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**The Effects of Reading Narrative Fiction on Social and Moral Cognition: Two Experiments
Following a Multi-Method Approach**

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Abstract

We present two experiments examining the effects of reading narrative fiction (vs. narrative non-fiction vs. expository non-fiction) on social and moral cognition, using a battery of self-report, explicit and implicit indicators. Experiment 1 ($N=340$) implemented a pre-registered, randomized between-groups design, and assessed multiple outcomes after a short reading assignment. Results failed to reveal any differences between the three reading conditions on either social or moral cognition. Experiment 2 employed a longitudinal design. $N=104$ participants were randomly assigned to read an entire book over seven days. Outcome variables were assessed before and after the reading assignment as well as at a one-week follow-up. Results did not show any differential development between the three reading conditions over time. The present results do not support the claim that reading narrative fiction is apt to improve our general social and moral cognition.

Keywords: fiction, narrative, social cognition, empathy, morality

Introduction

Social cognition, a broad construct involving the perception, interpretation, and response to social information, forms an important part of our everyday lives, helping us navigate interpersonal relationships in a variety of contexts (Fiske & Taylor, 2013). Two main components of social cognition are empathy, the capacity to vicariously share the feelings of others while retaining awareness of the self-other distinction (Singer & Klimecki, 2014), and Theory of Mind (ToM), the ability to understand and predict the mental states of others (Wellman et al., 2001). Although empathy and ToM are often associated with prosocial virtues, both abilities can be used for manipulation and deception (e.g. Bloom, 2016; Breithaupt, 2018; Bubandt & Willerslev, 2015; Ding et al., 2015; Imuta et al., 2016; Lee & Imuta, 2021; Vermeule, 2010). Hence, social cognitive abilities are not necessarily linked with morally good outcomes.

In this paper we present two experiments that test the degree to which social and moral cognitive abilities can be enhanced by reading narrative fiction. The question of whether literary fiction is socially and morally educative has a long history, and is motivated by research in various fields. Dr Johnson (1750) said fictions which are “true to life” while discouraging immorality “serve as lectures of conduct”; Shakespearean drama was increasingly revered through the nineteenth century for its insight into character (Emerson, 1850); the last hundred years has seen a growing body of work devoted to the idea that novels are specially placed to develop the reader’s moral imagination (Trilling, 1950) and processing of social information (Boyd, 2009, p. 192). Most influentially, Nussbaum (1990; 1995) has argued for the power of works by James, Proust and others to cultivate a judicious moral sensibility. In this century there has been an increasing focus in psychology and in the humanities on fiction’s impact on empathy; for instance, certain novels are said to help readers to take the perspective of a “stigmatized other” (Mar & Oatley, 2008).

Despite strong claims in the recent literature (e.g. Kidd & Castano, 2013), experimental support has so far been rather indirect (often relying on a single measure of social cognition),

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weak, and controversial (many effects have failed to replicate; see e.g. Panero et al., 2016; Samur et al., 2018). In a meta-analysis, fourteen experimental studies reporting a total of 53 effect sizes were synthesized by Dodell-Feder and Tamir (2018). After reading a fiction text, participants achieved small-size advantages in social cognitive performance compared to participants exposed to non-fiction text or no-reading conditions. However, when fiction reading was compared to non-fiction and no-reading control groups separately, significant improvements in social cognition were only seen for fiction compared to no-reading, which suggests that reading any short text accounts for some of the small improvement. So although this meta-analysis provides some evidence for a positive relationship between reading narrative fiction and social cognitive abilities, it is limited.

Psychologists who defend a positive relationship between fiction and social cognition typically reject the idea that fiction and non-fiction are distinguished by the former being “entertainment, with no connection to empirical validity” (Mar & Oatley, 2008, p. 173). Despite this framing in terms of the distinction between fiction and non-fiction, advocates of the value of fiction for improving social cognition generally concern themselves with features associated not only with fictionality, but also with narrativity, a broad category that includes non-fiction as well (e.g. Djikic et al., 2013; Mar et al., 2006; Mar & Oatley, 2008). For example, according to Mar and Oatley’s (2008) Simulation Model, which provided the theoretical framework for most of the studies included in the above meta-analysis, the primary function of narrative fiction is to simulate the social world. Narratives generally concern social interactions and relationships between people, while specifically fictional narratives invite us to imagine made-up simulations of the actual world. Mar and Oatley say that fiction is “unique in providing a model of what could happen” as opposed to what has happened (2008, p. 175). On this account, narrative fiction offers the experience of engaging in a distinctive kind of simulation of social interactions: one where it is possible to adopt, in a distanced way, a character’s perspective and where social situations are simplified. This, it is said, is apt to lead to increases in empathy and social knowledge, as well as

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differentiation and consolidation of readers' emotional repertoire. The Simulation Model does not make explicit assumptions regarding the *amount* of fiction exposure needed for improvement of social cognition. However, many studies that deployed the model (e.g., Bal & Veltkamp, 2013; Chlebuch et al. 2020; Djikic et al., 2013) sought and claimed to find effects that became manifest after reading a single text. Some researchers, while agreeing that narrative fiction enhances social cognition more strongly than expository non-fiction does, trace the effects to specific text features such as literariness, social content, or stylistics/structure (e.g. Chlebuch et al., 2020; Johnson et al., 2013b; Kidd & Castano, 2013; Małecki et al., 2016; Panero et al., 2016). Others postulate that the effects rely on reader characteristics, such as emotional transportation (Bal & Veltkamp, 2013) or imagery generation (Johnson et al., 2013a).

None of these studies is able to distinguish between the role played by *fictionality* and the role played by *narrativity* in explaining social cognitive effects. Although the contrast between fiction and non-fiction is contested, there is widespread agreement that works of non-fiction standardly aim for accurate representation and invite belief, whereas works of fiction standardly invite readers to imagine what is not the case (see e.g. Friend, 2012). The concept of narrative, though, is orthogonal to that of fiction; there are both fictional and non-fictional narratives, such as biographies and histories (see e.g. Schaeffer, 2013). Narratives present events unfolding over time, and typically concern the actions and interactions of agents, real or imagined. They are contrasted with non-narrative modes of presentation, such as expository texts that describe facts or situations without putting them into the structure of a story (Graesser et al., 2003). That is, the central difference between narrative and expository text concerns the way in which content is presented, whereas the difference between fiction and non-fiction concerns the content's purported relation to the reality.

These distinctions have, however, been ignored in most of the studies cited above. Some studies compared only fiction with fiction (e.g., Kidd & Castano, 2019; Kidd et al., 2016). Those which compared fiction and non-fiction used fictional narratives on the one hand and expository

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non-fiction on the other (e.g., Black & Barnes, 2015; Johnson et al., 2013b), leaving it open whether the effects are due to narrativity or fictionality. Contrasting narrative fiction not only with expository non-fiction but also with narrative non-fiction is important to test whether fictional narratives have greater benefits than non-fictional ones.

An additional problem with the existing studies is that the fictional narratives concerned social content, whereas the non-fictional texts did not, and therefore any effects of fiction on social cognition might be driven by the social content of those texts. What is needed therefore is a contrast between the effects of narrative fiction and narrative non-fiction where both are focused on social content. In this paper we aim to disentangle effects of fictionality and narrativity by directly comparing social cognitive abilities after reading narrative fiction, narrative non-fiction, and expository non-fiction texts concerning social content. Strictly speaking, to test the impact of narrativity would require also comparing expository fiction. However, by contrast with narrative non-fiction, expository fiction is relatively rare, and examples—such as More’s *Utopia* or many of Borges’s *Ficciones*—tend to violate standard conventions of the fiction genre, rendering them non-representative. Thus our study – like all previous studies in the field we are aware of – does not include an expository fiction condition. The same is true of a related study by Małecki, Sorokowski, Pawłowski, and Cieński (2019), which contrasted narrativity with perceived fictionality. Unlike the present work however, this study investigated attitudes towards animal welfare instead of general social cognitive abilities and morality, and contrasted a narrative placebo with a narrative presented as fiction and the same narrative presented as non-fiction, rather than comparing narrative fiction with narrative non-fiction and expository non-fiction. Proceeding in this way is important because there are good reasons to think that it is not fictionality, but instead narrativity, i.e. whether a text is narrative or expository, that is responsible for social cognitive and moral effects

First, philosophers of fiction have cast doubt on the claim that there is any sharp cognitive or epistemic distinction between fictional and non-fictional narratives (Friend, 2008, 2012, 2014;

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Matravers, 2014). Both fiction and non-fiction stories can invite vivid imaginings, cause beliefs, engage us emotionally, and so on. Second, narratively structured accounts, fictional and non-fictional, can simulate social experiences, so are able to encourage the reader to focus on the experiences and social interactions of persons, so narrativity seems more fundamental to social and moral cognition than fictionality does. Some empirical support for this claim is found in Koopman (2015), where reading a narrative about grief—whether a literary fiction or a non-literary, non-fiction “life story”—increased empathy compared to reading an expository text about grief. (Although this experiment is sophisticated in many ways, social and moral cognition were assessed via self-report questionnaires and a behavioural test of prosociality. Since both types of assessment are subject to social desirability biases (see below), the validity of these findings is limited). Mar (2018a) has recently proposed the Social Processes and Content Entrained by Narrative (SPaCEN) framework, which explicitly postulates narrativity rather than fictionality as relevant to social cognition. On this account, stories that improve social cognition must accurately represent the social world and evoke social processes such as empathy, and the skills gained must be actively applied and improved by practice. Fictions and non-fictions alike may meet these conditions. The SPaCEN framework predicts effects of story reading only after frequent engagement over a long period of time, based on a long-term accumulation of many experiences. Still, Mar’s assumption regarding the priority of narrativity over fictionality has not yet been empirically tested. To distinguish between predictions of the SPaCEN framework and the earlier Simulation Model requires comparing narrative fiction not only with expository non-fiction—as other studies have done—but also with narrative non-fiction. In sum, we expect that narrativity is more important for promoting social and moral cognition than fictionality since narratives – as distinct from expository texts – enable readers to simulate social experiences; fictionality (i.e. the content’s relation to reality) should affect to a lesser extent whether readers exercise their social cognitive abilities during reading.

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Furthermore, the extant evidence base mainly relies on measures of social cognition, though some researchers have considered morality as well. For instance, in an investigation by Johnson and colleagues (2013a), participants read a fictional story and were instructed to either generate imagery during reading, focus on word meaning, or read the story with a view to being entertained. The imagery-generation group was over three times more likely to engage in prosocial behaviour after the reading assignment than the entertainment group. In three experiments, Kidd and Castano (2019) randomly assigned volunteers to read a short literary fiction or popular fiction piece or nothing (the last condition was not implemented in their Experiment 1). Afterwards, participants completed a moral judgement task. The pattern of results was inconsistent, with more frequent moral judgements for the literary fiction group in Experiment 1, less frequent moral judgements for the literary fiction group in Experiment 3, and no group differences in moral judgement in Experiment 2. The above-mentioned experiment by Koopman (2015) also investigated prosocial behaviour after reading, which was found to be more frequent in the non-literary narrative non-fiction group than in the remaining groups (for further studies see Black et al., 2018, and Black & Barnes, 2021, who used a correlational design instead of an experimental one). Taken together, the available experiments on morality are difficult to summarize due to their heterogeneity, and none of them have disentangled the contributions of fictionality and narrativity to moral improvement.

