can be introduced, for instance in science fiction, but when this happens it is within a narrative framework. By contrast, though non-fiction can sometimes be written in narrative mode (as discussed above), it is frequently paradigmatic. Most writings in science, for instance, are paradigmatic.

Emotion and identification

Successful fiction is engaging and of emotional interest (Bal & Veltkamp, 2013). It is capable of prompting emotions in the reader (Oatley, 2012). By contrast, although it is good if non-fiction is also engaging, emotions are not necessary to it. Non-fiction is primarily informational.

A frequent feature of fiction is that it enables readers to identify with a protagonist (Oatley & Gholamain, 1997), perhaps to sympathize with that character, and perhaps also to sympathize with other characters, and this is part of the emotional appeal. This feature is sufficiently frequent in fiction to make it typical of this form. It is also possible to identify with protagonists in some kinds of non-fiction, such as memoir, biography, and social history, as well as news and magazine stories about individuals.

Kaufman and Libby (2012) reported six experiments on identification. They wrote short pieces of fiction for their student participants, in which the protagonist was a college student whose thoughts and feelings were depicted in the story. They coined the term "experience-taking," which they prefer to "identification" because they want to contrast it with "perspective-taking." Identification is, however, the

more usual literary term for this kind of effect, which includes lessening of the distinction between self and other, as readers take on the experience of a character in a story. As Kaufman and Libby explain, rather than evaluating the events of the story from an external point of view, readers who are high in experience-taking relinquish some of their own individuality, and take on a character's mindset and point of view. In their experiments they found that the more aware participants were of their own individuality as they read the story, the lower were their scores on experience-taking and, conversely, when readers were asked to think of themselves not as individuals but as average students, the higher were their scores on experience taking. In one experiment, experience taking was found to be less when the readers had a mirror in the cubicle where they had been asked to read. In other experiments Kaufman and Libby found that first-person as compared with third-person narratives increased experience taking, and also that a later rather than an earlier introduction into a story of a protagonist's characteristic of race or sexual preference, which was different from the readers' own, increased experience taking.

To sum up, successful fiction moves one emotionally, and it often enables readers to take on the mindset, goals, and intentions of a protagonist, in a mode of identification or experience-taking. The concerns and circumstances of characters prompt emotions in the reader, but it's not the emotions of characters one feels. The emotions are one's own. Although some kinds of non-fiction such as biography enable it, identification is far less characteristic of non-fiction than it is of fiction.

The nature of fiction

Fiction is often taken to be a description of some kind. A far better characterization is that it is a model. This idea was discussed by Aristotle (330 BCE/1970) in *Poetics,* in which the principal theoretical term is *mimesis*. This term refers to the relation of a piece of art to the world. Halliwell (2002) has shown that the term has two families of meanings. English translators of *Poetics* indicate only one of these, which they render as "copying," "imitation," "representation," and the like. The second and arguably more important meaning — the one on which Aristotle concentrated — is "world-making" or "modeling." Between the Renaissance and the Nineteenth century, various writers referred to this sense as "dream." The modern term is "simulation." As Oatley (1992; 1999) has proposed, fictional stories are simulations designed to run not on computers but on minds. They were, arguably, the very first kinds of simulations.

One sense of simulation as it relates to fiction is of complexes of several processes. This is like the simulations from which weather forecasts and longer-term predictions of climate change are made. The reason for simulations in these

functions is that although human beings are good at understanding things one at a time — for instance, that when a mass of cold air meets a mass of warm air, the cold air cools the warm air so that the water vapor in the warm air condenses to make rain or snow — we are less good at thinking of interactions among multiple processes. Simulations take into account multiple processes. In those designed to produce weather forecasts, these processes include changes of temperature, barometric pressure, winds, topography of the earth's surface, and so on, all of which interact. Simulations based on such complexes give better weather forecasts than do considerations of any single factor. Similarly if we read in a story-simulation that Abigail is angry with Beatrice, we can understand and anticipate what is likely to happen. If we add other factors, the situation becomes complex. Perhaps Beatrice is Abigail's three-year-old daughter, who has been behaving badly recently in a way Abigail can't understand. Or perhaps, in a different scenario, Beatrice is Abigail's lover, but doesn't want their relationship to be known to other people. The social world is almost invariably complex in ways of these kinds, and because of this our understanding of it can generally improve. It's at this point that the simulations of which we are capable, in our private consciousness (Baumeister & Masicampo, 2010), in conversation (Rimé, 2009), and in fiction, become helpful. The function of fictional simulations is to enable us to imagine possible worlds and possible outcomes, and that is why the idea that fiction is a merely a description of some kind is not helpful.

