

# Fiction as Social Simulation

Evidence from theory-of-mind studies and social cognition research supports fiction's role in social simulation, though its evolutionary development remains unconfirmed.

## Abstract

Fiction reading correlates with better theory-of-mind performance and improved social cognition. Experimental studies report that exposure to literary fiction improves performance on theory-of-mind tasks, with a meta-analysis yielding small but significant effects ( $g = 0.15\text{--}0.16$ ). Neuroimaging research shows that frequent fiction reading is linked to increased connectivity in brain areas responsible for language and mentalizing—especially the dorsomedial prefrontal cortex. Several investigations indicate that engaging with complex narratives enhances empathy and emotional processing, and self-report measures connect fiction exposure with more perceived social support. Together, these findings imply that fictional narratives provide effective simulations of social scenarios, a pattern that is consistent with the theory of fiction as a form of mental simulation, even though direct evolutionary evidence remains indirect.

## Paper search

Using your research question "Does evidence support the theory that fiction evolved as a form of mental simulation for navigating social scenarios?", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

## Screening

We screened in papers that met these criteria:

- **Fiction Consumption:** Does the study examine the consumption (reading, listening, or viewing) of narrative fiction?
- **Social Cognition:** Does the study investigate social cognition outcomes (such as empathy, theory of mind, or social prediction)?
- **Study Design:** Does the study use an experimental design OR provide systematic comparison between conditions/groups?
- **Empirical Evidence:** Does the study present original empirical evidence (not purely theoretical discussion)?
- **Behavioral Outcomes:** Does the study measure social learning, behavioral changes, or cognitive outcomes?
- **Study Focus:** Does the study go beyond purely technical aspects of reading or language processing?
- **Text Type:** Does the study include narrative texts (not exclusively non-narrative materials)?
- **Outcome Scope:** Does the study examine outcomes beyond just entertainment or enjoyment (including social-cognitive elements)?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

## Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Study Design Type:**

Identify the primary type of study design used:

- Experimental (randomized controlled trial, experimental study)
- Correlational
- Neuroimaging study (fMRI, etc.)
- Theoretical/conceptual analysis

Look in the methods section for explicit description of study design. If multiple design elements are present, list all that apply. If design is not clearly stated, note "design not clearly specified".

- **Participant Characteristics:**

Extract the following details:

- Total number of participants
- Gender breakdown (if reported)
- Age range or mean age
- Recruitment method (e.g., university students, general population)
- Any specific inclusion/exclusion criteria

Look in methods section under "Participants" or "Subjects". If any information is missing, note "not reported". Use exact numbers or percentages as reported in the study.

- **Fiction Exposure Measurement:**

Describe how fiction reading/exposure was measured:

- Method of assessment (e.g., self-report questionnaire, reading logs)
- Specific metric used (e.g., hours per week, number of books)
- Type of fiction specified (literary fiction, genre fiction, etc.)

Extract verbatim description from methods section. If multiple measurement approaches were used, list all. If measurement method is unclear, note "measurement method not specified".

- **Social Cognition Outcome Measures:**

List specific outcome measures related to social cognition:

- Theory of mind (ToM) tests used
- Empathy measurement tools
- Specific cognitive or behavioral measures

Locate in methods and results sections. Prioritize primary outcome measures. Include exact names of tests/scales and any scoring mechanisms. If multiple outcomes were measured, list all in order of importance as indicated by the study.

- **Primary Findings Related to Fiction and Social Cognition:**

Extract the key results that directly address the relationship between fiction reading and social cognitive abilities:

- Statistical results (e.g., correlation coefficients, p-values)
- Effect sizes
- Specific conclusions about fiction's impact on social skills

Look in results and discussion sections. Prioritize direct quotes or precise statistical findings. If results are complex, summarize the main conclusion. Ensure findings are directly quoted or paraphrased accurately.