The focus on social cognition does not enable assertions about narrative-based improvements of morality, as claimed in the literary and philosophical literature sampled above. From a psychological point of view, two routes of narrative-based moral enhancement have been suggested: The first route is via increased social cognitive abilities, as outlined above (Koopman, 2015). Sharing of others' mental states, enhanced by reading narratives, is assumed to affect a range of outcomes including compassion, awareness of the impact of one's actions on others' welfare, and more advanced moral judgements (Killen et al., 2011; Ugazio et al., 2014). Since improving social-cognitive abilities does not automatically improve morality (see above),

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increased social cognition cannot be regarded as a sufficient condition of enhanced morality. Yet it is possible that readers with appropriate motivation can employ the social knowledge gained from narratives to become morally better people.

The second route is more direct, via observational learning (Black & Barnes, 2021; Johnson et al., 2013a; Mumper & Gerrig, 2019). Readers are thought to be able to learn morally positive attitudes and behaviours when a story character is rewarded for morally positive behaviour or penalized for morally negative behaviour. Yet if such a pattern of reward is absorbed blindly, without attaining insight into principles of ethical conduct, readers could just as well acquire morally negative attitudes and behaviours when a story character is rewarded for a morally negative action or punished for a morally positive one.

One characteristic of previous research is that the indicators of social cognition, though easily administered in experimental settings, have limited validity. For example, empathy has been measured exclusively using self-report measures (Dodell-Feder & Tamir, 2018), which are compromised by social desirability biases and difficulty for individuals with relatively low empathic skills to accurately assess these skills (Ilgunaite et al., 2017). Theory of Mind (ToM) has predominantly been indexed by the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001), in which respondents judge the mental state of a person from a photograph of their eye region. Despite its widespread application, this measure has been criticized for its association with verbal intelligence (Baker et al., 2014), concerns that it reflects emotion recognition rather than ToM (Oakley et al., 2016; see also Mar, 2018b), and that it might not be sensitive to inter-individual differences within neurotypical populations (Black, 2019). In our experiments we therefore employed a greater variety of measures of social and moral cognition, including implicit tasks that are less susceptible to bias.

We report two experiments investigating the effects of reading narrative fiction on social and moral cognition. We aimed to clarify the contributions of fictionality and narrativity that might be responsible for changes in social and moral cognition by comparing the effects of

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reading a fictional narrative, non-fictional narrative, and expository non-fiction. Whilst Experiment 1 examined effects after reading a short excerpt, Experiment 2 assessed the impact of reading an entire book in a three-wave (pre-, post-, and follow-up) longitudinal design. In both experiments, social cognition was assessed using a battery of indicators including self-report, behavioural, and implicit measures, thereby increasing methodological rigour and explanatory power compared to all previous studies that have tested effects of fiction reading on social cognition. The outcomes under investigation also go beyond empathy and ToM by including implicit morality.

Various aspects of social cognition were measured in our broad battery of tasks. Participants' affective empathy was measured using an eye-tracking paradigm in which participants watched video clips of actors describing sad and neutral life events (increased empathy is indicated by increased fixations on the actor's eye region and increased pupil size for sad *vs.* neutral videos; Cowan et al., 2014; Michalska et al., 2013; Sirois & Brisson, 2014). The RMET was implemented as a measure of emotion recognition, and the Frith-Happé animations task was used as a measure of mentalizing/ToM (Heider & Simmel, 1944; White et al., 2011). We also included measures to assess moral cognition. Two basic self-concepts that have been associated with morality and its lack are, respectively, communion and agency (Bakan, 1966). Communion is associated with allocentric behaviours, since it is related to cultivating social relationships and pro-social traits including cooperation, while agency is associated with egocentric behaviours, since it is linked with distancing the self from others and anti-social traits including assertiveness (Bakan, 1966). We assessed these two self-concepts implicitly using a word-fragment completion task, which indicated ease of access to the respective concepts (Bartz & Lydon, 2004). In addition, an Immediate Affect towards Moral Stimuli (IAMS) task assessed participants' affective reactions towards morally positive/negative stimuli, which have been associated with guilt feelings in a moral dilemma, and with emotional reactions to/rejection of an unfair offer (Hofmann & Baumert, 2010). An Implicit Association Test (IAT) measured

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participants' moral vs. immoral self-concept, which predicts moral actions such as honest behaviour despite negative consequences (Perugini & Leone, 2009). In sum, measures of implicit (moral) attitudes have proven to be better predictors of real-life action than measures of explicit attitudes (e.g., Perugini & Leone, 2009); they have also been shown to be sensitive to narrative-based changes (Green & Brock, 2000). In Experiment 2, we additionally applied a test of prosocial behaviour. Table 1 summarizes the outcome measures used in both experiments and offers justifications for their use.

Finally, an important consideration when assessing the efficacy of fiction reading on social and moral cognitive abilities is the content of the texts to be read. To decide whether fictionality or narrativity facilitates social cognitive gains, it is essential to examine texts that all deal with the same social content. In Experiment 1, we chose grief as a theme likely to promote social cognition since it is an emotion and hence relevant to the question of emotional alignment; its emotional content naturally evokes empathy; and the tendency to grieve has been found to correlate with a tendency to empathize (Kellehear, 2002; Oltjenbruns, 1991). Moreover, grief has a significant cognitive content in that it is based on the recognition of a specific loss and the desire for a continued relationship with the loved one (Gustafson, 1989; Ratcliffe, 2017). Also, it is a moral emotion in the sense that a grieving person often thinks of themselves as morally bound to the memory of the loved one (McCracken, 2005). Experiment 2 broadened the scope of themes involved by adding friendship and immigration as further socially relevant topics (for more details please refer to the Methods section of Experiment 2).

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Outcome		Justification for investigating outcome	Operationalization	Justification for using operationalization	Use of operationalization in previous investigations in the field
Social cognition	Emotion recognition	Mar (2018a) proposes that narratives comprising accurate social content can teach lessons about human psychology including emotional expression	Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001) ^{a b}	<ul style="list-style-type: none"> • Oakley et al., (2016) suggested that the RMET measures emotion recognition • This task has been applied frequently in previous experiments, which aids comparison with existing evidence 	Yes (e.g., Black & Barnes, 2015; Djikic et al., 2013; Kidd & Castano, 2013, 2019; Kidd et al., 2016; Liu & Want, 2015; Panero et al., 2016; Samur et al., 2018)
	Theory of Mind (ToM)	Mar (2018a) suggests that stories providing access to protagonists' mental life exercise ToM	Frith-Happé animations task (White, et al., 2011) ^a	<ul style="list-style-type: none"> • This task builds on people's proclivity to ascribe human psychology to silent moving shapes • This task has been used as a reliable indicator of ToM in adults (White et al., 2011): High levels of ToM are suggested by correct recognition of mental interactions between animated shapes 	No
	Affective empathy	Mar (2018a) assumes that stories portraying affective responses of characters can elicit and train empathy	Eye-tracking paradigm: Dwell time percentage on eye region of an actor within a video; difference in pupil dilation between the sad and the neutral video ^b	<ul style="list-style-type: none"> • Cowan et al. (2014) demonstrated that the duration for which participants fixated their gaze on the eye region of an actor within a video is associated with participants' level of trait empathy • Pupil dilation indicates, amongst others, emotional arousal (Sirois & Brisson, 2014); Michalska et al. (2013) utilized pupil dilation as an indicator of empathic arousal 	No
Moral cognition/behaviour	Theorists in the humanities have traditionally argued that reading (fictional) stories has the potential to generate global moral improvement across a range of components of moral cognition and behaviour (e.g., Nussbaum, 1990, 1995)	Word completion task introduced by Bartz and Lydon (2004) ^{a b}	<ul style="list-style-type: none"> • This task is an implicit method of assessing moral cognition and decreases proneness to social desirability • It reflects the ease of access to morally relevant concepts (Bartz & Lydon, 2004), namely communion (associated with cultivating social relationships and pro-social traits) and agency (related to distancing the self from others and anti-social traits) 	No (however, Johnson et al. (2013b) used a different word completion paradigm)	

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Implicit affect towards moral stimuli task (IAMS task; Hofmann & Baumert, 2010) ^{a b}	<ul style="list-style-type: none"> • This task indicates affective responses to morally positive/negative stimuli • Performance in this task has been linked with guilt feelings in a moral dilemma, and with emotional responses to/rejection of an unjust offer (Hofmann & Baumert, 2010) 	No
Implicit moral identity IAT ^{a b}	<ul style="list-style-type: none"> • This task mirrors moral <i>vs.</i> immoral self-concept • Performance in this task predicts moral actions such as honest behaviour despite negative consequences (Perugini & Leone, 2009) • This task has proven to be a better predictor of real-life behavior than indicators of explicit attitudes (Perugini & Leone, 2009) 	No (but note that Johnson et al. (2013b) applied an IAT measuring prejudice against Arab Muslims and observed effects after reading a short excerpt)
Prosocial behaviour test ^b	<ul style="list-style-type: none"> • This task measures helping behaviour in a situation without direct benefit for the helping person 	Yes (similar tasks used by Johnson et al., 2013a, and Koopman, 2015)

Note. ^a used in Experiment 1; ^b used in Experiment 2.

Table 1. Overview and justification of dependent variables, their operationalization, and their use in previous experiments on fiction-based benefits for social and moral cognition.

Experiment 1

Our earlier discussion surveyed the enduring view that fiction has a special capacity to affect social and moral cognition; it also suggested that any such capacity might actually depend on fiction's narrative form and hence be shared equally by non-fictional narratives. Experiment 1 was designed to shed light on this issue, testing the hypothesis that reading a short narrative text improves social cognition more strongly than a non-narrative/expository text, regardless of fictionality.

To test this assumption, participants were randomly assigned to read an excerpt from either a narrative fiction, narrative non-fiction, or expository non-fiction text. Due to the brevity of reading interventions, a pre-post design would have provoked test-retest effects. Therefore, we adopted the approach employed by most similar previous studies (e.g. Black & Barnes, 2015; Chlebuch et al., 2020; Koopman, 2016; Liu & Want, 2015), testing social and moral cognitive abilities between text conditions after the reading assignment only.

Materials and Methods

All methodological procedures were approved by the Research Ethics Committee of the School of Psychology at the University of Kent, prior to commencement, and pre-registered on the Open Science Framework,

https://osf.io/cazmr/?view_only=c899a53508da407bb3af2fe80d129cc5. All measures, manipulations, and exclusions are reported.

Participants

Participants were recruited through Prolific Academic ($N=300$ in the final sample) and from the local student participant pool ($N=40$ in the final sample). Participants recruited via Prolific Academic were paid £7.00; volunteering psychology students from the University of Kent received course credits. All participants had English as their primary language, and provided written informed consent before data collection. Based on the sample size rationale in Kidd and Castano (2019; these authors showed that a final sample size of $N = 305$ had 80%

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power to detect the effect observed in Kidd and Castano (2013, Experiment 5, $d = .33$), our pre-registered target was to recruit 150 participants per condition (narrative fiction, narrative non-fiction, expository non-fiction) in order to reach a total (pre-exclusions) sample size of $N=450$. We expected that, as in Kidd and Castano (2019), approximately one third of data sets would meet exclusion criteria. Therefore, we assumed that the final sample for analysis would be $N=300$ (with $N=100$ in each condition). Data collection was stopped as soon as a minimum of 150 participants per condition was achieved. Sample size was determined before any data analysis. Participants were excluded from analyses if they did any of the following: (i) failed one attention check item that was interspersed within a questionnaire (Transportation Scale; Green & Brock, 2000), (ii) selected more than five mock authors (i.e., foils) in the Author Recognition Test-Genres (ART-G; Mar & Rain, 2015), meaning their foils score was more than 3.5 *SD* above the sample mean, (iii) spent less than 728s reading the assigned text excerpt, indicating their reading time was below two thirds of the time very fast readers would require to read the text¹.

