Fiction as Mental Simulation: An EP Perspective

Analysis of influential evolutionary psychology papers reveals consistent theoretical support for fiction evolving as mental simulation, with only one study challenging this consensus.

Abstract

An analysis of ten influential papers in evolutionary psychology reveals a largely consistent theoretical endorsement of the view that fiction evolved as a form of mental simulation. Several authors argue that narrative engagement provides a virtual arena for simulating social experiences, bolstering social cognition and adaptive learning. For example:

1. Boyd (2017), Mar and Oatley (2008), van Krieken (2018), and others present models in which fiction enables a safe environment for simulating interactions that inform social understanding.
2. Carroll (2012), Oatley and Mar (2005), and Grady (2020) depict fiction as a form of social rehearsal that improves cognitive strategies for handling real-life scenarios.
3. Steen and Owens (2001) and Tooby and Cosmides (2001) align fiction with evolutionary mechanisms that capitalize on our capacity for pretend play to prepare us for complex social challenges.

One study (Currie, 2020) questions the evolutionary benefits of deriving accurate knowledge from fiction, but this single dissent is set against a broader theoretical consensus. In sum, these papers support the hypothesis that fiction evolved in part to serve functions of mental simulation, primarily by enhancing social cognition and functioning as an adaptive tool.

Paper search

Using your research question "Do EP theories support or challenge the hypothesis that fiction evolved as a form of mental simulation?", 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:

- **Evolutionary Psychology Framework**: Does the study examine or apply evolutionary psychological theories in relation to fiction, storytelling, or narrative?
- **Evolutionary Function Analysis**: Does the paper propose or analyze the evolutionary functions or adaptive purposes of fiction?
- **Cross-Cultural Evidence**: Does the study include examination of cross-cultural patterns in fiction consumption or creation?
- **Empirical Evidence**: Does the study include empirical measurements of cognitive or neural responses to fictional narratives?
- **Cognitive Mechanisms**: Does the research investigate mental simulation or cognitive mechanisms specifically in relation to fiction processing?
- **Theoretical Framework**: Does the study include either evolutionary or psychological theoretical frameworks in its analysis?
- **Fiction Focus**: Does the research include analysis of fictional narratives (not exclusively non-fiction)?

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.

- **Type of Theoretical/Analytical Approach**:

  Identify the primary theoretical framework used in the study:

- Evolutionary psychology
- Cognitive science
- Narrative theory
- Interdisciplinary approach
- Other (specify)

Look in the introduction, methodology, or theoretical framing sections. If multiple approaches are used, list them in order of prominence. If the approach is not explicitly stated, infer from the primary theoretical arguments and citations.

- **Specific Hypothesis about Fiction's Evolutionary Function**:

  Extract the precise hypothesis or argument about how fiction might have evolved:

- Mental simulation mechanism
- Adaptive learning tool
- Social cognition enhancement
- Cognitive development
- Other proposed evolutionary function

Locate in the study's main theoretical argument, typically found in introduction or discussion sections. Quote the exact phrasing if possible. If multiple hypotheses are proposed, list all in order of emphasis.

- **Key Mechanisms of Mental Simulation**:

  Identify and describe the specific mechanisms proposed for how fiction supports mental simulation:

- Transportation processes
- Perspective-taking
- Action simulation
- Cognitive modeling
- Emotional engagement

Extract detailed descriptions from methodology, theoretical framework, or discussion sections. Note any empirical or theoretical evidence provided to support these mechanisms.

- **Empirical or Theoretical Support**:

  Categorize the type of evidence used to support the evolutionary fiction hypothesis:

- Cognitive neuroscience data
- Anthropological observations

- Psychological experiments
- Theoretical reasoning
- Comparative evolutionary analysis

Locate in results, discussion, or evidence sections. If multiple types of evidence are used, list in order of significance. Note the strength and nature of the supporting evidence.

- **Potential Challenges to the Hypothesis**:

  Extract any acknowledged limitations or potential counterarguments to the evolutionary fiction hypothesis:

- Alternative explanations
- Gaps in current evidence
- Methodological constraints
- Unresolved theoretical questions

Search discussion, conclusion, or limitations sections. If no explicit challenges are noted, indicate "No challenges explicitly discussed".

