

ARTICLE

# Does reading about fictional minds make us more curious about real ones?

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## Abstract

Although there is a large body of research assessing whether exposure to narratives boosts social cognition immediately afterward, not much research has investigated the underlying mechanism of this putative effect. This experiment investigates the possibility that reading a narrative increases social curiosity directly afterward, which might explain the short-term boosts in social cognition reported by some others. We developed a novel measure of state social curiosity and collected data from participants ( $N = 222$ ) who were randomly assigned to read an excerpt of narrative fiction or expository nonfiction. Contrary to our expectations, we found that those who read a narrative exhibited less social curiosity afterward than those who read an expository text. This result was not moderated by trait social curiosity. An exploratory analysis uncovered that the degree to which texts present readers with social targets predicted less social curiosity. Our experiment demonstrates that reading narratives, or possibly texts with social content in general, may engage and fatigue social-cognitive abilities, causing a temporary decrease in social curiosity. Such texts might also temporarily satisfy the need for social connection, temporarily reducing social curiosity. Both accounts are in line with theories describing how narratives result in better social cognition over the long term.

**Keywords:** social curiosity; narrative fiction; expository texts; reading; social cognition

## 1. Introduction

The idea that narratives play a role in our understanding of other minds has long fascinated readers, writers, and scholars alike. Encouragingly, empirical studies have confirmed that exposure to narratives is indeed associated with social cognition. For example, correlational studies find that life-time exposure to narrative fiction predicts better performance on measures of empathy and theory of mind (e.g., Mar et al., 2010; for a meta-analysis see Mumper & Gerrig, 2017). Experiments have also been

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conducted to test if a single exposure to narrative fiction directly causes an improvement in social-cognitive abilities (e.g., Kidd & Castano, 2013). However, the results from these experiments are mixed. Moreover, the underlying mechanism that would explain how reading a single short narrative affects social cognition remains unclear. Rather than focusing on *whether* short-term exposure to narratives immediately boosts social cognition, in this study we examine *why* that might be the case. To do so we investigate a possible proximal outcome of narrative consumption: greater curiosity about other people, or social curiosity. In short, this experiment examines whether reading narrative fiction increases social curiosity immediately afterward, with this curiosity perhaps explaining the temporary improvements in social cognition that some previous studies have found.

### 1.1. Stories and social cognition

A long line of theorizing and research connects stories to social cognition. In these accounts, narratives are inherently social and deal with the human condition (Bal, 2009; Bruner, 1986; Ryan, 2007). That is, narratives provide an abstract representation of the social world that then affords audiences with a mental simulation of particular events, as experienced by the story characters (Mar & Oatley, 2008; Oatley, 1999). Expository texts such as essays, on the other hand, do not focus on presenting experiences but rather ideas and arguments that are organized in order to convey information and convince readers (Decker & Schwegler, 1997). To construct these narrative simulations of the story world and, importantly, engage with the protagonists within them, readers make use of the same social-cognitive processes used to navigate the real social world (Gerrig, 1993; Zunshine, 2003, 2006). Consistent with this idea, neuroimaging studies demonstrate that understanding narratives relies on neural networks that are commonly associated with inferring the mental states of others, known as mindreading or mentalizing (Ferstl et al., 2008; Mar, 2007, 2011; Mason & Just, 2009). The repeated use of these social-cognitive abilities during engagement with stories might function as a form of training for these skills, helping to develop these abilities (Mar, 2018). In addition, narratives could provide opportunities for social-cognitive development by offering useful social knowledge and new perspectives (Mar, 2018). One example is the opportunity for audiences to form mental models of situations and characters that they might not easily encounter in daily life (Hakemulder, 2000).

### 1.2. Previous studies

The link between stories and social cognition was first established as an association between reading habits and social-cognitive abilities. These studies found that lifelong exposure to narrative fiction predicts better social cognition, with the same not holding true for expository nonfiction (Mar et al., 2006). This association is observed across the life span, with shared book reading predicting more advanced social-emotional development in early childhood (e.g., Aram & Aviram, 2009; Rose et al., 2018), leisure reading predicting better later social adjustment in older children (Mak & Fancourt, 2020), and exposure to narrative fiction predicting better empathy and mentalizing in adults (e.g., Mar et al., 2009; for a meta-analysis, see Mumper & Gerrig, 2017). Although these findings are consistent with the idea that repeated exposure to narratives aids in the

development of social-cognitive abilities, causal direction cannot be inferred from these correlational data. It could be that stories do in fact promote social cognition, but alternative explanations also exist. Perhaps people who excel at understanding others are drawn to narratives, or some unknown third variable could explain the association between stories and social cognition. In fact, more than one of these several options may be true.

Only true experiments, when properly designed, can allow for causal inferences. Experiments on this topic often randomly assign participants to read short texts of different genres (e.g., a single piece of literary fiction, popular fiction, expository nonfiction) or nothing at all, and then compare the groups on measures of social cognition immediately afterward (Mar, 2007). A landmark experiment from 2013 reported that participants who read literary fiction outperformed those who read popular fiction or expository nonfiction on two measures of social cognition (Kidd & Castano, 2013): the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001) and the Yoni Test (Shamay-Tsoory & Aharon-Peretz, 2007). This experiment seemingly provided evidence that a single exposure to a narrative causes an improvement in social cognition in the short term.

Subsequent attempts to replicate this result have been decidedly mixed, however. Although some conceptual and direct replications have been reported (e.g., Bal & Veltkamp, 2013; Black & Barnes, 2015; Pino & Mazza, 2016; van Kuijk et al., 2018), three large-scale direct replications failed to replicate these results (Camerer et al., 2018; Panero et al., 2016; Samur et al., 2018). Nevertheless, a meta-analysis of these studies, based on 53 effect sizes from 14 different studies, concluded that there is a small effect of reading a story on social cognition, when compared with reading nonfiction or nothing at all (Dodell-Feder & Tamir, 2018).

