

# **READING THE MIND**

The Relationship Between Social Cognition  
and Narrative Processing

**Lynn S. Eekhof**

### **International Max Planck Research School (IMPRS) for Language Sciences**

The educational component of the doctoral training was provided by the International Max Planck Research School (IMPRS) for Language Sciences. The graduate school is a joint initiative between the Max Planck Institute for Psycholinguistics and two partner institutes at Radboud University – the Centre for Language Studies, and the Donders Institute for Brain, Cognition and Behaviour. The IMPRS curriculum, which is funded by the Max Planck Society for the Advancement of Science, ensures that each member receives interdisciplinary training in the language sciences and develops a well-rounded skill set in preparation for fulfilling careers in academia and beyond. More information can be found at [www.mpi.nl/imprs](http://www.mpi.nl/imprs)

**ISBN:** 978-94-6469-727-8

**Design by:** Bregje Jaspers | [ProefschriftOntwerp.nl](http://ProefschriftOntwerp.nl)

**Printed by:** ProefschriftMaken | [www.proefschriftmaken.nl](http://www.proefschriftmaken.nl)

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and Narrative Processing

Proefschrift ter verkrijging van de graad van doctor  
aan de Radboud Universiteit Nijmegen  
op gezag van de rector magnificus prof. dr. J.M. Sanders,  
volgens besluit van het college voor promoties  
in het openbaar te verdedigen op  
maandag 15 januari 2024  
om 14.30 uur precies

door

Lynn Suzanne Eekhof  
geboren op 8 juni 1993  
te Groningen

**Promotor:**

Prof. dr. J.M. Sanders

**Copromotoren:**

Dr. R.M. Willems (Sociaal en Cultureel Planbureau)

Dr. K.W.M. van Krieken

**Manuscriptcommissie:**

Prof. dr. H.H.J. Das

Prof. dr. P.C.J. Segers

Prof. dr. J.A.L. Hoeken (Universiteit Utrecht)

Dr. M.J. van Duijn (Universiteit Leiden)

Dr. J.K. Kaakinen (Turun Yliopisto, Finland)

Voor Yente

*Jij kent van wat ik schrijf de achterkant*  
(Willem Wilmink)

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# Chapter 1

Introduction



Among the most wanted superpowers, such as invisibility and the power to fly, is the ability to read other people's minds. From *Star Wars*, to *Harry Potter*, to *Stranger Things*, pop culture features many characters who impress us with their capacity to access the minds of other people with their technological or supernatural powers. And yet, as fantastical as telepathy might seem, humans have in fact developed a broad repertoire of behaviors and skills that allow us to come to an understanding of what other people think and feel. We rely on a range of mindreading or social-cognitive abilities, such as empathy, emotion recognition, and perspective taking, that allow us to make sense of others based on their behavior and navigate the social world accordingly (Fiske & Taylor, 2013).

We do not only use our social-cognitive abilities to understand the thoughts, intentions, and emotions of others in the here-and-now, however. We can also put these abilities to work to understand the past experiences of others. By listening to the stories people tell us, we are invited to take someone else's perspective and live past events from their point of view. In the course of evolution, we have not only learned to share personal stories in social settings, but also to tell carefully constructed stories in writing, such as in books, magazines, and newspapers. These stories allow us to extend our perspective-taking abilities from the people in our direct surroundings to people that are physically and culturally far removed from us or do not even exist, as in the case of fictional stories. In other words, written stories, as studied in this dissertation, allow us to quite literally "read the minds" of a wide range of others.

Given that social-cognitive abilities seem to play a role in both navigating the real social world and in reading narratives, the question rises whether social cognition and narratives are somehow related, or, put more precisely, whether the capacity to read minds is related to the capacity to read narratives. For example, does reading about the minds of others in narratives help improve the real-life mindreading skills of adults? And, reversing the question, do existing differences in the mindreading skills of adults affect the way they are able to engage with the minds presented in narratives? Taken together: how do social-cognitive abilities and the processing of narratives impact each other? These are the questions that are central to the research presented in this dissertation.

In what follows I will first discuss the conceptual background of the two central phenomena in these questions: the reading of minds (social cognition) and the reading of narratives. I will then contextualize these questions by discussing previous literature on the possible bidirectional relationship between social cognition and narrative processing, drawing both from psychological, philosophical, linguistic, and developmental literature. Finally, I will outline the approach used in this dissertation and introduce the studies I have conducted to explore these issues.

## 1.1 Reading Minds

Social cognition is an overarching term used in social psychology and the philosophy of mind to refer to the various processes and skills people use to successfully navigate the social world (Fiske & Taylor, 2013; Frith, 2008). Among these processes are two central concepts that have received most attention both in theoretical and empirical literature: 1) mindreading, also known as Theory of Mind (ToM), mentalizing, or folk psychology, and 2) empathy. As these concepts form the basis for the social-cognitive abilities that I will explore in this dissertation, I will now give a brief overview of the literature on mindreading and empathy.

### 1.1.1 Mindreading

Generally speaking, mindreading refers to the ability to understand the mental states (e.g., thoughts, beliefs, intentions, desires) of other people and make sense of their behavior accordingly (Apperly, 2010; Frith & Frith, 2006). Somewhat confusingly, the terminology used to refer to this ability as well as its conceptualization differs between fields. For example, within developmental psychology, a child is argued to have a “Theory of Mind” when she understands that other people can hold false beliefs (e.g., understanding that another person believes an object to be in location X, even though I know the object to be in location Y; Dennett, 1978). This capacity is traditionally thought to emerge around the age of four in typically developing children, although more recent experimental designs seem to suggest that infants as young as one year old might have a theory of mind (Baillargeon et al., 2010). In a broader sense, the labels ToM, mindreading, or mentalizing are also used to refer to the overall ability to infer mental states and predict behavior, which develops and matures from early infancy to adolescence (Kilford et al., 2016) and is used throughout the lifespan to navigate the social world. Interestingly, however, not much research has focused on individual differences in mindreading abilities beyond early childhood, even though most people have an intuition that not everyone is equally talented in understanding others’ minds (Bukowski & Samson, 2017; Kilford et al., 2016). Finally, within the field of the philosophy of mind, the terms folk psychology (Botterill, 1996; R. M. Gordon, 1986) or intentional stance (Dennett, 1987) are sometimes used to refer to our ability or tendency to attribute mental states to others.

Not only the terminology to refer to these abilities but also the mechanism by which these abilities function is a topic of debate. Roughly three theories on the way we gain an understanding of others’ minds can be distinguished. According to “Theory Theory” mindreading is a form of rule-based reasoning. Theory Theory argues that we make inferences about others’ mental states and seek to explain their behavior based on a theory-like set of rules or generalizations about human behavior (e.g., Botterill, 1996; Gopnik & Meltzoff, 1997).

On the other hand, Simulation Theory argues that rather than using theoretical knowledge about the minds of others, we use our own mind as a model to simulate the mental states of others (e.g., Gallese & Goldman, 1998; R. M. Gordon, 1986, 1996). Although various versions of Simulation Theory exist, the main idea is that we employ our imaginative and mirroring capacities to simulate how we would think or act if we were in the metaphorical shoes of the other. According to Simulation Theory, mindreading thus relies on a form of perspective taking, the ability to deprioritize our own visual or mental perspective to see the world from the perspective of someone else (Bukowski & Samson, 2017). Finally, Interaction Theory, rooted in embodied theories of cognition, opposes the term “mindreading” altogether, arguing that it wrongly presupposes the existence of “hidden states” that others need to gain access to through intellectual processes. Instead, Gallagher (2001, p. 90) suggests that mindreading is more like “body reading”, in that we can directly perceive the beliefs and intentions of others through their movements, gestures, facial expressions, and posture (see also Gallagher, 2015).

More recently, scholars have argued for a pluralist account that integrates both cognitivist views, rooted in Theory Theory and Simulation Theory, and embodied views of mindreading, rooted in Interaction Theory (e.g., Andrews et al., 2021; Gallagher, 2015). As such, the three theories outlined above are not necessarily mutually exclusive, but all shed light on possible, co-existing mechanisms underlying the ability to understand others.

### 1.1.2 Empathy

Whereas mindreading often refers to the process of inferring propositional mental states (i.e., thoughts, beliefs, intentions, desires; Goldman & Sripada, 2005), the term empathy is traditionally used to refer to the way in which we engage with others’ emotions.<sup>1</sup> Empirical studies indeed suggest that the ability to engage with the propositional mental states of other can be dissociated from the ability to engage with the emotions of others (Healey & Grossman, 2018; Shamay-Tsoory & Aharon-Peretz, 2007). Note that although empathy often has connotations of kindness and prosocialness, most philosophical and psychological accounts view empathy first and foremost as a neutral way of gaining knowledge about the emotions of others.

Like mindreading, empathy has been described in the literature as a process that relies on simulation, reconstruction, and/or embodiment. For example, de Vignemont and Singer (2006) describe empathy as the sharing of an affective state “elicited by the observation or imagination of another person’s affective state” (p. 435), all the while being aware this affective state originates in the other. This last requirement distinguishes empathy from

1 Note, however, that some scholars use the term ‘cognitive empathy’ to refer to the ability to infer both the mental states and emotions of others, and ‘emotional empathy’ to refer to the vicarious sharing of emotions (Dvash & Shamay-Tsoory, 2014).

emotional contagion, which occurs when we unconsciously adopt the emotions of another person (Goldie, 1999).

Others have argued that empathy does not only rely on automatic processes such as simulation but also on more effortful reconstructive processes or rule-based reasoning (e.g., Goldman, 2011). Finally, in line with conceptualizations of mindreading as proposed by Interaction Theory, empathy has also been defined as an embodied process in which we directly experience or perceive the emotions of others through their “bodily and behavioral expressions” (Zahavi, 2008, p. 522).

In addition, empathy is sometimes used as an umbrella term that refers to a wider range of processes and abilities (Batson, 2009). This is partly due to the fact that the term “empathy” has had different meanings in different fields and in different times (for a historical overview, see Pinotti & Salgado, 2019). For example, empathy is also closely related to, and sometimes used interchangeably with empathic accuracy or emotion recognition, i.e., the ability to correctly identify which emotion someone is experiencing (Ickes, 2011; Ta & Ickes, 2017), or personal distress, the feeling of stress induced by observing the negative emotions of others (Batson, 2009). Finally, it is important to note that the term empathy is sometimes used to refer to processes or behaviors that could be called downstream consequences of empathy in a strict sense, such as prosocial or altruistic behavior (Goldman, 2011), or empathic concern, the tendency to feel concern or care for others in response to their emotional experiences (M. H. Davis, 1983).

Figure 1.1 visualizes the conceptualization of social cognition that is the basis for the work in this dissertation. In sum, social cognition is understood as an overarching concept that refers to the various skills we have “to make sense of other people” (Fiske & Taylor, 2013, p. 1). Different theories exist about the underlying abilities and processes that make up the social-cognitive skill set. Although terminology can be rather untransparent, in general, a distinction can be made between processes that target others’ propositional mental states (i.e., thoughts, beliefs, desires), which I will refer to as mindreading-related abilities (left side of Figure 1.1), and processes that target others’ affective mental states (right side of Figure 1.1; Healey & Grossman, 2018; Shamay-Tsoory & Aharon-Peretz, 2007), which I will refer to as empathy-related abilities. As described above, scholars have identified various means by which we can gain an understanding of these mental states, for example through effortful rule-based reasoning, subconscious simulation or perspective taking, or through embodied perception. More recently, hybrid accounts that argue we use a combinations of these different means depending on the context have gained popularity (e.g., Andrews et al., 2021; de Vignemont, 2009; Gallagher, 2015; Goldman, 2011). In line with these accounts, I will study a wide range of social-cognitive abilities in this dissertation, working under the assumption

that these different abilities work alongside each other to create an understanding of other people, and that these different abilities are potentially all related to narrative processing (Mar, 2018). Throughout the dissertation, I will refer to social-cognitive abilities or social cognition in general, unless more concrete claims about specific abilities are justified. Finally, beyond the theorizing about what social cognition is and how it functions, lies the more practical question of how we can measure social-cognitive abilities in neurotypical adults (see lower part of Figure 1.1). The considerations and justifications regarding the measurements used in this dissertation are discussed in Box 1.

### **Box 1. Assessing Social-Cognitive Abilities in Neurotypical Adults**

Measuring individual differences in social-cognitive abilities between neurotypical adults is notoriously difficult. Most tasks that tap into, for example, mindreading skills, have been developed in a clinical or developmental context and are therefore unsuitable for use with neurotypical adults. Many of these tests are benchmark tests (e.g., false-belief test; Wimmer & Perner, 1983) that measure whether someone is able to understand that others can hold false beliefs or not, and are thus unfit to measure subtle individual differences. Other tests suffer from severe ceiling effects when used outside of their clinical or developmental domain (e.g., basic emotion recognition; Turner & Felisberti, 2017).

An example of a measure that is often used but potentially suffers from ceiling effects when used with neurotypical adults is the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001). For this test, participants are presented with pictures of eyes accompanied by a list of four possible emotions. Participants have to select the word that they believe best matches the emotion expressed in the picture. Recently, however, the RMET has been shown to have poor sensitivity (Black, 2019) as well as poor internal consistency and homogeneity (Olderbak et al., 2015) in a neurotypical adult population. It is also unclear exactly what aspect of social cognition it measures (Oakley et al., 2016). Scores on the RMET correlate strongly with participants' verbal IQ, suggesting that it is not a pure measure of social-cognitive abilities (Peterson & Miller, 2012).

Given the issues described above, I have decided to rely on the following combination of behavioral measures, which I selected after careful review of the available but relatively unknown measures, and self-report measures:

#### **Interpersonal Reactivity Index (IRI)**

The Interpersonal Reactivity Index is a validated self-report questionnaire that has been developed to measure individual differences in empathy (Davis, 1983). It consists of four subscales. The Empathic Concern subscale measures participants' tendency to experience concern or care for others (e.g., *When I see someone being taken advantage of, I feel kind of protective towards them*). The Fantasy subscale reflects an inclination to be immersed in fictional worlds (e.g., *When I watch a good movie, I can very easily put myself in the place of a leading character*). The Personal Distress subscale measures the tendency to break down in emotionally tense situations (e.g., *I sometimes feel helpless when I am in the middle of a very emotional situation*). Finally, the Perspective Taking scale reflects participants' ability to take the perspective of others (e.g., *Before criticizing somebody, I try to imagine how I would feel if I were in their place*).

**Box 1. Assessing Social-Cognitive Abilities in Neurotypical Adults (continued)**

All subscales of the IRI have been related to aspects of emotional intelligence (De Corte et al., 2007). In addition, the Perspective Taking subscale has been related to several measures of emotion recognition (Israeleshvili et al., 2019). Nevertheless, questions have been raised about the degree to which the IRI can be seen as a true measure of empathy (Baldner & McGinley, 2014). For example, both empathic concern and personal distress could be seen as behavioral consequences of empathy, rather than aspects of empathy in a narrow sense. Furthermore, it is debatable to what extent fantasy can be seen as a part of empathy. Nevertheless, all subscales of the IRI can be argued to tap into various aspects of the broader category of social cognition. The IRI is therefore used in Chapters 5 and 6.

**Basic Empathy Scale (BES)**

To address the criticism on the IRI, the validated Basic Empathy Scale (Jolliffe & Farrington, 2006) was added as an additional self-report measure of empathy in Chapter 6. The structure of the BES is more in line with recent conceptualizations of empathy as relying both on a more automatic, mirroring route as well as a more effortful, reconstructive route (e.g., Goldman, 2011). The BES consists of two subscales. The Affective Empathy subscale reflects the tendency to share emotions with others (e.g., *I get caught up in other people's feelings easily*), whereas the Cognitive Empathy subscale reflects the ability to understand what others feel (e.g., *I can often understand how people are feeling even before they tell me*).

Both subscales have been found to be related to measures of mindreading (Čavojská et al., 2012). The Cognitive Empathy subscale has also been reported to have a negative relationship with experiences of alexithymia, the inability to express feelings in words (Jolliffe & Farrington, 2006).

**Spontaneous Theory of Mind Protocol (STOMP)**

The Spontaneous Theory of Mind Protocol is a relatively new behavioral measure that operationalizes mindreading as the tendency to provide spontaneous explanations for the behavior of others in terms of their mental states (Rice & Redcay, 2015). Participants are asked to watch two videos of about three minutes and give a description of what they have seen in seven to ten sentences. Both videos are muted scenes from existing Hollywood movies that feature complex social interactions. A score is calculated for each participant by chunking their responses and taking the percentage of chunks that contain descriptions of the thoughts, beliefs, intentions, and emotions of the characters. STOMP scores correlate with the cortical thickness of brain areas that are a part of the Theory of Mind network (Rice & Redcay, 2015). Importantly, the STOMP has been shown to be sensitive enough to pick up on individual differences between neurotypical adults (Rice & Redcay, 2015; Warnell & Redcay, 2019). The STOMP is used in Chapters 5 and 6.

**Multifaceted Empathy Test (MET)**

The Multifaceted Empathy Test is a measure of both affective or emotional empathy, i.e., the tendency to share the emotions of others, and cognitive or reconstructive empathy, i.e., the ability to correctly understand which emotion someone is feeling. Emotional empathy is measured by showing participants pictures of people experiencing various emotions, and asking them to rate the degree to which they feel similar to the person in the picture. Cognitive empathy is measured by showing the same pictures and asking participants to identify which emotion the person in the picture is experiencing by choosing from a list of four possible options. Although the MET has been developed



**Box 1. Assessing Social-Cognitive Abilities in Neurotypical Adults (continued)**

to test the empathic abilities of people with an autism spectrum disorder diagnosis, I did not expect to observe ceiling effects, especially in the emotional empathy trials because these trials measure the ability and tendency to engage with the emotions of others on a continuum, rather than asking for a correct answer. Scores on the emotional empathy trials of the MET have been found to correlate with scores on the Empathic Concern subscale of the IRI (Dziobek et al., 2008; Foell et al., 2018). The MET is used in Chapters 5 and 6.

**Visual Perspective-Taking Task (VPT)**

The Visual Perspective-Taking Task is a behavioral measure of perspective-taking abilities. In this task, participants see pictures of a room with an avatar in it and are asked to verify as quickly as possible how many dots are visible on the walls of the room either from their own perspective or the perspective of the avatar. Two measures can be extracted from this task: the degree to which participants were slowed down by their own conflicting perspective when taking the perspective of the avatar (egocentric intrusion) and the degree to which participants were slowed down by the avatar's conflicting perspective when taking their own perspective (altercentric intrusion). Although strictly speaking the VPT is a measure of visual perspective taking, altercentric intrusion scores have been linked to both lower general IRI scores (Mattan et al., 2016), and higher Empathic Concern and Perspective Taking scores (Nielsen et al., 2015), suggesting that visual perspective taking is related to social cognition. As the VPT relies on reaction times, I was unable to implement it in the study reported in Chapter 6, which was carried out online due to the COVID-19 pandemic. As a result, the VPT is only used in Chapter 5.

## 1.2 Reading Narratives

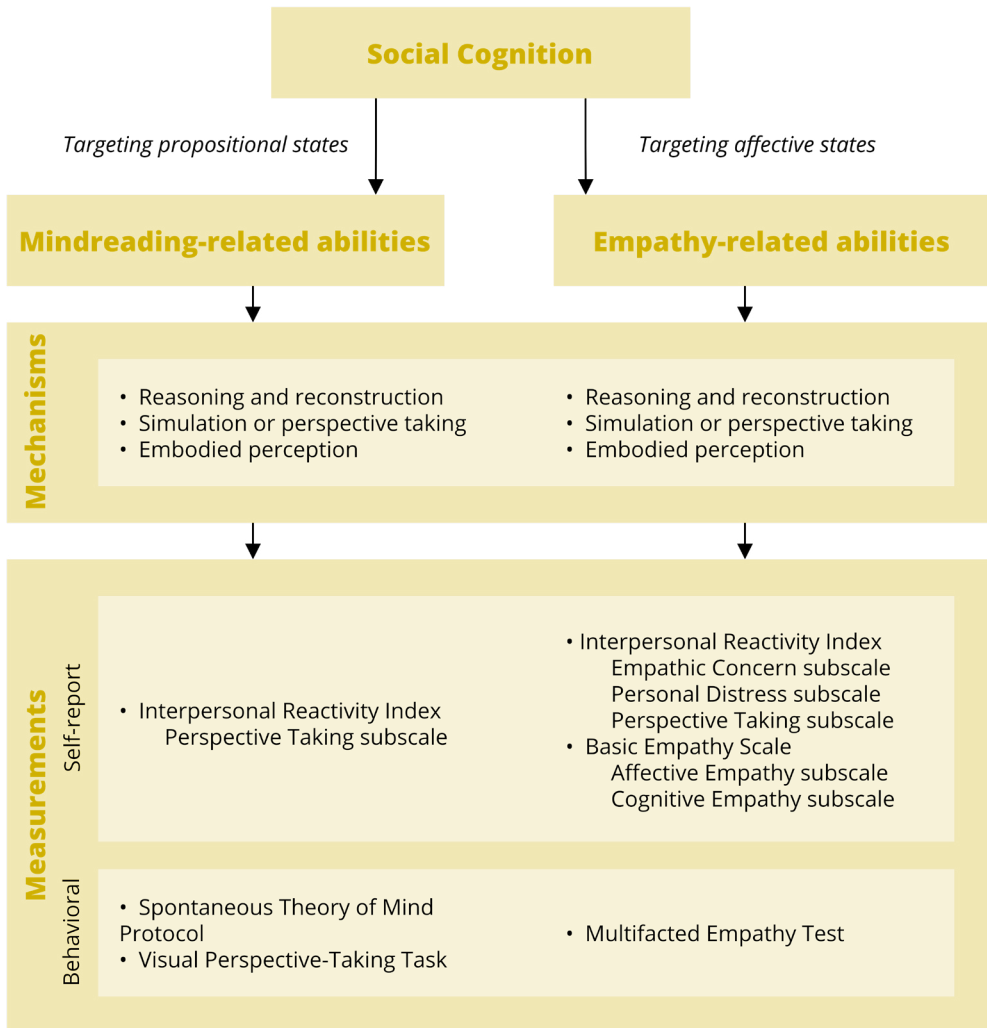
### 1.2.1 Narrative

As humans we find ourselves surrounded by narratives on a daily basis: from the stories we tell each other in social settings to the novels, series, and podcasts we choose to spend our free time with. However, defining exactly what a narrative is, is not straightforward. Basic definitions often describe narratives as representations of series of events (Rudrum, 2005; Ryan, 2007). For example, Toolan (2001, p. 6) gives the following minimalist definition: "a perceived sequence of non-randomly connected events". More elaborate definitions argue that what sets narratives even further apart from other types of discourse, such as expositions, is the fact that a narrative representation of events also assumes the presence of a "subject of consciousness", that is, a character (or narrator)<sup>2</sup> who experiences these events (J. Sanders & Redeker, 1993). For example, M. Bal (2009, p. 5) defines narrative as a representation of "a series of logically and chronologically related events that are caused or experienced by actors". Similarly, Ryan (2007, p. 29) gives the following condition for a

2 Since the narratives used in this dissertation are all narrations in which only the viewpoints of characters or character-narrators (as in first-person narration) are expressed, I will henceforth only refer to 'characters'. However, in all of these cases, one can also read 'characters, character-narrators, and/or narrators'.

narrative: “Some of the participants in the events must be intelligent agents who have a mental life and react emotionally to the states of the world”. These extended definitions make it clear that narratives are inherently social, since they are first and foremost “about human experience” (Ryan, 2007, p. 24; but see Trompenaars et al., 2018 for a discussion of narratives that feature nonhuman experiencers). Consequently, psychological realism is a defining feature for narratives, rather than whether the narrative events and characters are grounded in external reality (nonfictional) or not (fictional; Koopman & Hakemulder, 2015; Mar & Oatley, 2008; Oatley, 1999).

**Figure 1.1** The Conceptual Model of Social Cognition Used in This Dissertation



On a final note, a long line of research connects *written* narratives, specifically, to social cognition (Koopman & Hakemulder, 2015), because compared to audiovisual narratives, they require a more active form of engagement on the side of the reader (Green et al., 2008), which in turn is argued to increase the beneficial effects of narratives (Barnes, 2018). In line with this tradition, the focus of this dissertation will also be on print narratives. Another reason for studying such narratives is that they are easily accessible for a broad audience in daily life, and thus provide an ecologically valid context for studying the impact of narratives on social cognition. An additional advantage of studying print narratives is that they are easy to present to participants and more suitable for potential textual manipulations. More specifically, I have chosen to study the effects and processing of narratives written by professional writers that have been published and are available for a broad audience (Table 1.1). This not only ensures the quality of these narratives but also their accessibility and appeal for the neurotypical adult participants involved in the research. Although previous research on the link between narratives and social cognition has often focused on literary fiction, I argue that narrativity, rather than the literary quality or fictional nature of the narrative, is the determining feature in this relationship (see also Koopman & Hakemulder, 2015 and Chapter 3). As such both works of narrative fiction, some of which could be deemed popular and some of which could be deemed literary (Chapter 4 and 6), and journalistic narratives (Chapter 5) were used in the empirical studies of this dissertation. To sum up, in this dissertation a narrative refers to a publicly available written text that represents a sequence of connected events experienced by a character (or in some cases multiple characters). An overview of the specific narratives used in the chapters of this dissertation and their characteristics can be found in Table 1.1.