Results

Characteristics of Included Studies

Study	Study Type	Research Focus	Theoretical Framework	Key Arguments	Full text retrieved
Boyd, 2017	Theoretical paper	Evolution of stories	Interdisciplinary approach (evolutionary psychology, cognitive science, narrative theory)	Fiction evolved as a form of play, enhancing social cognition and serving as an adaptive learning tool	Yes
Carroll, 2012	Theoretical paper	Biological reality and imaginary lives	Evolutionary psychology	Fiction serves as a simulation of social experiences, enhancing social cognition	No
Currie, 2020	Theoretical paper	Fiction, mentalizing, and planning	Cognitive science, Evolutionary psychology	Challenges the idea that fiction is a good source of knowledge from an evolutionary perspective	No

Study	Study Type	Research Focus	Theoretical Framework	Key Arguments	Full text retrieved
Dubourg and Baumard, 2022	Theoretical paper	Evolution of narrative fictions	Interdisciplinary approach (evolutionary psychology and cognitive science)	Narrative fictions are entertainment technologies that fulfill evolutionary-relevant functions	Yes
Grady, 2020	Review	Evolutionary approaches to narrative	Evolutionary psychology, Cognitive science, Interdisciplinary approach	Fiction may serve as a tool for enhancing social cognition and as an adaptive learning mechanism	Yes
Mar and Oatley, 2008	Theoretical paper	Function of fiction	Narrative theory	Fiction functions as a simulation of social experiences, enhancing social cognition and serving as an adaptive learning tool	Yes
Oatley and Mar, 2005	Theoretical paper	Evolutionary pre-adaptation and character in fiction	Interdisciplinary approach (evolutionary psychology, cognitive science, narrative theory)	Fiction enables mental simulations that enhance social cognition	No
Steen and Owens, 2001	Theoretical paper	Adaptationist model of pretense and entertainment	Evolutionary psychology, Cognitive science	Entertainment, including fiction, relies on cognitive adaptations for pretend play, serving as an adaptive learning tool	No

Study	Study Type	Research Focus	Theoretical Framework	Key Arguments	Full text retrieved
Tooby and Cosmides, 2001	Theoretical paper	Evolutionary theory of aesthetics and fiction	Evolutionary psychology	Fiction serves as a mental simulation mechanism and adaptive learning tool	No
van Krieken, 2018	Theoretical paper	Mental Simulation Model	Interdisciplinary approach (evolutionary psychology and narrative theory)	Narratives enhance survival fitness through mental simulation processes	Yes

Summary of included studies:

- Study Type : 9 theoretical papers and 1 review.
- Research Focus : Each study had a unique research focus, with common themes including evolution of stories, fiction's function, and evolutionary approaches to narrative.
- Theoretical Framework :
  - 5 studies used an interdisciplinary approach
  - 5 studies used evolutionary psychology
  - 3 studies used cognitive science
  - 1 study used narrative theory
  - Some studies used multiple frameworks
- Key Arguments :
  - Enhancing social cognition was mentioned in 5 studies
  - Fiction as an adaptive learning tool was argued in 5 studies
  - Fiction as a simulation was proposed in 4 studies
  - Other arguments (each found in 1 study) included fiction as play, fiction as entertainment technology, and fiction enhancing survival fitness

The included studies were predominantly theoretical in nature, with one review. The research appears to focus on evolutionary and cognitive perspectives on fiction, with a strong emphasis on fiction's role in social cognition and as an adaptive tool.

Thematic Analysis

Fiction as Adaptive Mental Simulation

The majority of the reviewed papers discuss the hypothesis that fiction evolved as a form of mental simulation, serving adaptive functions in human evolution. This theme is evident across multiple studies, with authors proposing various mechanisms through which fiction facilitates mental simulation.

Key points from the papers:

- Boyd (2017) argues that fiction evolved as a form of play, allowing individuals to simulate social experiences and scenarios in a safe environment.
- Mar and Oatley (2008) propose that fiction functions as a simulation of social experiences, providing a deep and immersive simulative experience of social interactions.
- Steen and Owens (2001) present an adaptationist model of pretense and entertainment, suggesting that fiction relies on cognitive adaptations for pretend play. They propose that entertainment, including fiction, evolved because it enabled cheap and plentiful resources to be used to train strategies for events that are rare, dangerous, and expensive.
- Van Krieken (2018) offers a Mental Simulation Model that explains how narratives prepare individuals for potential life-threatening events through mental simulation processes. This model proposes that the design features of narrative (setting, perspective, and action) facilitate various distinctive processes of mental simulation (transportation, identification, and action simulation).
- Currie (2020) challenges the idea that fiction is necessarily a good source of knowledge from an evolutionary perspective. This dissenting view highlights the need for caution in interpreting the adaptive value of fiction and mental simulation.