*1.2.1. Methodological concerns.* In addition to the failed replications, experiments on this topic have been the subject of various critiques (for an overview, see Eekhof et al., 2022). For example, a *p*-curve analysis of the experiments reported by Kidd and Castano (2013) found that they lacked evidential value (van Kuijk et al., 2018). In addition, a more expansive *p*-curve of all the studies included in the aforementioned meta-analysis (Dodell-Feder & Tamir, 2018) found that when a single outlying experiment was removed, the remaining body of research lacked evidential value (Quinlan et al., 2022). This analysis also revealed that more than half of the critical statistical tests yielded *p* values greater than 0.05 (12 of 22). Moreover, these experiments had an average power of about 52% (95% CI: 16%, 81%), indicating that most experiments did not have enough power to reliably detect true effects. It appears that the experimental evidence of a causal effect of reading a single story on social cognition remains inconclusive.

*1.2.2. Theoretical concerns.* Aside from the question of whether a single exposure to a story improves social cognition, other researchers have questioned why this would be the case. As Mar (2018) notes, many of the theories that posit a causal link between narratives and social cognition assume that repeated and prolonged exposure is necessary. A detailed rationale for an immediate effect of reading a single narrative, on the other hand, is still lacking. Kidd and Castano (2013) have framed their effects as an example of priming: reading a piece of literary fiction engages social-cognitive abilities and makes these abilities more readily available,

immediately boosting social cognition. This does not explain, however, why this priming effect is not observed consistently and whether the effect, when observed, truly reflects an improvement in ability or some other, temporary, process (Lenhart et al., 2020).

An alternative account is that reading a short narrative does not affect readers' ability to understand others but rather their interest or motivation to do so (Carpenter et al., 2018; Djikic et al., 2013; Samur et al., 2018). Exposure to fiction may put readers in a mental mode oriented toward people and their mental states (Mar, 2018), or place them in the "mood for mindreading" (Eekhof et al., 2022, p. 7). In line with these ideas, we hypothesize that reading a narrative might temporarily increase readers' social curiosity, that is, their interest in "the way other people behave, think, and feel" (Renner, 2006, p. 305) and in "gaining new information and knowledge about the social world" (Renner, 2006, p. 306). This increase in social curiosity might subsequently lead to a small improvement in social-cognitive performance, since aspects of social cognition are argued to have a motivational component (e.g., Ickes, 2011; Zaki, 2014). Empirical research has confirmed that motivation affects performance on measures of social-cognitive abilities, including the Reading the Mind in the Eyes Test (e.g., Ridinger & McBride, 2015) and other behavioral tasks (e.g., Carpenter et al., 2016; Ickes et al., 1990; Simpson et al., 2003, 2011; Thomas & Maio, 2008). In addition, an increase in social curiosity fostered by narratives might lead readers to seek out social activities, activities that provide an opportunity to use and develop social-cognitive skills in the real world. Although this cannot explain the short-term effects found in previous experiments, this social curiosity account does provide an additional possible explanation for the longitudinal relationship between reading narrative fiction and social cognition.

### 1.3. Current study

To test the social curiosity account, this study assesses whether exposure to a single short narrative increases social curiosity. We were interested in examining whether exposure to narratives differs from exposure to expository texts, regardless of the fictional nature of these texts (cf., Mar, 2018). However, since we operationalized narratives as narrative fiction and expository texts as expository nonfiction in our experiment, the term narrative in our paper refers to narrative fiction and exposition refers to expository nonfiction. We also explored readers' trait social curiosity, that is, their relatively stable interest in other people, as a potential moderator of any effect of our experimental manipulation.

## 2. Method

All of our measures and data analysis strategy were pre-registered prior to data collection (<https://aspredicted.org/fz7dy.pdf>), and our materials, data, and code are all publicly available (<https://osf.io/4ejcu/>).

### 2.1. Participants

We aimed to recruit at least 275 native speakers of English, who participated in return for £3.07, using the online crowd-sourcing platform Prolific Academic. In total,

322 participants started the study. Based on our pre-registered exclusion criteria, 12 participants were excluded for failing to complete the study, 3 were excluded after retracting their consent at the end of the study, 6 were removed because their first language was not English, and 18 participants answered more than one comprehension check question incorrectly and were removed (see Section 3.2). In addition, we had originally planned to exclude participants whose reading times were more than three standard deviations away from the text-specific mean. However, upon inspection of the data, we found out that this criterion was too lenient and resulted in no participant exclusions, allowing participants with implausible reading times to remain (e.g., 14 seconds). We therefore deviated from our pre-registration and excluded participants with implausible reading speeds instead. This was operationalized as words read per minute (wpm). We adopted a cut-off point of three standard deviations faster than the mean reading speed reported in a relevant meta-analysis (Brysbaert, 2019), namely 391.60 wpm. As a result, 61 additional participants were excluded. Most participants completed the study on a laptop or PC ( $n = 215$ ), as was recommended in the study description. Because less than 15% of participants used a phone ( $n = 6$ ) or tablet ( $n = 1$ ), we did not run any additional analyses exploring the influence of completing the study on a small-screen device (consistent with our pre-registration).