### **1.2.2 Linguistic Viewpoint and Perspective Taking**

In line with the definition given above, one can argue that narratives are by definition perspectivized or viewpointed, that is to say that the narrative events are always grounded in the perspective or viewpoint of an experiencing character (van Krieken & Sanders, 2022; Vandelanotte, 2017). Viewpoint is a multidimensional phenomenon. First, narrative characters are always situated in a specific time and place. This dimension of viewpoint is sometimes called spatiotemporal or deictic viewpoint (van Krieken et al., 2017; Vandelanotte, 2017). In addition, readers may also gain access to the internal or cognitive viewpoint of the experiencing characters, such as their perceptions, thoughts, beliefs, and intentions, or emotions (van Krieken & Sanders, 2022; Vandelanotte, 2017). In other words, the events in a narrative are not only related to the spatiotemporal standpoint of a character but can also be filtered through their internal viewpoints (J. Sanders, 1994; J. Sanders & Redeker, 1993).

Viewpoint can be realized linguistically by various means and on multiple levels of the text, such as text-global manipulations of narrative voice (first vs. second vs. third person pronouns), local shifts in verb tense, or the use of free indirect discourse (e.g., J. Sanders

& Redeker, 1993; J. Sanders & van Krieken, 2019; Vandelanotte, 2017). According to the Linguistic Cues Framework by van Krieken et al. (2017), various dimensions of internal viewpoint can also be expressed by more local means, such as lexical markers. For example, a narrative can express what a character perceives (perceptual viewpoint) with the use of verbs of perception such as *to see* or *to smell*. The use of verbs of cognition such as *to think* or *to want* or epistemic adverbs such as *maybe*, on the other hand, mark what a character thinks, believes, or wants (cognitive viewpoint). Finally, what a character feels (emotional viewpoint) can be expressed by emotion verbs and adjectives such as *to love* or *excited*. Narratives that explicitly mark the internal viewpoint of its characters by means of these lexical markers, or other viewpoint techniques such as thought reports, are sometimes called internally focalized or invasive narratives (Niederhoff, 2013a; van Krieken & Sanders, 2022). An externally focalized or demonstrative narrative, on the other hand, focuses on the externally observable actions of characters but does not explicitly mark the perceptions, thoughts, and emotions of these characters. In such cases, the reader needs to infer the internal viewpoint based on descriptions of the behavior of the characters.

To sum up, narratives are by definition viewpointed because they presuppose the presence of an experiencing character. However, narratives may vary in the degree to which the viewpoints of these experiencing characters are linguistically explicitly marked, especially in the case of internal viewpoint. This is further explored in Chapters 2, 5, and 6.

Narrative viewpoint does not only have a linguistic aspect but also a psychological aspect. Because of the viewpointed nature of narratives, readers are invited to enter the minds of the characters and take their perspective. This process will be referred to as perspective taking (see also Bortolussi et al., 2018). What the relationship is between the linguistic expression of viewpoint and the psychological process of perspective taking is a relatively unexplored question. According to the Linguistic Cues Framework by van Krieken et al. (2017), linguistic markers of viewpoint, such as the ones mentioned above, invite readers to take the perspective of the character whose viewpoint is cued and align their own viewpoint with the relevant viewpoint dimension of that character. However, especially in the case of internal viewpoint, it is likely that readers may differ in the degree to which they take up this invitation and engage in perspective taking. Conversely, it is unlikely that internal perspective taking fully relies on the explicit linguistic marking of viewpoint. Some readers might have a tendency to take the perspective of a character regardless of the degree to which texts contain linguistic viewpoint markers. In such cases, the implied presence of an experiencing character is enough of a cue to engage in perspective taking (see also van Duijn et al., 2015). Nevertheless, individual differences between readers aside, a case can be made that the presence of lexical markers of perceptual, cognitive, and emotional viewpoint offer readers an entrance into the minds of characters and as such promote perspective taking. In line

with this idea, van Duijn and Verhagen have argued that reading a narrative can ultimately “be seen as a form of mindreading in which linguistic cues guide the inferential process” (2019, p. 207).

When perspective taking is established, it can lead to various forms of engagement with narrative characters. For example, alignment with a character’s emotional viewpoint may lead to experiences of narrative empathy, sympathy, or empathic concern (Coplan, 2004; Keen, 2006, 2007; Zillmann, 1995). The term identification, on the other hand, is usually reserved for situations in which readers take over the cognitive and perceptual perspective of characters, by aligning their own thoughts, beliefs, and perceptions with those of the character (Cohen, 2001, 2008). A handful of empirical studies suggests that character engagement is facilitated by linguistic viewpoint techniques but has not looked at the role of individual differences in perspective taking between readers (e.g., de Graaf et al., 2012; Habermas & Diel, 2010; van Peer & Pander Maat, 2001).

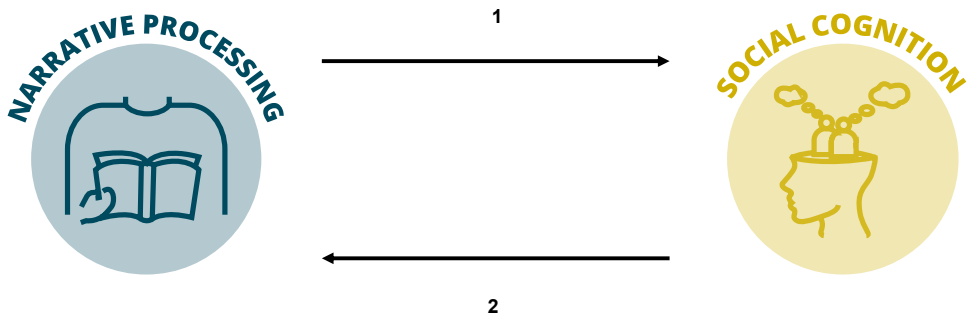
**Table 1.1** Narratives and Expository Texts Used in This Dissertation

Title	Author	Year of publication	Published in	Genre	Grammatical perspective	Number of words	Chapter
Excerpts from Het Byzantijnse Kruis ("The Byzantine Cross")	A.F.Th. van der Heijden	2008	Book	Literary short story	First person	38 (full text: 5136)	Chapter 2
Bij de groenteafdeling ligt een man. Hij bloedt uit zijn zij ("A man is lying near the produce aisle. He is bleeding from his side")	Bart Funnekotter & Joke Mat	2011	Newspaper	Journalistic narrative	Third person	1216	Chapter 2
Excerpts from the Corpus of Spoken Dutch	-	2000	Online corpus	Oral narrative	First person	86 (full text: 367)	Chapter 2
The Paris Apartment	Lucy Foley	2022	Book (chapter)	Narrative fiction (suspense)	First and third person	1645	Chapter 4
The Seven Husbands of Evelyn Hugo	Taylor Jenkins Reid	2017	Book (chapter)	Narrative fiction (romantic)	First person	2200	Chapter 4
The House in the Cerulean Sea	T.J. Klune	2020	Book (chapter)	Narrative fiction (fantasy)	Third person	2130	Chapter 4
The Personal Librarian	Marie Benedict	2021	Book (chapter)	Narrative fiction (historical)	First person	2041	Chapter 4
The Hidden Life of Trees	Peter Wohlleben	2015	Book (chapter)	Expository nonfiction (control)	Third person	2109	Chapter 4
Potato: A Global History	Andrew F. Smith	2011	Book (chapter)	Expository nonfiction (control)	Third person	1840	Chapter 4
Prisons Make Us Safer And 20 Other Myths About Mass Incarceration	Victoria Law	2021	Book (chapter)	Expository nonfiction (control)	Third person	2285	Chapter 4
Buzz, Sting, Bite	Anne Sverdrup-Thygeson	2019	Book (chapter)	Expository nonfiction (control)	Third person	1810	Chapter 4
Waar was Joske gebleven? ("Where did Joske go?")	Paul Teunissen	2015	News magazine	Journalistic narrative	Third person	5077	Chapter 5
De Invaller ("The Substitute")	René Appel	2003	Newspaper	Literary short story	Third person	713/875	Chapter 6
Koorddanser ("Tightrope walker")	Jasmijn Kam	2019	Literary website	Literary short story	Third person	1048/1198	Chapter 6

### 1.3 How Are Narratives and Social Cognition Related?

If reading narratives can ultimately be seen as “a form of mindreading” (van Duijn & Verhagen, 2019, p. 207) in which narrative viewpoint invites readers to engage with the minds of characters, the question rises whether the ability to read the minds of others in real life is somehow related to the ability to read narratives and engage with fictional minds, and vice versa. Various scholars have indeed proposed that mindreading abilities and the exposure to and processing of narratives are positively related. One line of thought connects the two by proposing that if reading narratives is a form of mindreading, frequent exposure to narratives should increase our mindreading abilities (e.g., Mar, 2018) because narratives provide an opportunity to train these abilities (see Arrow 1 in Figure 1.2). Another line of thought proposes that if reading narratives is a form of mindreading, our mindreading abilities should facilitate narrative processing (e.g., Dore et al., 2018; see Arrow 2 in Figure 1.2). I will now unpack these two questions one by one.

**Figure 1.2** The Bidirectional Relationship Between Narrative Processing (Left) and Social Cognition (Right)



#### 1.3.1 From Reading Narratives to Reading Minds: How Does Exposure to Narratives Impact Social Cognition?

A quick survey of some of the theoretical and empirical literature on the role of narratives in social cognition reveals several lines of thought on *why* exposure to narratives would affect social cognition throughout the lifespan. Narratives have always been considered an important tool for learning. For example, Boyd (2009) argues that storytelling is an adaptation that has allowed us to transcend the here-and-now and learn from the experiences of others, fostering the development of social cognition throughout evolutionary history. Similarly, scholars have argued that narratives do not only play an important role in the social-cognitive development of human beings as a species but also in the development of social cognition in childhood and beyond (e.g., Hutto, 2008; Mar & Oatley, 2008; Nussbaum, 1995).

The most comprehensive theory on the possible impact of narratives on social cognition is outlined in Mar's (2018) SPAcEN framework. This framework builds on the simulation account of narratives, which states that narratives can be seen as simulations of the social world that "evoke experiences akin to the real-world" (Mar, 2018, p. 455; Mar & Oatley, 2008). According to the SPAcEN framework, the construction and processing of these social simulations requires the use of the same social-cognitive abilities we use in daily life. Consequently, frequent exposure to narratives repeatedly engages and thus trains these abilities over time.

Additionally, the SPAcEN framework argues that narratives might also hone social cognition by transmitting social knowledge or shared values, such as universal truths about people, personal insights that readers can apply to their own lives (Oatley, 1999b), or the content of social schemas (Mar, 2018). This is particularly the case because narratives can broaden our horizon beyond the familiar contexts we experience in our daily lives (e.g., Nussbaum, 2001). As a result we might find ourselves in situations we would probably never encounter in real life, and gain access to the minds of people we are unlikely to meet in the real world. In line with Social Cognitive Theory, which posits that we can learn from observing both real-life and fictional others (Bandura, 2001), these fictional others can model certain behaviors, values, or information that might benefit social cognition. Moreover, these narrative encounters do not come with the consequences that "real-life" experiences are often accompanied by, leading some to compare narratives to a social laboratory or thought-experiment (Hakemulder, 2000; Koopman & Hakemulder, 2015) in which readers are safeguarded by so-called protective fictionality (Keen, 2007).

Finally, a case can be made that narratives foster social cognition through a positive impact on language abilities, especially in early childhood. Both narratives (Dyer et al., 2000; Schwering et al., 2021) and conversations about narratives often feature mental state concepts, such as verbs of cognition (*to think, to want*) or descriptions of emotions (*happy, relief*; Adrian et al., 2005; Ruffman et al., 2002). Since both comprehension of mental state terms specifically (Antonietti et al., 2006; Grazzani & Ornaghi, 2012; Moore et al., 1990; Ornaghi & Grazzani, 2013), and language ability in general (e.g., Milligan et al., 2007) have been found to be correlated to mindreading performance, (shared) narrative reading might also contribute to children's social-cognitive ability through a positive effect on linguistic abilities (Mol & Bus, 2011).

Encouragingly, there is some empirical evidence that frequently reading narratives is associated with increased social-cognitive performance. Shared book reading during early childhood predicts social-cognitive development (Aram & Aviram, 2009; Rose et al., 2018) and reading fiction for pleasure is a positive predictor of social adjustment later in childhood (H. W. Mak & Fancourt, 2020). Moreover, lifelong exposure to narratives is associated with



better performance on various measures of empathy and mindreading in adults (Mar et al., 2006, 2009; see Mumper & Gerrig, 2017 for a meta-analysis).

In order to explore whether these relationships are truly reflective of a direct and causal effect of narrative exposure on social cognition, another line of research has explored the idea that not only repeated exposure but also a single brief exposure to narratives might boost social-cognitive performance. The reasoning for this type of research is usually based on the idea of priming. The rationale is that reading even a single narrative engages social-cognitive abilities and thus makes these abilities more easily available afterward, (temporarily) boosting performance on measures of social cognition (e.g., Kidd & Castano, 2013). Although some studies have found that those who have been exposed to a piece of literary fiction outperform those who have been exposed to a piece of popular fiction, an expository text, or those who did not receive any text on several measures of mindreading (e.g., P. M. Bal & Veltkamp, 2013; Black & Barnes, 2015b; Kidd & Castano, 2013; Pino & Mazza, 2016; van Kuijk et al., 2018), results of experiments that test the direct effect of reading a narrative on social cognition are decidedly mixed (see e.g., Camerer et al., 2018; Lenhart & Richter, 2022; Panero et al., 2016; Quinlan et al., 2022; Samur et al., 2018). As I will further explore in Chapter 3, there are both theoretical and empirical concerns with these studies. First, there is a lack of fully-developed theorizing about the effect of a single brief exposure to narratives on social cognition (Mar, 2018). Second, studies thus far have often not taken into account individual differences between readers, the effects of specific text characteristics, and the fact that more social-cognitive abilities than just mindreading and empathy might be impacted by narratives. Instead, brief exposure studies seem to tacitly assume that a brief exposure to any narrative should affect the same aspects of social cognition in all types of readers. This might have obscured possible effects and given rise to the mixed findings.

In sum, narratives have been argued to provide us with the ability to engage with the minds of others and, consequently, opportunities to train our social-cognitive abilities, infer useful social knowledge about these minds during reading, talk about the social world, and learn the linguistic concepts needed to do so. The empirical literature to back up these claims is decidedly mixed, however, with correlational and longitudinal studies providing indirect evidence that narratives impact social cognition and results that are hard to interpret from experiments investigating the direct effect of narratives on social-cognitive performance. This line of research, the remaining open questions and unexplored issues around the effect of narratives on social cognition will be further discussed in Chapter 3.

### **1.3.2 From Reading Minds to Reading Narratives: How Does Social Cognition Impact the Processing of Narratives?**

More recently, scholars have suggested that the relationship between narratives and social cognition is not unidirectional and that social cognition also influences how readers process narratives. However, this direction of the relationship between narratives and social cognition has received relatively little attention compared with the other direction of the relationship discussed in Section 1.3.1. As outlined above, narratives are textual representations of a series of connected events experienced by one or more minds. Keeping track and making sense of these minds during reading is thus a crucial aspect of narrative processing. The idea that social-cognitive abilities therefore facilitate narrative processing has especially received attention in research on emergent reading comprehension. It is argued that social-cognitive abilities aid children in understanding narrative characters and their behavior (Atkinson et al., 2017; Dore et al., 2018). Additionally, social-cognitive abilities might facilitate language acquisition in general, and the acquisition of mental state language and pragmatics (e.g., metaphors) specifically (Atkinson et al., 2017; Lecce & Devine, 2022; Milligan et al., 2007) as well as the development of metacognitive abilities, such as the ability to reflect on one's own reading (Atkinson et al., 2017; Lecce & Devine, 2022). Both language proficiency and metacognition may in turn aid narrative processing and reading comprehension.

Empirical studies support the contention that social-cognitive abilities play an important role during narrative processing in emergent readers. Social-cognitive abilities, especially mindreading, are positively related to general reading comprehension all throughout childhood and adolescence (Boerma et al., 2017; Lecce et al., 2021; McIntyre et al., 2018; Pavias et al., 2016; Pelletier & Wilde Astington, 2004). Moreover, mindreading abilities in both four-year-olds and nine- to ten-year-olds are a positive predictor of reading comprehension one or two years later (Atkinson et al., 2017; Lecce et al., 2021), suggesting that these abilities play a causal role in emergent reading comprehension. Additional evidence comes from studies on nontypically developing children. For example, children with an autism spectrum disorder, which is typically linked to decreased social-cognitive performance, have been found to perform poorer on narrative comprehension tasks compared with typically developing peers (Barnes, 2012; McIntyre et al., 2018). Finally, social-cognitive abilities are not only related to reading comprehension in general but also to the acquisition, processing, and understanding of markers of narrative viewpoint in children (e.g., Antonietti et al., 2006; Grazzani & Ornaghi, 2012; Moore et al., 1990; Ornaghi & Grazzani, 2013).

Although social-cognitive abilities are arguably also implicated in narrative reading after the developmental stage (e.g., Mar, 2018; see also previous section), there is relatively little research on how individual differences in social cognition affect narrative processing in neurotypical adults. fMRI studies do suggest that brain networks typically associated with

social cognition are involved in narrative comprehension tasks (Mar, 2011; Mason & Just, 2009). Moreover, a handful of studies has found that social-cognitive abilities, especially self-reported empathy, are positively associated with engagement with narrative characters (Habermas & Diel, 2010; Koopman, 2015, 2016; van Lissa et al., 2018; Wimmer et al., 2021). However, studies on how a wider range of social-cognitive abilities are related to various aspects of narrative processing are lacking.

All in all, there is research that suggests that social-cognitive abilities affect the narrative reading process. However, since most of this research has been carried out with children, it is unclear what role social-cognitive abilities play in adults. Moreover, most of these studies have looked at mindreading abilities (in children) or self-reported empathy (in adults). Mar (2018) makes a convincing case that a wider range of social-cognitive processes play a role during narrative processing. Hence, the question rises whether and how more diverse aspects of social cognition affect narrative processing. Finally, previous research has mostly looked at the effects of social-cognitive abilities on comprehension measured after reading. More studies are needed to further disentangle which aspects of narrative processing make use of and are thus affected by readers' social-cognitive abilities.

## 1.4 Approach and Outline

In this dissertation I aim to shed light on the relationship between social cognition and narratives. The two broad questions outlined at the start of this introduction and repeated below in a slightly rephrased fashion are the thread running through the different chapters:

- (1) *How does exposure to narratives affect social-cognitive abilities in neurotypical adults?*
- (2) *How do social-cognitive abilities affect the processing of narratives in neurotypical adults?*

The research presented in this dissertation to address these questions is rooted in various disciplines. I combine insights and theories from the humanities (e.g., literary studies, narratology, cognitive linguistics, philosophy of mind) with innovative empirical methods and theories from the social sciences (e.g., psycholinguistics, social psychology, cognitive neuroscience). By doing so, I hope to not only gain a more nuanced understanding of the relationship between narratives and social cognition but also to contribute to the interdisciplinary efforts of the empirical study of literature and media.

The dissertation starts off with an analytical chapter in which I further analyze the linguistic expression of viewpoint in narratives (**Chapter 2**). In this chapter I also develop and validate a lexical identification procedure for the three types of viewpoint that are most relevant

to social cognition: perceptual viewpoint, cognitive viewpoint, and emotional viewpoint. This procedure will form the basis for the textual analyses in the empirical chapters in the remainder of this dissertation, which consists of two parts.

The first part of the dissertation focuses on the first research question I identified (Arrow 1 in Figure 1.2) and uses a combination of literature review and experimentation. The goal of this part of the dissertation is to organize existing research on the impact of narratives on social cognition in neurotypical populations, disentangle the mixed findings, and shed light on the possible mechanism behind the short-term effects of narrative exposure. Because of the multitude of existing studies on the impact of narratives on social cognition, this part of the dissertation starts with a literature review (**Chapter 3**). Using the insights of earlier studies, I draw up a research agenda that can help elucidate three aspects of the possible impact of narratives on social cognition that warrant further research: the textual characteristics of narratives, the role of individual differences between readers, and the aspects and mechanisms of social cognition that are involved. In line with the third recommendation of this research agenda, I describe an experiment in **Chapter 4** that was conducted to study the mechanism behind the potential short-term effect of exposure to works of narrative fiction on social-cognitive abilities. I explore the possibility that exposure to narrative fiction, as opposed to expository nonfiction, temporarily induces a state of social curiosity that in turn affects social-cognitive performance. I also analyze whether this effect is related to the presence of viewpoint markers in the text.

In the second part of this dissertation I focus on the second research question outlined above (Arrow 2 in Figure 1.2), drawing on both analytical and empirical methodologies. The goal of this part of the dissertation is to study how social-cognitive abilities impact specific aspects of narrative processing that go beyond general reading comprehension in neurotypical adults. Because I suspect that social-cognitive abilities play an important role in the processing of narrative viewpoint, **Chapter 5** describes an eye-tracking study that was designed to investigate how readers process perceptual, cognitive, and emotional viewpoint markers during narrative reading, and, crucially, how individual differences in social-cognitive abilities influence this type of processing. This study elucidates how social-cognitive abilities affect narrative processing and perspective taking on a micro scale. Next, in **Chapter 6**, I describe a questionnaire study that sheds light on the role of social-cognitive abilities on the macro level of narrative processing and perspective taking, by looking at character engagement. In this study I manipulated two literary fictional narratives for the presence of viewpoint markers and investigated how the relative presence or absence of these markers interacts with readers' social-cognitive abilities to elicit experiences of character engagement. I will conclude with a discussion (**Chapter 7**) in which I critically reflect on the studies in this dissertation and discuss how my findings further our understanding of the bidirectional relationship between social cognition and narrative processing.





# Chapter 2

## VPIP: A Lexical Identification Procedure for Perceptual, Cognitive and Emotional Viewpoint in Narrative Discourse

**This chapter has been published as<sup>3</sup>:**

Eekhof, L. S., van Krieken, K., & Sanders, J. (2020).  
VPIP: A Lexical Identification Procedure for Perceptual, Cognitive,  
and Emotional Viewpoint in Narrative Discourse.  
*Open Library of Humanities*, 6(1), 18.  
<https://doi.org/10.16995/olh.483>

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3 For reasons of consistency, minor adjustments in spelling and formatting have been made to this chapter and subsequent chapters that have been published in journals.

## **Abstract**

Although previous work on viewpoint techniques has shown that viewpoint is ubiquitous in narrative discourse, approaches to identify and analyze the linguistic manifestations of viewpoint are currently scattered over different disciplines and dominated by qualitative methods. This chapter presents the ViewPoint Identification Procedure (VPIP), the first systematic method for the lexical identification of markers of perceptual, cognitive and emotional viewpoint in narrative discourse. Use of this step-wise procedure is facilitated by a large appendix of Dutch viewpoint markers. After the introduction of the procedure and discussion of some special cases, we demonstrate its application by discussing three types of narrative excerpts: a literary narrative, a news narrative, and an oral narrative. Applying the identification procedure to the full news narrative, we show that the VPIP can be reliably used to detect viewpoint markers in long stretches of narrative discourse. As such, the systematic identification of viewpoint has the potential to benefit both established viewpoint scholars and researchers from other fields interested in the analytical and experimental study of narrative and viewpoint. Such experimental studies could complement qualitative studies, ultimately advancing our theoretical understanding of the relation between the linguistic presentation and cognitive processing of viewpoint. Suggestions for elaboration of the VPIP, particularly in the realm of pragmatic viewpoint marking, are formulated in the final part of the chapter.



## 2.1 Introduction

*During the long ride to the subway station, she and her husband did not exchange a word, and every time she glanced at his old hands, clasped and twitching upon the handle of his umbrella, and saw their swollen veins and brown-spotted skin, she felt the mounting pressure of tears.* (Nabokov, 1948)

Stories allow us to do what seems to be impossible in real life: to get a glimpse inside someone else's mind (Cohn, 1978; Palmer, 2004). As we read the short excerpt of Nabokov's *Signs and Symbols* (1948) above, we gain access to the perceptions, thoughts and feelings of one of the story's characters, an older woman whose son has just tried to take his own life. Through the use of perceptual verbs like *glanced* and *saw* we come to see what she sees: the hands of her seemingly agitated husband. And in the last clause, we get an impression of her sadness through the use of the verb *felt*. These types of verbs are characteristic of narrative discourse and are considered viewpoint (or perspective) techniques, i.e., linguistic elements that grant us access to the internal and subjective viewpoints of characters within a narrative.

Viewpoint refers to the expression of a subject's position in relation to objects and scenes. In this conceptualization, viewpoint has two aspects: a vantage point from which an object or scene is presented or viewed, and an orientation, i.e., the resulting depiction of the object or scene from that specific point (Langacker, 1987). If the vantage point changes, so does the orientation. This implies that viewpoint is by its very nature subjective, and that its manifestation in language creates a personalized—and therefore restricted—account of an object or scene.