The initial target sample was reached after 462 volunteers. When exclusion criteria were applied, 340 participants remained in the final sample (a reduced exclusion rate compared to

¹ The reading time cut-off was based on an average word reading speed of 239ms reported by Benjamin and Gaab (2012). We considered a word reading speed of 239ms – 1SD (=51ms) = 188ms to indicate very fast reading and assumed a word count of 5,800. This exclusion criterion was stricter than the pre-registered plan to exclude participants whose reading duration was more than 3.5SD away from the sample mean. The deviation from the pre-registration was recommended by an anonymous reviewer since all participants had reading times within 3.5SD of the sample mean, which suggested that the pre-registered criterion was not sensitive enough to detect participants who failed to thoroughly complete the reading assignments. Pre-registered analyses are reported in full at

https://osf.io/pr3zn/?view_only=f92f4d965e8d49b0b31333af82615462.

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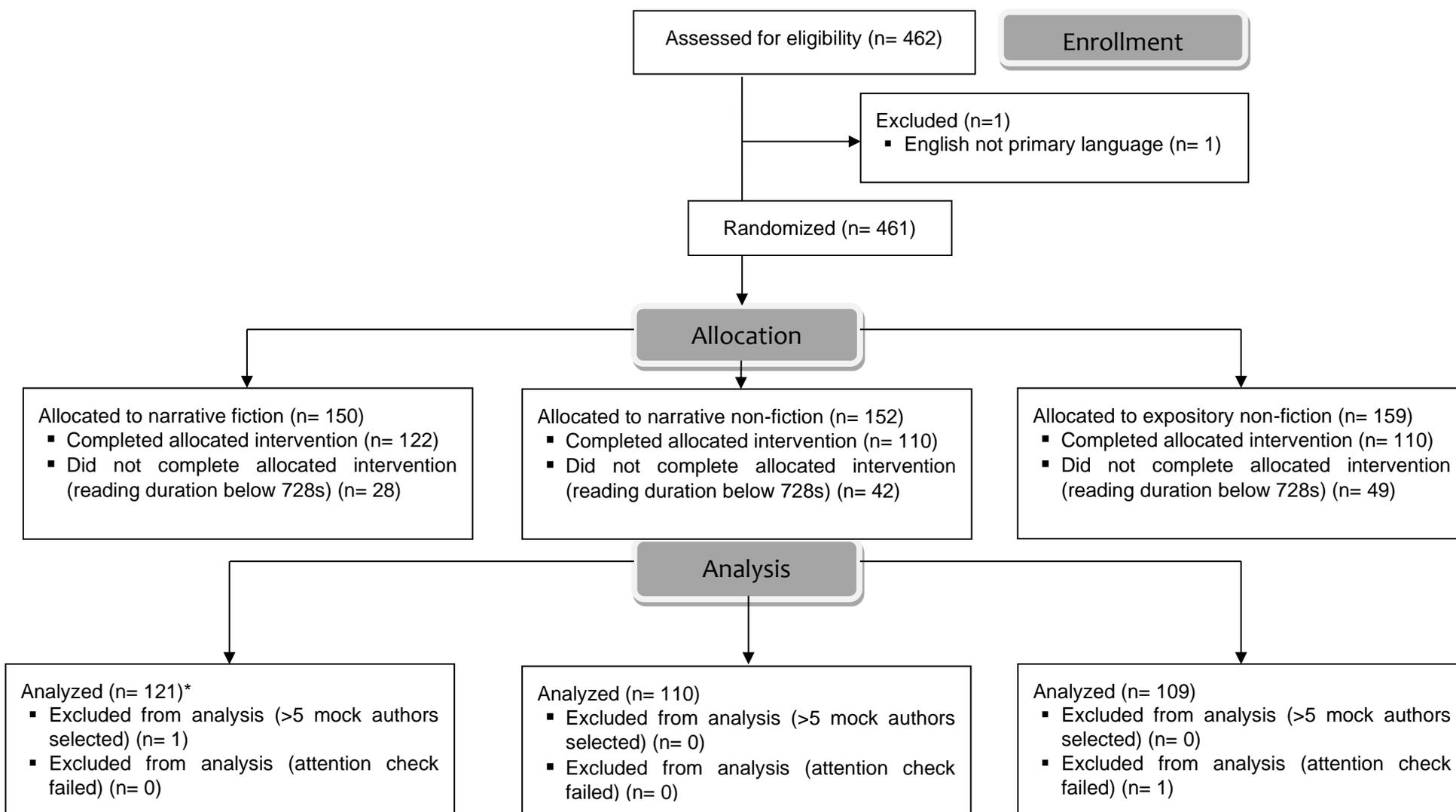
Kidd and Castano, 2019), 121 of whom had read narrative fiction (54.5% female, mean age = 34.02, *SD* of age = 13.70), 110 who had read narrative non-fiction (60.9% female, mean age = 32.13, *SD* of age = 10.36), and 109 who had read expository non-fiction (58.7% female, mean age = 31.20, *SD* of age = 10.93). See Figure 1 for a schematic diagram of the flow of participants through the experiment.

Reading stimuli

Following recommendations by other researchers (e.g., Kurby & Zacks, 2015; Molinari et al., 2011), we used naturalistic texts that facilitated natural reading. In addition, texts were selected to be comparable in terms of subject matter (i.e. dealing with grief). This advances the state of the art since, out of all previous experiments in the field, only Koopman (2015) used reading stimuli with matched content across conditions. We additionally aimed for the two (fiction vs. non-fiction) narrative texts to be comparable regarding what literary theorists call *focalization* (i.e. the perspective from which the story is presented; Genette, 1980). According to these criteria, *In the Springtime of the Year* by Susan Hill (1974) was chosen as the narrative fiction book. This novel deals with a woman who copes with the death of her husband. Using internal focalization, the story is told from the widow's perspective. *The Year of Magical Thinking* by Joan Didion (2005) served as the narrative non-fiction book. Similar to the Hill novel, this memoir is from the perspective of a woman dealing with the loss of her husband. *Grief Counselling and Grief Therapy* by J. William Worden (2003, third edition) was selected as the expository non-fiction book, since it is non-fictional and written in an expository style. Each participant was presented with an excerpt from the beginning of one of the books. Length of texts, approximately 6,000 words, was based on previous literature (e.g. Kidd & Castano, 2013), and was matched across conditions.

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Figure 1. Flow of participants through Experiment 1.



*The number of analyzed data varies between tasks due to incomplete administration or technical problems (or command of Chinese language in the IAMS). Respective numbers are given in Table 2.

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Readability was assessed subjectively by authors 2 and 3. This method of assessment was preferred over computerized measures of readability (e.g., word frequency, Flesch-Kincaid) because we also wanted to gauge attractiveness for our target population, i.e. young adults, which is not directly covered by computerized measures. Both authors congruently rated readability to be in the easy to moderate range, and attractiveness to be medium, for all texts. Interrater agreement was not calculated since there was no indication of any disagreement.

Assessment tasks

State affect. The 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) reflected baseline affect. Participants were presented with 10 negative affect adjectives (e.g., “upset”) and 10 positive affect adjectives (e.g., “enthusiastic”), and rated the intensity with which they felt the corresponding affect using a 5-point scale ranging from 1 = “not at all” to 5 = “extremely”. Two sum scores were calculated to achieve indicators of positive and negative affect, respectively (potential range for each sub-scale: 10 to 50). In the current sample Cronbach’s alpha was .90 for positive affect and .90 for negative affect.

Trait empathy. To assess participants’ levels of trait empathy, we applied the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983). Participants responded to 28 items, e.g., “I often have tender, concerned feelings for people less fortunate than me”, on a 5-point Likert scale ranging from 0 = “Does not describe me well” to 4 = “Describes me very well”. A total sum score with a potential range of 0 to 112 was calculated. In the present sample Cronbach’s alpha was .84.

Lifetime exposure to print. ART-G (Mar & Rain, 2015) provided an indicator of reading habits. Participants were asked to recognize the names of 110 authors of narrative fiction and 50 authors of expository non-fiction (targets) among names of 40 non-authors (foils). Fiction and non-fiction sub-scores were calculated from the number of selected authors for each genre, i.e. the fiction sub-score is the sum of correctly identified fiction authors, and the non-fiction sub-score is the sum of correctly identified non-fiction authors. Unlike the scoring procedures of the

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ART version by Stanovich and West (1989), foils were not subtracted from hits because the authors of ART-G do not provide instructions of this type. In the present experiment, the ART-G fiction sub-score was implemented as covariate since we were interested in the effect of reading a short text, adjusted for differences in lifetime fiction exposure.

Transportation. Transportation was operationalized using the 12-item scale developed by Green and Brock (2000). There are 11 general items, while item number 12 refers to vivid imagery for specific characters (used here in relation to characters described in the text). High levels of transportation are indicated by a high sum score, which is calculated after reverse-coding three negatively worded items. In the current sample Cronbach's α was .82. We originally planned to implement transportation as a covariate, yet due to recommendations by two anonymous reviewers we opted against this – the transportation scale refers to narrative texts, so does not seem to be applicable for expository reading stimuli. Pre-registered analyses including transportation as a covariate are deposited at https://osf.io/pr3zn/?view_only=f92f4d965e8d49b0b31333af82615462.

Emotion recognition. We measured emotion recognition using the Reading the Mind in the Eyes Test-Revised (RMET; Baron-Cohen et al., 2001). Better emotion recognition skills were indexed by a high relative frequency of correct responses.

Implicit morality. First, a word completion task (Bartz & Lydon, 2004) assessed self-concepts in terms of agency and communion. Six out of 13 word fragments could be completed with agency words (e.g. ___ erior: 'superior', 'inferior', 'interior') and six word fragments could be completed with communion words (_ ind: 'kind', 'mind'); one word fragment could be completed with either an agency or communion word, i.e. c_ _ p_ _ _ tive ('competitive', 'cooperative', 'comparative'). Responses were coded as either a 'hit' or a 'miss' for the target word. An agency score was calculated by summing the hits to the target words: 'superior', 'confident', 'active', 'competitive', 'boast', 'greedy', and 'hostile'. A communion score was

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computed by summing the hits to target words: ‘kind’, ‘warm’, ‘gentle’, ‘cooperative’, ‘whiny’, ‘nag’, and ‘dependent’.