The final sample consisted of data from 222 participants (110 men, 110 women, 2 other), aged between 18 and 75 years ( $M = 40.63$ ,  $SD = 14.49$ ), with 115 participants assigned to read a narrative and 107 assigned to read an expository text. There were at least 24 participants assigned to each individual text, and very few reported that they had read the text before (7 for narrative and 11 for exposition). Most participants were from the UK ( $n = 183$ ) or Canada ( $n = 28$ ), with the remainder being from the USA, Ireland, or declining to provide their country of residence. On average, participants had 14.91 years of education ( $SD = 2.85$ ). A post-hoc sensitivity analysis based on our most complex regression model (i.e., the moderation model reported in Table 5) found that with this sample we had an 80% chance of detecting a statistically significant effect, for an effect-size of  $f^2 = 0.057$  or greater (equivalent to an  $R^2$  value of 0.053).

All participants were informed about their rights and gave written, online consent according to the Declaration of Helsinki before the start of the study. The study was approved by the institutional ethics assessment committee of York University (Approval Number 2019–263) and Radboud University (Approval Number 2018–3568).

## 2.2. Materials

### 2.2.1. Texts

We presented chapters from books, with participants randomly assigned to read one of four possible chapters for either the narrative or expository condition. For both conditions, we selected four single chapters that were around 2,000 words, could be understood in isolation, and were not difficult for the average reader. Because we did not have any predictions regarding specific narrative genres, we selected chapters for four major narrative genres, based on the top 10 most popular books for the eBook platform Overdrive (as of June 2022): suspense, romantic, fantasy, and historical. For the expository condition, we selected chapters from works of expository nonfiction

that were written in a nonnarrative style and did not cover any interpersonal topics. The specific texts and their characteristics can be found in [Table 1](#).

### 2.2.2. Manipulation checks

To check whether participants paid sufficient attention during reading, we created three comprehension questions for every text (four response options each). Participants who answered more than one question incorrectly were removed from the data set. We also measured participants' familiarity with the text by asking them whether they had read the text before (response options: *yes, no, maybe/not sure*).

### 2.2.3. State inventory of social curiosity (SISC)

Since no previously developed measure of state social curiosity exists, we developed the State Inventory of Social Curiosity (SISC) to measure participants' current interest in other people after reading. For this task, participants are presented with six profiles (two women, four men) consisting of a picture of a person and an accompanying short description of their profession and hobbies. After viewing each profile, participants were asked to rate their agreement with the following three items using 7-point Likert scales (1 = *totally disagree*, 7 = *totally agree*): I would like to learn more about this person; I am curious about this person's opinions; I wonder what this person's life story is. The profiles were presented in a random order.

To avoid floor and ceiling effects and ensure variability in participants' ratings, we created four uninteresting and two interesting profiles. The uninteresting profiles were created by selecting pictures of people who are not smiling. Three of these pictures were combined with descriptions that contained a profession from the top 3 most boring professions as reported by van Tilburg et al. (2022; e.g., accountant, tax advisor). The person in the fourth picture was described as being a child in elementary school. In addition, each of these four descriptions contained less interesting hobbies, partially inspired by the results of van Tilburg et al. (2022; e.g., playing videogames, going to church). The interesting profiles were created by selecting pictures of people who are smiling. These pictures were combined with descriptions that contained one of the two least boring professions (van Tilburg et al., 2022; i.e., investigative journalist, photographer), as well as interesting hobbies (e.g., collecting vinyl records, organizing board game nights). To avoid ceiling effects induced by socially desirable responses for those concerned about appearing unprejudiced based on race, we selected pictures of white people for four of the six profiles.

### 2.2.4. Social curiosity scale (SCS)

We measured trait social curiosity using the Social Curiosity Scale (Renner, 2006) in order to examine whether it acted as a moderator in the association between condition (narrative versus exposition) and state social curiosity. The Social Curiosity Scale consists of 10 items measuring both general social curiosity (e.g., I find it fascinating to get to know new people) and covert social curiosity (e.g., Every so often I like to stand at the window and watch what my neighbors are doing). Items were presented in a random order with 7-point Likert scales (1 = *totally disagree*, 7 = *totally agree*). Scores on the Social Curiosity Scale have been found to correlate with self-

**Table 1.** Text characteristics

Book Title	Chapter	Author	Year of Publication	Condition	No. of Words	Mean No. Sentences Per Paragraph	Mean No. Words Per Sentence	Mean No. Characters per Word	Flesch Reading Ease	Flesch–Kincaid Grade Level	Percentage of Viewpoint Markers
The Seven Husbands of Evelyn Hugo	Chapter 1	Taylor Jenkins Reid	2017	Narrative (Romance)	2200	2.4	10.6	4.1	80.6	4.6	9.00
The Paris Apartment	Prologue and Three Hours Later	Lucy Foley	2022	Narrative (Suspense)	1645	4.6	10.5	4.2	84.9	3.9	7.89
The House in the Cerulean Sea	Chapter 1	T.J. Klune	2020	Narrative (Fantasy)	2130	2.8	9.1	4.3	83.0	3.9	8.17
The Personal Librarian	Chapter 1	Marie Benedict	2021	Narrative (Historical)	2041	2.6	15.1	4.5	65.6	7.8	7.72
				Grand Mean for Narrative Condition (SD)	2004 (248.02)	3.10 (1.01)	11.33 (2.61)	4.28 (0.17)	78.53 (8.79)	5.05 (1.86)	8.19 (0.57)
The Hidden Life of Trees	The Language of Trees	Peter Wohlleben	2015	Exposition	2109	8.2	17.0	4.7	61.3	8.8	5.56
Potato: A Global History	The Cultural Potato	Andrew F. Smith	2011	Exposition	1840	4.7	19.2	4.8	47.0	11.4	2.28
Prisons Make Us Safer And 20 Other Myths About Mass Incarceration	The system of mass incarceration is flawed and not working as designed (or, A brief history).	Victoria Law	2021	Exposition	2285	3.3	22.8	5.1	40.4	12.6	4.38
Buzz, Sting, Bite	Introduction	Anne Sverdrup-Thygeson	2019	Exposition	1810	3.9	21.8	4.7	54.5	11.0	3.71
				Grand Mean for Expository Condition (SD)	2011 (226.81)	5.03 (2.19)	20.20 (2.62)	4.83 (0.19)	50.80 (9.07)	10.95 (1.59)	3.98 (1.37)

report measures of general curiosity, extraversion, social competence, social skills, and social support (Renner, 2006). Previous studies that employed the Social Curiosity Scale found good internal reliability for an index variable comprised of all 10 items, with Cronbach's alpha around 0.80 (e.g., Fitri et al., 2020; Hartung & Renner, 2013; Renner, 2006).