In discourse studies, viewpoint is typically conceptualized as a multidimensional concept. Vandelanotte (2017a), for instance, distinguishes deictic viewpoint from cognitive viewpoint: whereas deictic viewpoint refers to the spatiotemporal position from which a subject views an object or situation (that is, the vantage point), cognitive viewpoint captures all of the subject's mental states and activities such as thoughts and attitudes (see also Farner, 2014 and Uspensky, 1973 for similar views). Additional dimensions that have been put forward include perceptual, emotional, and moral viewpoint (Sanford & Emmott, 2012; van Krieken et al., 2017). The emotional and moral dimensions overlap with the concept of stance, which refers to "the linguistic means by which speakers and writers convey their personal attitudes and emotions, their evaluations and assessments, and their level of commitment towards propositions" (Gray & Biber, 2014, p. 219). Lexical stance markers are expressions of personal feelings, attitudes, value judgments, or assessments, such as evaluative adjectives (*beautiful, angry*) and adverbials (*surprisingly, unfortunately*; see for example Pearce, 2005). Such markers give expression to a subject's emotional or moral experience of something and, therefore, to the subject's viewpoint. The difference between stance and viewpoint is

that the latter concept includes more categories than stance alone, such as the sensory perceptions of a subject which do not necessarily mark the subject's stance toward an object (e.g., *He saw an orange tree*). Thus, while stance markers are typically also (moral or emotional) viewpoint markers, not all viewpoint markers are stance markers.

The study of viewpoint in narrative discourse has a long tradition in both literary studies and linguistics. A central aim of these studies is to elucidate how language is exploited in narrative discourse to describe events and situations from the subjective viewpoints of characters, and how this language use contributes to the aesthetic, rhetorical, functional, affective, and cognitive effects of narratives. The linguistic manifestation of viewpoint is studied both at a text-wide level, with a focus on the use of grammatical person (first, second, or third), and at lower levels of the discourse, with a focus on linguistic phenomena at lexical and sentence levels. Studies of this latter category have mainly adopted qualitative methods to analyze viewpoint in stretches of fictional as well as nonfictional narrative discourse, including the use of verb tense and free indirect discourse (Dancygier, 2017; Dancygier & Vandelanotte, 2009; Nikiforidou, 2010; van Duijn et al., 2015). The present chapter aims to foster quantitative research on local-level viewpoint phenomena in narrative discourse, by developing an identification procedure for lexical viewpoint markers.

Thus far, relatively few studies have employed quantitative methods to study narrative viewpoint. These studies have identified a range of linguistic manifestations of viewpoint, at multiple levels of analysis and in different types of narratives. For example, Habermas (2006) and Habermas and Diel (2010) examined nonfictional oral narratives on the propositional level for the presence of viewpoint by analyzing the use of mental verbs, direct and indirect speech, and the historic present. Other studies have analyzed viewpoint techniques in journalistic narratives by examining speech and thought representations (e.g., J. Sanders, 2010; van Krieken & Sanders, 2016a), referential expressions and grammatical roles (van Krieken et al., 2015; van Krieken & Sanders, 2016), and tense and temporal adverbs (van Krieken & Sanders, 2019). Similar analyses have also been applied to literary fiction (e.g., Ikeo, 2014).

General conclusions to be drawn from these quantitative studies are, first, that the expression of viewpoint is constitutive in narrative discourse and that linguistic markers indicating such viewpoints are ubiquitous in narrative discourse. Second, the linguistic manifestation of viewpoint in narrative discourse is highly diverse, which can be explained by the multidimensional nature of viewpoint (e.g., Farner, 2014; Uspensky, 1973). A *Linguistic Cues Framework* was recently presented that establishes connections between specific linguistic viewpoint markers on the one hand and the viewpoint dimension they give expression to on the other, distinguishing between spatiotemporal viewpoint, perceptual viewpoint, cognitive viewpoint, emotional viewpoint, moral viewpoint, and embodied viewpoint (van Krieken et al.,

2017). A central premise of the framework is that these six dimensions are independently regulated by the use of particular linguistic cues. For example, verbs of perception (e.g., *to see*, *to hear*) are argued to indicate that a character's perceptual viewpoint is represented, while verbs of cognition (e.g., *to think*, *to want*) are argued to indicate that a character's cognitive viewpoint is represented. Each of these markers is thus, in its own way, an instruction to interpret a particular part of the discourse from a subjective viewpoint.

Taking the *Linguistic Cues Framework* (van Krieken et al., 2017) as an anchor, a lexical identification procedure can be developed for the identification of these viewpoint markers in narratives. Such a procedure could help establish a unified approach to the study of viewpoint in narrative, which currently appears to be scattered across disciplines and methods, and advance quantitative analyses of viewpoint markers. This may in turn benefit experimental research on the effects and processing of viewpoint by providing a ground for the identification and manipulation of viewpoint markers in narrative stimuli. This is important, because previous empirical research on viewpoint has often exclusively focused on text-wide viewpoint manipulations, comparing first-, second-, and third-person narration (i.e., grammatical viewpoint, e.g., Brunyé et al., 2009, 2011, 2016; Child et al., 2018; Ditman et al., 2010; Mulcahy & Gouldthorp, 2016). Studies on intra-textual viewpoint markers remain scarce, although there is evidence that these markers play a pivotal role in readers' experience and interpretation of narrative discourse (J. Sanders & Redeker, 1993; van Krieken & Sanders, 2017). For example, van Krieken (2018) has shown that the presence of viewpoint markers, such as perception verbs like *to look*, guides readers' interpretations of ambiguous perceptions such that these perceptions are represented as coming from the story character rather than the narrator. Similar effects are to be expected for narrative processes such as narrative engagement, transportation and persuasion (see van Krieken et al., 2017, for example).

In this chapter, we therefore introduce the ViewPoint Identification Procedure, "VPIP", a method for identifying the presence of perceptual, cognitive, and emotional viewpoint in narrative discourse. The VPIP was developed with three important goals in mind: 1) *user-friendliness*: the VPIP should be easy to use for both established viewpoint researchers as well as researchers from other fields (e.g., psychologists, cognitive neuroscientists, and psycholinguists) who wish to study viewpoint in an experimental context; 2) *replicability*: in order to be able to replicate experiments and analyses studying viewpoint across researchers and texts, the VPIP should be as straightforward and consistent as possible; and 3) *implementability*: the output of the VPIP should ideally align with the most detailed measures of linguistic processing (e.g., online measures like eye tracking) that can be used in viewpoint experiments. This means that our procedure aims at analyzing narrative discourse on the lexical level, which is also the smallest level on which viewpoint information can be conveyed (see Krippendorff, 2018). For now, the VPIP focuses on perceptual, cognitive, and

emotional viewpoint. The reason for this is threefold: first of all, we believe these levels can be unequivocally and meaningfully identified on the lexical level, contrary to, for example, spatiotemporal viewpoint, which is also expressed through grammatical relations and choices that transcend the word level. Second, we believe these three dimensions of viewpoint are of relevance to a broad range of researchers who wish to study the processing and effects of viewpoint, as they have clear correlates in cognition and behavior (e.g., mental imagery, mindreading, and empathy). Finally, at least for moral viewpoint, analytical approaches are already available (that is, in terms of *evaluation*: Hunston & Thompson, 2000; *appraisal*: Martin & White, 2007; and *stance*: Biber et al., 1999).

We hope that the resulting procedure presented here will prove to be as useful and important for a broad range of scholars as recent lexical identification procedures for the presence of other prevalent language phenomena such as metaphor (Metaphor Identification Procedure (MIP), Pragglejaz Group, 2007; and Metaphor Identification Procedure VU (MIPVU), Steen et al., 2010), irony (Verbal Irony Procedure (VIP), Burgers et al., 2011), subjectivity and stance (Vis et al., 2012), and hyperbole (Hyperbole Identification Procedure (HIP), Burgers et al., 2016).

In what follows, we will first introduce the procedure. We will then discuss some special cases before illustrating the use of the procedure by applying it to three short Dutch examples (a literary narrative, a news narrative, and an oral narrative). The reliability of the procedure will be tested on a full-length Dutch news narrative. Finally, we will describe the possible applications, optional extensions, and limitations of our procedure in the discussion.

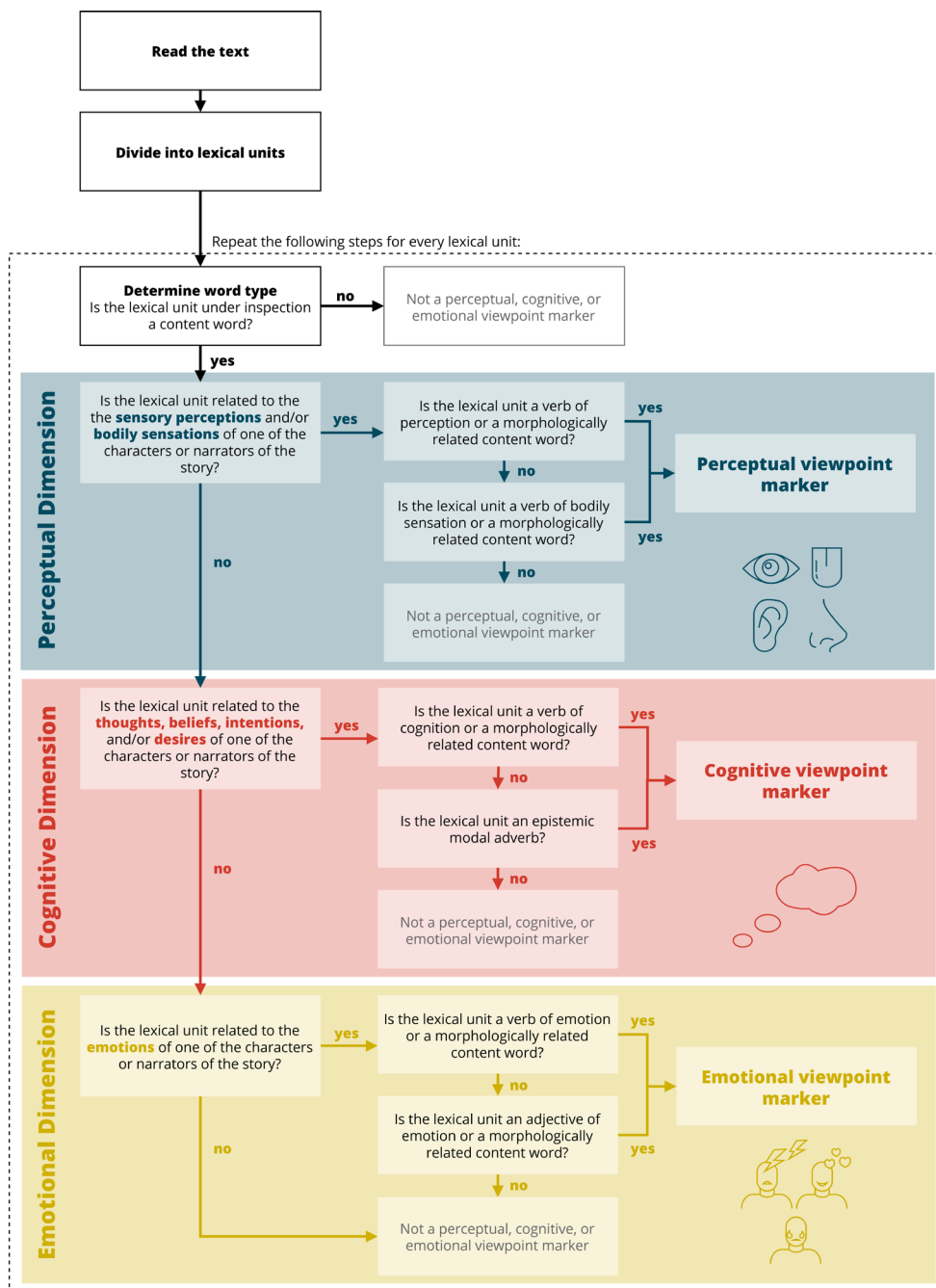
## 2.2 Procedure

The procedure for identifying perceptual, cognitive, and emotional viewpoint markers is graphically represented in Figure 2.1, below. In what follows, we will discuss the steps in more detail.

### **Step 1) Read the text**

Raters should first read the text thoroughly to get a global impression of its meaning and use of viewpoint techniques.

Figure 2.1 The ViewPoint Identification Procedure (VPIP)



### Step 2) Divide the text into lexical units

For the purposes of the present identification procedure, all words can be considered lexical units. The only special cases that deviate from this rule are (complex) phrasal verbs (e.g., Dutch *opmerken* (“to notice”), as in *hij merkte het lawaai op*, (lit. “he noticed the noise up”); see also Steen et al., 2010), which should be considered single lexical units. We used the electronic version of the *Van Dale Groot woordenboek der Nederlandse taal* (Den Boon & Geeraerts, 2005) to identify phrasal verbs.

Repeat the following steps for every lexical unit:

### Step 3) Determine the word type

Although viewpoint can be expressed by both function words and content words, perceptual, cognitive, and emotional viewpoint are almost exclusively expressed through content words.<sup>4</sup> Function words usually give rise to other dimensions of viewpoint. For example, interjections like *Gee!* or *Wow!* express a moral evaluation or attitude (i.e., stance), while determiners play a role in spatiotemporal viewpoint (van Krieken et al., 2017). As the VPIP is concerned with perceptual, cognitive, and emotional viewpoint, the remainder of the procedure is solely applied to content words:

- a. If the lexical unit is a content word (nouns, verbs, adjectives, adverbs), continue to step 4.
- b. If the lexical unit is a function word (interjections, determiners, prepositions, complementizers, pronouns), mark it as not a perceptual, cognitive, or emotional viewpoint marker and go back to step 3 for the next lexical unit.

### Step 4) Determine the viewpoint dimension

Is the lexical unit related to:

- a. ...the perceptions by one of the senses (visual, auditory, tactile, olfactory, taste) and/or bodily sensations of one of the characters or narrators of the story? If yes, continue to step 5a. If not, continue to step 4b.
- b. ...the thoughts, beliefs, intentions, and/or desires of one of the characters or narrators of the story? If yes, continue to step 5b. If not, continue to step 4c.
- c. ...the emotions of one of the characters or narrators of the story? If yes, continue to step 5c. If not, score the lexical unit as not a perceptual, cognitive, or emotional viewpoint marker and go back to step 3 for the next lexical unit.

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4 An example of an exception to this rule is the complementizer *om* (“in order to”), which could be argued to express a character’s intention (see Sanders, 1994, for a discussion).

## Step 5) Determine whether the lexical unit is a viewpoint marker for that dimension

### a. Perceptual dimension

- I. Is the lexical unit a verb of perception or a content word morphologically related to such a verb? If yes, score the lexical unit as a perceptual viewpoint marker. If not, continue to step 5a.II.
- II. Is the lexical unit a verb of bodily sensation or a content word morphologically related to such a verb? If yes, score the lexical unit as a perceptual viewpoint marker. If not, score the lexical unit as not a perceptual, cognitive, or emotional viewpoint marker and go back to step 3 for the next lexical unit.

### b. Cognitive dimension

- I. Is the lexical unit a verb of cognition or a content word morphologically related to such a verb? If yes, score the lexical unit as a cognitive viewpoint marker. If not, continue to step 5b.II.
- II. Is the lexical unit an epistemic modal adverb? If yes, score the lexical unit as a cognitive viewpoint marker. If not, score the lexical unit as not a perceptual, cognitive, or emotional viewpoint marker and go back to step 3 for the next lexical unit.

### c. Emotional dimension

- I. Is the lexical unit a verb of emotion or a content word morphologically related to such a verb? If yes, score the lexical unit as an emotional viewpoint marker. If not, continue to step 5c.II.
- II. Is the lexical unit an adjective of emotion or a content word morphologically related to such an adjective? If yes, score the lexical unit as an emotional viewpoint marker. If not, score the lexical unit as not a perceptual, cognitive, or emotional viewpoint marker and go back to step 3 for the next lexical unit.

The different viewpoint markers in step 5 can be identified using the definitions and examples in Table 2.1. In case of uncertainty when determining whether a lexical unit meets these definitions, an additional paraphrase test can be done: if the lexical unit under investigation can be replaced by or paraphrased with the use of one of the basic forms of a particular dimension, it is a viewpoint marker for that dimension. For example, in the sentence *Hij snakte naar een avondje rust* ("He craved a quiet evening"), the verb *snakken* ("to crave") can be replaced by the basic form *willen* ("to want"): *Hij wilde een avondje rust* ("He wanted a quiet

evening"). Therefore *snakte* can be considered a cognitive viewpoint marker. Paraphrase tests have proven useful and reliable for the detection of similar linguistic phenomena.<sup>5</sup>

Table 2.1 shows an overview of the markers and their definitions by viewpoint dimension and provides the basic forms and examples. Note that all content words morphologically related to (but not necessarily derived from) any of the categories of viewpoint markers are also considered to be viewpoint markers (see the column on the right of the table).

To further facilitate the viewpoint identification process, we have compiled a list of Dutch verbs of perception and bodily sensation (steps 5a.I and 5a.II), verbs of cognition and epistemic modal adverbs (steps 5b.I and 5b.II), and verbs and adjectives of emotion (step 5c.I and 5c.II) that can be found in the Appendix (Appendix A.1). The list was developed as follows. For the four types of verbs, verb classes from work by Levin (1993) were identified that satisfied the definitions from Table 2.1. These can be found in Table 2.2.

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5 For paraphrase testing of discourse perspective type, see Bekker (2006); for paraphrase testing of causal connective categories, see Sanders (1997).



**Table 2.1** Definitions and Examples of Different Types of Perceptual, Cognitive, and Emotional Viewpoint Markers

Dimension	Viewpoint marker	Definition	Basic forms	Examples	Morphologically related words
Perceptual	Verb of perception	A verb that denotes experiences by one of the five senses: visual, auditory, tactile, olfactory, or taste.	<i>Zien</i> ("to see"), <i>horen</i> ("to hear"), <i>voelen</i> ("to feel"), <i>ruiken</i> ("to smell"), <i>proeven</i> ("to taste")	<i>Bezichtigen</i> ("to inspect") <i>Waarnemen</i> ("to perceive")	<i>Bezichtiging</i> ("inspection") <i>Waarneembaar</i> ("perceptible")
	Verb of bodily sensation	A verb that denotes an internal bodily state experienced by a body part.	<i>Pijn doen</i> ("to hurt")	<i>Duizelen</i> ("to grow dizzy") <i>Jeuken</i> ("to itch")	<i>Duizelig</i> ("dizzy") <i>Jeuk</i> ("itch")
Cognitive	Verb of cognition	A verb that represents thoughts, beliefs, intentions, and/or desires.	<i>Denken</i> ("to think"), <i>geloven</i> ("to believe"), <i>willen</i> ("to want")	<i>Wantrouwen</i> ("to distrust") <i>Overwegen</i> ("to consider")	<i>Wantrouwig</i> ("distrustful") <i>Overweging</i> ("consideration")
	Epistemic modal adverb	An adverb that indicates a subject's certainty about a claim or description of reality (see Klein, 1998; Salverda, 2003)	<i>Waarschijnlijk</i> ("probably"), <i>zeker</i> ("definitely")	<i>Wellicht</i> ("perhaps") <i>Ongewijfeld</i> ("undoubtedly")	Not applicable
Emotional	Verb of emotion	A verb that denotes the experience of emotion.	<i>Voelen</i> ("to feel")	<i>Schamen</i> ("to feel ashamed") <i>Enthousiasmeren</i> ("to enthuse")	<i>Schaamte</i> ("shame") <i>Enthousiasme</i> ("enthusiasm")
	Adjective of emotion	An adjective that denotes the experience of emotion.	<i>Boos</i> ("angry"), <i>blij</i> ("happy")	<i>Jaloers</i> ("jealous") <i>Blij</i> ("happy")	<i>Jaloezie</i> ("jealousy") <i>Blijdschap</i> ("happiness")

**Table 2.2** Verb Types and the Verb Classes From Levin (1993) That Were Used to Create the Lists of Viewpoint Markers

Verb type	Verb classes from Levin (1993)
Verbs of perception	Verbs of perception <sup>6</sup> <i>See</i> verbs <i>Sight</i> verbs <i>Peer</i> verbs Stimulus subject perception verbs
Verbs of bodily sensation	Verbs of bodily state and damage to the body
Verbs of cognition	Verbs of desire <i>Want</i> verbs <i>Long</i> verbs Verbs with predicative complements Appoint verbs Characterize verbs Declare verbs Conjecture verbs Verbs of assessment
Verbs of emotion	Verbs of psychological states <sup>7</sup> <i>Amuse</i> verbs <i>Admire</i> verbs <i>Marvel</i> verbs <i>Appeal</i> verbs

The verbs of these verb classes were then translated into Dutch, taking only those English meanings and Dutch translations into consideration that were related to the perceptual, cognitive, and emotional viewpoint dimensions and satisfied the definitions given in Table 2.1. In addition, the closed class of epistemic modal verbs was added to the list of verbs of cognition. With these verbs, speakers indicate commitment to the validity of a proposition on the basis of their estimation of the probability that a particular state of affairs is the case (J. Sanders, 1994, p. 146). Such estimates are subjective by nature and thus express subjective viewpoints (see also J. Sanders & Spooren, 1996, 1997).

The class of emotion adjectives was compiled based on work by Hevner (1936) on emotional adjectives used to describe music, a revised version of Hevner's adjective list (Schubert, 2003), and Dutch translations of the adjectives used in the Multifaceted Empathy Test (Dziobek et al., 2008; Eekhof, van Krieken, et al., 2021). All translations were made using the electronic version of *Van Dale: Groot Woordenboek der Nederlandse Taal* (Den Boon & Geeraerts, 2005).

6 This verb class contains verbs of perception by all of the five different senses (i.e., visual, auditory, tactile, olfactory, and taste).

7 This verb class contains verbs of both positive (e.g., *admire*) and negative valence (e.g., *deplore*).

The epistemic modal adverbs were taken from Salverda (2003) and the electronic version of *Van Dale*.

## 2.3 Special Cases

In general, application of the identification procedure should be straightforward. However, there are a few special cases that require extra attention. These are described below and illustrated with examples from news narratives. Viewpoint scores are marked in bold (blue = perceptual viewpoint marker, red = cognitive viewpoint marker, yellow = emotional viewpoint marker).

### 2.3.1 Ambiguity

In some cases, words with multiple meanings can receive different viewpoint scores depending on the meaning that is intended given the context. For example, the Dutch word *zullen* ("shall/will") can either be used as a temporal auxiliary when forming the future tense (see Example 1), or to signal epistemic modality. Only when the verb is used in an epistemic modal sense, is it considered a cognitive viewpoint marker (see Example 2). Another example is the verb  *vinden* ("to maintain" or "to find") which can either signal cognitive viewpoint (see Example 3), when it is used to express an opinion (see also Vis et al., 2015), or perceptual viewpoint (see Example 4), when it is used in the sense of discovering something. Similarly, the verb *moeten* ("to need/to have to/should") can have multiple meanings including a deontic and epistemic interpretation. Only in those occurrences with an epistemic interpretation, related to the thoughts, beliefs, intentions, and/or desires of one of the characters of the story, should these be considered cognitive viewpoint markers (see Examples 3 and 5). Deontic interpretations, characterized by the presence of an external or objective force, as in Example 6, are not part of the cognitive viewpoint dimension (see J. Sanders & Spooren, 1996, 1997).

#### Example 1)

Hun	huisarts	heeft	<b>beloofd</b>	dat	hij	Hans	zal	helpen
<i>Their</i>	<i>G.P.</i>	<i>has</i>	<i>promised</i>	<i>that</i>	<i>he</i>	<i>Hans</i>	<i>will</i>	<i>help</i>

Their G.P. has promised that he will help Hans. (Volkskrant, 2017)

#### Example 2)

Deze	keer	<b>zou</b>	het,	<b>moest</b>	het	eindelijk	<b>lukken</b>
<i>This</i>	<i>time</i>	<i>would</i>	<i>it,</i>	<i>should</i>	<i>it</i>	<i>finally</i>	<i>succeed</i>

This time, it finally had to succeed. (HP/De Tijd, 2013)

## Example 3)

Een arts **moet** in de eerste plaats helpen, **vindt** ze  
*A doctor should in the first place help, maintains she*  
 A doctor should primarily help, she maintains. (Volkskrant, 2017)

## Example 4)

Ze staat op uit hun hoge bed met wieltes en **vindt** haar man op de bank  
*She stands up from their high bed with wheels and finds her husband on the couch*  
 She stands up from their high bed with wheels and finds her husband on the couch.  
 (Volkskrant, 2017)

## Example 5)

Hij nam de pillen die hem in coma **moesten** brengen  
*He took the pills that him in coma must induce*  
 He took the pills that had to induce him into a coma. (HP/De Tijd, 2013)

## Example 6)

Toen de oude dame toch naar het verpleeghuis moest...  
*When the old lady nevertheless to the nursing home must...*  
 When the old lady nevertheless had to go to the nursing home [...]. (Volkskrant, 2017)

### 2.3.2 Collocations, Fixed Expressions, and Idioms

As our procedure identifies viewpoint at the lexical level, collocations, fixed expressions, idioms, and other multiword units whose meaning transcends the lexical level are nevertheless scored for their individual lexical subparts. As a result, only those subparts that are content words and refer to one of the viewpoint dimensions (see step 4), are potential viewpoint markers. This might mean that in cases where the viewpoint meaning solely arises at the supralexical level, none of the lexical subparts are scored as viewpoint markers (see Example 7). In other cases, some of the subparts do carry a viewpoint meaning, in which case a viewpoint score is assigned to these individual subparts. For instance, in Example 8, *twijfel* ("doubt") is part the expression *de twijfel slaat toe* ("the doubt kicks in") and is scored as a cognitive viewpoint marker, because it is morphologically related to *twijfelen* ("to doubt"), a verb of cognition. We will further elaborate on this issue in the discussion.