Second, in the implicit affect towards moral stimuli (IAMS) task, we followed the experimental procedure and stimuli applied by Hofmann and Baumert (2010). In each trial, participants were asked to categorize a Chinese pictograph as ‘pleasant’ or ‘unpleasant’ using two response keys on the keyboard. Shortly before the Chinese pictograph was presented, a moral prime (e.g. an elderly couple walking arm-in-arm, or a man directing a gun into the camera), or control picture (e.g. a lightning striking a mountainside) appeared for 100ms. It is assumed that the affective reaction to the moral primes presented is misattributed to the Chinese pictograph, thus influencing the response. We used 10 pictures of morally positive behaviours and 10 pictures of morally negative behaviours as moral primes. As comparison pictures, we included 10 non-moral pictures of positive valence, as well as 10 non-moral pictures of negative valence. Responses exceeding a threshold of 2000ms (approximately 2.92% of all responses) or falling below 350ms (approximately 6.33% of all responses) were considered outliers and excluded from analyses. To achieve an indicator of immediate affect towards moral stimuli, the individual difference index of the IAMS was calculated for each participant (cf. Hofmann & Baumert, 2010; proportion of ‘positive’ judgements on trials in which a Chinese pictograph was preceded by a positive moral prime *minus* percentage of ‘positive’ judgements on trials in which a Chinese character was preceded by a negative moral prime). To control for general, morally unrelated affect, the individual differences index of the IACS (immediate affect towards control stimuli) was computed (i.e. proportion of ‘positive’ judgements on trials with positive morality-irrelevant primes *minus* the proportion of ‘positive’ judgements on trials with negative morality-irrelevant primes). Data of participants ($N=8$) who were familiar with Chinese characters were excluded from analysis of the IAMS task.

Third, we applied an Implicit Association Test (IAT) of implicit moral identity (implicit moral identity IAT), with the experimental procedure and stimuli replicating Perugini and Leone

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(2009), and following the standard IAT sequence (Greenwald et al., 1998). The target categories were ‘Moral’ (represented by the stimulus words: ‘honest’, ‘sincere’, ‘faithful’, ‘modest’, ‘altruist’) *vs.* ‘Immoral’ (represented by the stimulus words: ‘deceptive’, ‘arrogant’, ‘dishonest’, ‘cheater’, ‘pretentious’), and the paired categories were ‘Me’ (represented by the stimulus words: ‘I’, ‘me’, ‘myself’, ‘self’, ‘my’) *vs.* ‘Others’ (represented by the stimulus words: ‘them’, ‘they’, ‘others’, ‘your’, ‘you’). Implicit moral identity was indexed by the D6 measure (Greenwald et al., 2003), because we wanted to replicate procedures by Perugini and Leone (2009), and this indicator has proven to outperform other error-penalty formulas (Greenwald et al., 2003). D6 is calculated as the mean latency in the ‘immoral-me’ block *minus* the mean latency in the ‘moral-me’ block, divided by the individual standard deviation of latencies across ‘immoral-me’ and ‘moral-me’ blocks. In line with the D6 scoring algorithm, responses with latencies below 400ms or above 10,000ms were excluded from analysis, and latencies of errors were replaced by the block mean of correct-response latencies plus 600ms. Higher scores express a stronger implicit moral self-concept.

Theory of Mind (ToM). A revised version of the Frith-Happé animations task (White et al., 2011) was used as an indicator of ToM. Participants watched four video clips depicting animated triangles and interpreted the interactions between these shapes, then described what they thought was happening in each clip by typing their response into a text box. These open responses were coded in terms of accuracy and type of description, as outlined in Abell and colleagues (2000). The accuracy score for each video clip had a potential range of 0 to 2, so that the sum score yielded a potential range of 0 to 8, with higher scores indicating better mentalizing abilities. Type of description was coded as either random action, interaction, or mentalizing attribution. A frequency count of each type was calculated for each participant, each with a potential maximum of 4. Subsequently, participants categorized the type of interaction as either no interaction, physical interaction, or mental interaction by responding to a multiple-choice question. Choosing ‘mental interaction’ was coded 1, the remaining choices were coded 0, so that

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the sum score integrating responses to all four video clips had a potential range of 0 to 4. When mental interaction was chosen correctly, two further multiple-choice questions probed details about the feelings of each of the shapes, with one out of five response options being correct. Correct answers were coded 1, errors were coded 0, resulting in a four-video sum score with a possible range of 0 to 8.

Procedure

Participants completed all tasks on a computer, through the Qualtrics platform. After giving their informed consent to participate, respondents completed the PANAS the ART-G, and the IRI. Next, participants were randomly allocated to one of the three reading conditions (narrative fiction *vs.* narrative non-fiction *vs.* expository non-fiction), where they were provided with a plain formatted excerpt, but no information about its source. The perceived genre of reading stimuli was not assessed because first, we were interested in effects of actual rather than perceived fictionality; and second, previous research has not consistently shown that perceived fictionality can be experimentally controlled (Wimmer, 2015; see also Chlebuch et al., 2020) or that it influences aspects of social cognition independently from narrativity (Małecki et al., 2019).

Subsequently, participants completed the Transportation Scale and performed the word completion task, Frith-Happé animations task, RMET, IAMS task and implicit moral identity IAT. Finally, participants were debriefed in written form. The entire experiment took 80mins to complete, on average.

Data Analysis

All analyses were pre-registered, and the full datasets and analyses are available on the Open Science Framework web pages (see https://osf.io/pr3zn/?view_only=f92f4d965e8d49b0b31333af82615462).

We adopted the standard significance level of $p < .05$ for all inferential tests. Each task was analyzed separately using ANCOVAs that included text condition (narrative fiction *vs.* narrative non-fiction *vs.* expository non-fiction) as the between-subjects factor, and the fiction sub-score of

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the ART-G as covariate. For the IAMS task, the IACS score was included as an additional covariate. In every ANCOVA, two planned contrasts were implemented: First, a contrast comparing both narrative conditions to the expository condition, and second, a contrast comparing the fictional condition with both non-fictional conditions.

Results

Descriptive statistics for the dependent measure in each assessment task are summarized in Table 2, and the key effects are plotted in Figure 2. Replicating previous research with the IAMS task, participants overall were significantly more likely to judge a pictograph as pleasant after a positive moral prime than after a negative moral prime ($M = .63$ vs. $.48$; $t(274)=11.05$, $p<.001$, $d=.67$), and participants were significantly more likely to judge a pictograph as pleasant after a positive morality-irrelevant control stimulus than after a negative morality-irrelevant control stimulus ($M = .71$ vs. $.49$; $t(275)=12.45$, $p<.001$, $d=.75$). This supports the underlying assumption of the IAMS task that ratings are biased towards prime valence. Overall accuracy on the RMET and animations tasks was good ($M = 69\%$ and 3.01 , respectively), and the positive mean D6 value ($M = .66$) in the moral IAT is consistent with previous research showing a preference for an implicit moral self-concept.

Pre-registered exploratory analyses showed that the three text conditions did not differ regarding the PANAS positive or negative affect scores, or the IRI total score ($ps > .05$). There were also no condition differences on the fiction sub-score of the ART-G ($p = .90$). Between-group differences following the reading intervention were tested separately for each assessment task (and sub-scale, where appropriate) using ANCOVAs, as described above. Table 2 shows the statistical effects for the main effect of text condition, for each task/sub-scale. None of the ANCOVAs showed a significant effect of text condition ($ps > .07$), nor did any of the predefined contrasts reach significance ($ps >.06$).

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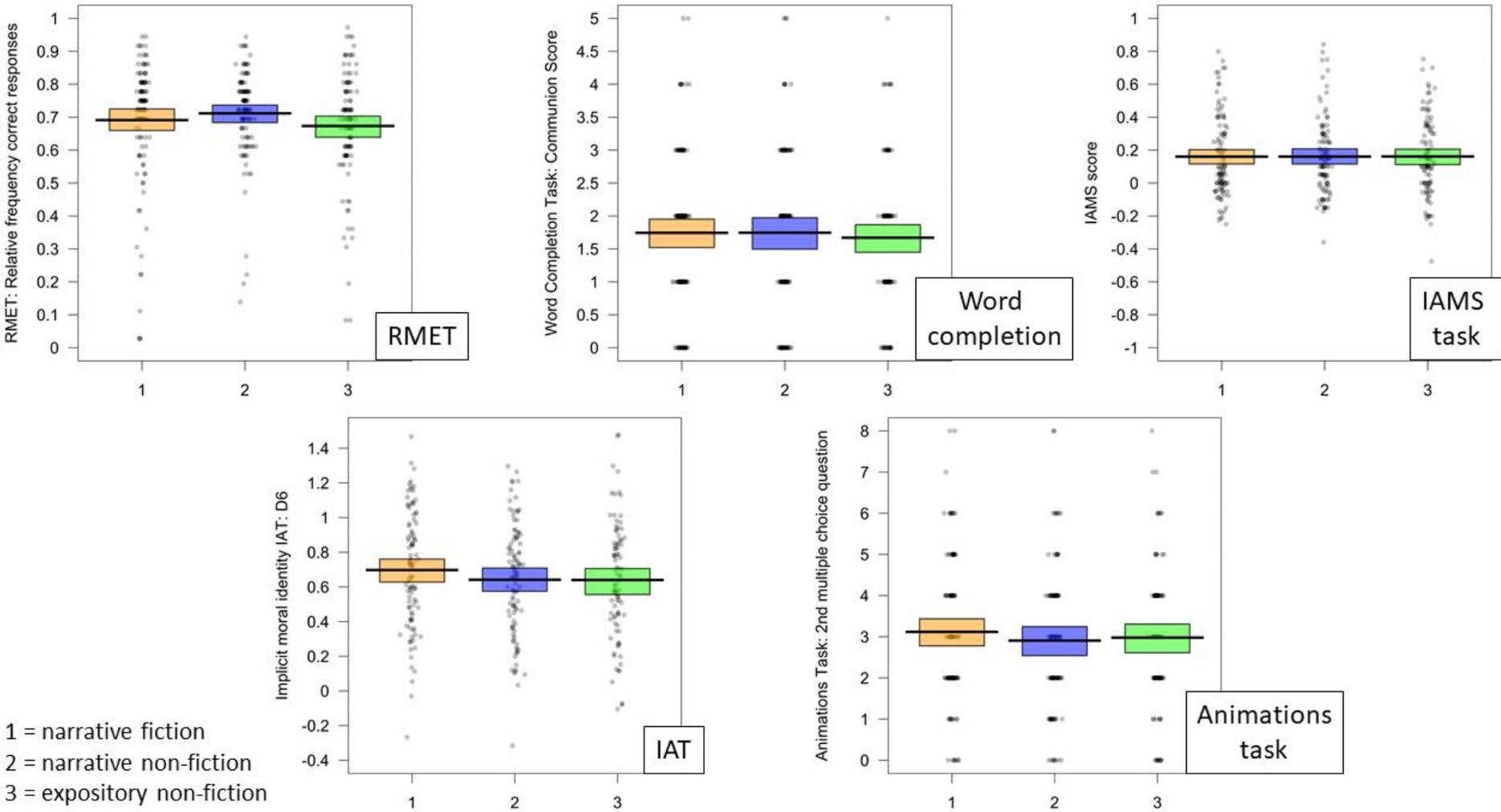
	Dependent measure	Narrative fiction		Narrative non-fiction		Expository non-fiction		ANCOVA: main effect of text condition			
		<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>	<i>N</i>	<i>M (SD)</i>	<i>df</i>	<i>F value</i>	<i>p value</i>	η^2_p
Word completion task	Agency score	121	3.24 (1.36)	110	2.98 (1.12)	109	3.38 (1.31)	2, 336	2.58	.077	.015
	Communion score	121	1.74 (1.18)	110	1.75 (1.27)	109	1.67 (1.09)	2, 336	0.24	.787	.001
Frith-Happé animations task	OR: Accuracy sum score	120	4.28 (2.08)	110	4.41 (1.91)	107	4.21 (2.14)	2, 333	0.42	.656	.003
	OR Type: Frequency mentalizing	120	2.74 (1.22)	110	2.56 (1.17)	107	2.83 (1.19)	2, 333	1.33	.267	.008
	MCQ 1: Accuracy sum score	121	1.97 (1.10)	110	1.75 (1.06)	109	1.85 (1.03)	2, 336	1.03	.357	.006
	MCQ 2: Accuracy sum score	111	3.12 (1.75)	96	2.91 (1.76)	98	2.98 (1.69)	2, 301	0.49	.615	.003
RMET: Relative frequency of correct responses		121	.69 (.18)	110	.71 (.14)	109	.67 (.17)	2, 336	1.48	.228	.009
IAMS score		109	.16 (.24)	101	.16 (.23)	103	.16 (.23)	2, 308	0.16	.851	.001
Implicit moral identity IAT: D6		99	.70 (.33)	99	.64 (.32)	89	.64 (.34)	2, 283	1.34	.264	.009
ART-G	Fiction sub-score	121	14.64 (13.04)	110	19.04 (15.99)	109	17.58 (17.47)				
	Non-fiction sub-score	121	3.26 (3.62)	110	4.02 (3.70)	109	4.31 (4.79)				