### 2.3. Procedure

The study was conducted online using the survey site Qualtrics (Provo, UT). After providing informed consent, participants were randomly assigned to read either one of the four narrative chapters, or one of the four expository chapters. Afterward, they completed the State Inventory of Social Curiosity, followed by the Social Curiosity Scale. Participants were then asked to think back to the text they had read and complete the comprehension check and familiarity questions. Finally, participants were asked to provide the following demographic information: age, gender, country of residence, first language, English fluency (in years), and years of education. At the end of the study, participants were debriefed and provided with the opportunity to retract their consent. On average, participants took 20.23 minutes ( $SD = 23.10$ ) to complete the study.

### 2.4. Data analysis

The data were analyzed in RStudio (version 2022.02.0, R version 4.1.2; R Core Team, 2020). We created a single index variable for the SISC, collapsing across all items and all profiles by averaging responses (i.e., averaging over 18 items in total). This index reflects the individual's state social curiosity (i.e., their current interest in learning about other people), with higher scores indicating greater interest. Since we did not have any specific predictions about the two subscales of the Social Curiosity Scale (Renner, 2006), we created a single index variable by averaging across all ten items. This index represents trait social curiosity (i.e., a relatively stable curiosity in other people). We calculated hierarchical omegas to estimate internal reliability for our index variables. Internal reliability was good for both SISC scores, reflecting state social curiosity ( $\omega = 0.91$ , 95% CI [0.88, 0.93]) and SCS scores, reflecting trait social curiosity ( $\omega = 0.81$ , 95% CI [0.68, 0.87]).

Although we pre-registered that we would use linear mixed models to analyze our data, after data collection we realized it is impossible to fit the random effects we had proposed because we have only one measurement per participant. We therefore deviated from our pre-registration and fit linear regression models instead. This also meant that we refrained from using Bayes Factors to quantify any effects, as initially pre-registered for the linear mixed models. Second, we pre-registered that text would act as a control variable in our analyses, but because the text variable can be reduced to the condition variable (i.e., once you incorporate all texts read, this information is redundant with condition), including both predictors in our regression models led to collinearity issues. Text was therefore omitted as a control variable in a deviation from our pre-registration. Although the texts in the two conditions differ slightly with respect to some surface-level textual characteristics (Table 1), we did not expect these surface characteristics to influence readers' social

curiosity. We reasoned that any effect of reading on social curiosity would be driven by the text content. Nevertheless, we explored the potential effect of the individual texts and their characteristics in the Results section.

A linear regression model was constructed with condition (narrative versus exposition) and gender (as a control variable) as our predictors. In line with our pre-registration, we did not include age as a predictor, because the correlation between age and state social curiosity (SISC) was smaller than .1 (Table 2). Because previous studies have found differences in social curiosity between men and women, we did, however, control for gender (Fitri et al., 2020; Litman & Pezzo, 2005). To explore the potential moderating role of trait social curiosity, we constructed another linear regression mode using the same model structure but with the interaction between condition and trait social curiosity (SCS) added. The SCS scores were scaled and centered for this analysis.

For both models, we used effects coding with  $-0.5$  (exposition) and  $0.5$  (narrative) as the weights for condition. As a result, the intercept reflects the grand average of state social curiosity across both conditions and the estimate for condition reflects the difference in state social curiosity between the narrative and expository condition. The estimate of any other predictor reflects the grand average of the effect of that predictor in the narrative condition and the effect of that predictor in the expository condition. Finally, the estimate of the interaction between any predictor and condition reflects the difference between the effect of that predictor in the narrative condition and the effect of that predictor in the expository condition.

Finally, in line with our pre-registration, we re-ran both regression models only including participants who were not previously familiar with the text they read. The pattern of results remained the same, but the effect of condition and gender edged just above the threshold of statistical significance (statistical significance for the moderation analysis remained the same). The output of these regression models is not reported here but available on the Open Science Framework (<https://osf.io/4ejcu/>).

### 3. Results

#### 3.1. Descriptive statistics

The descriptive statistics and correlations for all measures appear in Table 2. Scores for our newly developed SISC, reflecting state social curiosity, positively correlated with trait social curiosity (SCS). There was a wide range of scores for both the SISC and SCS, suggesting that both measures were sensitive to individual differences between participants and were not susceptible to floor or ceiling effects. SCS scores were slightly lower for men ( $M = 4.54$ ,  $SD = 0.88$ ) than for women ( $M = 4.85$ ,  $SD = 0.99$ ,  $d = -0.33$ , 95% CI  $[-0.60, -0.06]$ ). On average, people spent around the same amount of time reading for the narrative condition ( $M = 9.85$  minutes;  $SD = 6.49$ ) and the expository condition ( $M = 9.34$ ;  $SD = 3.59$ ;  $d = 0.10$ , 95% CI  $[-0.17, 0.36]$ ). Similarly, reading speed did not differ much between conditions, Narrative:  $M = 239.30$  wpm;  $SD = 71.94$ ; Exposition:  $M = 241.02$  wpm,  $SD = 76.90$ ;  $d = 0.02$ , 95% CI  $[-0.24, 0.29]$ .