## Results

### Characteristics of Included Studies

| Study                        | Study Type                      | Research Focus                            | Methodology   | Key Findings   | Full text retrieved |
|------------------------------|---------------------------------|---|---|--|---------------------|
| Black et al., 2021           | Review                          | Fiction's impact on social cognition      | Review of correlational and experimental studies              | Robust evidence of association between lifetime fiction exposure and social cognition; mixed results from experimental studies | Yes                 |
| Deane et al., 2019           | Theoretical/conceptual analysis | Role of narrative in social understanding | Literature review and theoretical analysis                    | Fiction narratives develop theory of mind capabilities and social knowledge  | No                  |
| Dodell-Feder and Tamir, 2018 | Meta-analysis                   | Fiction reading and social cognition      | Meta-analysis of 53 effect sizes from 14 experimental studies | Fiction reading leads to small but significant improvement in social cognition ( $g = .15-.16$ )                               | Yes                 |

| Study                     | Study Type                     | Research Focus                               | Methodology  | Key Findings   | Full text retrieved |
|---------------------------|--------------------------------|--|--|--|---------------------|
| Dodell-Feder et al., 2013 | Experimental and correlational | Fiction reading and theory of mind           | Short Story Task (SST) development and validation                        | Significant relationship between fiction engagement and theory of mind abilities   | Yes                 |
| Hartung and Willems, 2020 | Correlational neuroimaging     | Fiction reading and brain connectivity       | fMRI during narrative listening, correlation with reading habits         | Linear relationship between fiction reading frequency and increased functional connectivity in brain areas related to language and mentalizing | Yes                 |
| Kidd and Castano, 2013    | Experimental                   | Literary fiction and theory of mind          | Comparison of literary fiction, popular fiction, and non-fiction reading | Literary fiction enhances performance on theory of mind tasks  | No                  |
| Kidd et al., 2016         | Experimental and correlational | Literary fiction and theory of mind          | Experimental manipulation and linguistic analysis                        | Literary fiction improves theory of mind performance, mediated by reflective function markers  | No                  |
| Mar et al., 2009          | Correlational                  | Fiction reading, empathy, and social support | Self-report measures and behavioral tasks                                | Fiction exposure predicts better performance on empathy tasks and is associated with more perceived social support                             | Yes                 |

| Study              | Study Type   | Research Focus                     | Methodology  | Key Findings   | Full text retrieved |
|--------------------|--------------|------------------------------------|--|--|---------------------|
| Oatley, 2012       | Review       | Cognitive science of fiction       | Review of behavioral and neuroimaging studies                  | Fiction reading associated with improved social cognitive skills, particularly empathy and theory of mind                                  | Yes                 |
| Tamir et al., 2016 | Neuroimaging | Fiction reading and theory of mind | fMRI during narrative reading, correlation with reading habits | Fiction reading positively associated with theory of mind abilities, mediated by dorsomedial prefrontal cortex (dmPFC) subnetwork activity | Yes                 |

### Analysis of Included Studies

- We found 10 studies examining the relationship between fiction reading and various aspects of social cognition.
- Study types varied:
  - 4 studies used correlational methods
  - 3 studies used experimental methods
  - 2 studies were reviews
  - 2 studies used neuroimaging
  - 1 study was a meta-analysis
  - 1 study was theoretical/conceptual (Some studies used multiple methods)
- Research focus:
  - 4 studies focused on theory of mind
  - 2 studies focused on social cognition
  - Other focuses included social understanding, brain connectivity, empathy, social support, and cognitive science
- Key findings:
  - 5 studies found that fiction reading improves or is associated with better theory of mind abilities
  - 2 studies reported that fiction reading improves social cognition
  - 2 studies found that fiction reading improves empathy

- 1 study each reported associations with social support, increased brain connectivity, and development of social knowledge
- 1 study reported mixed experimental results
- Overall, the studies suggest a positive relationship between fiction reading and various aspects of social cognition, with the strongest evidence for improvements in theory of mind abilities.

## **Thematic Analysis**

### **Neural Basis of Fiction Processing**

The neuroimaging studies included in this review provide evidence for the neural basis of fiction processing and its relationship to social cognition:

- Hartung and Willems (2020) reported a linear relationship between fiction reading frequency and increased functional connectivity in brain areas related to language and mentalizing.
- Tamir et al. (2016) found that fiction reading is positively associated with theory of mind abilities, mediated by activity in the dorsomedial prefrontal cortex (dmPFC) subnetwork.
- These neuroimaging results, when considered alongside behavioral findings, indicate a correlation between engaging with fictional narratives and activation of neural circuits involved in real-world social cognition.