Note. OR = open response, MCQ = multiple choice question, RMET = Reading the Mind in the Eyes Test-Revised; IAMS = Immediate affect towards moral stimuli; IAT = Implicit Association Text; ART = Author Recognition Test.

Table 2: Experiment 1: Descriptive statistics for each dependent measure in each experimental condition, and ANCOVA results for the main effect of text condition.

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Figure 2. Pirate plots for main outcomes of Experiment 1.



Discussion

In Experiment 1 we employed a well-powered, pre-registered design to test the prediction that reading a short narrative text, regardless of its fictionality, leads to improvements in social and moral cognitive abilities. This hypothesis was unsupported. After reading one out of three texts that was either narrative fiction, narrative non-fiction, or expository non-fiction, participants did not differ in any outcome measure

It should be noted that given the number and length of tasks there may have been order effects, e.g. the performance in later tasks could have been affected by fatigue. However, by keeping the order of tasks consistent, any order effects were comparable across the three text conditions; therefore, no condition was disadvantaged or favoured. This means that potential condition differences could not have been the result of a confound in terms of differing fatigue.

The present findings do not support the suggestion that reading fictional stories improves recipients' social cognitive abilities, including empathy and ToM, or implicit morality. However, it is possible that the specific text stimuli under investigation were not suitable to bolster these abilities. The texts dealt with loss and grief. On the one hand, such negative experiences have traditionally been thought to elicit empathy and mentalizing to a particularly strong extent (Andreychik & Migliaccio, 2015); on the other hand, readers' empathy capacity could have been depleted by the sad experiences faced by the story characters, leading to compassion/empathic distress fatigue (Joinson, 1992; Klimecki & Singer, 2012). Furthermore, loss and grief are primarily socially isolating experiences, and it is possible that social cognition would be better promoted through texts providing positive examples of social interactions. Thus, in Experiment 2 we employed reading stimuli that addressed a wider range of themes.

Another potential explanation for the lack of effects is that the present textual manipulation, i.e. reading a short text excerpt in an online setting, might not have been sufficiently strong and ecologically valid for the effects to be visible, even though previous experiments using comparably strong manipulations (as synthesized by Dodell-Feder & Tamir,

2018) have yielded effects. Therefore, Experiment 2 used longer text materials – entire books – to be read in a natural environment. This more comprehensive reading stimuli improves the experiment's internal validity by providing a stronger experimental manipulation, and enhances its external validity by making the reading experience more akin to real-life (Kuzmičová, 2016). Only one previous experiment has tested the effects of reading on social cognition using entire books as stimuli (Pino & Mazza, 2016). In this experiment, after a baseline assessment participants were randomly assigned to read either a narrative literary fiction, narrative science-fiction, or narrative non-fiction text within one week. Post-tests were conducted 14 days after baseline assessment and covered ToM as indicated by the cognitive empathy subtest of the Multifaceted Empathy Test (MET; Dziobek et al., 2008), the emotion attribution task (Blair & Cipolotti, 2000), the cognitive empathy and social skills subscales of the Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004), the faces test (Baron-Cohen et al., 1997), and the first- and second-order false belief test (Rowe et al., 2001), as well as empathy via the explicit emotional empathy and implicit emotional empathy subtests of the MET, and the emotional empathy subscale of the EQ. At post-test, the literary fiction group outperformed the remaining groups on two indicators of ToM, namely the first- and second-order false belief test and the faces task, but not on any indicator of empathy. However, this study did not contrast narrative with expository texts and did not examine effects on morality.

A further issue with Experiment 1 is that individual differences in empathy and emotional states were assessed just before the reading assignment. Although this was necessary to control for potential baseline differences, it is possible that these questionnaires activated participants' empathy and emotion-related representations across all text conditions prior to reading. This may have made it harder for us to show any advantageous effect of narrative over expository texts. Furthermore, assessments of the outcome variables were conducted immediately after reading, which does not permit social cognitive abilities to be practiced, applied, or consolidated – processes which have been suggested as requirements for story-based benefits on social cognition

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(Mar, 2018a). Moreover, the lack of baseline testing prevents us from drawing conclusions about changes of outcome variables, since the level of outcome variables before the reading assignment is not known, and the lack of follow-up assessments renders assertions about the stability of effects impossible. The only existing series of experiments utilizing pre-, post-, and follow-up tests demonstrates the value of this approach: Bal and Veltkamp (2013) randomly assigned participants to read either a short narrative fiction excerpt or a set of narrative non-fiction newspaper articles. Empathy was assessed using the empathic concern subscale of Davis' (1980, 1983) IRI immediately before and after the reading assignment and at one-week follow-up. Empathy increased from the pre-test baseline only in the fiction group at follow-up, and only when readers were emotionally transported into the story. Like Pino and Mazza (2016), however, Bal and Veltkamp (2013) did not contrast narrative with expository texts or examine effects on morality; in addition, they used only short texts as stimuli.

Hence, in contrast to Experiment 1, Experiment 2 implemented baseline and follow-up assessments in addition to post-tests. Experiment 2 goes beyond the study by Pino and Mazza (2016) by implementing follow-up assessments in addition to pre- and post-tests, manipulating narrativity and fictionality separately instead of contrasting different types of narratives, and by including indicators of morality in addition to measures of ToM and empathy. It advances the experiment by Bal and Veltkamp (2013) by using entire books as stimuli, incorporating an expository non-fiction condition, and applying a broader range of outcome measures going beyond self-report. In sum, Experiment 2 facilitated a more rigorous test of the hypothesis that reading narratives improves social and moral cognition more strongly than does reading expository texts, regardless of fictionality.

Experiment 2

Experiment 2 employed a three-wave longitudinal design (pre-, post-, and follow-up), assessing performance on a battery of tasks that measured social and moral cognition in a laboratory setting. Participants were randomly assigned to read either a narrative fiction book, a

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narrative non-fiction book, or an expository non-fiction book between the pre- and post- sessions. We predicted that reading a narrative book, whether fiction or non-fiction, would lead to greater increases in social (i.e. empathy and emotion recognition) and moral cognition than reading an expository book.

Materials and Methods

This randomized controlled trial was approved by the Research Ethics Committee of the School of Psychology at the University of Kent, prior to commencement. The experiment followed a 3x3 mixed design involving one randomized between-subjects factor with three levels, text condition (narrative fiction *vs* narrative non-fiction *vs* expository non-fiction) and one within-subjects factor with three levels, time (time 1 *vs* time 2 *vs* time 3).

Participants

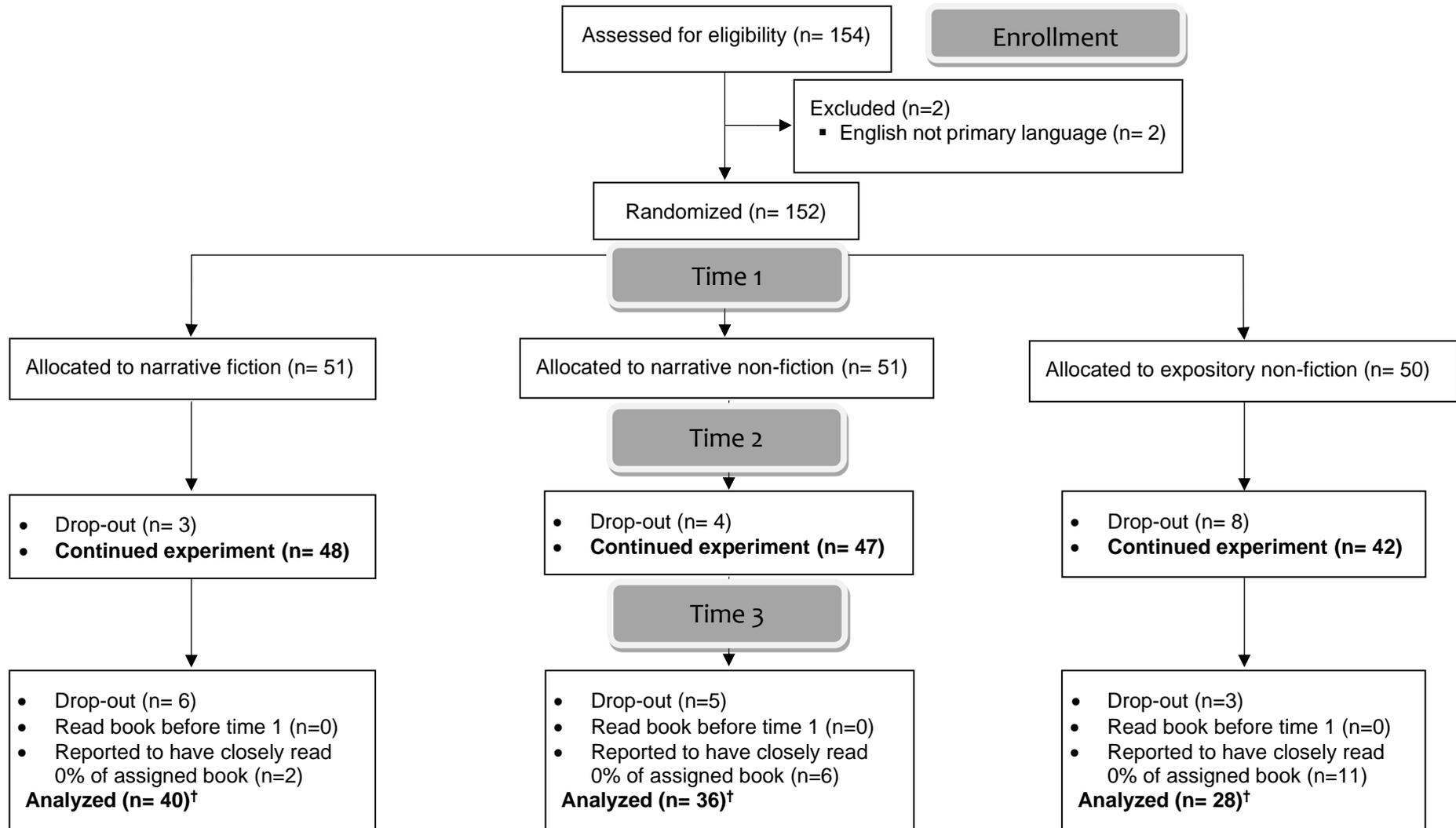
A total of $N = 150$ eligible participants, evenly randomized across the three text conditions (narrative fiction *vs* narrative non-fiction *vs* expository non-fiction), was targeted, reflecting practicality in terms of time, funding, personnel, and laboratory space. Only individuals whose first language was English and who had not participated in previous experiments using the same measures were deemed eligible. Sample size was determined before any data analysis. In line with this, $N = 154$ participants, 152 of whom met inclusion criteria, were recruited from the University of Kent student participant pool. When attrition and failure to fulfill the reading assignment (i.e., participants who reported they had not read any of the assigned book) were taken into account, 104 participants remained in the final sample, 40 who had read narrative fiction (90.0% female, mean age=19.75, *SD* of age=1.72), 36 who had read narrative non-fiction (80.6% female, mean age=20.36 *SD* of age=3.15), and 28 who had read expository non-fiction (82.1% female, mean age=19.43, *SD* of age=0.92. See Figure 3 for a schematic of the flow of participants through the experiment.