**Table 2.** Descriptive statistics and correlations

Variable	<i>M (SD)</i>	Min	Max	1	2	3	4
1. Age	40.63 (14.49)	18	75				
2. State Social Curiosity (SISC)	4.12 (0.88)	1.17	6.50	-.03 [-0.16, .010]			
3. Trait Social Curiosity (SCS)	4.68 (0.96)	1.50	6.80	-0.10 [-0.23, 0.03]	0.29** [0.17, 0.41]		
4. Reading Speed (wpm)	240.19 (74.39)	27.67	382.46	0.05 [-0.08, 0.19]	-0.09 [-0.22, 0.04]	0.00 [-0.13, 0.14]	
5. Reading Time (minutes)	9.60 (5.29)	4.30	59.46	-0.10 [-0.23, 0.03]	0.09 [-0.04, 0.22]	0.05 [-0.08, 0.18]	-0.77** [-0.82, -0.71]

Note: These descriptive statistics are based on the full data set ( $N = 222$ ). Values in square brackets indicate the 95% confidence interval for each correlation. \* $p < 0.05$ . \*\* $p < 0.01$ .

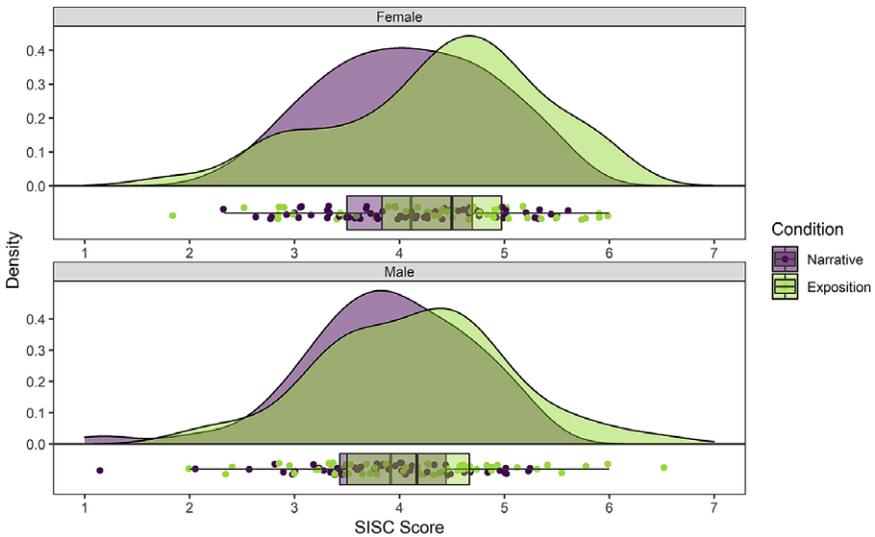
3.2. Main analyses

Gender was coded as a binary variable (male and female) with those who responded otherwise ( $n = 2$ ) excluded due to the small number of cases. We first fit a linear regression to see whether condition and gender predicted state social curiosity (SISC; Table 3). Regression diagnostics identified three influential outliers that were removed before the interpretation of the model. Men were less socially curious at the end of the experiment ( $M = 4.02, SD = 0.86$ ) than women ( $M = 4.22, SD = 0.89$ ), regardless of condition (Fig. 1). There was also an effect of condition but in the opposite direction of what we had predicted: participants who read a piece of narrative fiction were less socially curious ( $M = 4.00, SD = 0.81$ ) than participants who read expository nonfiction ( $M = 4.25, SD = 0.93$ ; Table 4, Fig. 1). Overall, gender and condition predicted about 4% of the variance in state social curiosity scores.

**Table 3.** Estimates for the regression model predicting state social curiosity (SISC) based on condition and gender

Predictors	Estimates (B)	95% CI		p
		LL	UL	
(Intercept)	4.26	4.10	4.41	<0.001***
Condition (Narrative)	-0.26	-0.48	-0.04	0.021*
Gender (Male)	-0.24	-0.46	-0.02	0.031*
Fit		$R^2 = 0.041^*$ (95% CI [0.00, 0.10])		
		$F(2, 214) = 4.56, p = 0.012$		

Note: Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .



**Figure 1.** Density plot of state social curiosity (SISC) by condition and gender.

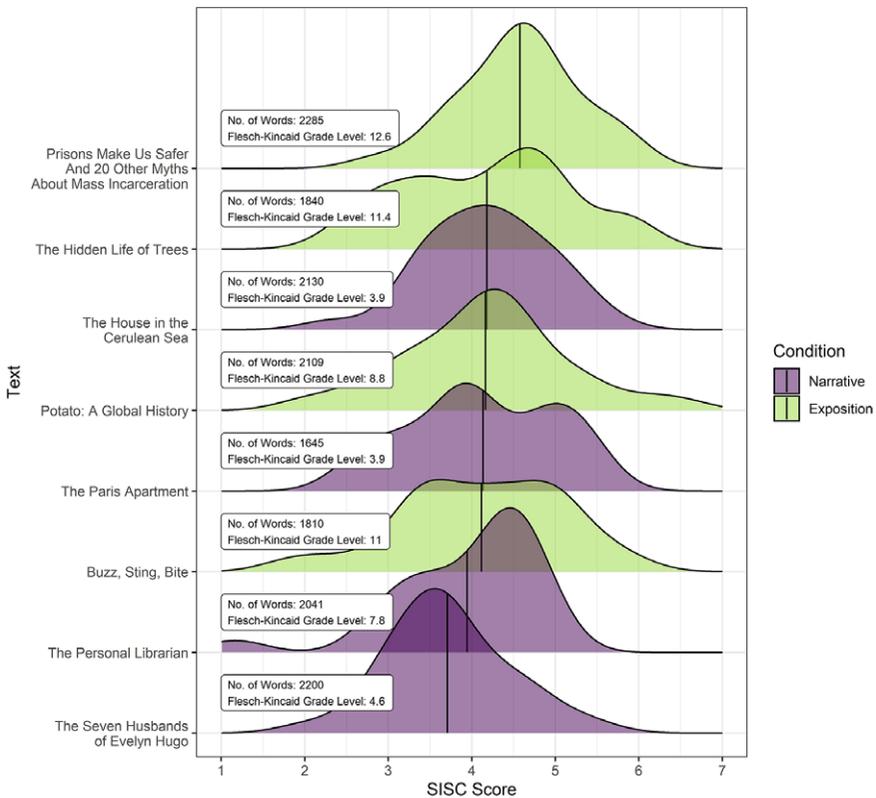
Note: Figure is based on the full data set (excluding those who did not identify as either female or male;  $N = 220$ ).