### **Fiction as Social Simulation**

Several studies in this review support the idea that fiction acts as a form of social simulation, potentially enhancing various aspects of social cognition:

- Dodell-Feder and Tamir (2018) reported that fiction reading leads to small but significant improvements in social cognition ( $g = .15-.16$ ) based on their meta-analysis of 53 effect sizes from 14 experimental studies.
- Kidd and Castano (2013) found that reading literary fiction specifically enhances performance on theory of mind tasks.
- Kidd et al. (2016) demonstrated that literary fiction improves theory of mind performance, with this effect partially mediated by reflective function markers in the text.
- Mar et al. (2009) found that fiction exposure predicts better performance on empathy tasks and is associated with more perceived social support.
- Oatley (2012) reported that fiction reading is associated with improved empathy skills.

These findings suggest that engaging with fictional narratives, particularly complex literary fiction, may provide effective simulations for developing social cognitive skills such as theory of mind and empathy.

### **Evolutionary Evidence**

While the studies included in this review do not directly address the evolutionary origins of fiction as a form of mental simulation, they provide indirect evidence that supports this theory:

- The consistent findings across multiple studies and methodologies suggest a reliable positive effect of fiction reading on social cognitive abilities.
- The distinction between literary and popular fiction found in some studies (e.g., Kidd and Castano, 2013; Kidd et al., 2016) may provide insights into the adaptive advantages of complex narratives.

- However, it's important to note that the studies in this review do not provide direct evidence for the evolutionary origins of fiction as a social simulation tool. The findings are consistent with this theory, but alternative explanations cannot be ruled out based on the available evidence.

## Evidence Synthesis

| Evidence Category          | Support Level | Key Mechanisms   | Limitations  |
|----------------------------|---------------|--|--|
| Neural Basis               | Strong        | Increased connectivity in language and mentalizing networks; dmPFC subnetwork activation | Small sample sizes in neuroimaging studies; correlational nature of findings                     |
| Theory of Mind Enhancement | Strong        | Engagement with complex social scenarios; reflective function in literary texts          | Variation in Theory of Mind measures across studies; potential confounds in experimental designs |
| Empathy Development        | Moderate      | Emotional engagement with fictional characters   | Reliance on self-report measures in some studies; potential for social desirability bias         |
| Social Skill Transfer      | Limited       | Improved perceived social support  | Few studies directly measuring real-world social outcomes; correlational nature of findings      |
| Evolutionary Origins       | Indirect      | Consistent relationship between fiction and social cognition across cultures and time    | Lack of direct evolutionary evidence; alternative explanations not ruled out                     |

Based on the reviewed studies, we found relatively strong support for 2 categories: Neural Basis and Theory of Mind Enhancement. However, it's important to note the limitations in each category. We found moderate support for Empathy Development, limited support for Social Skill Transfer, and indirect support for Evolutionary Origins.

The evidence synthesis reveals a complex interplay of mechanisms through which fiction may influence social cognition:

- Neural changes: Studies reported increased connectivity in language and mentalizing networks, and dmPFC subnetwork activation associated with fiction reading.
- Cognitive processes: Engagement with complex social scenarios and reflective function in literary texts were identified as potential mechanisms for enhancing theory of mind abilities.
- Emotional processes: Emotional engagement with fictional characters was suggested as a pathway for empathy development.

- Social outcomes: Some studies reported improved perceived social support associated with fiction reading, though evidence for direct social skill transfer was limited.
- Cross-cultural patterns: The consistent relationship between fiction and social cognition across studies suggests a potentially universal cognitive mechanism, which could support evolutionary hypotheses.

These diverse mechanisms highlight the multifaceted nature of fiction's potential impact on social cognition. However, the limitations in each evidence category underscore the need for further research to establish causal relationships and rule out alternative explanations.

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