A second sense of simulation is empathy, coming to understand emotions of others by feeling them in oneself (de Vignemont & Singer, 2006). An influential account of the mechanism of empathy is by Goldman (2009) who bases his explanation of the process on simulation.

A third sense of simulation is also relevant to fiction. We can understand what other people are thinking, and this ability is known as theory-of-mind. One of the two theories of how we do this is by simulation of the other's thoughts in ourselves (Harris, 1992). (The other theory is that we form a theory of what the other person is thinking.) Arguably, as Zunshine (2006) has proposed, fiction is largely about theory-of-mind: working out what fictional characters are thinking and feeling. Zunshine says that it is this that makes fiction enjoyable. Identification, as discussed above, can be thought of as using inner simulation processes for such purposes. In a large meta-analysis of fMRI studies Mar (2011) found substantial overlap between areas of the brain concerned with theory-of-mind and areas concerned with understanding stories.

The conception of fiction as a kind of simulation is becoming accepted. Speer, Reynolds, Swallow, and Zacks (2009) had people in an fMRI machine read a short story, with words displayed one-by-one on a screen so that readers did not have to move their eyes (which adversely affects imaging). Speer et al. found that if in a

story, a protagonist pulled a cord to turn on a light, the part of the reader's brain associated with grasping was activated. When a protagonist entered a room, the part of the brain associated with analyzing a scene was activated. So reading the simulations of a story involves the same brain structures as those used for comparable actions and perceptions in real life. Kaufman and Libby (2012), mentioned above, also describe the process of experience taking as one that involves simulation.

Mar, Oatley, Hirsh, dela Paz and Peterson (2006) based their study, in which they found that reading fiction was associated with increased empathy and theory-of-mind, on this idea of simulation. They argued that when people learn to fly an airplane, they can improve their flying abilities in a flight simulator. Similarly, when people engage in the simulations of fiction they should become better in the domain with which fiction is concerned, including empathy and understanding of others. This prediction about fiction readers was borne out. By contrast, people who predominantly read non-fiction were found to have less good empathy and theory-of-mind. The amount of life-time reading that people have done can be measured accurately by Stanovich and West's (1989) Author Recognition Test, which is a list of names of writers and of people who are not writers (foils). A participant checks all the names he or she recognizes as writers. Mar et al. (2006) modified the test to estimate fiction and non-fiction reading by including in the list a set of authors of fiction, such as P. D. James and Toni Morrison, a set of authors of non-fiction such as Richard Dawkins and Bob Woodward, as well as foils. In a replication, Mar, Oatley, and Peterson (2009) again found fiction reading to be associated with higher empathy, this time after controlling for individual differences. In a study of what genres of fiction might be most effective, Fong, Mullin and Mar (2012) found that the reading of some genres such as romance stories had positive associations with empathy, whereas reading of science fiction had a (non-significant) negative correlation. Mar, Tackett, and Moore (2010) found that the amount of fiction to which preschool children were exposed in terms of number of stories they had read to them, and the number of fictional films they watched, predicted their performance on five theory-of-mind tasks. The amount of children's watching of television (a much more variegated source) had no such predictive effect.

In a study that is very useful in this line of thinking Johnson (2012) asked participants to read a short story written to promote empathy and to exemplify pro-social behavior. Measurements taken after reading included transportation and empathy. Soon after they had finished reading and completing a set of questionnaires, participants saw an experimenter drop six pens, apparently by accident. Those who were more transported into the story were more likely to help the experimenter pick up the pens, and this behavior was partly mediated by the increase in empathy that readers experienced as a result of reading. A second study

replicated the first, and also showed that participants who were more transported into the story were more likely to see photographs of faces as anxious. In another very useful study, Bal and Veltkamp (2013) did two experiments. In the first they asked people to read either a Sherlock Holmes story by Arthur Conan-Doyle, or a non-fiction control piece of the same length taken from newspaper reports. The second experiment had a similar design but with the fiction piece being an excerpt from José Saramago's novel, *Blindness*. They found that readers who were highly transported into the Conan-Doyle story became more empathetic, but readers of the Conan-Doyle or the Saramago pieces who were less transported became less empathetic. The effects were not found in the control condition.