## Example 7)

Ik was in de zevende hemel  
*I was in the seventh heaven*  
 I was on cloud nine. (Volkskrant, 2008)

Example 8)

Maar bijna drie weken na kerst slaat de **twijfel** toe.  
*But almost three weeks after Christmas kicks the doubt in.*  
 But almost three weeks after Christmas, doubt kicks in. (Volkskrant, 2017)

### 2.3.3 Adjectives in Combination With Copular Verbs or Verbs of Emotion

Adjectives that function as viewpoint markers can appear with a variety of verbs, only some of which are also considered viewpoint markers. Verbs of emotion are always considered emotional viewpoint markers. The copular verbs, *zijn* ("to be") and *worden* ("to become") however, are not considered viewpoint markers, because their function is only grammatical. Other copular verbs that have a viewpoint meaning because they refer to the beliefs of characters or narrators, such as *lijken* ("to seem") or *schijnen* ("to appear") are considered cognitive viewpoint markers. See the examples below.

Example 9)

Hij had zich als jochie **beschadigd** **gevoeld**, **waardeloos**, **schuldig** ook.  
*He had himself as little lad hurt felt, worthless, guilty as well.*  
 As a little lad, he had felt hurt, worthless, and guilty as well. (HP/De Tijd, 2013)

Example 10)

Ze is **blij** met de euthanasiewet.  
*She is happy with the euthanasia law.*  
 She is happy with the euthanasia legislation. (Volkskrant, 2017)

Example 11)

Haar man **lijkt** **vastbesloten**.  
*Her man seems determined.*  
 Her husband seems determined. (Volkskrant, 2017)

### 2.3.4 Inanimate Subjects

There are instances in which something inanimate, rather than one of the characters, is the subject in a sentence with a viewpoint marker, as in the examples below. If, in these cases, the viewpoint is nevertheless to be understood as coming from one of the characters or narrators, the lexical unit should still be considered a viewpoint marker. In the first example above, the intention that is expressed by the verb *must* is to be understood as coming from the *he* that is taking the pills. Hence, although *the pills* are the subject of *must*, the verb is still a cognitive viewpoint marker as it signals the intention of the character. Similarly, in the second example, the feeling that the time had been *lonely* and *grim* is experienced by the character. Therefore, these two adjectives should be considered emotional viewpoint markers.

Note that in more extreme cases, something inanimate might be the main character of a story, as in the Dutch novel *Specht en Zoon* (“Woodpecker and Son”) by Willem Jan Otten, in which the main character and narrator is a painting canvas (see Trompenaars, 2018; Trompenaars et al., 2018). Our identification procedure does not differentiate between animate and inanimate characters and narrators, and so lexical elements that express the viewpoint of inanimate characters or narrators should still be considered viewpoint markers.

Example 12) (= Example 5)

Hij nam de pillen die hem in coma **moesten** brengen  
*He took the pills that him in coma must induce*  
 He took the pills that had to induce him into a coma. (HP/De Tijd, 2013)

Example 13)

Een andere tijd was het, die ook **eenzaam** was en **naar**  
*A different time was it, that also lonely was and grim*  
 It was a different time, that had also been lonely and grim. (Volkskrant, 2017)

## 2.4 Three Sample Narratives

To illustrate the identification procedure, we will now discuss three sample narratives. The first sample is an excerpt from a literary story by the Dutch literary author A. F. Th. van der Heijden (2008). The second is an excerpt of a news story, published in a national Dutch broadsheet newspaper (NRC Handelsblad, 2011). Finally, we will look at an excerpt from an oral conversational narrative, taken from the Corpus of Spoken Dutch (Corpus Gesproken Nederlands; CGN, 2000).

Below, we present the sample narratives divided into lexical units with content words in bold and the viewpoint scores marked by color (blue = perceptual viewpoint marker, red = cognitive viewpoint marker, yellow = emotional viewpoint marker). Multiword units are marked with brackets. We will only discuss application of the procedure to viewpoint markers and complex cases. Note that in practice the full procedure is applied to all lexical units of the text: function words are rejected after step 3, other content words may be rejected in step 4 and 5 if they are not related to the viewpoint dimensions relevant to the VPIP or if they do not meet the definitions of the viewpoint markers in Table 2.1.

All sample narratives and the analysis scripts for the reliability analysis reported below are publicly available on the Radboud Data Repository (<https://doi.org/10.34973/85CM-1V03>).

### 2.4.1 Literary Fiction: The Byzantine Cross by A. F. Th. van der Heijden (2008)

*The Byzantine Cross* is a short story about a person with an obsession for scissors, which he uses to break into cars. The following passage describes a scene in the store where the man usually buys his scissors. He is afraid that the woman at the till will recognize him from his frequent visits to the store.

De / **volgende** / **keer** / **probeerde** / ik / bij / een / **andere** / **kassa** / [af] / te / [rekenen].  
/ Maar / ik / **werd** / **doorgestuurd**. / Ik / **overwoog** / **nog** / het / **ding** / [terug] / te /  
[leggen], / maar / dat / **leek** / me / **helemaal** / **verdacht**. / **Overal** / **vandaan** / **voelde**  
/ ik / **camera's** / op / me / **gericht**.<sup>8</sup>

The next time I tried to pay at a different till. But I was referred to her. I considered putting the thing back, but that struck me as really suspicious. I felt cameras directed at me from every direction. (translation from Van der Heijden, 2016)

*Probeerde* ("tried") = cognitive viewpoint marker

This lexical unit is related to the intentions of the main character, which falls under the cognitive dimension (step 4b). In step 5b.I, we see that the verb is not on the list of verbs of cognition in Appendix A.1, but it does satisfy the definition of a verb of cognition given in Table 2.1: it is a verb that represents intention. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Overwoog* ("considered") = cognitive viewpoint marker

This lexical unit is related to the thoughts of the main character about his course of action, which falls under the cognitive dimension (step 4b). In step 5b.I, we see that the verb *overwegen* ("to consider") is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Leek* ("seemed") = cognitive viewpoint marker

This lexical unit is related to the beliefs of the main character about the suspiciousness of putting the scissors back. In step 5b.I, we see that the verb *lijken* ("to seem") is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

8 Literal translation: The / next / time / tried / I / at / an / other / till / *particle* / to / pay. / But / I / was / referred. / I / considered / still / the / thing / back / to / put, / but / that / seemed / me / completely / suspicious. / Everywhere / away / felt / I / cameras / on / me / pointed.

*Verdacht* ("suspicious") = cognitive viewpoint marker

This lexical unit is related to the (hypothetical) thoughts of one of the characters of the story, namely the cashier referred to as *haar* ("her"). In step 5b.i, we see that this adjective is morphologically related to the verb *verdenken*, which is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Voelde* ("felt") = perceptual viewpoint marker

The verb *voelen* ("to feel") can either refer to a physical sensation (e.g., *I feel the sun on my skin*), which falls under the perceptual dimension, or the experience of emotion (e.g., *I feel bad*), which falls under the emotional dimension. In this case, the perceptual dimension is evoked (step 4a) but with a hyperbolic interpretation: the man's perception of the cameras is probably affected by his anxious state, as it is unlikely that there are cameras pointed at him from every direction. In sum, the perceptual meaning of *voelen* ("to feel") is metaphorically projected on the emotional domain, providing an instance of subjectification (Kissine, 2010; Traugott, 1989). However, because the VPIP is concerned with viewpoint rather than metaphor, we decided to code the semantically primary meaning. Based on these considerations, this lexical unit is scored as a perceptual viewpoint marker.

## 2.4.2 News Narrative: Crime Report (NRC Handelsblad, 2011)

This news narrative describes a shooting that took place in April 2011 in a shopping mall in the Dutch city of Alphen aan den Rijn. In this passage, a shop owner is interviewed about the aftermath of the incident.

**Later / [gaan] / ze / [terug]. / "Iedereen / was / in / shock", / zegt / Charradi. / "Schuin / tegenover / ons / is / ook / een / modezaak. / De / eigenares / daarvan / is / overleden. / Verschrikkelijk. / Een / collega / die / je / iedere / dag / ziet. / Je / gelooft / het / niet. / Je / hebt / het / gevoel / dat / je / in / een / film / bent / waarin / je / niet / wilt / zijn".<sup>9</sup>**

Later on, they go back. "Everyone was in shock", says Charradi. "There is another fashion store diagonally opposite to us. The female owner of that store has died. Horrible. A colleague you see every day. You don't believe it. You have the feeling that you are in a movie you do not want to be in".

*Shock* ("shock") = emotional viewpoint marker

9 Literal translation: Later / go / they / back. / 'Everyone / was / in / shock', / says / Charradi. / 'Diagonally / opposite to / us / is / also / a / fashion store. / The / (female) owner / there of / has / died. / Horrible. / A / colleague / that / you / every / day / see. / You / believe / it / not. / You / have / the / feeling / that / you / in / a / movie / are / in which / you / not / want / be'.



This lexical unit is related to the emotional dimension (step 4c) as it expresses the emotion that main character Charradi and others felt when they went back to the crime scene. In step 5c.I, we see that although the verb (*to*) *shock*, which is the English loan verb from which this noun is derived, is not on the list of verbs of emotion in Appendix A.1, the Dutch counterpart *schokken* (“to shock”) is. As a result, this lexical unit is scored as an emotional viewpoint marker.

*Verschrikkelijk* (“horrible”) = emotional viewpoint marker

This lexical unit refers to the emotions that main character Charradi experiences when she learns one of her colleagues has died. In step 5c.II, we see that the lexical unit matches the definition of an adjective of emotion given in Table 2.1: it is an adjective that denotes the emotion of horror. As a result, this lexical unit is scored as an emotional viewpoint marker.

*Ziet* (“see”) = perceptual viewpoint marker

This lexical unit is related to the visual perception of the main character, which falls under the perceptual dimension (step 4a). In step 5a.I we see that the verb *zien* (“to see”) is on the list of verbs of perception in Appendix A.1. As a result, this lexical unit is scored as a perceptual viewpoint marker.

*Gelooft* (“believe”) = cognitive viewpoint marker

This lexical unit is related to the (dis)belief of the main character about the tragic situation, which falls under the cognitive dimension (step 4b). In step 5b.I we see that the verb *geloven* (“to believe”) is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Gevoel* (“feeling”) = emotional viewpoint marker

This lexical unit refers to the emotions of the main character (step 4c). In step 5c.I we see that this noun is morphologically related to the verb *voelen* (“to feel”), which is on the list of verbs of emotion in Appendix A.1. As a result, this lexical unit is scored as an emotional viewpoint marker.

*Wil* (“want”) = cognitive viewpoint marker

This lexical unit is related to the desire of the main character to not be in the situation she found herself in, which falls under the cognitive dimension (step 4b). In step 5b.I, we see that the verb *willen* (“to want”) is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

### 2.4.3 Oral Narrative: The Road Trip (CGN, 2000)

In this excerpt, taken from the Spoken Dutch Corpus (CGN, 2000), three friends reminisce about their youth. One of the friends then proceeds to tell a short story about one of their road trips. Please note that names and place names have been removed for the sake of anonymity.

- God / wat / **nog** / een / **keer** / eens / **gelachen** / in / in / zo'n / **bussie**
- toen / **moest** / ik / **rijden**
- **waren** / we / naar / **PLACE NAME** / of / **PLACE NAME** / **weet** / ik / **veel** / **waar** / we / **waren**
- **hadden** / we / **eerst** / **NAME** / **enorm** / z'n / **bek** / **gehouden**
- die / **wou** / **niks** / **meer** / **zeggen**
- **zaten** / we / op / 't / **terras** / en / **NAME** / **raakte** / met / een / **meisje** / aan / de / **praat** / en / z'n / **eerste** / **vraag** / **was** / **wat** / **studeer** / jij
- nou / dat / **heb** / ie / de / **hele** / **hele** / **dag** / **moeten** / **horen**
- hij / **zegt** / van / als / 't / **zo** / **moet** / dan / **gaan** / dan / **ga** / ik / naar / **huis**<sup>10</sup>

God on another occasion we laughed so much in such a van. That time I was the driver. We went to PLACE NAME or PLACE NAME, well I don't know where we were. We had first shut NAME's mouth so much. He didn't want to say anything anymore. We were sitting at an outdoor café and NAME started talking to this girl and his first question was "what do you study?" Well, he has had to hear it from us all day long. He says like: if it has to go like this, then I'll go home.

*Gelachen* ("laughed") = emotional viewpoint marker

This lexical unit is related to the emotion of the main characters, including the narrator (step 4c). In step 5c.I we see that *lachen* ("to laugh") is on the list of verbs of emotion in Appendix A.1. As a result, this lexical unit is scored as an emotional viewpoint marker.

*Moest* ("had")

It is clear that this lexical unit is not related to the perceptions or bodily sensations (step 4a) of one of the characters. When judging whether it is related to the cognitive dimension (step 4b), we should keep in mind that only epistemic interpretations of the verb *moeten* ("to have to") are considered to be related to this dimension. In this case, the interpretation is

<sup>10</sup> Literal translation:

- God / what / still / one / time / once / laughed / in / in / such a / van
- then / needed / I / drive
- were / we / to / PLACE NAME / or / PLACE NAME / know / I / much / where / we / were
- had / we / first / NAME / tremendously / his / mouth / kept
- he / wanted / nothing / anymore / say
- sat / we / on / the / terrace / and / NAME / got / with / a / girl / on / the / chat / and / his / first / question / was / what / study / you
- well / that / has / he / the / whole / whole / day / must / hear
- he / says / like / if / it / so / must / then / go / then / go / I / to / home

deontic: there is an (undisclosed) external force such that the narrator was the one who “had to” drive. So, the lexical unit is not related to the cognitive dimension, nor to the emotional dimension, and is discarded after step 4c. This lexical unit is not a viewpoint marker of the perceptual, cognitive, or emotional dimension.

*Weet* (“know”) = cognitive viewpoint marker

This lexical unit refers to the beliefs of the narrator about the destination of the road trip, which falls under the cognitive dimension (step 4b). In step 5b.I, we see that the verb *weten* (“to know”) is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Wou* (“wanted”) = cognitive viewpoint marker

This lexical unit refers to the desire of one of the characters to not speak anymore, which falls under the cognitive dimension (step 4b). In step 5b.I, we see that the verb *willen* (“to want”) is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

*Moeten* (“had”)

Again, we have to analyze the interpretation of the verb *moeten* (“to have to”) before we can rate it. Although not as straightforward as the previous occurrence of *moest*, this case can also be seen as having a deontic meaning by virtue of the presence of an external force: his friends’ constant talking about the incident leads to the fact that Bert-Jan “had to” listen to them all day. So, the lexical unit is not related to the cognitive dimension, nor to the emotional dimension, and is discarded after step 4c. This lexical unit is not a viewpoint marker of the perceptual, cognitive, or emotional dimension.

*Horen* (“hear”) = perceptual viewpoint marker

This lexical unit is related to the auditory perception of the narrator, which falls under the perceptual dimension (step 4a). In step 5a.I we see that the verb *zien* (“to see”) is on the list of verbs of perception in Appendix A.1. As a result, this lexical unit is scored as a perceptual viewpoint marker.

*Moet* (“must”) = cognitive viewpoint marker

For this final occurrence of *moeten* (“to have to”) the context does not present any external forces that would justify a deontic interpretation. Rather, it is the character who internally reaches the conclusion that things will probably go a certain way. So the lexical unit, in its epistemic interpretation, is related to the thoughts and beliefs of a character, which falls under the cognitive dimension (step 4b). In step 5b.1, we see that the verb *moeten* (“to have to”) is on the list of verbs of cognition in Appendix A.1. As a result, this lexical unit is scored as a cognitive viewpoint marker.

## 2.5 Reliability Analysis

The full news story from Section 2.4.2 was used to test the reliability of our procedure. First, the text was divided into 1145 lexical units by the first author. Then, the first and second author independently applied the VPIP to the story (Table 2.3). Raters agreed on scores for 1128 of the 1145 lexical units, making interrater agreement almost perfect (98.52%,  $\kappa = 0.87$ ; Landis & Koch, 1977). There were 17 cases of disagreement. In most of these cases ( $n = 14$ ), one of the raters scored the lexical units as a viewpoint marker whereas the other did not. In the three remaining cases, raters agreed on the viewpoint marking nature of the lexical unit but disagreed on the dimension. In total, 63 lexical units (5.50% of the text) were identified unanimously as being a viewpoint marker. The results of this analysis show that, first, the VPIP can be used reliably by multiple raters on longer stretches of narrative discourse, and that, second, the frequency with which perceptual, cognitive, and emotional viewpoint markers occur is very similar to the frequency of metaphor related words identified with lexical identification procedures (see e.g., de Vries et al., 2018).

**Table 2.3** Descriptive Statistics for the Distribution of Viewpoint Scores by Rater

Score	Rater #1		Rater #2	
	<i>n</i>	%	<i>n</i>	%
Not a perceptual, cognitive, or emotional viewpoint marker	1078	94.15	1072	93.63
Viewpoint marker	67	5.85	73	6.38
Perceptual	26	2.27	24	2.10
Cognitive	29	2.53	33	2.88
Emotional	12	1.05	16	1.40

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## 2.6 Discussion

### 2.6.1 Contributions and Applications

In this chapter, we presented the VPIP, a lexical identification procedure for perceptual, cognitive, and emotional viewpoint in narrative discourse. The VPIP uses a detailed step-wise procedure to identify the lexical elements that signal the perceptual, cognitive, and emotional viewpoints of story characters and narrators. Application of the procedure is further facilitated by a large appendix of Dutch viewpoint markers. We have demonstrated that the VPIP can be applied to a wide variety of narratives, ranging from spontaneous, oral narratives to stylized, literary narratives. In addition, the good results of the reliability analysis indicate that the procedure can be used by multiple raters with substantial agreement.

We believe the VPIP can be used by a broad and diverse group of scholars ranging from literary scholars to cognitive neuroscientists. As such, the VPIP can be a stepping stone toward interdisciplinary studies of viewpoint as well as new experimental paradigms that are not yet available in the field of viewpoint studies. In addition, a quantified and easy to implement procedure like the VPIP can be used across researchers and texts, facilitating comparisons between studies. Crucially, this also allows for the replication of viewpoint experiments or analyses by other researchers (direct replications) or for other texts (replications with different stimuli; for the importance of replication in the humanities, see Peels, 2019).

Besides use of the VPIP as a tool for quantitative, descriptive analyses of the manifestation of perceptual, cognitive, and emotional viewpoint in narratives, another essential area of application is in experimental studies of viewpoint. Because the VPIP identifies viewpoint markers on the lexical level, its output aligns with many types of (online) experimental measurements. For example, researchers interested in the online processing of viewpoint could use the VPIP to track the effect of viewpoint markers on various psychophysiological measures such as eye movements, skin conductance or EEG. The systematic identification of viewpoint markers is also crucial for the design of stimuli in experiments investigating the effect of viewpoint markers on readers. For example, researchers studying the role of perceptual simulation or mental imagery during story reading might be interested to use the VPIP to design or evaluate their stimuli (e.g., a text high in perceptual viewpoint markers might elicit more mental imagery than a text that lacks perceptual viewpoint markers; see also M. Mak & Willems, 2018). On the other hand, cognitive and emotional viewpoint markers might elicit processes such as theory of mind or mentalizing during reading that could be measured using functional Magnetic Resonance Imaging (fMRI; see Mar, 2011). As previous research has already shown the effect of viewpoint markers on readers' interpretations of narratives (van Krieken, 2018), researchers interested in the role of viewpoint markers with respect to processes such as emotional engagement, transportation, comprehension and persuasion might be interested to use the VPIP to manipulate stimuli texts (e.g., create a

version with and without viewpoint markers; see de Graaf et al., 2012; Hoeken et al., 2016; M. Mak & Willems, 2018). Importantly, the experimental work that the VPIP incites can in turn inform our theories by furthering our understanding of the cognitive processing of viewpoint.

### 2.6.2 Limitations and Optional Extensions

As has become clear from the examples above, the aim of the VPIP is mostly methodological, rather than conceptual. We do not intend to present the procedure as a single, complete definition of what viewpoint is, and how it is manifested linguistically. Obviously, a lexical identification procedure will not suffice to capture instances of viewpoint that arise on other levels of analysis. For example, the VPIP does not take into account from what grammatical viewpoint a (particular part of the) narrative is narrated. By implication, the procedure does not consider instances of reported speech and thought that are embedded within the narrative, either. In the news narrative discussed in Section 2.4.2 several instances can be pointed out:

- a) Later they go back.
- b) “Everyone was in shock”, says Charradi.
- c) “There is another fashion store diagonally opposite to us.
- d) The female owner of that store has died.
- e) Horrible.
- f) A colleague you see every day.
- g) You don’t believe it.
- h) You have the feeling that you are in a movie you do not want to be in”.

Sentence b) represents an utterance spoken by Charradi, which is indicated by the explicit embedding through the reporting verb *says* as well as by quotation marks. This entails that the validity of these particular words, both in content and wording, is limited to this subjective viewpoint. In addition, sentences f–h) are pragmatically embedded as impressions of what Charradi and her colleagues exchanged when they went back a) and found the horrible e) news that the owner of the shop across the street had died c–d). In b), Charradi explicitly *describes* in a past tense sentence how they all felt: *Everybody was in shock*. In sentences f–h), by contrast, she *shows* how they all felt by representing their impressions in present tense with a generic *you*, blending her own voice with the voices of the others. The present tense with *you* demarcates a shift to a free indirect speech representation mode (J. Sanders, 2010), which is embedded within the direct quote. A pragmatic analysis of viewpoint would allow for an analysis of such embedded viewpoints, and the different internal and external voices and viewpoints involved and intertwined in the narration, which could elucidate how linguistic perspective manifests itself and functions at different layers of the narrative. Hence, for researchers interested in these phenomena, the VPIP could be extended with a qualitative, more pragmatic analysis.

Researchers working with literary or otherwise stylized narratives in which multiword units like idioms play an important role may wish to extend the VPIP to also include collocations, fixed expressions, and idioms (e.g., *I am at my wits’ end*). One way this could be achieved is

by adding another paraphrase test at the end of the identification procedure. After applying the VPIP to the full narrative, raters could look for multiword viewpoint markers by checking whether any multiword units present in the text can be replaced by a single-word viewpoint marker of one of the three relevant categories (e.g., *I am at my wits' end* can be rephrased as *I am worried*, justifying an emotional viewpoint marker rating; *she feasted her eyes on the beautifully decorated cupcakes* can be rephrased as *she looked at the beautifully decorated cupcakes*, justifying a perceptual viewpoint marker rating).

Finally, at present our procedure does not take into account the spatiotemporal, moral, and embodied dimensions of viewpoint as described in van Krieken et al. (2017). Spatiotemporal viewpoint is expressed by syntax and anaphora (Kuno, 1987; see also van Krieken et al., 2015). Moral viewpoint is interpreted on the basis of evaluations in the narrative that underpin the rhetorical intentions of telling the story. Research in this tradition can be traced back to studies of oral storytelling by Labov and Waletzky (1967) and Tannen (1982), and to studies of story plots and narrative archetypes, rooted in Propp (1928) and Campbell (1949; see also J. Sanders & van Krieken, 2018). Among others, Martin and White (2007) have described how evaluations, attitudes or stance are expressed linguistically and how they can be analyzed in narrative discourse. Embodied viewpoint is an aspect of mental simulation of narrative as evoked by expressions of shape, orientation, and movement, and is studied in neuroimaging studies of sensory and motor simulation such as Zwaan (1999, 2009). In the future, the VPIP could be extended to also include these dimensions.

To conclude, we believe that in its current form the VPIP can be a helpful tool to systematically identify perceptual, cognitive, and emotional viewpoint markers. For researchers interested in the experimental and analytic study of these manifestations of viewpoint, the VPIP opens many horizons for the study of viewpoint.

## 2.7 Source Materials

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# **Part I**

**From Reading Narratives  
to Reading Minds**



# Chapter 3

## Reading About Minds: The Social-Cognitive Potential of Narratives

**This chapter has been published as:**

Eekhof, L. S., van Krieken, K., & Willems, R. M. (2022).  
Reading about minds: The social-cognitive potential of narratives.  
*Psychonomic Bulletin & Review*, 29, 1703–1718.  
<https://doi.org/10.3758/s13423-022-02079-z>

## **Abstract**

It is often argued that narratives improve social cognition, either by appealing to social-cognitive abilities as we engage with the story world and its characters, or by conveying social knowledge. Empirical studies have found support for both a correlational and a causal link between exposure to (literary, fictional) narratives and social cognition. However, a series of failed replications has cast doubt on the robustness of these claims. Here, we review the existing empirical literature and identify open questions and challenges. An important conclusion of the review is that previous research has given too little consideration to the diversity of narratives, readers, and social-cognitive processes involved in the social-cognitive potential of narratives. We therefore establish a research agenda, proposing that future research should focus on 1) the specific text characteristics that drive the social-cognitive potential of narratives, 2) the individual differences between readers with respect to their sensitivity to this potential, and 3) the various aspects of social cognition that are potentially affected by reading narratives. Our recommendations can guide the design of future studies that will help us understand how, for whom, and in what respect exposure to narratives can advantage social cognition.