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All participants provided written informed consent before data collection. Participants were reimbursed with course credits and payment of £10.00 for attending the testing sessions and reading the book, or with payment of £40.00 if they did not require course credits.

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Figure 3. Flow of participants through Experiment 2.



†The number of analyzed cases varies between tasks due to technical problems, incomplete administration of tasks, or exclusion of participants with scores more than 3SD away from the sample mean. Respective numbers are given in Table 4.

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Reading stimuli

As outlined above, reading stimuli were entire books (narrative fiction vs narrative non-fiction vs expository non-fiction). In contrast to Experiment 1, we aimed to implement a variety of book themes providing knowledge about the social world, namely grief, friendship, and immigration, in order to base our evidence on a wider foundation. These themes cover a range of social situations both in terms of social levels – grief is primarily solitary (Barrett & Scott, 1989), friendship is reciprocal (Telfer, 1970), and immigration is national/societal (*Oxford English Dictionary*) – and in terms of the extent of personal experience – friendship is experienced by virtually everyone (Bukowski et al., 2009), grief increases in the course of a lifetime (Znoj, 2015), and immigration is undergone by just some people. Each of the themes was provided in each of three text conditions, so that a total of nine books were implemented and content was matched across text conditions. For example, immigration was the theme of one narrative fiction, one narrative non-fiction, and one expository non-fiction book. The grief books were the same as those used for excerpts in Experiment 1.

Texts were comparable in length. All narratives were told from the protagonist’s perspective. Table 3 contains further details about the reading stimuli.

Theme	Narrative fiction	Narrative non-fiction	Expository non-fiction
Grief	In the springtime of the year (Susan Hill; 256 pages)	The year of magical thinking (Joan Didion; 227 pages)	Grief counselling and therapy (J. William Worden, 3 rd edition; 248 pages)
Friendship	A separate peace (John Knowles; 270 pages)	Stand before your god (Paul Watkins; 240 pages)	Close relationships (Duncan Cramer; 176 pages)
Immigration	Across a hundred mountains (Reyna Grande; 255 pages)	The distance between us (Reyna Grande; 159 pages [†])	Mexican immigration to the United States (Manuel Gamio; 248 pages)

Note. [†]Participants were instructed to stop reading after 159 pages, i.e., part 1 of the book, to ensure a comparable amount of reading between text conditions.

Table 3: Experiment 2: Overview of reading stimuli.

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Assessment tasks

Affective empathy. Participants' level of affective empathy was assessed using an eye-tracking paradigm based on Cowan and colleagues (2014). Participants watched two 3-min videos in which a female actor described either a sad or a neutral story in a monologue. An SR Research Eyelink 1000 eye-tracker monitored their eye movements and pupil dilation throughout each video. Between the two videos, participants performed a simple distractor task, requiring them to listen to and repeat back three numbers. After each video, participants rated on a 5-point scale how sad they found the video (for the sad film), or how emotionally arousing they found the video (for the neutral video; as in Cowan et al., 2014). Order of videos was randomized. Pupil size and percentage dwell-time to the eye-region (calculated by summing the duration of fixations to the eyes and dividing it by the sum of fixation durations for the entire videos) served as an empathy index. To avoid repeated viewing of the same videos at the three time points (pre- vs post- vs follow-up testing sessions), we used three pairs of videos, describing different neutral and sad events, recorded by three different female actors. Order of videos was counterbalanced across participants.

Emotion recognition. We measured emotion recognition using the RMET-Revised as in Experiment 1. This time, however, the original set of 36 items was split into two equally difficult halves (as in Samur et al., 2018, Experiment 3), based on the item accuracy reported for university students (Baron-Cohen et al., 2001), which allowed us to use the RMET at pre- and post-reading sessions without repetition of stimuli. The order of the test halves was counterbalanced across participants.

Implicit morality. We implemented the IAMS task as an indicator of implicit moral affect, and the IAT as an indicator of implicit moral identity, as in Experiment 1. The same version of each task was used at pre-, post-, and follow-up testing sessions.

Prosocial behaviour. As a test of prosocial behaviour, participants were asked whether they would be willing to sign up for another long experiment that was in fact fictitious. This test

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was administered only in the post-reading session. Participants passed the test if they indicated their interest via providing their email address, and failed if they did not.

Procedure

Each testing session took place in a laboratory at the University of Kent. At baseline, participants were first asked to complete a questionnaire assessing demographics. At this stage, participants also filled in the IRI, EQ, and ART-G. The PANAS was administered at each testing session, and immediately after the reading assignment, participants completed the Transportation Scale². Results of the IRI, EQ, and PANAS are not reported since they were included as control variables and are not directly relevant to our hypotheses. Next, participants completed the eye-tracking paradigm, followed by the IAMS task, the implicit moral identity IAT, and the RMET. At the end of this testing session, participants were randomly allocated to one of nine books which were either narrative fiction, narrative non-fiction, or expository non-fiction (see reading stimuli section above). They were then provided with the respective book, which they were asked to read within the following seven days and to return at the post-reading testing session. Every two days, participants were sent an email prompt asking them to report what page they were currently reading and to provide a 1-sentence summary of what they had read since the last prompt. Post-reading testing sessions were carried out seven days after baseline. Participants completed the eye-tracking paradigm, the IAMS task, the implicit moral identity IAT and the RMET. At the end of the post-reading testing session, participants' prosocial behaviour was assessed. Seven days after the post-reading testing session, participants returned to the laboratory for a follow-up testing session. Here, participants completed the eye-tracking task, the IAMS task, and the implicit moral identity IAT. The RMET was not repeated this time because this would have required that the original set of 36 items be split into triplets of 12 items per testing session. This might have threatened the test's reliability.

²As in Experiment 1, the Transportation scale was not used within analyses.

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Engagement with the reading task was assessed at the end of the follow-up testing session. Participants responded to a compliance check questionnaire asking how much of the assigned book they had read; response options were “I have not read the book”, “I started reading the book but haven’t finished it”, “I have skimmed the entire book”, “I have closely read the entire book”, “Other: _____”. If participants selected the second option, they were asked to indicate the page at which they had stopped reading. In combination with the email prompts sent out between pre- and post-tests, this questionnaire provided a treatment check and helped identify participants who did not engage with the reading assignment to a sufficient degree. Finally, participants were reimbursed and debriefed in written form.

Data Analysis

Full datasets and analyses including R scripts are available on the Open Science Framework web pages (see https://osf.io/8uxk3/?view_only=63c3934d757849ed901328026aa5704d).

We adopted the standard significance level of $p < .05$ for all inferential tests. Each task was analyzed separately using linear mixed-effect models via the `lmer` function in the `lme4` package (Bates et al., 2015) using R (version 4.0.4, R Core Team, 2021). Each model included the between-subjects variable text condition (narrative fiction *vs* narrative non-fiction *vs* expository non-fiction) and within-subjects variable time (pre-test *vs* post-test *vs* follow-up test). To compare the three text conditions we used deviation coded contrast schemes to compare fiction *versus* non-fiction (narrative non-fiction (-.5), narrative fiction (1), expository non-fiction (-.5)) and narrative *versus* expository (narrative non-fiction (.5), narrative fiction (.5), expository non-fiction (-1)). The three time conditions were also deviation contrast coded to compare pre-test *versus* post-test (pre-test (1), post-test (-1), follow-up (0)) and post-test *versus* follow-up test (pre-test (0), post-test (1), follow-up (-1)). As in Experiment 1, the fiction sub-score of the ART-G was centred and included in all `lmer` models as fixed effect covariate. In the eye-tracking paradigm, an additional within-subjects factor of stimuli (neutral *vs* sad; deviation coded (-.5 *vs*

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.5)) was included. In the RMET, the time variable only had two levels (pre-test vs post-test; deviation coded (-.5 vs .5)), and for the IAMS task, the IACS difference score (see above) was centred and included as an additional fixed effect covariate. A χ^2 -test with the factor text condition (narrative fiction vs narrative non-fiction vs expository non-fiction) was carried out for the prosocial behaviour test at the post-reading testing session.

Results

Some participants were not included in all analyses due to technical problems or scores more than $3SD$ away from the sample mean. This affected up to 17 participants (16.35%) per measure. Exact sample sizes and descriptive statistics for the dependent measure in each assessment task are summarized in Table 4, and the key effects are plotted in Figure 4.

Preliminary analysis of the eye-tracking paradigm replicated the basic effects seen in Cowan et al. (2014); the sad video was rated as moderately sad ($M = 3.77$), and pupil diameter was greater during the sad than during the neutral video ($M = 981.05$ vs 962.79 , $t(93) = 3.10$, $p = .003$, $d = 0.32$). Overall accuracy on the RMET was good ($M = 73\%$). Replicating previous research with the IAMS task, participants were significantly more likely to judge a pictograph as pleasant after a positive moral prime than after a negative moral prime ($M = .60$ vs $.39$; $t(102) = 7.32$, $p < .001$, $d = 0.72$), and significantly more likely to judge a pictograph as pleasant after a positive morality-irrelevant control stimulus than after a negative morality-irrelevant control stimulus ($M = .62$ vs $.41$; $t(102) = 6.90$, $p < .001$, $d = .68$). This supports the underlying assumption of the IAMS task that ratings are biased towards prime valence. Finally, the positive mean D6 value ($M = .63$; $t(103) = 32.22$, $p < .001$, $d = 3.16$) in the moral IAT is consistent with previous research showing a preference for an implicit moral self-concept.