The theory of fiction as simulation of selves and their interactions in the social world is supported by several lines of evidence. For psychology this theory is superior to the idea that fiction is a description of some kind.

Conclusion from four considerations relating to the nature of fiction

The centers-of-gravity of fiction and non-fiction are separate. Fiction has the general subject matter of selves in the social world. It is in the narrative mode, and is about intentions and the vicissitudes they encounter. It is emotionally engaging and encourages identification or experience-taking. It is based on a simulation that the reader runs in his or her mind. These characteristics do not offer a definition of fiction, but they do offer a prototype. With these characteristics in mind, the difference between fiction and non-fiction can be meaningfully used as an independent variable to investigate whether fiction has distinctive effects on empathy.

The current study

Highly relevant recent studies on effects of fiction, notably those of Johnson (2012) and Kaufman and Libby (2012) have used stories that were written specially for the studies. The whole issue of the nature and effects of fiction, however, only arises from stories that have been published by skilled novelists and short-story writers. We thought it important to enquire about effects of fictional short stories and non-fictional essays of a literary kind, published by known writers, which were seen as accomplished enough to appear in anthologies.

Our aim was to enquire, in an experiment, about effects of such reading on empathy. Two of our outcome measures were from Davis's (1983) Interpersonal Reactivity Index: these were the scale of Empathetic Concern which Davis calls Affective Empathy, and the scale of Perspective Taking which he calls Cognitive

Empathy. In addition we used Baron-Cohen, Wheelwright, Hill, Raste, and Plumb's (2001) Mind in the Eyes Test, a test of empathy that has been found to be associated with lifetime fictional reading by Mar et al. (2006) and Mar et al. (2009). We were also concerned to see whether readers' personality affected the results, so for this purpose we measured readers' Big Five Personality Traits.

Method

Participants

Participants were 100 university students from University of Toronto community (average age 21.7, 69 women), who were recruited through posters distributed across campus. Participants had spent on average 17.8 years speaking English in English-speaking environment. All participants were treated according to American Psychological Association and Canadian Psychological Association ethical standard for treatment of human participants.

Procedure

Participants were seated at a desk in a cubicle and given a package to complete[1]. First they completed seven questionnaires, which included a Demographics Questionnaire, the Big-Five Inventory (John, Donahue, & Kentle, 1991) (measuring personality traits), Author Recognition Test-Revised (ART-R; Mar, Oatley, Hirsh, de la Paz, & Peterson, 2006) (measuring life-long print exposure to fiction and non-fiction), and Empathic Concern and Perspective Taking scales of the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983, and 1994) (measuring emotional and cognitive empathy, respectively).

Participants were then randomly assigned to read either an essay or a short story. After answering content questions about the text they had read, and rating it on how artistic and interesting they found it, participants were given another set of eight questionnaires, which included another administration of the Empathic Concern and Perspective Taking scales of the Interpersonal Reactivity Index, and one-time-only administration of a non-self-report test of empathy: Baron-Cohen et al.'s (2001) Mind in the Eyes Test.

We hoped that the multiple questionnaires, administered before and after reading the text, would disguise the purpose of the experiment and thus reduce demand characteristics. During the debriefing, after prompting, participants reported that they recognized some questions as recurring, but given how many questions were

asked, they could not recall their previous responses, and just completed questionnaires as was asked. With regards to the possibility that, due to the multiplicity of questionnaires, participants have rushed through or randomly answered the questions, that would only increase the random noise in the experiment, thus making it more difficult to find the effect if it were there. Whatever effects we found, therefore, were strong enough (as can be seen from effect sizes), to emerge despite the possibility of large random error.

The people were then debriefed and received a payment of $20 for their participation.