### 3.1 Introduction

One of the things that make us unique as human beings is our urge to communicate with each other by means of narratives (Boyd, 2009). From ancient myths to bedtime stories, and from narrative commercials to works of literary fiction: narratives are omnipresent throughout the lifetime. Unsurprisingly, then, reflections on the function of these narratives have likewise occupied countless readers, writers, and scholars. The social and emotional potential of narratives has led some to argue that exposure to narratives can strengthen our abilities to understand others (e.g., Mar & Oatley, 2008; Nussbaum, 1995, 2010). This suggests that the role of narratives transcends simple entertainment, potentially affecting personal lives as well as societies.

Empirical research seems to support the thesis that exposure to narratives improves our ability to understand others. Correlational studies, for instance, show that frequent exposure to literary fiction (in adults) or story books (in children) is associated with superior social-cognitive abilities (e.g., Adrian et al., 2005; Mar et al., 2006; see also Mumper & Gerrig, 2017). Furthermore, in an attempt to establish the causal direction of this association, several intervention studies as well as experiments found evidence for a direct, positive effect of a *single exposure* to literary narratives on social cognition (e.g., Black & Barnes, 2015b; Kidd et al., 2016; Kidd & Castano, 2013, 2018; Montgomery & Maunders, 2015; Pino & Mazza, 2016; van Kuijk et al., 2018). The general finding from these latter studies is that performance on social-cognitive measures increases immediately after reading a literary, fictional narrative but not after reading a piece of popular fiction, nonfiction (e.g., an expository text), or nothing at all. However, three recent replication attempts did not find any significant direct effect of exposure to literary fiction compared with any of the other categories, and these failed replications have cast doubt on the social-cognitive benefits of narratives (Camerer et al., 2018; Panero et al., 2016; Samur et al., 2018).

We believe that the current state of mixed findings calls for reflection first, rather than more data. After discussing the conceptual background of what we will call *the social-cognitive potential of narratives*, we will give an overview of the existing empirical literature on both long-term associations between reading habits and social-cognitive abilities, and experimental research on the direct benefits of exposure to narratives, focusing mostly on research in neurotypical populations. Although much work has been done in the past years, several open questions and challenges remain unsolved. By identifying and critically discussing these, we aim to clear the ground for studies that will provide novel and nuanced insights in the relationship between narrative reading and social-cognitive abilities.

## 3.2 Theoretical Background

The idea that exposure to narratives can strengthen our social-cognitive abilities is articulated by psychologists (e.g., Mar & Oatley, 2008; Oatley, 1999), philosophers (e.g., Nussbaum, 1995, 2010) as well as literary scholars (e.g., Hakemulder, 2000; Zunshine, 2003, 2006), and can be traced back to work as early as Aristoteles' *Poetics* (approx. 335 BC). Before we explain why these scholars have argued that narratives can strengthen our social abilities, we first need to clarify the concepts of narrative and social cognition.

### 3.2.1 Narrative

Defining what constitutes a narrative, and what does not, has been the center of many debates among narratology scholars (see e.g., Rudrum, 2005; Ryan, 2007). In its most basic form, a narrative is often defined as a depiction of a sequence of related events in time (e.g., Abbott, 2008; Abrams & Harpham, 2009; Toolan, 2001). More elaborate definitions additionally stress the subjective nature of narratives (e.g., M. Bal, 2009). That is, narratives do not simply represent a sequence of external events but also imply the presence of a “subject of consciousness” who experiences the story events (Pander Maat & Sanders, 2002; J. Sanders, 2017; J. Sanders & Redeker, 1993). Readers are granted access to the inner world of these subjects through the use of viewpoint or perspective techniques—that is, the various linguistic means (e.g., verbs of cognition, descriptions of emotions) by which a writer or narrator “grant[s] us access to the internal and subjective viewpoints of characters within a narrative” (Eekhof et al., 2020, p. 2). On such accounts, “narrative is about human experience” (Ryan, 2007, p. 24) and “deals with the vicissitudes of human intentions” (Bruner, 1986, p. 16).

Although the term narrative is often used interchangeably with fiction and literature, strictly speaking fictionality and literariness are two dimensions that narratives can vary on independently. For example, narratives can be either fictional, as in the case of fairytales or romance novels, or nonfictional, as in the case of narratives based on true events, such as biographies (Abrams & Harpham, 2009). Similarly, both fictional and nonfictional narratives can be deemed literary (e.g., award-winning literary novels or biographies) or nonliterary (e.g., fan fiction written by teenagers, travel blog stories).

The distinction between the latter two, however, is hard to qualify objectively. From an extrinsic point of view, literary works may be contrasted with a category such as popular fiction based on social constructs of literariness, such as expert ratings, literary prizes (Gavaler & Johnson, 2017; Kidd & Castano, 2013; Koopman & Hakemulder, 2015), or author prestige and social consensus (Koolen et al., 2020). Scholars of Russian formalism, on the other hand, have attempted to formulate text-intrinsic characteristics of literary texts, arguing that the literary



quality of a text can be found in its use of unconventional and defamiliarizing language, also called foregrounding (Abrams & Harpham, 2009; Gavalier & Johnson, 2017; Koopman & Hakemulder, 2015; Shklovsky, 1917/2004). The use of foregrounding devices, such as figures of speech, has been argued to uniquely draw attention to the formal aspects of the text, rather than the communicative message (Abrams & Harpham, 2009).

For the sake of transparency, we will use the word narrative to refer to any text that represents a sequence of events as experienced by a subject (see definitions above), regardless of the fictional and literary quality of these texts, while the term nonnarrative text refers to a text that does not represent a sequence of events as experienced by a subject but is expository in nature instead (e.g., an essay or encyclopedia article).

### 3.2.2 Social Cognition

Like narratives, social cognition also concerns the human experience and refers to the cognitive abilities people use “to make sense of other people and themselves” (Fiske & Taylor, 2013, p. 1). Two important social-cognitive processes that have been studied extensively, both on their own and in relation to narratives, are empathy and theory of mind. Empathy is a complex and multidimensional construct (Burke et al., 2016) that is often used to describe a broad array of processes, ranging from emotional contagion to compassion (Batson, 2009). By implication, the exact definition of empathy is a topic of debate. For example, de Vignemont and Singer (2006) define empathy as a vicarious experience by which we come to share the feelings of someone else, while still being aware that the source of these feelings lies outside ourselves. Embodied accounts have defined empathy as “a kind of direct, noninferential, (quasi-)perceptual awareness” but not necessarily sharing, “of other people’s emotions, sensations, and other psychological states” (Zahavi & Overgaard, 2012, p. 16).

Unlike empathy, theory of mind, which is also referred to as mindreading, mentalizing, or folk psychology, denotes a more cognitively effortful process that allows us to understand the mental states of others and predict their behavior accordingly (de Vignemont & Singer, 2006; Frith & Frith, 2006). This understanding has been argued to come about either through the use of a set of rules that constitute a folk-psychological theory (theory theory; e.g., Gopnik & Meltzoff, 1997) or by putting ourselves in the others’ shoes through a process of simulation (simulation theory; e.g., (Goldman, 1992; R. M. Gordon, 1986)). Compared with empathy, theory of mind often seems to be reserved for the realm of cognitive mental states (i.e., beliefs and desires; e.g., Apperly, 2010), rather than the affective dimension. Yet the terminology used is far from transparent, as other researchers use the term cognitive empathy to refer to both cognitive and affective theory of mind (i.e., the active and effortful attempts to understand the cognitive and affective mental states of others). In this context, it is distinguished from emotional empathy (i.e., the more or less spontaneous sharing of

emotions; Dvash & Shamay-Tsoory, 2014). All in all, empathy and theory of mind are hard to define concepts. Throughout this chapter we will therefore refer to “social cognition” as a general, umbrella construct, unless the studies we discuss have made claims about specific social-cognitive abilities.

### **3.2.3 The Social-Cognitive Potential of Narratives**

Having discussed these definitions, a clear connection between narrative comprehension and social cognition arises: both are centered around accessing and understanding the minds of others, be it narrative protagonists or people we encounter in the real world. This connection is the basis of various theories that suggest that exposure to narratives could foster social-cognitive abilities. The rationale for these theories mostly rests on either the activation of social-cognitive processes during narrative reading (process-based theories; Mar, 2018), or the transfer of knowledge through the narrative content (content-based theories; Mar, 2018). We will now discuss both positions in turn.

Process-based accounts are based on the idea that the brain uses the same cognitive systems to understand the minds of real and fictional others (in the case of emotions, this is sometimes called the “Panksepp-Jakobson hypothesis”; Jacobs, 2015). On such accounts, reading narratives is argued to draw on our real-life social-cognitive abilities (for neural support for this claim, see Mar, 2011). For example, Zunshine (2003, 2006) posits that we employ our mindreading or theory of mind skills to infer the mental states of narrative characters based on the descriptions of their behavior (see also van Duijn, 2018). In addition, Oatley (1999) describes narratives as a series of cues to run a mental simulation of the plot and, importantly, its corresponding emotions.

Interestingly, some scholars have also reasoned the other way around, arguing that social cognition involves the use of narrative processes. For example, Apperly (2010) describes mindreading as a process of creating situation models similar to those readers construct during narrative comprehension (e.g., Zwaan et al., 1995). Similarly, Ryan (2007) writes that “narrative involves the reconstruction of minds. But we perform this operation as a normal part of social life. Does it mean that we engage in private storytelling whenever we interact with human beings?” (pp. 27–28)

In line with these ideas, researchers have theorized that social-cognitive processes can be strengthened through their repeated use during reading (e.g., Mar, 2018). Mar and Oatley (2008), for example, argue that narrative “simulations of social experience” activate and train our empathic abilities by inviting us to try to understand and embody the emotions and beliefs of others in a process of what Koopman and Hakemulder (2015) have later termed “empathic imagination”. The recent SPaCEN (Social Processes and Content Entrained by

Narrative) framework (Mar, 2018) aptly sums up the rationale behind the process-based theories by arguing that narratives can enhance social cognition if they “represent the social world” (p. 459) and activate social processes that can be developed through repeated practice. For example, frequently reading novels centered around romantic relationships might elicit our theory of mind as we try to understand what the underlying beliefs, intentions, and feelings of the characters are. Over time, this cognitive exercise might translate into improved cognitive theory of mind abilities.

The other, content-based strand of accounts have proposed that narratives (also) contribute to social cognition by conveying social *knowledge* (Mar, 2018; Mar & Oatley, 2008). For example, through narratives we might find ourselves in unique situations that we would normally never be able to experience, opening the door to a whole range of new (social) experiences and accompanying knowledge (Hakemulder, 2000; see also Montgomery & Maunder, 2015). In terms of the SPaCEN framework (Mar, 2018), this means that narratives can foster social cognition if they contain useful, learnable, and applicable knowledge about the social world. For example, reading a narrative about a break-up might provide us with knowledge about the dynamics of human relationships that can help us understand the relationships in our personal lives.

It is very probable that these two routes, elicitation of social processes and transmission of social knowledge, work alongside each other in practice. However, one could argue that the elicitation of social processes is what uniquely sets narratives apart from nonnarrative or expository texts. After all, expository texts can also contain social information (e.g., a handbook on couples counseling).

As Mar (2018) notes, most theoretical accounts of the social-cognitive potential of narratives have not been specific about the underlying time scale of the supposed relationships. That is, most theories do not elaborate on the amount of exposure to narratives needed to affect social cognition, nor specify how long effects last. The SPaCEN model (Mar, 2018), however, explicitly presupposes that frequent and prolonged exposure to narratives is needed to produce lasting impact, much like training a muscle involves repeated use of that muscle. In addition, most theories do not specify in what stages of readers’ lives or development beneficial effects of narratives on social cognition are to be expected (but see Mar, 2018, which will be discussed later on). This will be relevant when reviewing the empirical evidence in favor of these effects.

Moving beyond the idea that narratives in general improve social cognition, some scholars have made claims about literary and/or fictional narratives in particular. Theoretical accounts stressing the importance of literariness propose that the use of foregrounding in literary

narratives specifically (i.e., the deviating use of language as a stylistic device in literature) elicits deeper forms of processing, reflection, and emotional response (Bálint et al., 2016; Sanford & Emmott, 2012). In line with this idea, Djikic and Oatley (2014) propose that literary features of a text can temporarily destabilize the personality and emotional system of the reader, which then allows for changes brought about by the narrative content.

Furthermore, scholars have argued that the complexity of literary texts requires extra (social-) cognitive efforts during processing and might thus lead to enhanced social-cognitive abilities. For example, literary fiction has been argued to be more layered, ambiguous, and less predictable, forcing the reader to engage in more (social) inferencing (Kidd & Castano, 2013). In addition, Zunshine (2011) argues that aspects of literary style, such as metaphors and other figures of speech, lead to a certain kind of social-cognitive complexity—for example, by making the reader aware of the subtle intentions and expectations of the narrator (see also Gibbs & Colston, 2019). Taken together, these accounts propose that literary narratives contain more social-cognitive complexity and as such provide a greater “work-out” for readers’ social cognition, leading to greater benefits compared with nonliterary narratives.

Yet other theorists have emphasized the role of fictionality, arguing that fictional narratives create a beneficial distance to the real world (Hakemulder, 2000; Keen, 2007; Oatley, 1999). This “protective fictionality”, as Keen (2007, p. xiii) calls it, means that readers can let their guard down and empathize with the narrative experiences without facing real-life consequences (Hakemulder, 2000). As a result, fictional narratives would allow readers to engage in “safer” and thus more perspective taking than nonfictional narratives, potentially leading to bigger effects on social cognition.

In summary, (frequent) exposure to narratives has been hypothesized to promote social cognition through the activation and subsequent strengthening of social-cognitive processes and through the transfer of socially relevant information. Furthermore, literariness and fictionality have been mentioned as additional driving forces behind this effect. As we will see in the next section, in more recent years, empirical researchers have begun to test these hypotheses. In what follows, we will discuss the existing empirical literature on the relationship between narratives and social cognition by looking both at the associations between reading habits and social-cognitive abilities as established in correlational and longitudinal studies, and the causal effects of exposure to narratives, as studied in experiments and interventions.

## 3.3 Empirical Evidence

### 3.3.1 Correlational and Longitudinal Studies

One line of research on the relationship between narrative reading and social-cognitive abilities has looked at associations between reading habits and various measures of social cognition. Researchers found positive relationships in age groups as young as preschoolers in both cross-sectional studies (e.g., Adrian et al., 2005; Aram & Aviram, 2009; Mar et al., 2010) and longitudinal studies (e.g., Rose et al., 2018). In these age groups, exposure to narratives is usually measured either explicitly, by asking caregivers how often they read books to their child, or more implicitly, with the use of recognition tests. In such tests, participants, in this case caregivers, are asked to indicate which author names (Author Recognition Test; ART; Stanovich & West, 1989), book titles, or phrases they know from a list that is made up of both existing names, titles, and phrases and foils. Scores on such tests are argued to reflect exposure to (certain types of) print. For example, Aram and Aviram (2009) measured mothers' ability to recognize key phrases and authors of children's books, supposedly reflecting the frequency with which they read these books to their children. They then found that scores on this measure were positively related to their children's empathy level, as assessed by kindergarten teachers, even after controlling for mothers' education level. Importantly, Mar et al. (2010) found that this relationship could not be explained by parents' literacy in general, since only parents' ability to recognize children's book titles and authors, but not adult book authors, was related to theory of mind performance in four- to six-year-olds, even after controlling for age, gender, language abilities, and parental income.

Although these studies seem to suggest that exposure to narratives benefits social-cognitive development in children, the question remains whether the found relationships are solely due to narrative exposure or are rather also the result of the accompanying social interaction between child and caregiver that is often centered around the mental states of narrative characters (Mar et al., 2010; see also Ratner & Olver, 1998). For example, Adrian et al. (2005) found that not only the frequency of joint book reading but also the frequency and variety of mothers' mental state talk during reading was related to performance on false belief tasks. Hence, as young children's exposure to narratives is usually embedded in a highly social context, it is difficult to disentangle the contribution of the narratives per se from the contribution of the surrounding social interaction.

Studies on children who can read by themselves might thus be better suited to study the relationship between social cognition and narrative exposure in a more restricted sense. However, social-cognitive development after early childhood has received relatively little attention (Kilford et al., 2016; but see Pavias et al., 2016). A recent study that did look at a large group of children from a wide range of age groups (8 to 16 years old) found a

significant relationship between the frequency of exposure to fictional narratives, as measured with self-report questionnaires, and self-reported perspective-taking tendencies, while controlling for age and gender (De Mulder et al., 2022). However, no relationship was found with performance-based measures of emotion recognition (i.e., ability to assign the correct emotion label to a picture). Moreover, in a study with German adolescents, Lenhart et al. (2020) failed to find a relationship between fiction exposure, as measured with an author and title recognition test, and self-reported social-cognitive abilities when not only controlling for age and gender but also for IQ and openness to experiences. De Mulder et al. (2021) suggest that a possible explanation for the lack of a clear relationship between fiction reading and social cognition in school-age children and adolescents is the fact that in these phases of life most reading takes place in educational contexts where exposure to fiction is compulsory. Interestingly, this hypothesis seems to be backed up by a longitudinal study by H. W. Mak and Fancourt (2020) who found that reading for pleasure at age 7, i.e., reading that is done outside of a school context, *was* associated with prosocial behavior at age 11, as measured with a parental questionnaire, even after controlling for a range of variables.

Finally, a number of studies have looked at the association between adults' reading habits and their social-cognitive abilities. For example, Mar et al. (2006) found that exposure to fiction, as measured by the number of correctly identified names of fiction writers, was positively associated with scores on the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001), a word-picture matching task that measures the ability to ascribe affective mental states to pictures of eyes, even after controlling for age, English fluency, and intelligence. These results provide support for a positive relationship between exposure to fiction and emotion recognition abilities. Moreover, exposure to nonfiction was negatively associated with performance on this task and another task of interpersonal sensitivity, suggesting that exposure to nonfiction does not have a neutral but rather a potentially detrimental effect on social-cognitive abilities compared with exposure to fiction.

The long-term association between exposure to fiction and social-cognitive skills in adults has since been observed in multiple other studies, using a variety of measures (e.g., Black & Barnes, 2015b; Djikic et al., 2013; Fong et al., 2013; Mar et al., 2009; Schwering et al., 2021; for an overview, see Mumper & Gerrig, 2017). Moreover, in an fMRI study Tamir et al. (2016) found that the positive relationship between fiction exposure (ART) and performance on mindreading tasks was mediated by the degree to which the brain regions related to theory of mind were activated when participants read social narratives, providing support for the idea that social cognition develops through repeated activation of social-cognitive processes elicited by narratives.

In sum, evidence from correlational and longitudinal studies suggests that exposure to narratives is positively related to social-cognitive abilities in preschoolers and adults. The evidence for school-age children and adolescents is more mixed but is indicative of an association between noncompulsory reading for pleasure and social cognition. Nevertheless, these findings do not necessarily provide direct evidence for a true causal effect of narrative reading on social-cognitive abilities: it might well be that the positive association between exposure to fiction and social-cognitive skills reflects the tendency of socially competent people to turn to fiction reading more often, for example, because they enjoy reading about the inner worlds of others in stories. Experiments and intervention studies were developed to further establish the causal direction of the relationship between reading narratives and social cognition and find additional support for the social-cognitive hypothesis of narrative reading.

### **3.3.2 Experiments and Intervention Studies**

The rationale behind most experimental studies assessing the causal effects of reading narratives is that if reading narratives leads to improved social cognition, then social-cognitive performance should be enhanced after exposure to narratives but not after exposure to nonnarrative texts or no exposure to any text. One line of research based on this approach has used interventions to study the social-cognitive potential of narratives. In these studies, participants in the intervention group are repeatedly exposed to narratives over an extended period of time (e.g., a week up to several months). Social-cognitive abilities are measured both before and after the intervention, and improvements in abilities are compared between the intervention group and a control group.

Intervention studies have thus far mostly been used to study the social-cognitive potential of narratives in young populations, possibly because interventions are relatively easy to implement in an educational setting. For example, in an intervention study in German after-school childcare centers, seven- to nine-year-olds' emotional vocabulary and their ability to identify, label and understand both visible and concealed feelings improved after eight 90-minute sessions of joint reading (Kumschick et al., 2014). In a review article, Montgomery and Maunders (2015) discuss eight other studies that report positive effects of narrative interventions, also called bibliotherapy, on various measures of social cognition and prosocial behavior in five- to fifteen-year-old children. The downside of these intervention studies, however, is that exposure to narratives is usually accompanied by various activities such as discussion groups or creative exercises, making it difficult to assess what the actual contribution of the narrative exposure is.

Other researchers have used experiments to target the specific effect of exposure to (certain types of) narratives on social cognition. In these studies, the social-cognitive abilities

of a group of participants who have been exposed to *one* particular kind of narrative are compared with the social-cognitive abilities of other groups that have been exposed to other types of texts (e.g., an expository text) or nothing at all. Using this approach, Djikic et al. (2013) found that participants who scored low on the personality trait “openness” experienced an increase in self-reported cognitive empathy (as measured with the self-report Perspective Taking subscale of the Interpersonal Reactivity Index, IRI; Davis, 1983) after reading a literary story but not after reading an expository text that was matched in terms of content, complexity, and length. The authors suggest that individuals who are generally not as open to new experiences benefit especially from the exposure to others’ perspectives that literary narratives offer, increasing their self-reported empathic abilities (see Djikic et al., 2009b).

As self-reported changes do not necessarily translate into actual abilities, a study by Kidd and Castano (2013) provided more evidence in favor of a direct effect of narrative reading on social-cognitive skills. In their experiments, the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001, see above) and the Yoni Task (Shamay-Tsoory & Aharon-Peretz, 2007) were used to measure participants’ social-cognitive abilities. The Yoni Task is a measure of cognitive and affective theory of mind that uses cartoons to assess the ability to infer the intentions and emotions of a character named Yoni based on verbal and eye-gaze cues. In a series of five experiments in which participants were assigned to read either an excerpt of literary fiction, popular fiction, nonfiction, or nothing, it was found that those who read literary fiction outperformed those who read popular fiction, nonfiction, or nothing on the Reading the Mind in the Eyes Test. Moreover, participants in the literary fiction condition outperformed those in the popular fiction condition on the Yoni Task. The authors thus concluded that engagement with narratives, in particular literary fictional narratives, enhances theory of mind.

Several studies have since attempted to replicate the immediate effect of a single exposure to literary fiction, with varying success. Some studies were able to replicate the positive effect of literary fiction on social-cognitive abilities as compared with the effect of popular fiction (Kidd & Castano, 2019; van Kuijk et al., 2018). In addition, exposure to literary fiction has also been found to have a positive effect when compared with science fiction, a genre closely related to popular fiction: students assigned to read a work of literary fiction outperformed a group of students who were assigned to read a work of science fiction on two theory of mind tasks after finishing the book (Pino & Mazza, 2016).

Moreover, the finding that reading a piece of literary fiction has a positive effect when compared with nonfiction has also been backed up by additional studies (P. M. Bal & Veltkamp, 2013; Black & Barnes, 2015b; Pino & Mazza, 2016). For example, using a within-subjects design, Black and Barnes (2015b) found that reading literary fiction significantly improved



scores on the RMET compared with the effect of reading nonfiction. Moreover, performance on an intuitive physics understanding test was not affected by reading condition, suggesting that the positive effect of literary fiction cannot be explained as a general improvement of (nonsocial and social) cognitive abilities as a result of the complexity of literary texts. Thus, the authors conclude that there seems to be a unique, direct link between one-time exposure to (literary) narratives and *social* cognition, rather than cognition in general.

However, other studies, including some direct replications of Kidd and Castano's (2013) experiments, have not found evidence for a direct positive effect of reading a piece of literary fiction as opposed to either popular fiction or nonfiction (Camerer et al., 2018; De Mulder et al., 2017; Panero et al., 2016; Samur et al., 2018; see also Djikic et al., 2012), causing many to cast doubts on the original claims. Nevertheless, a recent meta-analysis (Dodell-Feder & Tamir, 2018) that also included two of the recent failed replications (i.e., Panero et al., 2016; Samur et al., 2018), found that reading a piece of literary fiction does in fact have a small positive effect ( $g = .15-.16$ ) on social-cognitive abilities (both when looking at all effect sizes and when looking exclusively at effect sizes obtained with the RMET) when compared with reading nonfiction or nothing.

Nonetheless, the single-exposure approach has received additional criticism recently, as the rationale behind studies using the experimental design described above seems to contradict the tacit assumption of the theoretical models that *repeated* exposure to narratives is needed to improve social-cognitive abilities. In his SPaCEN framework, Mar (2018) argues that the rationale of the single-exposure studies is too simple. That is, assuming that in a sample of healthy adults with at least some previous reading experience, a single exposure to a brief narrative would lastingly improve something as substantial as social cognition is naïve. Instead, the results from single-exposure experiments should perhaps be interpreted as narratives temporarily putting readers in the “mood” for mind reading or making readers more aware of the inner worlds of others (see also Manierka et al., 2021).