**Table 4.** Descriptive statistics for state social curiosity (SISC) by condition and text

Condition	Mean (SD)	Text	Mean (SD)
Narrative	4.00 (0.81)	The Seven Husbands of Evelyn Hugo	3.71 (0.72)
		The Paris Apartment	4.13 (0.86)
		The House in the Cerulean Sea	4.18 (0.73)
		The Personal Librarian	3.94 (0.86)
Exposition	4.25 (0.93)	The Hidden Life of Trees	4.16 (0.98)
		Potato: A Global History	4.18 (1.00)
		Prisons Make Us Safer And 20 Other Myths About Mass Incarceration	4.58 (0.72)
		Buzz, Sting, Bite	4.12 (0.97)

Note: These descriptive statistics are based on the full data set (N = 222).

When examining state social curiosity scores between the different texts, some small differences were observed (Table 4). However, it is unlikely that these differences between individual texts could cause or obscure the effect of condition that we observed. Furthermore, as exemplified in Fig. 2, state social curiosity does not seem to



**Figure 2.** Density plots of state social curiosity (SISC) by text and condition sorted by mean state social curiosity (SISC) scores per text.

Note: Vertical lines indicate the mean and the figure is based on the full data set (N = 222).

**Table 5.** Estimates for the regression model predicting state social curiosity (SISC) based on the interaction between trait social curiosity (SCS) and condition, and gender

Predictors	Estimates ( <i>B</i> )	95% CI		<i>p</i>
		<i>LL</i>	<i>UL</i>	
(Intercept)	3.02	2.42	3.62	<0.001***
SCS Score	0.25	0.13	0.37	<0.001***
Condition (Narrative)	0.47	-0.64	1.57	0.406
Gender (Male)	-0.13	-0.34	0.09	0.246
SCS Score * Condition (Narrative)	-0.14	-0.37	0.09	0.224
Fit	$R^2 = 0.120^{**}$ (95% CI [0.04, 0.19]) $F(4, 209) = 7.14, p < 0.001.$			

Note: Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

covary with text length or text complexity (as indexed by Flesch–Kincaid Grade Level).

To see whether trait social curiosity moderates the association between condition and state social curiosity, we fit another linear regression model that included the interaction between condition and trait social curiosity (SCS; Table 5). Regression diagnostics identified three additional influential outliers that were removed before interpretation of the model. After including the effect of trait social curiosity and its interaction with condition, the previously found effects of gender and condition were no longer statistically significant. There was a statistically significant effect of trait social curiosity on state social curiosity, such that trait social curiosity positively predicted state social curiosity (SISC). This association validates our novel task. As evidenced by the lack of a statistically significant interaction, the effect of condition on state social curiosity was not moderated by trait social curiosity. Overall, gender, condition, trait social curiosity, and the interaction between the latter two predicted about 12% of the variance in state social curiosity scores.

To see whether the effect of condition we found in the first model was actually caused by differences in trait social curiosity between the two conditions, we compared the levels of trait social curiosity between the two conditions using the full data set ( $N = 222$ ). Participants reported very similar levels of trait social curiosity in both conditions, and there was no statistically significant difference between the narrative ( $M = 4.62, SD = 0.91$ ) and expository condition ( $M = 4.74, SD = 1.00, t(214) = -0.90, p = .37, d = -0.12, 95\% CI [-0.39, 0.14]$ ).

### 3.3. Exploratory analyses

Based on our descriptive statistics, we noticed that the texts that resulted in the least social curiosity seemed to deal with more social topics. For example, the text that ranked highest was about a young journalist who tries to figure out why a well-known celebrity only wants to be interviewed by her (The Seven Husbands of Evelyn Hugo; Fig. 2). In contrast, the texts that led to the most social curiosity focused on distinctly nonsocial topics, such as the way that trees communicate (The Hidden Life of Trees). In between were both narrative and expository texts that were not exclusively social or nonsocial in nature. For example, one narrative was about two characters but with no social interaction described (The Paris Apartment), and another was an

expository text about the social and cultural impact of potatoes (Potato: A Global History). These observations suggest that perhaps the effect of genre on state social curiosity is driven by the presentation of social targets rather than whether a text is a narrative or not. This is consistent with an *fMRI* study that found that narratives with social content activate social-cognitive brain networks more strongly than narratives without social content (Tamir et al., 2016).