Instruments

Demographics Questionnaire. Participants were asked for their age, gender, and number of years they had spent speaking English in English-speaking environment.

Author Recognition Test-Revised (Mar, Oatley, Hirsh, de la Paz, & Peterson, 2006). The Author Recognition Test-Fiction measures lifelong reading of fiction, and the Author Recognition Test-Nonfiction measures lifelong reading of nonfiction. The original Author Recognition Test was designed by Stanovich and West (1989), who reported it to offer a good measure of exposure to print during a participant's lifetime. Test results correlate strongly with diary-based and other measures of the amount of reading people do (West, Stanovich, & Mitchell, 1993). Respondents are asked to check off from a list of names those they recognize as authors. Guessing and social desirability effects are discouraged by letting the respondents know that some names are not authors (they are foils). Mar et al. (2006) revised this test to include 50 writers of fiction only, 50 writers of nonfiction only, and 40 foils. In our experiment participants were indeed discouraged from guessing: out of 140 names, no-one marked more than 8 foils. One of our participants was, however, an extreme outlier, five standard deviations above the median on both the Author Recognition Test-Fiction and the Author Recognition Test-Nonfiction, and was excluded from analyses.

Big Five Inventory (John, Donahue, & Kentle, 1991). This is a 44-item scale that measures the Big-Five dimensions of personality (Extraversion, Conscientiousness, Openness, Agreeableness, and Emotional Stability). It uses short phrases that are prototypical of each dimension (John & Srivastava, 1999). Participants are asked whether they see themselves as someone who, for example, "can be moody," or "tends to be quiet." Responses are scored on a 5-item Likert scale (1 = strongly disagree, 5 = strongly agree). The scale's test-retest correlations (over a 6-week interval) are .65–.83 (John et al., 1991).

Empathy Measures. ***Interpersonal Reactivity Index*** **(Davis, 1980, 1983, 1994)** is a 28-item self-report measure with four subscales: Perspective Taking, Empathic Concern, Personal Distress, and Fantasy. Since, in this experiment, we were interested in cognitive and affective empathy, we used just the Perspective Taking subscale and the Empathic Concern subscale, each of which has 7 items. The Perspective Taking subscale measures tendency to assume the psychological viewpoint of others (cognitive empathy) e.g. "I try to look at everybody's side of a disagreement before I make a decision." The Empathic Concern subscale measures the feelings of compassion for unfortunate others (emotional empathy) e.g. "I am often quite touched by things that I see happen." Participants are asked to rate how well the statements they read describe them on an 11-point Likert scale (0 = "does not describe me at all" 10 = "describes me very well"). Davis (1983) reported good internal consistency, with alpha coefficients ranging from .68 to .79.

Mind in the Eyes Test – revised **(Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001).** The Mind in the Eyes Test is a non-self-report measure of empathy that consists of 36 still pictures of actors' eye-regions (as if seen through a letter box). For each item, respondents are asked to choose one of four possible mental or emotional states that the photographed person might be experiencing. This test requires an understanding of others' mental states and their translation into an appropriate emotion word, based on exposure to visual cues, so it can be considered to test one aspect of empathy. Originally, Baron-Cohen and colleagues devised it as a test of 'mentalizing' to be able to differentiate individuals with deficiencies in cognitive empathy, such as those having Asperger Syndrome or high-functioning autism from normal controls (Baron-Cohen et al., 2001).

Essays and Short Stories. We used eight essays and eight short stories from anthologies that were for the most part written in the first half of 20th century. They were by well-known authors, and covered a variety of subjects, see Appendix A. Unlike studies in which non-literary texts are constructed with particular empathy-inducing themes in mind (e.g., Johnson, 2012), the present experiment tested the effect on empathy of literary texts that have no particular agenda. For that reason, the standards that were applied were literary excellence (as judged by critical reviews and literary awards for authors in general, or texts in particular), a variety of themes (as can be seen from text titles), and length that was appropriate for experimental setting.