An additional problem that experiments face is that they almost exclusively make use of the RMET to measure social-cognitive abilities. Not only has the RMET been criticized for its poor internal consistency and homogeneity (Olderbak et al., 2015), a recent study also showed that performance on the RMET correlates highly with measures of verbal ability (Peterson & Miller, 2012). This is highly problematic for research on the relationship between narrative exposure and social cognition, because this means that any found effects might in fact reflect a positive effect of reading on verbal abilities (e.g., Mol & Bus, 2011), rather than social-cognitive abilities. Although this issue might be partially solved by controlling for language abilities, as some studies have done, results from experiments solely relying on the RMET should be interpreted with caution.

All in all, then, the best evidence in favor of a causal effect of reading narratives on social cognition comes from the intervention studies (Kumschick et al., 2014; Montgomery & Maunders, 2015) and a handful of experiments that have not solely relied on the RMET to measure social-cognitive abilities (i.e., P. M. Bal & Veltkamp, 2013; Djikic et al., 2013b; Kidd & Castano, 2013; Pino & Mazza, 2016). However, even studies that have employed other measures than the RMET have not always replicated the positive effect of a single case of exposure of narratives on social cognition (e.g., De Mulder et al., 2017; see also Dodell-Feder & Tamir, 2018). Thus, experimental evidence for the social-cognitive potential of narratives is mixed at best and the question of how these mixed findings should be interpreted rises.

We propose that part of the explanation for these conflicting outcomes might lie in the fact that previous studies have often collapsed various types of texts, readers, and social-cognitive processes, tacitly assuming that any (literary) narrative will affect all readers in the same, positive way. To overcome this generalized approach, there is a need of experiments that even more specifically isolate “narrative features that promote a positive impact on social cognition” (Mumper & Gerrig, 2017, p. 117). Moreover, more attention has to be paid to individual differences between readers, in an attempt to clarify what readers can benefit from the proposed positive impact and which specific aspects of social cognition are in fact impacted. In other words, rather than working from the idea that narratives either do or do not impact social cognition, we propose to work from the idea that narratives can impact social cognition in certain circumstances and focus on mapping out these circumstances.

We argue that in order to move forward, reflection is needed on the three central aspects of the social-cognitive potential of narratives: the text, the reader, and the social-cognitive processes. In the next section we therefore identify open questions and challenges related to these three aspects that can lead these further inquiries and help move the field forward. Ultimately, these reflections can lead to carefully constructed experiments that can help elucidate how, for whom, and when the social-cognitive potential of narratives emerges.

## 3.4 Open Questions and Challenges

### 3.4.1 What Text Characteristics Drive the Social-Cognitive Potential of Narratives?

Most research designs that have been used thus far do not provide much insight in the specific textual characteristics that drive the positive effects of reading narratives. Studies have mostly focused on global text dimensions such as literariness and fictionality and have often resorted to making comparisons that conflate various textual dimensions, making it hard to draw sound conclusions about the driving factors behind any found differences. In

this section, we will discuss these challenges in more detail, and provide avenues for future research on the textual characteristics that drive the positive effects of narrative reading.

Following the theoretical accounts that put a special emphasis on the general concepts of literariness and fictionality as the driving forces behind the social-cognitive potential of narratives (e.g., Keen, 2007; Zunshine, 2011), most empirical studies have aimed to investigate the difference between literary fiction, popular fiction, and nonfiction. As described above, some studies have found evidence for a beneficial effect of literariness by comparing the effect of reading a piece of literary fiction to the effect of reading a piece of popular fiction (Kidd & Castano, 2013, 2018; Pino & Mazza, 2016; van Kuijk et al., 2018). However, others have not been able to reproduce this finding (Camerer et al., 2018; Panero et al., 2016; Samur et al., 2018) and this approach has since been criticized (Gavaler & Johnson, 2017; Koopman & Hakemulder, 2015; Panero et al., 2016). One of the objections is that the texts in the original Kidd and Castano (2013) experiments were chosen based on extrinsic criteria, such as prizes and ranking (for an elaborate critique, see Gavaler & Johnson, 2017), and the various texts used in the different conditions were poorly matched on, for example, content. Hence, it is hard to disentangle exactly which intrinsic characteristics of the textual stimuli were responsible for the difference found between literary and popular fiction narratives (Gavaler & Johnson, 2017).

Other studies have attempted to demonstrate the specific effect of literariness and/or fictionality on social-cognitive abilities by comparing the effect of literary fiction to the effect of nonfiction (i.e., expository texts; P. M. Bal & Veltkamp, 2013; Black & Barnes, 2015b; De Mulder et al., 2017; Kidd & Castano, 2013; Pino & Mazza, 2016). This comparison is problematic, however, as it collapses the effects of literariness, fictionality, and narrativity by comparing a literary, fictional narrative (literary fiction) to a nonliterary, nonfictional expository text (nonfiction). The evidential value of these studies is thus limited when evaluating and studying the textual causes behind the found differences.

One possible solution for this issue lies in studies that have used text manipulations to study the effect of specific literary features on social-cognitive processes. For example, Koopman (2016) found that readers who read a narrative that was high in foregrounding (i.e., containing literary devices such as metaphors, alliterations, ellipses, etc.) reported more empathic understanding than those who read a manipulated version without foregrounding of the same narrative. However, in a qualitative study by Kuzmičová et al. (2017) readers' elaborations were in fact found to be more empathic after reading a manipulated narrative without foregrounding rather than after reading the original narrative high in foregrounding. Another study examined literary gaps, instances in the narrative where readers are invited to use social inferencing and creativity to complete missing information (De Mulder et al.,

2017). The authors hypothesized that a narrative with literary gaps would boost social-cognitive abilities more than a manipulated narrative in which these gaps were already filled in. However, no effect of the presence of literary gaps on measures of theory of mind was found. In sum then, empirical research on literariness has yielded little evidence for its effect on social cognition, nor has it convincingly provided specific text characteristics that might drive the social-cognitive potential of narratives.

To our knowledge, empirical studies thus far have not isolated the specific effect of fictionality. An fMRI study, however, does suggest that brain regions related to emotion are more active when readers think they are reading a fictional narrative compared with a nonfictional narrative (Altmann et al., 2014), providing some initial support for the idea of protective fictionality.

Koopman and Hakemulder (2015) have argued that rather than focusing on literariness or fictionality, a more fruitful approach might be to study characteristics related to the overarching concept of narrativity (see also Mar, 2018), because the positive effect of narrative reading, when found, seems to extend to narratives in general (e.g., including life narratives; see Koopman, 2015). That is not to say that literariness and fictionality do not play a role at all. However, regardless of their literariness or fictionality, narratives can be distinguished from nonnarrative or expository texts in terms of form, content, and the type of engagement they bring about. These characteristics might be worthwhile to study in more detail in future research.

There is already some evidence that formal narrative characteristics, such as the representation of the inner world of protagonists, might play a role. For example, Kidd et al. (2016) found that the beneficial effect of literary fiction compared with popular fiction was mediated by “the extent to which a text provides sophisticated interpretations of behavior in terms of mental states” (p. 51), as measured by Computerized Reflective Function, which automatically analyzes a text for the presence of linguistic items that signal high levels of reflection (e.g., “think”, “but”) as opposed to low levels of reflection (e.g., “me”, “can”). Furthermore, Johnson, Jasper, et al. (2013) found that empathy for Arab Muslims was significantly higher after reading a full narrative that included dialogues and monologues than after reading a condensed form of the same narrative, which was a shorter summarized version of the plot. Other characteristics that might be of importance include viewpoint or perspective markers (see e.g., Eekhof et al., 2021; van Krieken et al., 2017) or descriptions of mental states in general (see e.g., Cupchik et al., 1998; Gavaler & Johnson, 2017; Habermas & Diel, 2010). An unresolved question, however, is to what degree the presence of mental state descriptions is most beneficial to social cognition, and to what degree their relative absence within an otherwise complete narrative is in fact more constructive, because they

require readers to put their mindreading and inferencing abilities to work. An intervention study with four-year-olds provided some evidence for the latter, showing that children who were exposed to stories without mental state descriptions outperformed a group of children who were exposed to the same stories enriched with mental state descriptions on various false-belief tasks (Peskin & Astington, 2004).

Although no content is unique to narratives per se, there are indications that certain content, when expressed in a narrative form, has a stronger effect on social cognition. Narratives with social content lead to more activation in brain areas related to theory of mind, compared with nonsocial narratives (Tamir et al., 2016). In addition, especially narratives that convey negative emotion seem to engage these areas (Altmann et al., 2012). This finding is further supported by a correlational study that found that exposure to romance, a genre known to focus on relationships and emotions, more so than exposure to other fictional genres, was related to better performance on the RMET, even while controlling for various variables including English fluency, trait openness, and extraversion (Fong et al., 2013). Other content-related aspects that might play a role include the number of characters (Kuzmičová et al., 2017), the morality or likeability of characters (Habermas & Diel, 2010; Salgado & Tourhout, 2018), or the similarity between the character and the reader (Komeda et al., 2013). More research is needed to further explore the role of story content and its interaction with the narrative form in the social-cognitive potential of narratives.

Crucially, the narrative form is also known to elicit processes of narrative engagement, such as absorption (Kuijpers et al., 2014) or transportation (Green et al., 2004): the pleasurable feeling of “being lost” in a story world (Nell, 1988), as well as narrative empathy (Keen, 2007), and mental imagery. Future research could therefore also investigate the role of functional aspects of narratives (i.e., related to the experience) as opposed to extensional aspects (i.e., related to form/content; Tay et al., 2018). For example, Calarco et al. (2017) argue that absorption and identification might facilitate the social-cognitive potential of narratives: the more readers are absorbed in the narrative and align themselves with the characters, the more social processes might be activated and thus trained.

Differences in the extent to which narrative engagement is evoked during reading have already been found to modulate the effect of (literary, fictional) narratives on empathy and prosocial behavior (P. M. Bal & Veltkamp, 2013; Johnson, 2012, 2013; Johnson, Cushman, et al., 2013; Johnson, Jasper, et al., 2013; Stansfield & Bunce, 2014; Walkington et al., 2019). However, as Tay et al. (2018) point out in their model on the role of the arts and humanities in human flourishing: it remains to be seen whether these forms of engagement are mediators (i.e., text-dependent) or moderators (i.e., reader-dependent). In other words, it is not clear yet whether certain narratives might bring about a form of narrative engagement that

consequently positively impacts social cognition, or whether readers with a higher disposition for this type of engagement (e.g., high transportability) benefit more from exposure to narratives.

The studies discussed above give an impression of the narrative characteristics that may play a role in advancing social-cognitive abilities through narrative exposure. As became apparent from the discussions, the main challenge lies in designing research designs that can help move the study of the driving factors behind the social-cognitive potential of narratives beyond the broad concepts of literariness and fictionality. Crucially, this might call for new experimental approaches, such as textual manipulations, within-subject designs, or methodologies such as eye tracking or other methods that allow for the measurement of online effects of word-level characteristics. Finally, as narrativity can be distinguished from literariness and fictionality, a broader range of narratives should be included in future research. For example, nonfictional narratives, both of literary quality (e.g., biographies, memoirs, literary journalism; van Krieken, 2019) and nonliterary quality (e.g., personal narratives) could be studied to see how social-cognitive abilities are impacted by engaging with narrative accounts of real-life events.

### **3.4.2 What Types of Readers Are Susceptible to These Effects?**

The effect of exposure to narratives likely does not only vary as a function of textual characteristics but also depends on characteristics of the reader and the interaction between the text and the reader (see also Gerrig & Mumper, 2017). Some scholars have even argued that the match between the reader and the text might be more important than the text itself (Tay et al., 2018). Nevertheless, previous research has mostly only controlled for individual differences in trait empathy and print exposure between adult readers (e.g., Kidd & Castano, 2013), or differences in demographic variables such as age and parental income between children (e.g., Mar et al., 2010). Relatively few studies have looked at these and other individual differences as factors of interest and this might partially explain the mixed findings observed thus far: by lumping together a heterogeneous sample of participants into a single “idealized reader”, we might miss the possibility that readers with different characteristics react differently to the same text. In this section, we will discuss opportunities for future research related to individual differences between readers and their susceptibility to the social-cognitive potential of narratives.

Several studies provide evidence for the role of individual differences in the relationship between narrative reading and social cognition. As described above, a beneficial effect of reading literary fiction over nonfiction was found for readers with low scores on the openness dimension of the Big Five Inventory but not for readers high in openness (Djikic et al., 2013b). In a similar study, readers with a highly avoidant attachment style were found to experience more emotion change after reading an excerpt of literary fiction than after

reading a matched expository text, whereas the difference between the two texts was not significant for readers with a less avoidant attachment style (Djikic et al., 2009a). A study on the long-term associations between reading habits and social cognition also reported that, after controlling for multiple other individual differences, a positive association between exposure to narrative fiction and empathic concern was only found for high school students with a low tendency to become transported into narrative worlds (i.e., low transportability; Lenhart et al., 2020). Together, these findings seem to suggest that exposure to narratives is especially beneficial to readers who have a tendency to avoid emotional situations. That is, readers who normally have a hard time opening up to emotional experiences or might even resist such experiences, might feel safe to let their guard down when reading narrative representations of emotional situations and subsequently benefit more from doing so than those who already find themselves in emotional situations regularly in daily life.

In addition, age and social-cognitive development might play a role in how sensitive readers are to the benefits of narrative exposure. Mar (2018) argues that the degree to which readers' social-cognitive abilities are receptive to change might vary with age, such that large effects of narrative exposure could be expected in children and adolescents (Kilford et al., 2016) whose social cognition is still in the midst of development. While adults on average might have less room for improvement, exposure to narratives might still affect those with relatively large opportunity for development, such as those who with an autism spectrum disorder (see Tsunemi et al., 2014). To further understand how social cognition might be fostered through narrative exposure across the life span, more research is thus needed to understand what aspects of social cognition are receptive to what degrees of improvement in various stages of development (see also Mar, 2018). Note that at least in the case of empathy, there is evidence that adults can still improve their empathic skills through various training interventions (e.g., role-play activities; Bas-Sarmiento et al., 2020; Teding van Berkhout & Malouff, 2016; Weisz et al., 2021).

Although, on the one hand, some room to grow might be needed for the social-cognitive potential of narratives to arise, some basic level of social-cognitive abilities might, on the other hand, already be needed to be able to understand and thus benefit from narratives. For example, Pavias et al. (2016) showed that the ability to recall socially relevant aspects of narratives increases with age, especially during adolescence, potentially mirroring developments in social cognition (see also Sebastian et al., 2012). Moreover, even within healthy adults social-cognitive abilities affect narrative processing (Eekhof, van Krieken, et al., 2021). However, given that positive effects of reading have been found in children as young as three years (e.g., Rose et al., 2018), these minimally required abilities might be in place already at early stages of social-cognitive development.

Similarly, individual differences in verbal and reading abilities might play a role. Readers who have a hard time reading and understanding a narrative, might not be able to form rich simulations of the story world and character's minds. Indeed, various studies have found that readers with higher print exposure scores find it easier to emotionally engage with story characters (Koopman, 2015, 2016; van Lissa et al., 2018). Thus, a certain level of reading abilities might need to be in place in readers, possibly depending on the complexity of the narrative as well, in order for the social-cognitive potential of narratives to arise.

Besides these trait-related individual differences, a study by Koopman (2015) suggests that personal experience with the topic of a narrative leads to more prosocial behavior and empathic understanding: participants who had personal experience with depression were more likely to donate money to charity and reported more understanding for depressed patients after reading, regardless of the genre of the text they had just read (see also Green, 2004). The author suggests that readers with personal experience with a topic might be more engaged by a story, potentially leading to more activation of social-cognitive processes. This idea is backed up by an fMRI study by Chow et al. (2015): not only did readers report more vivid imagery when they had personal experience with the situations described in a story, it was also found that connectivity within motor and visual regions increased with personal experience, suggesting that personal experience leads to richer or deeper forms of narrative engagement.

In a similar vein, some researchers have also suggested that there might be a role for personal preferences (e.g., De Mulder et al., 2021; Djikic et al., 2012; Panero et al., 2016), such that when readers are allowed to choose what narrative they want to read, more positive effects might be observed, again because narrative engagement seems to facilitate the effect of reading on social cognition (see previous section).

To conclude, future studies should focus on the characteristics that make readers more or less sensitive to the social-cognitive potential of narratives in general and in relation to specific types of narratives and textual characteristics. Including measures of individual differences in experiments might reveal interesting patterns of sensitivity in heterogeneous groups of readers that might otherwise have been overshadowed by the absence of significant main effects of narrative exposure. Besides emotional disposition, social-cognitive development, verbal abilities, personal experience and preference, additional relevant characteristics that have been found to play a role in other narrative processes include the need for affect (Maio & Esses, 2001) and the need for cognition (Cacioppo & Petty, 1982; see also Appel & Richter, 2010; Green et al., 2008; Kuijpers et al., 2019). Finally, the individual differences approach will not only advance our understanding of the precise workings of the social-cognitive potential of narratives but will also open up the possibility of reliably and strategically putting this



potential into practice, for example in patient populations that need additional empathy training (Calarco et al., 2017).

### **3.4.3 Which Aspects of Social Cognition Are Influenced by Narrative Reading?**

Following theoretical accounts on the social-cognitive potential of narratives, most empirical studies have focused on the relationship between narrative reading and the broad concepts of empathy and theory of mind. Future studies should aim for both a deeper and broader view on the aspects of social cognition that narratives might influence. In this section we will discuss the practical and theoretical challenges that come with this line of research.

One of the primary challenges that empirical studies of the social-cognitive potential of narratives have faced is to translate theoretical claims about the effects of narratives on social cognition into experiments that test how specific, quantifiable social-cognitive abilities are affected by exposure to narrative. This is difficult for two reasons. First of all, it is not always clear what a specific task measures, or, vice versa, how a certain ability can be measured in a valid way. For example, the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001) has been used to make claims about a broad variety of abilities (Stansfield & Bunce, 2014), ranging from emotion recognition (van Kuijk et al., 2018) to empathy (Djikic et al., 2013b), cognitive empathy (Mar et al., 2006), and affective theory of mind (Kidd & Castano, 2013). As a result, it is hard to draw sound conclusions on the specific aspects of social cognition that are impacted by exposure to narratives.

Second, Turner and Felisberti (2017) have noted the lack of tasks that can reliably measure the subtle differences in mindreading abilities that can be expected among healthy adults. They argue that most tasks that are available suffer from ceiling effects, as they were originally designed to be used in clinical and developmental contexts, for example to distinguish those with autism spectrum disorders from healthy controls (see also Black, 2019). In general, then, an important avenue for future research is to develop tasks and measures that can support more specific claims about the relationship between narratives and particular social-cognitive abilities.

Another important avenue for future studies involves broadening the scope of social-cognitive abilities under investigation beyond empathy and theory of mind. As Mar (2018) has shown in his SPaCEN framework, the proposed mechanism behind the relationship between narrative reading and empathic and mindreading abilities can be applied to a range of aspects of social cognition, as long as these abilities depend on either trainable processes that are activated by narrative reading or knowledge that narratives can convey.

Empirical research on the effects of narrative exposure on other social-cognitive abilities is relatively scarce thus far but provides some promising leads. Exposure to narratives has been found to increase certain behaviors that might depend on social-cognitive abilities, such as prosocial behavior (Johnson, 2012; Koopman, 2015). For example, readers who reported feeling high levels of affective empathy for the main protagonist of a narrative during reading were twice as likely to help the experimenter pick up dropped pens than those who reported low levels of affective narrative empathy (Johnson, 2012). Reading a narrative can also reduce prejudice and stereotyping (Hakemulder, 2000; Johnson, 2012, 2013; Johnson, Jasper, et al., 2013; Koopman, 2015; Vezzali et al., 2015; see also Fong et al., 2015, for long-term effects on sexual stereotyping). For instance, readers who were transported in a narrative describing the experiences of an Arab Muslim woman reported less stereotypical beliefs about Arab Muslims afterward and experienced more positive attitudes (Johnson, 2013). This effect was mediated by the degree to which participants experienced affective empathy toward the protagonist of the narrative.

In addition to empathy and theory of mind, which have been the primary focus of research thus far, prosocial behavior and stereotyping, which have started to gain more interest, future research could study the effect on other social-cognitive abilities related to understanding others, such as emotional contagion, emotion recognition, emotion regulation, social memory, social schemas, facial recognition, or even processes related to understanding the self (see also Mar, 2018). When we have a more detailed understanding of the various social-cognitive abilities that are positively (or negatively) affected by narrative reading, this will also clear the ground for clearly targeted interventions in populations suffering from specific social-cognitive deficits.

### 3.5 Conclusion

Inspired by reflections on the function of narratives, recent years have seen a rise in studies looking at the relationship between narrative reading and social cognition. A review of the empirical literature on both the correlations between reading habits and social-cognitive abilities and the causal effects of narrative exposure on these abilities shows conflicting findings: although the long-term associations are rather stable, reading a single narrative sometimes does and sometimes does not lead to improved social-cognitive abilities compared with reading nonnarrative expository texts or nothing, and this approach has recently received criticism. Ultimately this means that the question “does narrative reading promote social-cognitive abilities?” cannot be answered unequivocally. However, another way of looking at these conflicting findings might be to think of narratives as having a social-cognitive potential that sometimes does and sometimes does not arise. In this chapter, we

have argued that future research should focus on mapping out the circumstances that allow this potential to come about by focusing on specific aspects of the reader, the text, and social cognition (see also Panero et al., 2016).

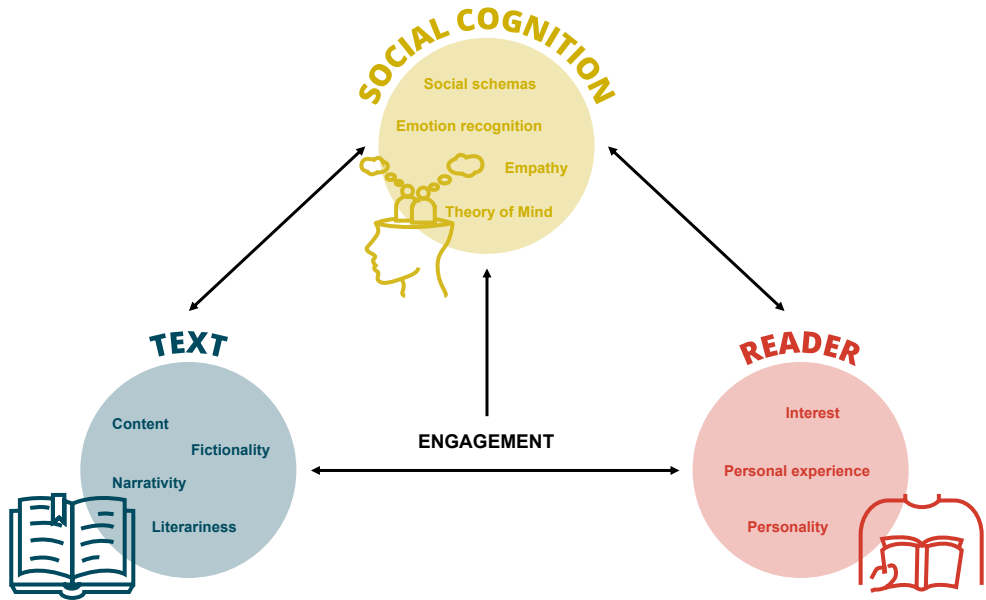
Figure 3.1 graphically represents the three factors of interest in the study of the social-cognitive potential of narratives as mapped out in this chapter. Above, we have identified open questions related to these factors that can guide future explorations on this topic. First of all, studies should focus on unraveling the text characteristics that drive narrative effects on social cognition. A review of existing empirical work shows that most studies have focused on the general categories of fictionality and literariness (Koopman & Hakemulder, 2015), but we have argued for a shift toward studies focusing on more specific narrative textual features such as markers of perspective and characteristics of protagonists. Furthermore, future studies will benefit from integrating an individual differences approach, as not all readers can be expected to react to a single narrative in the same way. Hence, taking into account personality characteristics such as the need for cognition or need for affect might show interesting patterns of sensitivity. Finally, deepening and broadening our view of social cognition, by developing more specific measures and investigating social-cognitive processes beyond empathy and theory of mind, will further our understanding of the specific aspects of empathy and mindreading as well as other social-cognitive abilities that narrative reading may foster.

Note that there are also relevant questions related to the interactions between these three factors that future research may study, as indicated by the arrows in Figure 3.1. For example, do specific textual characteristics affect different aspects of social cognition (interaction between narrative and social cognition)? How do readers differ in the degree to which various aspects of social cognition are susceptible to improvement through narrative exposure (interaction between social cognition and reader)? Are readers sensitive to different types of narratives (interaction between narrative and reader)?

Finally, recent empirical work on the relationship between narratives and social cognition has sparked plenty of other questions and avenues for further research, such as the case of other narrative media (see Black & Barnes, 2015a, 2019; Mar et al., 2010; Nathanson et al., 2013) or even other art forms and their relationship with social cognition (for an overview, see Kou et al., 2020), the timeline of the effects of narrative exposure (see P. M. Bal & Veltkamp, 2013), and the effects of writing rather than reading narratives (e.g., Kou et al., 2020; Maslej et al., 2017). Research on these questions may also benefit from the approach outlined here, that is, by focusing on specific factors of interest, taking into account individual differences between readers (or listeners, spectators etc.), and studying a wide range of social-cognitive abilities.