To further explore the influence of the degree to which texts present social targets on social curiosity after reading, we coded our stimuli with respect to perceptual, cognitive, and emotional viewpoint markers. This analysis was exploratory and was not pre-registered. Such viewpoint markers are content words, like verbs (e.g., *to see*, *to like*), adjectives (e.g., *numb*, *thoughtful*), adverbs (e.g., *maybe*, *happily*), or nouns (e.g., *glance*, *pleasure*), that express someone's perspective (Eekhof et al., 2020; van Krieken et al., 2017). This perspective could be related to perception (i.e., sensations), cognition (i.e., beliefs, intentions), or emotion, directed at an object, person, or situation (Eekhof et al., 2020; van Krieken et al., 2017). Viewpoint markers are typically considered a characteristic of narrative texts, because narratives, by definition, present the perspectives of characters on a series of events. However, expository texts may also contain viewpoint markers, inserted to make a text more vivid or engaging (e.g., "Let's look at some examples together") or to describe the experiences of people mentioned in the text (e.g., "Cavemen constantly feared for their lives"; Sangers et al., 2021).

We coded our texts for the presence of perceptual, cognitive, and emotional viewpoint markers using the ViewPoint Identification Procedure (VPIP; Eekhof et al., 2020). Each text was divided into lexical units by the first author. In most cases, words corresponded to lexical units. However, personal names (e.g., *Evelyn Hugo*), geographical names (e.g., *United States*), and contractions (e.g., *she's*) were counted as single lexical units. The first author then coded every lexical unit as being either a perceptual, cognitive, or emotional viewpoint marker, or not a viewpoint marker. An independent coder also coded 10% of the content words for each text. As the interrater agreement was almost perfect (96.15%;  $\kappa = 0.80$ )<sup>1</sup>, the ratings of the first author were used in the subsequent analysis. As we had no reason to believe that the different dimensions of viewpoint marker would differ in their likelihood of engaging social-cognitive processes, we analyzed the total number of viewpoint markers by calculating a single viewpoint score for each text. This score reflects the percentage of lexical units that can be considered viewpoint markers (perceptual, cognitive, or emotional; Table 1), and acted as an index of a text's potential to engage readers' social-cognitive abilities. All analyses conducted are reported here.

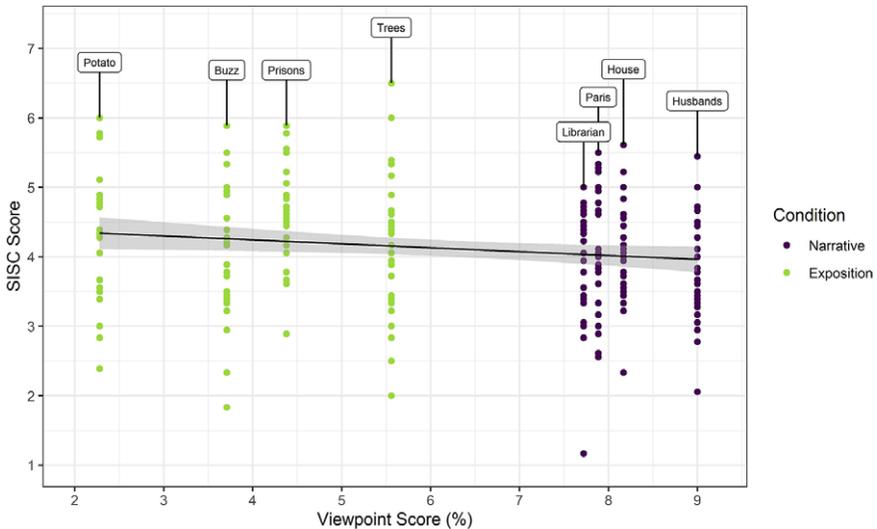
To examine whether viewpoint scores for the texts predict subsequent state social curiosity, we fit a linear regression model that included viewpoint score and gender (as a control; Table 6). No influential outliers were identified. Viewpoint score had a statistically significant negative effect on state social curiosity. In other words, the more viewpoint markers a text contained, the less socially curious participants were after reading it (Fig. 3). As in the main analysis, men were less socially curious than women after reading, regardless of the viewpoint score of the text they read (Fig. 1).

<sup>1</sup> Interrater agreement for the categorical distinction between perceptual versus cognitive versus emotional versus no viewpoint markers was also good (95.63%;  $\kappa = .78$ ).

**Table 6.** Estimates for the regression model predicting state social curiosity (SISC) based on viewpoint score and gender

Predictors	Estimates (B)	95% CI		p
		LL	UL	
(Intercept)	4.63	4.28	4.98	<0.001***
Viewpoint Score	-0.06	-0.11	-0.01	0.015*
Gender (Male)	-0.24	-0.46	-0.02	0.030*
Fit		$R^2 = 0.044^*$ (95% CI [.00, 0.10])		
		$F(2, 214) = 4.92, p = 0.010$		

Note: Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .



**Figure 3.** Scatterplot of state social curiosity (SISC) by viewpoint score.

Note: Figure is based on the full data set ( $N = 222$ ). *Potato* = Potato: A Global History; *Buzz* = Buzz, Sting, Bite; *Prisons* = Prisons Make Us Safer and 20 Other Myths About Mass Incarceration; *Trees* = The Hidden Life of Trees; *Librarian* = The Personal Librarian; *Paris* = The Paris Apartment; *House* = The House in the Cerulean Sea; *Husbands* = The Seven Husbands of Evelyn Hugo.

Overall, viewpoint score and gender predicted about 4% of the variance in state social curiosity scores.

#### 4. Discussion

A long line of research connects narratives to improved social-cognitive abilities. In this study we set out to shed light on the mechanism behind this relation by studying a possible outcome of narrative exposure: social curiosity. We hypothesized that narratives could make readers more curious about other people, and that this might help explain past findings of an immediate short-term boost to social cognition. Since various social-cognitive abilities have a motivational aspect (e.g., Ickes, 2011; Zaki,

2014), an increase in social curiosity might motivate people to put more effort into social-cognitive tasks.