Texts were chosen to be around 6,000 words (about 10 pages). The complexity (the level of reading difficulty) of texts was measured by the Flesch-Kincaid Grade Level score, which is calculated by the following formula: (.39 X ASL) + (11.8 X ASW) – 15.59, where ASL is the average sentence length (the number of words in

the whole text divided by the number of sentences), and ASW is the average number of syllables per word (the number of syllables divided by the number of words). Since in their original form, the essays had longer sentences and more polysyllabic and rare words, we modified all of them to reduce their complexity. We did this in three ways: long sentences were divided, rare words were replaced with more common synonyms, and complex syntax was simplified. We also shortened some of the essays. All the short stories were retained in their original state.

Since 100 participants read one of 16 texts, each text was read by approximately six participants. Given that the objective of the experiment was not to test whether a particular text will have a particular effect, but rather whether a category (of fictional vs. non-fictional literary text) would have such an effect, we tried to include as many texts as experimentally feasible. The objective for the multiplicity of texts was to be able to generalize our conclusions to literary fiction and non-fiction, and thus avoid the potential problem of making generalization about literature from experimenting with a single text.

Level of Artistic Merit and Level of Interest. After they read the text to which they had been assigned, participants were asked to rate it on Likert scales from 0 to 10 (0 = Not at all, 10 = Extremely) as to how artistic, and how interesting they found it. This was done to ensure that essays and short stories were not systematically more artistic or interesting in a way that might confound results.

Dependent measures. Since the subscales of the Interpersonal Reactivity Index were administered both before and after the experimental manipulation, Change of Cognitive Empathy (based on the Perspective Taking Subscale), and Change of Affective Empathy (based on the Empathic Concern subscale) were created by regressing each of the variables at Time 2 on the respective variables at Time 1, and using standardized residuals. Scores on the Mind in the Eyes Test were measured just once, after reading, and were used in their raw form.

Manipulation Checks. After reading the text to which they had been assigned, participants were given five short multiple-choice questions of fact (rather than interpretation) to verify that they had read and understood the text. Six participants got three or more answers of the five incorrect, and were therefore considered not to have read or understood the text in its entirety. They were excluded from statistical analyses. For the other participants, the number of questions that they got correct gave a measure of Comprehension Level of the text.

Results

The difference in complexity between the essays and the short stories was first tested, to ensure that a confounding variable has not been introduced. No differences were found between the essays and short stories in complexity level as measured by Flesch-Kincaid Grade Level, $t(14) = -.04$, $p = .97$, or in length, $t(14) = .79$, $p = .45$. Furthermore, there were indeed no significant differences between the essays and short stories either on Artistic Merit, $F(1,91) = .69$, $p = .41$, or Level of Interest, $F(1,91) = .52$, $p = .47$.

The next section presents three tables that show descriptive statistics of covariates and the dependent variables. The means, standard deviations, minimum and maximum scores of covariates (ART-Fiction/Nonfiction, Big-Five, Comprehension Level, Artistic Merit, and Level of Interest) are presented in Table 1.

Table 1. Means, standard deviations (*SD*), minimum and maximum values of covariates.

Covariate	Mean	*SD*	Min.	Max.
Author Recognition-Fiction	6.2	6.50	0	31
Author Recognition-Nonfiction	4.71	4.07	0	21
Big-Five: Extraversion	3.34	.76	1.4	5.0
Big-Five: Agreeableness	3.48	.67	2.1	4.8
Big-Five: Conscientiousness	3.35	.66	1.4	5.0
Big-Five: Neuroticism	3.06	.67	1.5	4.25
Big-Five: Openness	3.52	.68	2.1	5.0
Comprehension Level	4.51	.72	3	5
Artistic Merit	6.02	2.24	1	10
Level of Interest	5.90	2.49	1	10

The means, standard deviations, and alphas for the Perspective Taking subscale were $M = 6.1$ ($SD = 1.63$), $\alpha = .78$ at Time 1, and $M = 5.98$ ($SD = 1.76$), $\alpha = .86$ at Time 2. The means, standard deviations, and alphas for the Empathic Concern subscale were $M = 6.72$ ($SD = 1.74$), $\alpha = .84$ at Time 1, and $M = 6.63$ ($SD = 1.92$), $\alpha = .89$ at Time 2. The correlations between Time 1 and Time 2 for Perspective Taking and Empathic Concern subscales were .90 and .93, respectively.