To conclude, the mixed findings in the empirical literature on the relationship between narrative reading and social cognition do not warrant pessimism. Rather, they provide plenty of avenues for reflection and incentives for new, carefully designed studies. Taking the research questions this review has identified as a guideline, we hope future research will unravel the circumstances that allow the social-cognitive potential of narratives to emerge.

**Figure 3.1** Factors of Interest in the Study of the Social-Cognitive Potential of Narratives and Their Interactions







# Chapter 4

## Does Reading about Fictional Minds Make Us More Curious about Real Ones?

**This chapter has been published as:**

Eekhof, L. S., & Mar, R. A. (2023).

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

*Language and Cognition, Advance Online Publication.*

<https://doi.org/10.1017/langcog.2023.30>

## 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.



## 4.1 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 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.

### 4.1.1 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 (M. 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, 1999b). 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).

### 4.1.2 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 (H. W. 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., P. M. Bal & Veltkamp, 2013; Black & Barnes, 2015b; 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).

#### 4.1.2.1 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 .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.

#### **4.1.2.2 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., 2013a; 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.

### 4.1.3 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 this chapter 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.

## 4.2 Method

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

### 4.2.1 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 preregistered 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 Materials). 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 preregistration 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 preregistration).

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 4.5) found that with this sample we had an 80% chance of detecting a statistically significant effect, for an effect-size of  $f^2 = .057$  or greater (equivalent to an  $R^2$  value of .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).

## 4.2.2 Materials

### 4.2.2.1 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 4.1.

### 4.2.2.2 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*).

#### **4.2.2.3 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 in van Tilburg and colleagues (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 and colleagues (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 boardgame nights). To avoid ceiling effects induced by socially desirable responding for those concerned about appearing unprejudiced based on race, we selected pictures of white people for four of the six profiles.

Table 4.1 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
<b>Grand mean for narrative condition (SD)</b>					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
<b>Grand mean for expository condition (SD)</b>					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)

#### 4.2.2.4 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 vs. exposition) and state social curiosity. The Social Curiosity Scale consists of ten 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-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 ten items, with Cronbach's alpha around .80 (e.g., Fitri et al., 2020; Hartung & Renner, 2013; Renner, 2006).

#### 4.2.3 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.

#### 4.2.4 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 ( $\omega = .91$ , 95% CI [.88, .93]) and SCS scores, reflecting trait social curiosity ( $\omega = .81$ , 95% CI [.68, .87]).



Although we preregistered 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 preregistration and fit linear regression models instead. This also meant that we refrained from using Bayes Factors to quantify any effects, as initially preregistered for the linear mixed models. Second, we preregistered 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 preregistration. Although the texts in the two conditions differ slightly with respect to some surface-level textual characteristics (Table 4.1), 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 vs. exposition) and gender (as a control variable) as our predictors. In line with our preregistration, we did not include age as a predictor, because the correlation between age and state social curiosity (SISC) was smaller than .1 (Table 4.2). 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 preregistration, 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/>).

## 4.3 Results

### 4.3.1 Descriptive Statistics

The descriptive statistics and correlations for all measures appear in Table 4.2. 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 4.2** Descriptive Statistics and Correlations

Variable	M (SD)	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			
3. Trait Social Curiosity (SCS)	4.68 (0.96)	1.50	6.80	[-.16, .10] -.10	.29**		
4. Reading Speed (wpm)	240.19 (74.39)	27.67	382.46	[-.23, .03] .05	[.17, .41] -.09	.00	
5. Reading Time (minutes)	9.60 (5.29)	4.30	59.46	[-.08, .19] -.10	[-.22, .04] .09	[-.13, .14] .05	-.77**
				[-.23, .03]	[-.04, .22]	[-.08, .18]	[-.82, -.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.

\*  $p < .05$ . \*\*  $p < .01$ .

### 4.3.2 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 4.3). Regression diagnostics identified three influential outliers that were removed before 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 (Figure 4.1). 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 4.4, Figure 4.1). Overall, gender and condition predicted about 4% of the variance in state social curiosity scores.

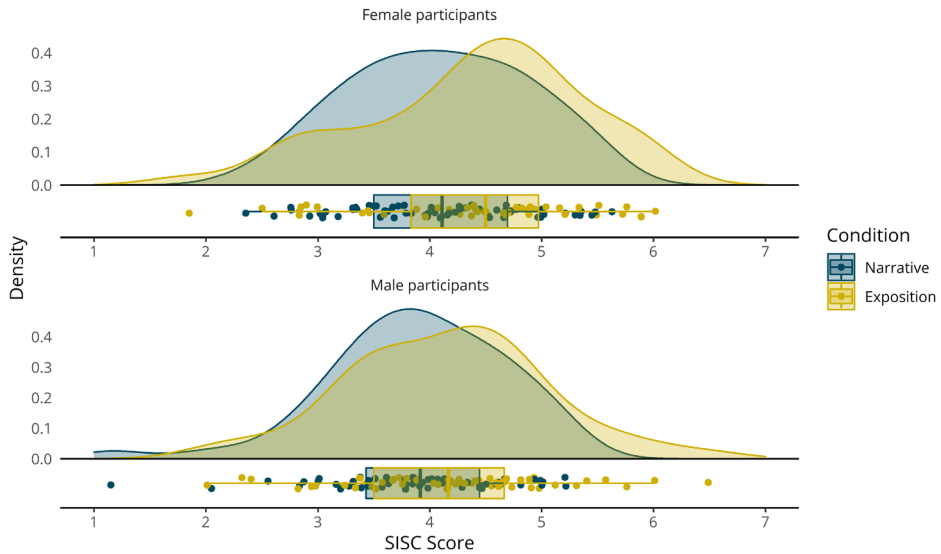
When examining state social curiosity scores between the different texts, some small differences were observed (Table 4.4). However, it is unlikely that these differences between individual texts could cause or obscure the effect of condition that we observed. Furthermore, as exemplified in Figure 4.2, state social curiosity does not seem to covary with text length or text complexity (as indexed by Flesch-Kincaid Grade Level).

**Table 4.3** 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	< .001***
Condition (Narrative)	-0.26	-0.48	-0.04	.021*
Gender (Male)	-0.24	-0.46	-0.02	.031*
Fit	$R^2 = .041^*$ (95% CI [.00, .10]) $F(2, 214) = 4.56$ , $p = .012$			

*Note.* Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Figure 4.1** Density Plot of State Social Curiosity (SISC) by Condition and Gender

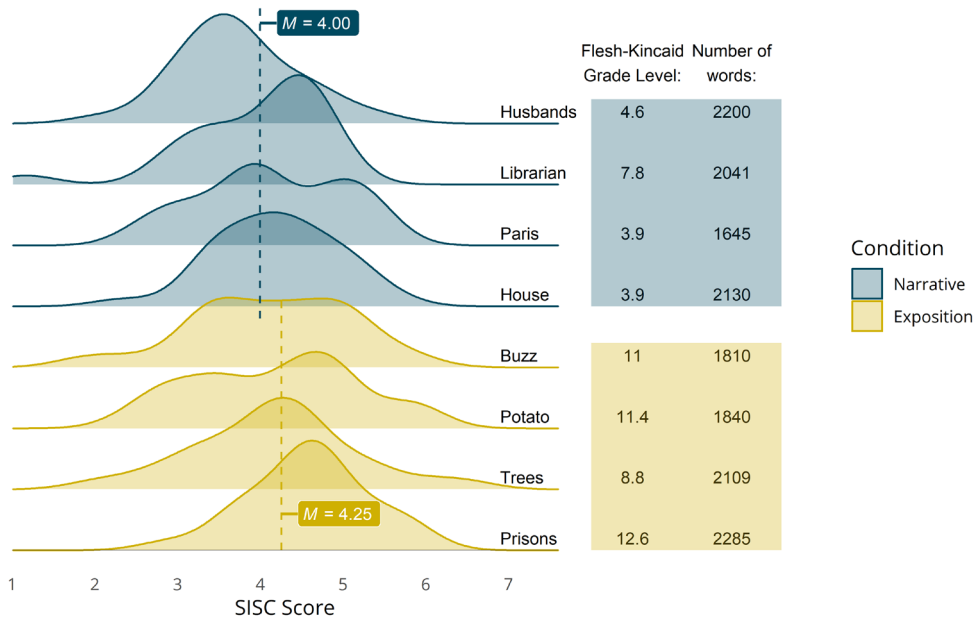
*Note.* Figure is based on the full data set (excluding those who did not identify as either female or male;  $N = 220$ ).

**Table 4.4** 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 ( $N = 222$ ).

**Figure 4.2** Density Plots of State Social Curiosity (SISC) by Text and Condition Sorted by Mean State Social Curiosity (SISC) Scores per Text



*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*.

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 4.5). 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]).

**Table 4.5** 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 (B)	95% CI		p
		LL	UL	
(Intercept)	3.02	2.42	3.62	< .001***
SCS Score	0.25	0.13	0.37	< .001***
Condition (Narrative)	0.47	-0.64	1.57	.406
Gender (Male)	-0.13	-0.34	0.09	.246
SCS Score * Condition (Narrative)	-0.14	-0.37	0.09	.224
Fit	$R^2 = .120^{**}$ (95% CI [.04, .19]) $F(4, 209) = 7.14$ , $p < .001$ .			

Note. Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### 4.3.3 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 lowest 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*; Figure 4.2). 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 preregistered. 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 (VIP; 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 interrater agreement was almost perfect (96.15%;  $\kappa = .80$ )<sup>11</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 4.1), 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 4.6). 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 (Figure 4.3). As in the main analysis, men were less socially curious than women after reading, regardless of the

11 Interrater agreement for the categorical distinction between perceptual vs. cognitive vs. emotional vs. no viewpoint markers was also good (95.63%;  $\kappa = .78$ ).

viewpoint score of the text they read (Figure 4.1). Overall, viewpoint score and gender predicted about 4% of the variance in state social curiosity scores.

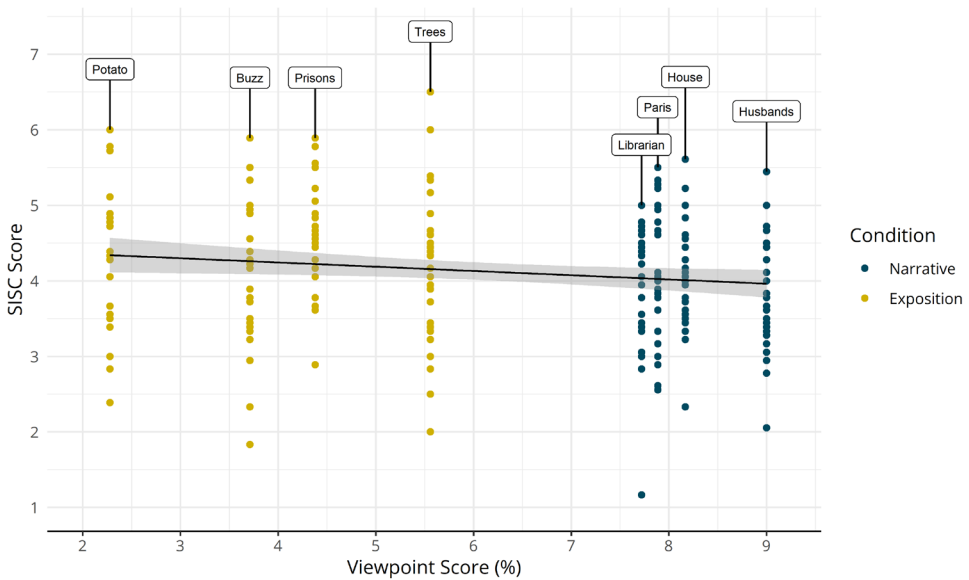
**Table 4.6** Estimates for the Regression Model Predicting State Social Curiosity (SISC) Based on Viewpoint Score and Gender

Predictors	Estimates (B)	95% CI		p
		LL	UL	
(Intercept)	4.63	4.28	4.98	< .001***
Viewpoint Score	-0.06	-0.11	-0.01	.015*
Gender (Male)	-0.24	-0.46	-0.02	.030*
Fit	$R^2 = .044^*$ (95% CI [.00, .10]) $F(2, 214) = 4.92, p = .010$			

Note. Estimates represent unstandardized regression weights. LL and UL indicate the lower and upper limits of a confidence interval, respectively.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Figure 4.3** 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.



## 4.4 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., 2022b; 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, van Krieken, 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., P. M. Bal & Veltkamp, 2013; Black & Barnes, 2015b; 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 and colleagues (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.



# Part II

**From Reading Minds  
to Reading Narratives**



# Chapter 5

## Reading Minds, Reading Stories: Social-Cognitive Abilities Affect the Linguistic Processing of Narrative Viewpoint

**This chapter has been published as:**

Eekhof, L. S., van Krieken, K., Sanders, J., & Willems, R. M. (2021).  
Reading Minds, Reading Stories: Social-Cognitive Abilities  
Affect the Linguistic Processing of Narrative Viewpoint.  
*Frontiers in Psychology, 12*, 698986.  
<https://doi.org/10.3389/fpsyg.2021.698986>

## Abstract

Although various studies have shown that narrative reading draws on social-cognitive abilities, not much is known about the precise aspects of narrative processing that engage these abilities. We hypothesized that the linguistic processing of narrative viewpoint—expressed by elements that provide access to the inner world of characters—might play an important role in engaging social-cognitive abilities. Using eye tracking, we studied the effect of lexical markers of perceptual, cognitive, and emotional viewpoint on eye movements during reading of a 5000-word narrative. Next, we investigated how this relationship was modulated by individual differences in social-cognitive abilities. Our results show diverging patterns of eye movements for perceptual viewpoint markers on the one hand, and cognitive and emotional viewpoint markers on the other. Whereas the former are processed relatively fast compared with non-viewpoint markers, the latter are processed relatively slowly. Moreover, we found that social-cognitive abilities impacted the processing of words in general, and of perceptual and cognitive viewpoint markers in particular, such that both perspective-taking abilities and self-reported perspective-taking traits facilitated the processing of these markers. All in all, our study extends earlier findings that social cognition is of importance for story reading, showing that individual differences in social-cognitive abilities are related to the linguistic processing of narrative viewpoint.



## 5.1 Introduction

Although reading might seem a rather solitary activity compared with engaging in social interaction, many scholars have argued that social-cognitive processes play an important role during story reading. That is, the abilities we use in our daily lives to make sense of the emotions, beliefs, intentions, and behavior of others, such as empathy, emotion recognition, and theory of mind, are also engaged when we read about fictional others in stories (Mar & Oatley, 2008; Oatley, 1999b; Zunshine, 2006). However, despite research underlining the importance of social-cognitive abilities for story reading, it is not clear exactly what aspects of narrative processing require readers to put these abilities to work. In other words, there is relatively little research on the relationship between social-cognitive abilities and the processing of specific narrative characteristics.

In this study we therefore investigated how individual differences in readers' social-cognitive abilities are related to a crucial aspect of narrative processing, namely the linguistic processing of narrative viewpoint. In what follows, we will first discuss the role of social cognition during narrative reading. After introducing the multidimensional concept of narrative viewpoint, we will discuss why the linguistic processing of narrative viewpoint is likely related to readers' social-cognitive abilities.

### 5.1.1 Social Cognition and Narrative Reading

The contention that narratives engage social-cognitive abilities follows from two views on what constitutes a narrative. First, narratives are often loosely defined as the representation of a sequence of events that are related in time (e.g., Abbott, 2008; Toolan, 2001; for an overview, see Ryan, 2007). In line with these plot-focused definitions, Zunshine (2003, 2006) has argued that much like displays of behavior in real life, textual descriptions of narrative events can invite readers to use their theory of mind abilities to assign mental states to the characters performing these events. For example, descriptions of the actions and/or body language of characters might leave the reader wondering why a character behaves in a certain way, or guessing how the character feels, living through these events. Hence, on this account, social cognition might play an important role in making sense of the plot of narratives.

In addition, scholars have stressed the subjective aspect of narratives (e.g., M. Bal, 2009; Bruner, 1986). For example, M. Bal (2009, p. 10) gives the following definition: “[...] a series of connected events caused or *experienced by actors* presented in a specific manner” [emphasis added]. On such accounts, narratives are unique because the events always presuppose the presence of someone who experiences these events. As a result, authors can choose to directly represent the internal states of their protagonist through the use of, for example,

mental verbs (*to think, to believe*) or other perspectivization techniques that grant the reader direct access to the mind of story characters (Eekhof et al., 2020; van Krieken et al., 2017). These mental representations might also elicit a form of perspective taking in readers (van Krieken et al., 2017).

Comprising the above approaches, narratives can be seen as a sequence of textual cues, guiding the reader to form a cognitive, social, and emotional simulation of what is described in the narrative (Mar & Oatley, 2008; Oatley, 1999b). Crucially, such a simulation also requires readers to employ social-cognitive abilities to “reconstruct the minds” of the narrative characters (Ryan, 2007, p. 28). In a similar vein, Koopman and Hakemulder (2015, p. 91) argue that an important aspect of being absorbed in a story world is “empathic imagination”, a process whereby the reader uses empathic abilities to imagine “how it would be to be in the shoes of a particular character”.

Several studies provide (indirect) evidence for the involvement of social-cognitive abilities during narrative reading. For example, a range of fMRI studies has shown that brain regions that are part of the mentalizing network (e.g., mPFC, bilateral pSTS/TPJ) are also activated during narrative comprehension (e.g., Mason & Just, 2009; for a meta-analysis see Mar, 2011). Furthermore, theory of mind development in children parallels developments in the processing of narratives. For example, recall of socially relevant details of a story has been found to increase between adolescence and adulthood, potentially mirroring a development in social-cognitive abilities in the same period (Pavias et al., 2016). Similarly, in a story retelling task, both age and theory of mind abilities were found to positively predict the ability to coordinate story characters’ actions and mental states in preschoolers (Pelletier & Wilde Astington, 2004; see also Fernández, 2013). Finally, in a longitudinal study, children’s theory of mind scores at age four predicted narrative comprehension and recall two and a half years later (Atkinson et al., 2017). Taken together, these studies tentatively suggest that social-cognitive abilities play a role in narrative comprehension, both in adults and in children.

However, many of the previous studies have taken a rather broad look at narrative processing, looking at the relationship between social cognition and story reading in general (fMRI studies), or narrative comprehension and recall after reading (developmental studies). As a result, not much is known yet about the specific aspects of narrative processing that engage readers’ social-cognitive abilities. Two fMRI studies, however, did find that processing stories rich in descriptions of characters’ mental states (Tamir et al., 2016) and stories with negative valence (i.e., dealing with negative events such as crimes and disasters; Altmann et al., 2012) elicited more activation in brain regions related to theory of mind (e.g., dmPFC subnetwork) compared with stories with less socially relevant content and stories with positive valence, suggesting that, broadly speaking, processing of social and negatively

valenced narrative content draws on social-cognitive abilities. Nevertheless, more research is needed to elucidate what exactly it is about narratives that requires readers to use their social-cognitive abilities. That is, future studies should provide a more detailed account of the facets of narrative processing that engage social cognition.

### 5.1.2 Narrative Viewpoint

An aspect of narrative processing that might play a role in the engagement of social-cognitive abilities during reading is the linguistic processing of narrative viewpoint. As explained above, narratives presuppose the presence of an “experiencing subject” (J. Sanders & Redeker, 1996). Typically, the events in narratives are always grounded in and related through the subjective viewpoints (or perspectives) of these experiencing characters and/or narrators (J. Sanders, 1994). During reading, readers align themselves with the events and dynamically take the perspective of one or more of the characters and/or narrators, both in terms of their spatio-temporal viewpoint in the narrative world and in terms of their inner viewpoint or consciousness (Vandelanotte, 2017). In their Linguistic Cues Framework, van Krieken and colleagues (2017) distinguish between multiple dimensions of viewpoint and argue that each dimension is regulated by different linguistic cues. For example, perceptual viewpoint, referring to the narrative representation of characters’ perceptions and sensations, can be expressed through the use of perceptual verbs (*to watch, to hear*), emotional viewpoint, referring to the narrative representation of characters’ emotions, can be expressed through the use of emotion adjectives (*angry, delighted*), and cognitive viewpoint, referring to the narrative representation of characters’ mental states, can be expressed through epistemic markers (*probably, definitely*). Crucially, these linguistic viewpoint markers are hypothesized to invite the reader to identify with a particular subject in the narrative (van Krieken et al., 2017). In other words, linguistic markers of viewpoint can be seen as a signal to the reader to engage in perspective taking. As such, viewpoint markers might play an important role in eliciting social-cognitive processes during narrative reading, given that perspective taking is an important aspect of social cognition (Frith & Frith, 2006; Goldman & de Vignemont, 2009; Healey & Grossman, 2018).

Interestingly, literature on the development of language and theory of mind provides evidence that social cognition plays a role in the linguistic processing of viewpoint markers such as verbs of cognition and emotion, although this has not always been tested in narrative contexts (for a general overview on the relationship between language acquisition and theory of mind acquisition see Milligan et al., 2007). For example, comprehension of verbs of cognition in short stories has been found to be related to performance on first-order false belief tasks, and to a lesser degree to second-order false belief tasks in children aged between four and eight years (Antonietti et al., 2006), and to second-order false belief tasks in children aged between eight and eleven years (Grazzani & Ornaghi, 2012). Similarly, in a task that

required children to make sense of spoken instructions to find an object, comprehension of modal verbs and adjectives, which can be considered markers of cognitive viewpoint (Eekhof et al., 2020; van Krieken et al., 2017), was significantly related to performance on first-order false belief tasks in four-year-olds (Moore et al., 1990). Furthermore, comprehension of verbs of emotion on a short-story task was significantly correlated with emotion understanding in a study with seven- to ten-year-olds (Ornaghi & Grazzani, 2013). These results indicate that individual differences in social-cognitive abilities are related to the linguistic processing of at least emotional and cognitive viewpoint markers in children, suggesting that social cognition and the processing of narrative viewpoint somehow go hand in hand.

All in all, viewpoint markers are likely to play a role in engaging social-cognitive processes during the reading of narratives, as at least in childhood the processing of viewpoint markers has been found to be related to individual differences in social-cognitive abilities. Hence, we wanted to further investigate the relationship between the linguistic processing of viewpoint markers in narratives and social-cognitive abilities in adult readers. Our rationale was that if individual differences in social-cognitive abilities affect the linguistic processing of narrative viewpoint, this highly suggests that markers of narrative viewpoint engage these social-cognitive abilities.

### **5.1.3 Current Study**

We set out to study how the linguistic processing of narrative viewpoint markers is affected by individual differences in social-cognitive abilities, using eye tracking. Hence, as a first step we aimed to find out how perceptual, cognitive, and emotional viewpoint markers affect reading behavior. More importantly, we then assessed how these effects are modulated by social-cognitive abilities. In sum, the current study aimed to answer the following research question:

*What is the effect of perceptual, cognitive, and emotional viewpoint markers in narratives on reading behavior, and how is this effect modulated by individual differences in social-cognitive abilities?*

Based on a study by M. Mak and Willems (2018), who found that narrative passages describing characters' perceptions, thoughts, and emotions increased reading times, we hypothesized viewpoint markers to be processed slower than non-viewpoint markers. We also hypothesized that, in general, social-cognitive abilities would modulate the effect of viewpoint markers on reading behavior. More specifically, and based on the research that shows that theory of mind abilities positively predict narrative comprehension in general (e.g., Atkinson et al., 2017), and the acquisition of epistemic markers, verbs of cognition, and verbs of emotion specifically (Antonietti et al., 2006; Grazzani & Ornaghi, 2012; Moore et al.,

1990; Ornaghi & Grazzani, 2013), we tentatively hypothesized that social-cognitive abilities lead to faster processing of viewpoint markers (i.e., more skipping, shorter gaze durations, less rereading). We did not have specific hypotheses about the modulating effect of social-cognitive abilities for each specific viewpoint marker category separately.

## 5.2 Method

An eye-tracking study was designed to study the linguistic processing of viewpoint markers by looking at the effect of these markers on skip rate, gaze duration, and re-reading rate (for the justification of these eye-tracking methods, see Pre-Processing of Eye-Tracking Data). We chose to focus on markers of perceptual, cognitive, and emotional viewpoint as we expected the processing of these viewpoint dimensions to be most relevant to the domain of social cognition. We opted for eye tracking as an appropriate method for several reasons. First, contrary to, for example, self-paced reading, eye tracking provides a relatively ecologically valid way to study reading, as participants can be presented with large pieces of texts without any additional task. Furthermore, eye tracking has proven to be a useful method to study individual differences in narrative processing, as evidenced by recent studies on individual differences in mental simulation (M. Mak & Willems, 2018), sensitivity to literary style (van den Hoven et al., 2016), sensitivity to lexical characteristics and absorption (Eekhof, Kuijpers, et al., 2021), metaphor processing (de Vries et al., 2018), and reading style (Faber et al., 2020) during story reading. Contrary to previous studies, we used a nonfictional rather than a fictional narrative, published in a well-established journalistic weekly magazine. A main function of narrative journalism is to increase the general audience's understanding of society in all its complexities and to enhance the audience's sense of being part of that society (van Krieken & Sanders, 2021). In this genre, narrative perspective taking is typically stimulated by multiple linguistic viewpoints that readers are invited to share (van Krieken et al., 2015). As viewpoint techniques are typical of narratives regardless of their fictionality, we believe research on the relationship between social cognition and narratives should be expanded to include nonfictional narratives as well (see also Koopman & Hakemulder, 2015).