We also conducted exploratory analyses of the compliance check, which revealed that participants in the three text conditions did not report differing levels of engagement with the reading assignment (i.e. the percentage of the assigned book they had closely read), $F(2, 101) = 1.205$, $p = .304$, $\eta^2_p = .023$. Thus, there was no condition imbalance regarding engagement

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with the reading assignment that could have masked possible condition differences in social and moral cognition. In addition, we carried out a series of 3x2-ANOVAs to explore whether baseline levels on social or moral cognition measures differed by text condition (narrative fiction *vs* narrative non-fiction *vs* expository) or participant status (included in final analyses *vs* excluded from final analyses). None of these ANOVAs yielded a significant main effect or interaction ($p_s \geq .10$). Hence, social and moral processing did not differ at baseline between text conditions or between participants who were or were not included in analyses, and these factors did not interact to affect baseline levels.

Effects of the reading intervention were tested separately for each metric outcome measure using linear mixed-effect models, as described above. Table 5 shows the inferential statistics for the main effects of text condition and time, as well as the interaction of text condition with time, for each task.

The effect of text condition did not reach significance on any measure ($p_s > .25$). There was a significant effect of time on the percentage dwell-time to the eye region in the eye-tracking affective empathy task; contrasts (pre-test *vs* post-test; post-test *vs* follow-up) showed that percentage dwell-time decreased significantly between pre- and post-test only ($p = .04$). All other effects of time and all interactions between time and text condition were non-significant ($p_s \geq .05$).

Regarding the prosocial behaviour test, the majority of participants in all text conditions demonstrated prosocial behaviour: 35 out of 38 in the narrative fiction condition, 33 out of 35 in the narrative non-fiction condition, and 24 out of 25 in the expository non-fiction condition passed the test. According to a χ^2 -test, text conditions did not significantly differ in prosocial behaviour, $\chi^2(2)=.414, p=.813$.

Discussion

In Experiment 2 we employed a three-wave pre-post-follow-up design to test the prediction that reading a narrative text, regardless of its fictionality, leads to improvements in

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social and moral cognitive abilities. Stimulus texts addressed a variety of themes with social content matched across conditions. Improvements regarding the experimental design (i.e. incorporating further measurement time points) and the experimental manipulation (i.e. improving both intensity – length of text materials, and breadth – range of themes), enabled a stronger test of this prediction than Experiment 1.

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Dependent measure	Narrative fiction			Narrative non-fiction						Expository non-fiction								
	<i>n</i>	<i>n O</i>	<i>n TP</i>	<i>T1</i> <i>M (SD)</i>	<i>T2</i> <i>M (SD)</i>	<i>T3</i> <i>M (SD)</i>	<i>n</i>	<i>n O</i>	<i>n TP</i>	<i>T1</i> <i>M (SD)</i>	<i>T2</i> <i>M (SD)</i>	<i>T3</i> <i>M (SD)</i>	<i>n</i>	<i>n O</i>	<i>n TP</i>	<i>T1</i> <i>M (SD)</i>	<i>T2</i> <i>M (SD)</i>	<i>T3</i> <i>M (SD)</i>
Dwell-time percentage to eye region neutral video	37	0	3	.52 (.29)	.53 (.29)	.52 (.29)	31	0	5	.49 (.26)	.46 (.26)	.45 (.24)	24	0	4	.58 (.25)	.43 (.28)	.46 (.26)
Dwell-time percentage to eye region sad video	37	0	3	.66 (.23)	.54 (.26)	.56 (.26)	31	0	5	.52 (.25)	.49 (.25)	.47 (.26)	24	0	4	.58 (.28)	.48 (.26)	.49 (.27)
Pupil size neutral video	36	1	3	951.42 (225.22)	967.36 (232.16)	946.47 (199.01)	29	2	5	959.50 (307.52)	891.15 (232.98)	890.500 (247.84)	22	2	4	959.33 (225.84)	941.07 (200.98)	928.93 (247.64)
Pupil size sad video	36	1	3	966.50 (221.08)	982.25 (211.70)	950.30 (218.79)	29	2	5	972.52 (332.90)	914.42 (261.59)	893.37 (270.93)	22	2	4	971.78 (266.62)	954.42 (208.05)	965.92 (276.72)
RMET: Relative frequency of correct responses	39	1	0	.75 (.12)	.74 (.14)	N/A	35	0	1	.75 (.11)	.72 (.13)	N/A	28	0	0	.73 (.13)	.71 (.14)	N/A
IAMS score	38	0	2	17.31 (25.58)	19.95 (32.39)	28.04 (38.84)	34	1	1	25.10 (31.46)	19.95 (32.39)	28.69 (38.46)	25	0	3	20.14 (34.68)	19.35 (36.63)	8.98 (34.28)
Implicit moral identity IAT: D6	40	0	0	.59 (.27)	.68 (.21)	.66 (.24)	35	1	0	.66 (.33)	.61 (.30)	.61 (.26)	26	0	2	.65 (.29)	.61 (.20)	.55 (.23)

Note. *n O* = Number of cases excluded to due values more than 3*SD* away from sample mean; *n TP* = Number of cases missing due to technical problems/incomplete administration; *T1*= pre-test; *T2*= post-test; *T3*=follow-up; RMET = Reading the Mind in the Eyes Test; IAMS = Immediate affect towards moral stimuli; IAT = Implicit Association Test.

Table 4: Experiment 2: Descriptive statistics for each metric outcome measure.

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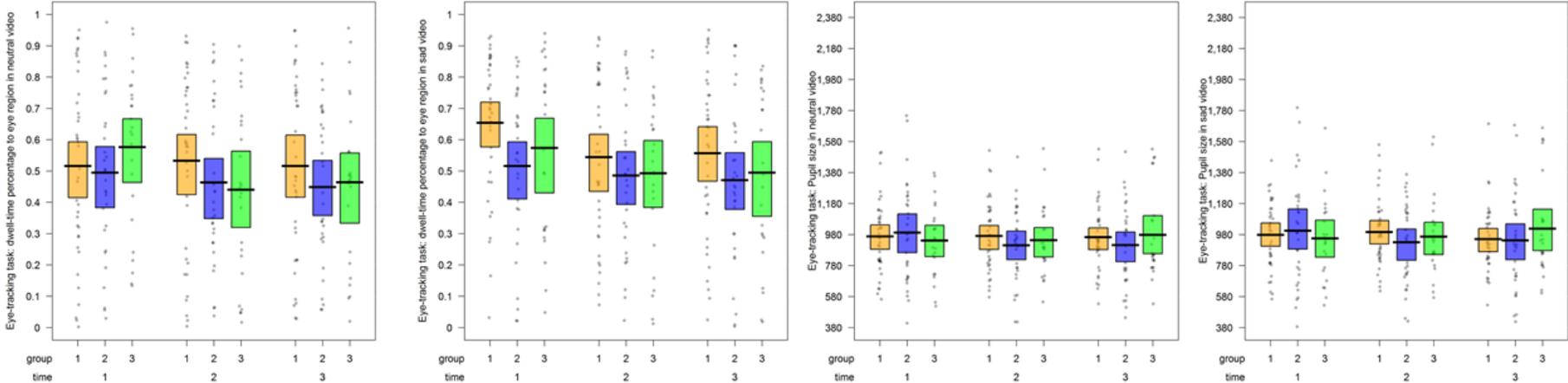
Dependent measure		Eye-tracking task								RMET: Relative frequency of correct responses				IAMS score				Implicit moral identity IAT: D6			
		Dwell-time percentage to eye region				Pupil size				β (SE)	df	t	p	β (SE)	df	t	p	β (SE)	df	t	p
		β (SE)	df	t	p	β (SE)	df	t	p												
Effect of text condition	Fiction vs non-fiction	.04 (.03)	122.17	1.07	.29	16.42 (41.08)	94.07	.40	.69	-.03 (.04)	145.35	-.71	.48	-0.76 (3.18)	78.56	-.24	.81	.01 (.03)	98.12	.47	.64
	Narrative vs expository	-.02 (.04)	122.17	-.54	.59	-15.08 (46.16)	94.47	-.33	.74	.01 (.04)	144.72	.19	.85	4.03 (3.51)	79.85	1.15	.26	.02 (.03)	99.24	.521	.60
Effect of time	Pre-test vs post-test	.04 (.02)	444.98	2.08	.04*	19.10 (9.82)	433.71	1.95	.05	-.02 (.01)	97.33	-1.69	.09	-2.12 (1.87)	170.85	-1.13	.26	.00 (.02)	197.2	.11	.91
	Post-test vs follow-up	.02 (.02)	444.96	1.24	.21	11.25 (9.83)	433.99	1.44	.25					-1.65 (1.89)	172.17	-0.87	.38	.02 (.02)	198.80	1.02	.31
Interaction of text condition with time	Fiction vs non-fiction: Pre-test vs post-test	-.02 (.03)	445.26	-.73	.46	-28.76 (14.79)	433.55	-1.94	.05	.02 (.02)	97.54	.97	.34	-2.17 (2.85)	169.60	-0.76	.45	-.05 (.03)	196.80	-1.87	.06
	Narrative vs. expository: Pre-test vs post-test	-.04 (.03)	444.43	-1.32	.19	18.00 (16.95)	433.65	1.06	.29	-.00 (.02)	97.04	-.06	.96	-3.91 (3.17)	170.34	-1.23	.22	-.01 (.03)	197.40	-.27	.79
	Fiction vs non-fiction: Post-test vs follow-up	-.01 (.03)	444.49	-.33	.74	-14.17 (14.90)	433.40	-.95	.34					-3.83 (2.88)	171.17	-1.33	.19	-.02 (.03)	197.40	-.66	.51
	Narrative vs expository: Post-test vs follow-up	-.01 (.03)	445.02	-.39	.69	12.97 (16.96)	434.30	.476	.45					-5.23 (3.21)	171.96	-1.63	.10	-.02 (.03)	199.60	-.89	.38
ART-G fiction sub-score		.01 (.00)	88.78	1.66	.10	9.82 (5.27)	88.01	1.86	.07	.00 (.00)	96.66	1.14	.26	-.24 (.38)	77.69	-.62	.54	-.00 (.00)	98.75	-.21	.84

Note. RMET = Reading the Mind in the Eyes Test; IAMS = Immediate affect towards moral stimuli; IAT = Implicit Association Test. * is $p < .05$.

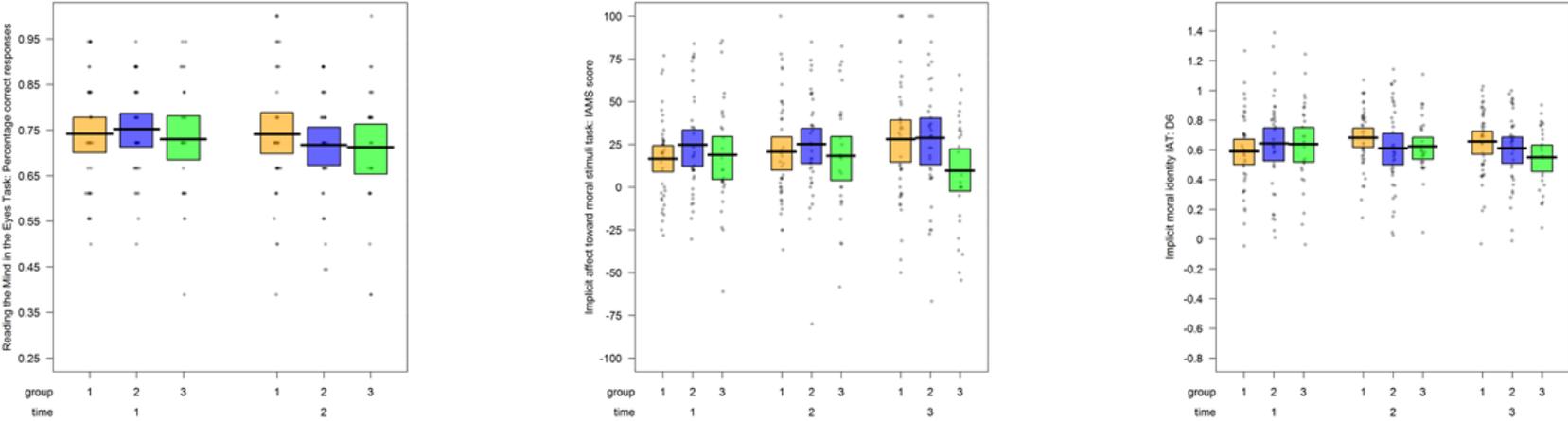
Table 5: Experiment 2: Linear mixed-effects model results for each metric outcome variable.