Descriptive statistics for Change of Cognitive Empathy, Change of Affective Empathy, and Mind in the Eyes Test, and correlations among them, are presented in Table 2.

To test the central hypothesis, we ran a multivariate analysis, with Change of Cognitive Empathy, Change of Affective Empathy, and the Mind in the Eyes Test, as dependent variables; Condition (Essay versus Short Story) as the main independent variable (fixed-factor); with Author Recognition Test-Fiction, Author

Table 2. Descriptive statistics and correlations among the dependent variables.

Dependent variable	Mean	*SD*	Min.	Max.	Change of Cognitive Empathy	Change of Affective Empathy	Mind in the Eyes Test
Change of Cognitive Empathy	.002	.78	−2.54	2.13	1.00	.21*	−.04
Change of Affective Empathy	−.001	.71	−2.79	1.44		1.00	.04
Mind in the Eyes Test	25.37	3.84	12	33			1.00

Note. * Correlation is significant at the .05 level (2-tailed).

Recognition Test-Nonfiction, the Big-Five traits, Comprehension Level, Artistic Merit, and Level of Interest, as covariates. The results showed significant effects for Change of Cognitive Empathy, $F(11,81) = 2.09$, $p < .05$, $R^2 = .221$, and the Mind in the Eyes Test, $F(11,81) = 1.93$, $p < .05$, $R^2 = .208$. The effect, however, was non-significant for Change in Affective Empathy, $F(11,81) = 1.23$, $p = .28$. It is important to note that the significant effect (for both Change of Cognitive Empathy and Mind in the Eyes Test) was driven by the covariates, and that the overall effect of Condition (short stories vs. essays) was not significant.

Significant covariates of Change of Cognitive Empathy were Openness on the Big Five personality traits, $F(1,81) = 8.29$, $p < .01$, $R^2 = .093$, and participants' judgments of Level of Interest of the texts $(1,81) = 5.38$, $p < .05$, $R^2 = .062$.

The effect of Condition (Essay versus Short Story) on Change of Cognitive Empathy, for high and low Openness individuals, is presented in Figure 1. Although there was no overall effect of reading an essay as compared with a short story, you may see from this figure that there was a strong effect for participants who were low in Openness; the low-Openness participants who read the short story rather than the essay underwent a positive Change in Cognitive Empathy ($M = .32$, $SD = .86$) and this was significantly different from the Change of those who were high in Openness ($M = -.28$, $SD = .95$), $t(46) = -2.32$, $p < .05$, Cohen's $d = .68$.

As you may also see from Figure 1, participants who were high in Openness were generally lower on the scale of Change of Cognitive Empathy than were those who were low in Openness, and this difference was significant, $\beta = .277$, $p < .01$. This is an interesting result in conjunction with our finding that Openness correlated positively with the Perspective Taking Scale at Time 1, $r = .24$, $p < .05$. Level of Interest in the text had an almost significant simple positive relationship with Change of Cognitive Empathy, $\beta = .198$, $p = .057$.

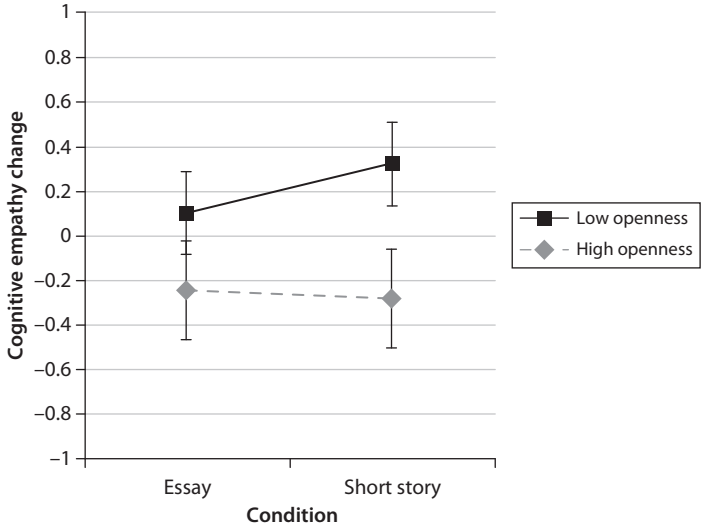

Figure 1. Perspective Taking Change across Condition (Essay vs. Short Story) and across two levels of Openness: Low Openness (below the mean), High Openness (above the mean).