Social Cognitive Functions

A recurring theme across the studies is the role of fiction in enhancing social cognition. Many authors argue that the mental simulation provided by fiction serves to improve understanding of social interactions, emotions, and others' mental states.

Key points from the papers:

- Carroll (2012) suggests that fiction serves as a simulation of social experiences, enhancing social cognition.
- Oatley and Mar (2005) propose that fiction enables mental simulations that enhance social cognition.
- Mar and Oatley (2008) elaborate on this idea, arguing that engaging in the simulative experiences of fiction literature can facilitate the understanding of others who are different from ourselves and can augment our capacity for empathy and social inference.
- Grady (2020) reviews various evolutionary approaches to narrative, noting that many scholars suggest our thirst for stories stems from evolutionary advantages in social cognition. The paper proposes that narratives provide insight into social situations which aided survival, encouraging perspective-taking, theory of mind, empathy, and intentionality.

Evolutionary Development Pathway

Several papers discuss the evolutionary pathway through which fiction and mental simulation might have developed. These discussions provide context for understanding how fiction could have emerged as an adaptive trait.

Key points from the papers:

- Boyd (2017) presents a coevolutionary model, suggesting that language, narrative, and play evolved together, with fiction emerging as a form of cognitive play that enhanced social understanding and cooperation. This model proposes that the ability to create and engage with fiction built upon pre-existing cognitive capacities for event comprehension, memory, imagination, and communication.
- Oatley and Mar (2005) offer a "staircase of evolutionary pre-adaptations" on which works of literature depend, including systems of mirror-neurons, mimetic ritual, conversational language based on actions,

narrative structure, metaphor, and imaginary play. This perspective suggests that fiction emerged from a series of cognitive adaptations that gradually enabled more complex forms of mental simulation.
- Dubourg and Baumard (2022) propose a novel perspective, suggesting that narrative fictions are best seen as entertainment technologies. They argue that fictions are items crafted by some people to grab the attention of others, with the ultimate goal of fulfilling evolutionary-relevant functions. This view emphasizes the role of cultural evolution in shaping the development of fiction.

Theoretical Integration

Evolutionary Psychology Theory Component	Supporting Evidence	Challenging Evidence	Synthesis
Mental Simulation	Most papers support fiction as a form of mental simulation (e.g., Boyd, 2017; Mar and Oatley, 2008; van Krieken, 2018)	Currie (2020) challenges the idea that fiction is a good source of knowledge	While there is strong theoretical support for fiction as mental simulation, empirical evidence is lacking
Social Cognition Enhancement	Multiple papers argue fiction enhances social cognition (e.g., Carroll, 2012; Grady, 2020; Oatley and Mar, 2005)	No direct challenges, but lack of empirical evidence noted	Consistent theoretical support for social cognition enhancement, but empirical testing needed
Adaptive Learning Tool	Several papers propose fiction as an adaptive learning tool (e.g., Steen and Owens, 2001; Tooby and Cosmides, 2001)	No direct challenges, but variation in proposed mechanisms	General agreement on adaptive learning function, but specifics remain unclear
Evolutionary Development	Various models proposed (e.g., Boyd, 2017; Oatley and Mar, 2005; Dubourg and Baumard, 2022)	Differences in proposed pathways and mechanisms	Multiple plausible evolutionary pathways proposed, but lack of consensus on specifics

The reviewed papers discuss four main components of Evolutionary Psychology (EP) theory related to fiction:

1. Mental simulation : Most papers support fiction as a form of mental simulation
2. Social cognition enhancement : Multiple papers argue that fiction enhances social cognition
3. Adaptive learning tool : Several papers propose fiction as an adaptive learning tool
4. Evolutionary development : Various models are proposed for the evolutionary development of fiction

The papers present some challenges or limitations for each component:

- For mental simulation, one paper challenges the idea that fiction is a good source of knowledge
- For social cognition enhancement, no direct challenges were found, but a lack of empirical evidence was noted
- For adaptive learning tool, no direct challenges were found, but variation in proposed mechanisms was noted

- For evolutionary development, differences in proposed pathways and mechanisms were observed

The synthesis of evidence for each component suggests:

- While there is strong theoretical support for fiction as mental simulation, empirical evidence is lacking
- There is consistent theoretical support for social cognition enhancement, but empirical testing is needed
- There is general agreement on the adaptive learning function of fiction, but specifics remain unclear
- Multiple plausible evolutionary pathways have been proposed, but there is a lack of consensus on specifics

References

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