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Figure 4. Pirate plots for metric outcome variables in Experiment 2.



group 1=narrative fiction, group 2=narrative non-fiction, group 3=expository non-fiction



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However, as none of the linear mixed-effect models yielded significant interactions between text condition and time, which would show advantages for the narrative over the expository condition, our data was not able to support this hypothesis. The three text conditions (narrative fiction *vs* narrative non-fiction *vs* expository non-fiction) failed to show differential patterns regarding their social cognitive abilities, prosocial behaviour, or morality over time. Considering the overall patterns of results, neither reading (fictional or non-fictional) narratives nor (narrative or expository) works of fiction was associated with systematic gains in the outcomes of interest. Exploratory analyses confirmed that the text conditions did not differ regarding engagement with the reading assignment, ruling out the possibility that text condition effects were masked by differing levels of participant commitment. Indeed, since none of our measures showed evidence of improvement from the baseline assessment (regardless of text condition), we can also rule out the possibility that *any* form of reading tested here had a consistent effect on social outcomes.

In the present experiment, we deliberately chose book themes dealing with relevant aspects of the social world. Therefore, the present null effects cannot be explained by inappropriate reading stimuli. The book themes selected were likely to invite empathy and activate an understanding of the characters' minds; such processes have been highlighted as a requirement of narrative-based enhancement of social cognition (Mar, 2018a). These processes were not directly assessed here, so we cannot ascertain to what extent social cognitive abilities were employed while participants read the narratives. No previous research has assessed social and moral cognition while readers are actively engaged in reading a story, though it seems plausible that these abilities would be applied most intensely then. Future investigations are encouraged that assess outcomes before, during, and after the reading process more closely in order to gain a better understanding of the temporal dynamics underlying narrative-based effects.

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An alternative explanation for the present null effects is that perhaps participants did not practice their social processes following the reading (Mar, 2018a). Participants may not have encountered enough opportunities to apply their social and moral cognition in the one-week interval between post-test and follow-up, or they were not sufficiently motivated to do so. The latter could be a consequence of the experimental setting. Although reading stimuli were in principle deemed attractive for our target population, participants still were randomly assigned to a book they may not have otherwise chosen to read, which can result in reduced motivation to delve into the reading and to transfer lessons learned from the reading to real life.

Indeed, it is possible that participants were not sufficiently committed to the task at hand. A greater number of participants in the expository non-fiction condition dropped out or were excluded for not reading any of the text. This pattern may be a consequence of the expository non-fiction books failing to match participants' personal preferences as well as the narrative books (e.g. Harkrader & Moore, 1997; Summers, 2013; Topping et al., 2008). Nevertheless, our compliance check on the reading assignment showed that participants who were included in the final sample for analyses engaged with the reading to a comparable level between conditions, and comparisons of baseline performance showed that groups were equated on social and moral processing prior to any reading intervention.

General Discussion

Social cognition, involving the ability to understand and share the mental states of others, is a vital aspect of everyday life and contributes to successful interpersonal functioning. Reading fictional stories has been proposed as a way to promote these abilities, and there is some evidence to support this view, as synthesized in two recent meta-analyses (Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017).

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One line of research has utilized experimental manipulations to demonstrate that reading a short narrative fiction text improves empathy and ToM (Dodell-Feder & Tamir, 2018). Using a comparable design, text length, and measures (in addition to implicit measures novel in this field), Experiment 1 did not replicate this finding. Results did not show condition differences on any outcome measure. Crucially, Experiment 2 confirmed the overall pattern of results from Experiment 1, even though a different experimental design was utilized here.

A lesson that might be learned from the present experiments is related to experimental design. On one hand, Experiment 1 was well-powered, with a higher retention rate than previous studies (e.g., Kidd & Castano, 2019); nevertheless, the design may not have been ideal due to the brevity of the reading intervention, which may be too weak to yield measurable effects. On the other hand, Experiment 2 attempted to compensate for this by implementing a stronger experimental manipulation – participants were assigned to read a whole book instead of a short excerpt – but this may have negatively affected participants' engagement with the reading, caused attrition and ultimately impeded the detection of potential effects. Thus, both a short and a longer reading intervention may not be suitable to reveal potential reading-based benefits for social and moral cognition. In addition to correlational and cross-sectional designs, which are limited in determining causal relationships, future work could implement longitudinal designs in which participants are tracked in their everyday environment using ambulatory assessment with regards to narrative fiction, narrative non-fiction and expository non-fiction exposure, other school/professional and leisure activities, and social and moral cognition over an extended period of time. Although such designs would be much more time consuming and expensive than the designs applied in existing work, they could avoid the downsides of short and longer reading interventions outlined above. By contrast with correlational and cross-sectional approaches,

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longitudinal observations can provide information about the time course in which variables change, and hence, approximate causal inferences.

Besides that, it should be noted that we tested social and moral cognitive abilities in a rather general sense. It is possible that, while not having this kind of global effect, reading narrative fiction affects specific aspects of our social and moral cognition, e.g., by influencing our empathy and moral attitudes toward particular groups of people. It cannot be ruled out, for instance, that the narrative stimuli used in Experiment 1 increased participants' empathy toward grieving individuals only; the current assessment measures would not have been sensitive to such a change. Such specific effects of reading fictional narratives on morality have been observed in experimental studies in the past. For example, stories about animals that failed to raise participants' general concern for animal welfare have nevertheless been found to increase their concern for the welfare of the species depicted in those narratives (Małeckı et al., 2019).

In the present article, we presented an approach involving the following novel contributions. We tested a theory-driven hypothesis in order to clarify textual features underlying the relation between reading on the one hand, and social and moral cognition on the other. Text stimuli were carefully selected based on subject matter, narrative focalization, and length, and for the first time directly compared effects of fictionality and narrativity. Furthermore, a comprehensive battery of self-report, behavioural, and implicit measures was applied to assess social and moral cognition. Nevertheless, several limitations restrict the explanatory power of our account.

In line with expert recommendations (e.g., Kurby & Zacks, 2015; Molinari et al., 2011) we used naturalistic texts instead of creating artificial texts in order to facilitate ecologically valid reading. Whilst artificial texts promise a high level of experimental control over extraneous variables, they have been criticized for properties such as lack of coherence

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and contextual richness, not meeting recipients' reading goals, and being shorter than naturalistic texts, which likely distort normal reading processes (Graesser et al., 1994; Magliano & Graesser, 1991). Our naturalistic texts were matched regarding subject matter, length, and focalization, but still differed along several variables, which harbours the risk of confounds. For instance, author gender varied regarding the grief (and immigration) theme(s) – the two narrative texts were written by women, whereas the expository text was written by a man. This can introduce bias because (an author's) gender impacts on the experience of grief, the theme of some of our texts (Bierhals et al., 1996; Schwab, 1996), and on readers' perception of authorial skills (Armstrong & McAdams, 2009; Paludi & Strayer, 1985; Weinberg & Kapelner, 2018). We also did not align the texts according to time of creation or individual writing style, which may have led participants to rate the texts as differentially relatable. Furthermore, the expository non-fiction pieces lack the literary qualities of any of the narrative works; however, this is a natural, inevitable confound if typical narratives are contrasted with typical expository texts, since literariness is a quality usually valued in narrative, but not in expository texts (Wimmer, 2015). Finally, although every effort was made to justify the choice of stimulus texts, texts were still selected by the researchers, which entails the possibility of an experimenter bias, even if it is the common approach in the field (Bal & Veltkamp, 2013; Black & Barnes, 2015; Djikic et al., 2013; Johnson et al., 2013a, b; Kidd & Castano, 2013; Kidd et al., 2016; Koopman, 2015; Małeckki et al., 2016; and Tamir et al., 2015 all used reading stimuli selected by the study authors).

Another limitation is related to the assessment of morality. Whilst the current measures are implicit indicators predicting moral emotions and moral behaviour that philosophers of fiction have assumed to benefit from reading fictional narratives (e.g., Nussbaum, 1990), they do not mirror moral reasoning or deliberation, which have also been proposed to be affected by reading fiction/narratives (e.g., Hakemulder, 2000). In other

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words, reading fictional narratives might have effects on morality other than those we tested for. Furthermore, due to drop-out, the sample of Experiment 2 most likely lacked the statistical power necessary for detecting small-sized effects.

Finally, the current experiments suggest further investigation in this area. It is possible that more robust effects could be produced when outcome variables are geared towards the specific aspect of social cognition that is explicitly addressed within the reading stimuli. For example, investigating empathy for grieving individuals after reading a text about grief might reveal a stronger impact on the degree to which readers empathize with others. A more fine-grained examination of textual variables, such as narrative techniques, could also help identify the underlying processes through which readers may identify or empathize with protagonists (for a promising step in this direction see Eekhof et al. 2021). Selection of reading materials would benefit from collaborations with independent researchers to avoid experimenter bias and include further expertise. There may also be specific samples for whom reading fictional narratives could improve social cognition. The present findings relate to typically developing adults of a relatively young age and do not rule out the possibility that narrative-based interventions are effective for certain populations such as typically developing children (Cates & Nicolopoulou, 2019; Kucirkova, 2019) and children with Autism Spectrum Disorder (ASD; Dodd et al., 2011; Tsunemi et al., 2014). However, even in these populations it appears that an improvement of social cognition requires that exposure to stories is combined with targeted discussion of characters' mental life (Calarco et al., 2017).

In conclusion, the present findings cast doubt on popular claims about the capacity for reading fictional narratives to enhance social and moral cognition, and highlight the need for further robust empirical research to test this link. The current results suggest targeted investigation of the following questions: Are benefits of narrative fiction for social cognition restricted to the areas of social cognition explicitly addressed by the reading? If reading

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fictional narratives invites the application and practice of social cognitive abilities during the reading process, how long does the enhancement of social cognition persist? Are there specific groups of people who benefit from reading fictional narratives, whereas others do not?

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Declaration of Interest Statement

The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest, in the subject matter or materials discussed in this manuscript.

Open Practices Statement

All data is openly available at https://osf.io/pr3zn/?view_only=f92f4d965e8d49b0b31333af82615462 (Experiment 1) and https://osf.io/8uxk3/?view_only=63c3934d757849ed901328026aa5704d (Experiment 2). The pre-registration file for Experiment 1 can be found at https://osf.io/cazmr/?view_only=c899a53508da407bb3af2fe80d129cc5.

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