In terms of the Mind in the Eyes Test, significant covariates were Author Recognition Test-Fiction, $F(1,81) = 4.64$, $p < .05$, $R^2 = .054$ and Comprehension Level, $F(1,76) = 6.33$, $p < .05$, $R^2 = .073$. The relationship of exposure to fiction (Author Recognition Test-Fiction) and the Mind in the Eyes Test was positive, $\beta = .250$, $p < .05$, such that an increase in Author Recognition Test-Fiction predicted increased scores on the Mind in the Eyes Test. Higher Comprehension Levels for the texts also led to higher scores in the Mind in the Eyes Test, $\beta = .266$, $p = .01$.

As an exploratory analysis, we treated each text as a category and attempted to predict whether some were significantly more likely to predict Change in Cognitive Affect. There was no significant differences between texts in terms of their effect on Change in Cognitive Affect, $F(15,77) = 1.51$, $p = .12$.

Discussion

We asked how a piece of literary fiction in the form of a short story, as compared with a non-fictional essay, affects empathy. We did not find that the type of writing (literary fiction vs. literary non-fiction) made a significant difference for our outcome measures, except through interaction with personality variable Openness,

and the effect was limited to Change of Cognitive Empathy. For participants who were low in Openness, change in self-reported Cognitive Empathy was significantly increased in the Short Story condition. People who were high in Openness had their scores of Change of Cognitive Empathy lowered by reading either an essay or a short story.

Our result is surprising on two accounts. First, given the findings of previous studies, such as that of Johnson (2012), we had anticipated that reading-induced empathy to be increased by exposure to fiction. One reason for the discrepancy could be that although we designed experiment to measure difference between fiction and non-fiction, all of our texts were literary (as can be seen from the lack of difference in artistic merit between the two sets). If literariness is associated with multiplicity of perspectives, perhaps the difference between the short stories and the essays was lost on high Openness individuals. In the ordinary course of events, outside our study, many of the non-fiction texts that people read are of a non-literary kind, for instance in newspapers, textbooks, and reports. These need not invite creative interpretations, even by highly open individuals. In future it would be worth comparing effects of non-literary texts with literary ones. Furthermore, we did not measure transportation, which was an important mediator of the effect of reading on empathy in Johnson's (2012) study, and this measure should be included in our future studies.

The second surprise was the difference between people who were low and high on Openness, with those low in Openness reporting higher Cognitive Empathy after reading the Short Story, and those high in Openness reporting lower Cognitive Empathy. For those high in Openness, there may be a ceiling effect such that they were already high in Cognitive Empathy; Openness was positively correlated with the Perspective Taking scale of the Interpersonal Reactivity Index at Time 1. As such, there may not have been much room for positive change on this scale. Since these people were already cognitively empathetic, they may have paid attention to aspects of the text other than those that might have further increased their cognitive empathy. Another explanation might be that participants who were high in Openness were already responsive to others' opinions, so that reading the text may have made them aware of the limitations of their empathy with the result that after reading they reported that they had less empathic accuracy. Participants who were low in Openness reacted in the opposite direction. After being immersed in another's way of thinking in their simulation of a short story, as compared with the more impersonal style of an essay, their self-reported Cognitive Empathy improved.

Since the Mind in the Eyes Test measures just one aspect of cognitive empathy — a visually based inference — the lack of correlation between this non-self-report measure of empathy and the self-reported Perspective Taking scale of

the Interpersonal Reactivity Index needs to be researched further. If self-reported empathy is at variance with actual skills in empathic inference, than a change in self-report in cognitive empathy, for example, may indicate a greater willingness to understand others, rather than an actual improvement in understanding others. Whether this increased willingness leads to actual greater empathic skills needs to be further researched.