To put this account to the test, we developed a new behavioral measure of state social curiosity: the State Inventory of Social Curiosity (SISC). Encouragingly, our new measure displayed good internal reliability and correlated with a trait measure of social curiosity (Renner, 2006), key aspects of reliability and validity. Contrary to our expectations, however, those who had read an expository text exhibited greater social curiosity immediately after reading compared with those who read a narrative. In other words, reading a narrative was found to decrease, rather than increase, social curiosity when compared with reading an expository text. This association was not moderated by trait social curiosity, but the effect of condition became statistically nonsignificant when trait social curiosity was included. However, the fact that there was almost no difference in trait social curiosity between the two conditions makes it unlikely that this trait explains our original effect of condition. That said, due to our statistical power, null results should be interpreted with some caution. In conclusion, we found evidence that reading a narrative causes a small decrease in state social curiosity immediately afterward.

This result is not consistent with the social curiosity account or the idea that reading a narrative places readers in a social-processing mode (e.g., Eekhof et al., 2022; Mar, 2018). How then might we explain this reduction in social curiosity after reading a narrative? One explanation could be rooted in the idea of fatigue or depletion for a specific cognitive process. Because narratives are inherently social and engage social-cognitive abilities (Gerrig, 1993; Mar, 2011), reading a narrative might result in a reduction in either capacity (fatigue) or motivation to engage these abilities.

This motivational account is related to reader needs: perhaps story readers become less interested in engaging with other people's minds because the narrative fulfills this need. Such an idea is in line with the Temporarily Extending the Boundaries of the Self model (TEBOTS; Slater et al., 2014), which proposes that narratives can be used to fulfill the need for relatedness or belonging. This is also consistent with research on social snacking (Gardner et al., 2005; Jonason et al., 2008), which similarly argues that there are several forms of surrogates that can "stand in" for real others when it comes to fulfilling belongingness needs. Conversely, it might also be the case that exposure to an expository text elicits a greater need for social connection – rather than narratives fulfilling this need – because exposition often lacks social content. This is in line with the Social Reconnection Hypothesis, which states that people are more motivated to connect with others after social exclusion (Maner et al., 2007). Since we did not collect any baseline data for our measure of state social curiosity, we cannot tease apart these two explanations. Overall, however, our findings could also be interpreted in terms of social needs.

After inspecting the data we suspected that the degree to which texts contain social content may additionally drive the effect we found, which would be consistent with the above accounts. Specifically, we hypothesized that the more a text presents readers with minds or social targets, the more readers need to engage their social-cognitive abilities, resulting in less social curiosity after reading. We therefore analyzed our texts for the presence of lexical markers of perceptual, cognitive, and emotional viewpoint. A greater prevalence of these markers in a text did

indeed predict less state social curiosity after reading. This is in concord with previous eye-tracking research in which viewpoint markers engaged social-cognitive abilities (Eekhof et al., 2021), and further supports the fatigue account described above.

Although neither the fatigue account nor the social needs account can explain why some previous studies did find an immediate effect of reading a narrative on social-cognitive abilities (e.g., Bal & Veltkamp, 2013; Black & Barnes, 2015; Kidd & Castano, 2013; Pino & Mazza, 2016; van Kuijk et al., 2018), it is important to emphasize that at least the fatigue account is not in any way inconsistent with the possibility that long-term exposure to narratives does contribute to social cognition. In fact, the fatigue account is fully consistent with this phenomenon. Consider the metaphor of reading as exercising a muscle, as first introduced by Zunshine (2006). Doing push-ups for half an hour exhausts your arm muscles (rather than primes them), making it harder for you to win an arm-wrestling match directly after. However, doing half an hour of push-ups every day over the long term will strengthen your arm muscles and increase your chances of winning an arm-wrestling match in the future. Similarly, reading narratives might exhaust social-cognitive abilities in the short run but can nevertheless train these abilities in the long run. This would explain why the long-term associations between reading habits and social cognition are rather robust (Mumper & Gerrig, 2017), whereas the evidence in favor of an immediate effect of narratives on social cognition is not (Quinlan et al., 2022).

More research is needed to further explore whether this fatigue account is indeed inconsistent with the effects of reading in the short term. It is first important to find out whether other groups are able to replicate our finding that reading exposition elicits greater social curiosity immediately afterward compared with reading a story. Future studies should also include other behavioral measures to examine the potential downstream consequences of increased social curiosity. For example, do participants seek out different activities after reading an expository text compared with a narrative one, such as being more likely to agree to meeting friends rather than staying at home, as a result of heightened social curiosity?

Our study also contributes to the understanding of social curiosity in general. Past work has failed to make the important distinction between social curiosity as a relatively stable trait versus social curiosity as a temporary state that can fluctuate throughout the day depending on various factors. In this respect, our State Inventory of Social Curiosity fills a clear research need, as no other task tapping state social curiosity exists. Our task also helps to support future research on the ways in which social curiosity can be temporarily heightened or suppressed.

Recognizing the distinction between trait and state curiosity, and measuring each appropriately, will help advance research in many ways. For example, in our study, we observed that men were less socially curious than women both in terms of trait and state, regardless of reading condition. This is seemingly at odds with previous research that relied on self-report measures of *trait* social curiosity. For example, Fitri et al. (2020) found no relationship between gender and trait social curiosity, and Litman and Pezzo (2005) found that men were generally more socially curious than women. More research is needed to determine whether and how men and women might differ in both their stable curiosity in other people as well as their state social curiosity.

In closing, we have discovered a relationship between genre and social curiosity, such that reading a narrative, or perhaps any text high in social content, causes a

decrease of curiosity about other people, in the short term. The state measure of social curiosity that we developed will help support other researchers interested in this topic, including the way that media engagement influences this interest in other people.

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**Data availability statement.** Our materials, data, and code are all publicly available on the Open Science Framework (<https://osf.io/4ejcu/>).

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