We also found the greater the lifelong reading of fiction as measured by the Author Recognition Test-Fiction, the better participants were in their identification of the mental states of individuals in the still pictures of the Mind in the Eyes Test, regardless of the condition to which they were assigned. This is a useful replication of the findings of Mar et al., (2006) and Mar et al., (2009). Mar et al., (2009) ruled out the kind of explanation for this result in which people who were better at understanding social cues would be more likely to read fiction. They found a strong positive relationship between scores on the Author Recognition Test-Fiction and scores in the Mind in the Eyes Test even when individual differences had been controlled for. Our result also adds to the conclusions of a recent meta-analysis by Mol and Bus (2011) of helpful cognitive effects of reading as measured by the Author Recognition Test. The improved scores on the Mind in the Eyes Test that have been found to occur with fictional reading, using Mar et al.'s modified Author Recognition Test, seem likely to derive from coming to understand the emotional lives of many kinds of literary character in many kinds of situation. This is an effect that cumulates over a lifetime. It is different from and complementary to the kind of effect one can see in the short moment of an experiment, using measures such as Cognitive Empathy and Affective Empathy derived from Davis's scales.

The set of results on increased empathy associated with higher lifetime levels of reading fiction also fits well with the findings of Taylor, Hodges, and Kohanyi (2003), who found that people who had been writing fiction for at least five years scored higher on Interpersonal Reactivity Index than a normative population. Writers are dedicated readers of their own work. To write a story they need to enter the minds of others with greater persistence than someone reading the story. In their work, therefore, they model a way of being that develops greater cognitive empathy.

Another result of our experiment is that the participants who had more lifelong exposure to fiction were better at correctly answering questions about the text they have read. Comparable results have been found by Mar, Babyuk, Valenzano, and Peterson (2008), who found that the higher people's scores were on the Author Recognition Test-Fiction , the larger were their vocabularies (although the general vocabulary of fiction is not larger than that of non-fiction). The results also fit in with finding by Mar (2010) who found, alongside an effect of increased vocabulary among fiction readers, effects of several positive aspects of verbal reasoning.

Given that, in our study, we found a causal effect of reading fictional literature on empathy only in individuals who were low on Openness, we must be careful about generalizations. We wondered whether those who were low in Openness merely believed themselves to have increased in Cognitive Empathy when they read a short story. More likely, we believe, is that these individuals did benefit more from the fictional story they read (or benefited from it more quickly) because their lack was the greater. Since humans, as a species, are not born with cognitive empathy but develop it in middle childhood, it seems reasonable that there could be a potential of continuing to develop it throughout one's lifetime, and that fictional literature could be one means of doing this. While we have obtained some evidence for this relationship, in order to answer questions about the quality, speed, and mechanism of this development, it is necessary to conduct further experiments.

Many people consider reading fiction merely a leisure activity. The labels we place on fiction, however, do not negate its contribution to cognitive development. The world of literature encourages us to become others in imagination, and this may be one of most benign means of improving one's abilities in the social domain. Of course, we can understand others by interacting with them, but in real life misunderstanding often causes severe upsets. Fictional literature, in which we can misunderstand without suffering negative consequences, may be a gentler teacher.

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Note

1. Please note that the data collected here are a part of an omnibus experiment that addressed several different dependent variables (please see Djikic, Oatley, & Carland, 2012; and Djikic, Oatley, & Moldoveanu, in press). Here we will discuss only the questionnaires and the dependent variables that were directly relevant to this particular experiment.

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Appendix A

Essays and short stories used in the experimental procedure

Essays	Short stories
Henri Bergson: *Why Do We Laugh?*	Paul Bowles: *The Echo*
John Burroughs: *Science and Literature*	Katherine Brush: *Night Club*
Havelock Ellis: *What Makes a Woman Beautiful?*	Frank O'Connor: *My Oedipus Complex*
Sigmund Freud: *Dreams of the Death of Beloved Persons*	Jean Stafford: *A Country Love Story*
John Galsworthy: *Castles in Spain*	Jean Stafford: *In the Zoo*
Stephen Jay Gould: *Nonmoral Nature*	Wallace Stegner: *Beyond a Glass Mountain*
George Bernard Shaw: *Killing for Sport*	Clark van Tilburg: *The Wind and Snow of Winter*
Rabindranath Tagore: *East and West*	Glenway Wescott: *Prohibition*

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