Our materials, data, and code are all publicly available on the Open Science Framework (<http://www.osf.io/xdjtp>).

### 5.2.1 Participants

Based on a power simulation (see Data Management) we aimed for a sample of 90 participants. Taking into account the high rate of data rejection in eye-tracking studies with long texts, we recruited 114 native speakers of Dutch with normal or corrected to normal vision and no history of reading disorders from the participant pool of Radboud University to

take part in the experiment in exchange for money (€15) or course credit. Three participants did not finish the experiment because of time constraints or technical failure. Of the remaining participants, 21 had to be excluded due to poor quality of eye-tracking data (see Pre-Processing of Eye-Tracking Data). After data rejection, the final sample contained data from 90 participants, aged between 18 and 48 years ( $M = 23.30$ ,  $SD = 5.49$ , 67 females, 23 males). The experiment was conducted in accordance with the declaration of Helsinki and was approved by the institutional ethics assessment committee (approval number 2018-3568).

## 5.2.2 Materials

### 5.2.2.1 Narrative

A Dutch nonfictional narrative (i.e., journalistic narrative; see van Krieken, 2019; van Krieken & Sanders, 2021) published in a weekly Dutch news magazine, *Vrij Nederland*, was presented to all participants.<sup>12</sup> The story describes a real-life missing person case and is told from the perspective of the missing man's brother, who struggles to find peace during the 16 years that his younger brother is missing. At the end of the story, the missing man's remains are found in a river and it is revealed that he had passed away as the result of a car crash. All paratextual elements (e.g., pictures and pull quotes) except the title were removed for the experiment, resulting in a 5077-word text.<sup>13</sup>

The ViewPoint Identification Procedure (VPIP; Eekhof, Van Krieken & Sanders, 2020) was applied to identify all markers of perceptual, cognitive, and emotional viewpoint in the narrative. This procedure defines perceptual viewpoint markers as content words that express the perceptual viewpoint, i.e., the perceptions and bodily sensations, of characters and/or narrators, and operationalizes these as verbs of perception (e.g., *to see*, *to hear*, *to smell*), verbs of bodily sensation (e.g., *to itch*, *to sting*), and other content words morphologically related to these verb types (e.g., *sight-to see*, *itchy-to itch*). Cognitive viewpoint markers are defined as content words that express the cognitive viewpoint, i.e., the thoughts, beliefs, intentions and/or desires, of characters and/or narrators. These markers are operationalized as verbs of cognition (e.g., *to think*, *to believe*), including modal epistemic verbs (e.g., *should*, *might*), modal epistemic adverbs (e.g., *possibly*, *definitely*), and morphologically related content words (e.g., *thought-to think*, *possible-possibly*). Finally, the VPIP defines emotional viewpoint markers as content words that express the emotional viewpoint, i.e., the emotions, of characters and/or narrators, and operationalizes these as verbs of emotion (e.g., *to disdain*, *to love*), adjectives

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12 Source: Teunissen, P. (2015, November 21). Zestien jaar vermist, zestien jaar zoeken. Waar was Joske gebleven? *Vrij Nederland*. Retrieved from: <https://www.vn.nl/zestien-jaar-vermist-zestien-jaar-zoeken-waar-was-joske-gebleven/>

13 Due to experimenter error, 134 words of the original narrative were not presented to the participants. These words belonged to the introduction and were not crucial to the coherence or comprehensibility of the narrative plot structure.

of emotion (e.g., *angry*, *bewildered*), and morphologically related content words (e.g., *disdain-to disdain*, *anger-angry*).

The narrative was coded by the first author according to the steps of the VPIP (Eekhof et al., 2020). That is, first the text was read, then the narrative was divided into 5032 lexical units, with complex phrasal verbs (e.g., *uitkijken*, *hij kijkt uit* “to look out, he looks out”) being treated as a single lexical unit. Function words were then disregarded, and for the remaining content words it was determined whether the lexical unit in its narrative context was related to one of the three viewpoint dimensions, and whether the lexical unit could be considered a viewpoint marker for that dimension. To assess the reliability of the procedure, 20% of the content words of the narrative were then also independently coded by the second author. As interrater reliability for both the binary decision (viewpoint marker vs. non-viewpoint marker; 96.81%,  $\kappa = .84$ ), and categorical decision (perceptual vs. cognitive vs. emotional vs. non-viewpoint markers; 96.31%,  $\kappa = .82$ ) were almost perfect, the ratings of the first author were used for the analyses. 292 lexical units (300 words) were scored as viewpoint markers: 86 lexical units (93 words) were marked as perceptual viewpoint markers, 146 lexical units (148 words) were marked as cognitive viewpoint markers, and 59 lexical units (59 words) were marked as emotional viewpoint markers. An example from the coded narrative is given in Table 5.1. More examples can be found in Supplementary Table 1 in Appendix A.2. All words that were not coded as perceptual, cognitive, or emotional viewpoint markers, were marked as “non-viewpoint marker”. As the viewpoint markers were all content words, we decided to also disregard function words from the non-viewpoint marker category. Hence, besides the 300 viewpoint markers, 2510 non-viewpoint marking content words were used as a baseline in the analyses (see also Pre-Processing of Eye-Tracking Data). For information on the distribution of word classes in the different viewpoint marker categories, see Supplementary Table 2 in Appendix A.2.

**Table 5.1** A Coded Excerpt from the Stimulus Narrative

Dutch original	English translation
<p>“Jos is niet thuisgekomen”. Pa was die morgen op zijn kamer gaan <b>kijken</b>. Zijn bed was onbeslagen. Pa had niets <b>gehoord</b>. [...] Een mengeling van <b>ergernis</b> en <b>ongerustheid</b> welde in Gerard op. [...] De volgende dag kwamen twee politiemensen bij de familie Mahler op bezoek. Ze <b>hoorden</b> het verhaal van Gerard en zijn zussen <b>aan</b>. Dat Jos wel van feestvieren <b>hield</b>, maar nooit zomaar weg <b>zou</b> blijven. De beambten <b>suggereerden</b> dat het viertal ergens anders was gaan doorfeesten.</p>	<p>“Jos hasn't come home”. Dad had gone to <b>look</b> in his room that morning. His bed was untouched. Dad had <b>heard</b> nothing. [...] A mixture of <b>annoyance</b> and <b>anxiety</b> welled up in Gerard. [...] The next day, two policemen visited the Mahler family. They <b>listened</b> to the story of Gerard and his sisters. That Jos did <b>like</b> to party but <b>would</b> never just stay away. The officers <b>suggested</b> that the foursome had continued partying somewhere else.</p>

*Note.* Viewpoint markers are printed in bold, with perceptual viewpoint markers marked in blue, cognitive viewpoint markers marked in red, and emotional viewpoint markers marked in yellow.

### 5.2.2.2 Measures of Social-Cognitive Abilities

As previous research is unclear about the specific aspects of social-cognitive abilities that could play a role in the processing of narrative viewpoint, we decided to use a combination of self-report and performance-based measures that tap into a broad spectrum of social-cognitive abilities. As much as possible, we included measures that were not susceptible to ceiling effects in a neurotypical population. Moreover, we included both linguistically-mediated tasks (e.g., Spontaneous Theory of Mind Protocol; Rice & Redcay, 2015) and measures that, at least at face value, are not linguistically-mediated (e.g., the emotional trials of the Multifaceted Empathy Test; Dziobek et al., 2008). We reasoned that if social-cognitive abilities, as measured with nonlinguistic tasks, affect the processing of narrative viewpoint, this is extra strong evidence that there is a relationship between social cognition and narrative processing that goes beyond any potentially confounding effects of language ability.

#### 5.2.2.2.1 Interpersonal Reactivity Index

As a first measure, we included the validated Interpersonal Reactivity Index (IRI; Davis, 1983), which is a multidimensional, self-report measure of trait empathy that taps into participants' tendency to feel concern for others (Empathic Concern, e.g., *I often have tender, concerned feelings for people less fortunate than me*), take the perspective of others (Perspective Taking, e.g., *I try to look at everybody's side of a disagreement before I make a decision*), feel anxious in emotional situations (Personal Distress, e.g., *I sometimes feel helpless when I am in the middle of a very emotional situation*), and emotionally engage with fictional others (Fantasy, e.g., *I really get involved with the feelings of the characters in a novel*). The 28 items of the IRI (Davis, 1983) were presented with 7-point scales (1 = *disagree*, 7 = *agree*). A Dutch translation partially based on De Corte et al. (2007) and M. Mak and Willems (2018) was used.



### 5.2.2.2 Multifaceted Empathy Test

Although previous research on the relationship between reading narratives and social-cognitive performance has often used the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001), this measure has recently received criticism for its poor internal consistency, homogeneity, and content validity (e.g., Black, 2019; Olderbak et al., 2015; Turner & Felisberti, 2017). Hence, as an alternative for the RMET we chose to include the Multifaceted Empathy Test (MET; Dziobek et al., 2008), which is a validated measure that uses participants' responses to ecologically valid pictures (i.e., full-body pictures of people in various daily situations experiencing a wide range of emotions) to assess both emotion recognition<sup>14</sup> and emotional empathy. A potential downside of the MET is that it has been developed mainly for use in nonneurotypical populations (e.g., patients with an autism spectrum disorder, Dziobek et al., 2008; patients with narcissistic personality disorder, Ritter et al., 2011; patients with borderline personality disorder, Dziobek et al., 2011), and as a result may be susceptible to ceiling effects in a neurotypical population (Turner & Felisberti, 2017).

For the MET (Dziobek et al., 2008) participants viewed 40 pictures of people in various situations and were asked to select an emotion word from a list of four options that matched the emotion the person in each photo was experiencing as closely as possible (emotion recognition), and to rate the degree to which they "felt along" with the person in the picture by indicating the degree to which they experienced the same emotion as the person in the picture on a 9-point scale (1 = *not at all*, 9 = *a lot*; emotional empathy). Emotion recognition and emotional empathy were assessed in alternating blocks. Hence, each picture occurred twice: once in an emotion recognition block, and once in an emotional empathy block. Each block consisted of ten pictures, resulting in a total of eight blocks (four emotion recognition blocks and four emotional empathy blocks). To avoid a confounding effect of vocabulary knowledge, a glossary of synonyms and example sentences for each emotion word that was used in the emotion recognition trials was provided.

The 109 German emotion words of the emotion recognition trials were translated into Dutch, using a similar method as Foell et al. (2018), who translated the test from German to English. The first author translated the words from German to Dutch using the online version of the dictionary *Van Dale Groot woordenboek der Nederlandse taal* (Den Boon & Geeraerts, 2005). Then, a backtranslation was performed by an independent German scholar. For 76 words, the backtranslation matched the original German word, in which case the Dutch translation was finalized. The procedure was repeated for the remaining 33 cases for which the backtranslation did not match the original German word. After the second round, 21

14 Although Dziobek et al. (2008) argue that the MET measures cognitive empathy, Oakley et al. (2016) have argued that social-cognitive tasks that measure participants' ability to assign mental states or emotions to pictures of faces or eyes reflect emotion recognition rather than theory of mind or cognitive empathy.

unclear cases remained. These were resolved by discussion between the first author and the German translator. The translation resulted in a list of 107 unique Dutch emotion words. In two cases, a single Dutch word was chosen as a translation for two distinct German words (*träumerisch* and *verträumt* were both translated as *dromerig*, “dreamy”; *beglückt* and *erfreut* were both translated as *verheugd*, “joyful”).

#### **5.2.2.2.3 Visual Perspective-Taking Task**

We also included the Visual Perspective-taking Task (VPT; Samson et al., 2010), which measures participants’ ability to alternate between their own perspective and the perspective of an avatar. Although strictly speaking the VPT is a measure of visual perspective taking, we included it as a measure of social cognition, as the capacity to switch between egocentric and altercentric perspectives has been described as one of the fundamentals of social cognition (Fuchs, 2015). Moreover, aspects of trait empathy have been related to reduced altercentric intrusion, i.e., reduced interference from the perspective of the avatar (e.g., Mattan et al., 2016; Nielsen et al., 2015), supporting the use of the VPT as a measure of social cognition.

In the VPT (Samson et al., 2010), participants viewed 96 pictures of a room with an avatar in it and were asked to verify the number of circles visible on the side walls from either their own or the avatar’s perspective. Before each picture was shown, a fixation cross appeared for 750 ms. After 500 ms, a cue appeared for 750 ms signaling participants to either verify their own perspective (YOU) or the perspective of the avatar (HE/SHE). 500 ms later, a number cue between 0 and 3 would appear for 750 ms. Lastly, the picture appeared on the screen. The participant’s task was to verify whether the number cue matched the number of circles on the wall as visible from the perspective that was cued, i.e., their own perspective (YOU) or the perspective of the avatar (HE/SHE). Crucially, on half of the trials the number of circles visible from the participant’s perspective was identical to the number of circles visible from the avatar’s perspective (CONGRUENT), but on the other half of the trials a different number of circles would be visible from the different perspectives (INCONGRUENT). Participants used the mouse to indicate whether the number cue matched the number of circles seen from the cued perspective (MATCH; index finger) or not (MISMATCH; middle finger). If no answer was given within 2000 ms, the next trial would start. Feedback was given after every trial. The pictures were presented in two blocks. Perspective, congruence, and correct response were counterbalanced. Six practice trials were presented at the start of the task, which could be repeated until the participant felt comfortable with the procedure.

#### **5.2.2.2.4 Spontaneous Theory of Mind Protocol**

Finally, the Spontaneous Theory of Mind Protocol (STOMP; Rice & Redcay, 2015) was included as a promising new measure that may be sensitive to individual variation among healthy adults (Rice & Redcay, 2015; Warnell & Redcay, 2019). Scores on this measure reflect

a spontaneous tendency to mentalize when describing the events in two naturalistic videos and have been found to correlate with individual variability in cortical thickness of brain areas related to theory of mind in a neurotypical population (Rice & Redcay, 2015).

For the STOMP task (Rice & Redcay, 2015) participants viewed two silent videoclips taken from existing movies that are centered around complicated social interactions, and were then asked to describe what they had just seen in seven to ten sentences. One videoclip was a 2-minute excerpt from the movie *John Tucker Must Die*, in which a girl comes back from a date with a boy whom she has to distract by pretending to flirt with him, so that her friend, who has been secretly following their date by hiding in his car, can escape. The other videoclip was a 3-minute excerpt from the movie *Rear Window*, in which a woman is looking for something in an apartment, while being watched by the neighbors across the street, when the owner of the apartment comes home. Participants saw both videoclips in a random order.

### **5.2.2.3 Measures of Reading-Related Individual Differences**

As we wanted to control for a possible confounding effect of print exposure, a Dutch version (Koopman, 2015) of the Author Recognition Test (ART; Stanovich & West, 1989) was used as an implicit measure of print exposure: participants were presented with a list of 30 real author names and 12 foils, and were asked to select the names of authors they knew.

Shallow narrative comprehension was measured using three multiple choice questions with four response options each (see Open Science Framework) to check whether participants paid enough attention during reading. All participants scored above chance on these questions, hence, no data were excluded based on the comprehension questions.

### **5.2.3 Data Recording and Stimulus Presentation**

During reading, eye movements were recorded with a desktop-mounted EyeLink 1000 plus eye tracker, recording at 1000 Hz. A head and chinrest were used to reduce head movements. For most participants the dominant eye was tracked, unless this led to noisy signal, in which case the other eye was tracked (approx. 15% of participants).

The narrative was presented using SR Research Experiment Builder. The narrative was divided into 56 sections that fit on the screen and contained between 42 and 151 words ( $M = 90.66$ ,  $SD = 25.02$ ). Most sections contained exactly one paragraph of the 64 paragraphs that made up the narrative, but in some cases the sections contained more than one paragraph, and/or a section break had to be inserted between sentences belonging to the same paragraph. The text was presented in black letters, set in 16 points Times New Roman, on a white page with 120 pixel margins on all sides and double line spacing on a BenQ XL 24020T 24" LED

screen (resolution: 1024x768, 32 bits per pixel). Participants were seated 108 centimeters (42.52 inches) from the screen. The eye tracker was calibrated and validated on a 9-point grid until the largest difference between any target point and computed fixation position was  $< 1^\circ$ . A drift check and, if necessary, drift correction took place after every seven slides. At the start of each section a fixation cross marked the position of the first word for 1000 ms. Participants used the space bar to go to the next section of the text. It was not possible to go back to a previous section.

All questionnaire-based measures (i.e., IRI, ART, and shallow comprehension) and the STOMP were administered digitally in Qualtrics (Provo, UT). The Multifaceted Empathy Test was presented with E-prime (version 2.0; Schneider et al., 2002), using the keyboard (numbers 1 through 9) to record responses. The Visual Perspective-taking Task was presented with DMDX (Forster & Forster, 2003), using a Logitech G502 HERO mouse with a polling frequency of 1000 Hz to record reaction times.

### **5.2.4 Procedure**

The experiment took place in the Humanities Lab of Radboud University. Upon entering the lab, participants signed for informed consent. Then, participants filled in the IRI and ART questionnaire as well as two other questionnaires not relevant to the purposes of the current study on a laptop. After that, participants were tested on their eye dominance, and received instruction on the eye-tracking part of the experiment, which took place in a soundproof booth. After calibration of the eye tracker, participants read the narrative at their own pace while one eye was being tracked. After having finished reading, the participants completed the MET and VPT on the same computer in the soundproof booth. Then, the participants moved to the laptop outside the booth to complete the STOMP and the measure of shallow comprehension as well as one other question not relevant for the purposes of the current study. Finally, participants were debriefed about the goal of the experiment and compensated for their time. Participants took between 60 to 90 minutes to complete the entire experiment. As described above, three participants were excluded because they were not able to finish the experiment within the available time.

### **5.2.5 Data Analysis**

#### **5.2.5.1 Pre-Processing of Eye-Tracking Data**

Eye-tracking data were preprocessed in RStudio using popEye (Schroeder, 2019). PopEye is an R package that can be used to clean, preprocess, and analyze data from reading experiments. The default parsing algorithm from EyeLink was used for the parsing of fixations, saccades, and blinks. During the first stage of data preprocessing, fixations  $< 80$  ms were merged with any longer fixations within a 1-letter distance. In the second stage, fixations  $< 40$  ms were merged with any longer fixations within a 3-letter distance. Fixations that were

more than 20% away from the text area were removed. Fixations were automatically aligned on the vertical axis to the lines of the text using the SpakovII algorithm (Špakov et al., 2019).

After the automatic preprocessing, all sections from all participants were inspected visually to check the quality of the automatic vertical alignment. If the automatic alignment of a section was incorrect because the underlying data were too noisy (e.g., horizontal drift) the section was rejected (i.e., removed from all analyses). If more than 30% of the sections of a participant had to be rejected, that participant was excluded. This led to the exclusion of 21 participants (see above). Of the remaining included participants, 317 sections (6.29%) had to be removed on this ground. If the automatic alignment of a section was incorrect but the quality of the underlying data was sufficient, the same preprocessing steps described above were applied again except this time outliers were not removed and vertical alignment was done manually. That is, fixations were visualized per section and for each sequence of fixations it was determined to which line the sequence belonged. This was done for 705 (13.99%) sections. For the remaining 4018 (79.72%) sections, the automatically preprocessed and aligned data were of sufficient quality. After preprocessing, data from at least 40 of the original 56 sections were available for each participant ( $M = 52.48$ ,  $SD = 4.14$ ).

From the preprocessed data, eye-tracking measures were calculated. In line with recommendations by Kliegl and Laubrock (2017), Orquin and Holmqvist (2018), and von der Malsburg and Angele (2017), we decided against analyzing all of these measures, as this would greatly increase the risk of a Type-I error. Instead, we chose to focus on a small number of measures that covered both early and late processing: skip rate, gaze duration, and rereading rate. Skip rate, a binary variable that indicates whether a word has been fixated at any point during reading (skip rate = 0) or not (skip rate = 1), is usually associated with low-level word characteristics such as word length and word frequency (Brysbaert et al., 2005; Inhoff & Radach, 1998). However, it has also been found to be related to word predictability and context constraints (Brysbaert et al., 2005), making it an interesting candidate for our study, as viewpoint characteristics of words are both a lexical as well as a contextual phenomenon. Moreover, skip rate has been found to vary between readers (Faber et al., 2020), making it an interesting measure to detect individual differences.

Gaze duration reflects the total duration of fixations made on a word when it is first encountered and has been associated both with “later stages of word processing” (Radach & Kennedy, 2013, p. 431) as well as the “upper bound of early processing” (Kliegl & Laubrock, 2017, p. 77). As such, gaze durations might reflect the possible interaction between lexical characteristics (such as the viewpoint marker categories) and higher-level processes (such as social-cognitive abilities). Moreover, gaze duration has often been found to be sensitive to

individual differences between readers during narrative reading (de Vries et al., 2018; Eekhof, Kuijpers, et al., 2021; M. Mak & Willems, 2018; van den Hoven et al., 2016).

Finally, rereading rate is a measure of late processing and reflects whether a word has been fixated again after the first run of reading (rereading rate = 1) or not (rereading rate = 0). The fact that this measure has been described as being relevant for cognitive processes that take place at the discourse level of texts (Rayner & Liversedge, 2012) makes it especially interesting for our study, as engaging with characters' viewpoints takes place at the discourse level as well.

In keeping with cautions expressed by Orquin and Holmqvist (2018), and Rayner and Liversedge (2011), we do not make direct qualitative assumptions about the connection between these eye-tracking measures and the exact linguistic or cognitive processes that they may reflect. However, in line with previous studies, we do assume that decreased skip rates and longer gaze durations reflect slower processing, potentially induced by processing difficulties (see e.g., Ashby et al., 2005; Gordon et al., 2020; Hessel & Schroeder, 2020; Rayner et al., 2011; Slattery & Yates, 2018). Rereading rate is relatively understudied, but Hessel and Schroeder (2020) found that words that were inconsistent with the context were reread more often, suggesting that increased rereading rate also reflects processing difficulties.

As a final cleaning step during preprocessing, gaze durations more than three standard deviations away from the subject-specific means were removed from all analyses. In addition, data from the first word of each section were removed from all analyses for each of the three measures. Function words were disregarded from all analyses, except function words that were part of a lexical unit that was coded as a viewpoint marker during application of the ViewPoint Identification Procedure. After data cleaning, content words had a mean skip rate of .27 ( $SD = .44$ ), a mean gaze duration of 244.83 ms ( $SD = 103.42$  ms), and a mean re-reading rate of .21 ( $SD = .41$ ).

Because we wanted to control for possible confounding effects of word length and word frequency, all words were annotated for the number of letters and lemma frequency, taken from the SUBTLEX-NL corpus (Keuleers et al., 2010).

### **5.2.5.2 Statistical Analyses**

Statistical analyses were performed in RStudio (RStudio version 1.3.959, R version 4.0.0; R Core Team, 2020). We calculated mean scores per participant for the four subscales of the IRI. Reliability was acceptable for all subscales (Table 5.2), except the Empathic Concern subscale ( $\alpha = .69$ ). Consequently, the Empathic Concern subscale was not included in the analyses.

ART scores were calculated by taking the number of correctly identified author names and subtracting the number of wrongly identified names (Table 5.2).

Emotion recognition scores for the Multifaceted Empathy Test were calculated by adding up the number of correct answers per participant for the emotion recognition trials. However, reliability turned out to be unacceptable ( $\alpha = .43$ ). As reliability did not increase to above .70 even after dropping half of the items, we decided to exclude this measure from the analyses. The reliability of the emotional empathy trials of the Multifaceted Empathy Test, on the other hand, was excellent ( $\alpha = .95$ ). Scores per participant were calculated by averaging over the 40 items (Table 5.2).

In line with Samson et al. (2010), we only analyzed data from matching trials (i.e., trials in which the number of circles visible from the cued perspective matches the number cue) and correct trials (i.e., trials with incorrect responses were excluded) of the Visual Perspective-taking Task. Egocentric Intrusion was calculated by subtracting the mean response time for congruent other-trials from incongruent other-trials per participant. As such, the measure reflects the extra time needed to take up the altercentric perspective in the presence of a conflicting egocentric perspective, compared with when the altercentric perspective is congruent with the egocentric perspective. High scores on this measure thus indicate a poor ability to separate the two different perspectives and suppress the egocentric perspective in favor of the altercentric perspective. Altercentric Intrusion was calculated by subtracting the mean response time for congruent self-trials from incongruent self-trials per participant. As such, the measure reflects the extra time needed to take up the egocentric perspective in the presence of a conflicting altercentric perspective, compared with when the egocentric perspective is congruent with the altercentric perspective. High scores on this measure thus indicate a poor ability to separate the two different perspectives and suppress the altercentric perspective in favor of the egocentric perspective. Mean scores for both measures are reported in Table 5.2.

Participants' responses on the STOMP task were chunked by the first author based on Rice and Redcay's (2014) procedure of dividing sentences into clauses that represent individual units of information (for a full description of the chunking rules, see Open Science Framework). These chunks were then coded by the first author as being either external descriptions (i.e., physical descriptions and descriptions of physical inferences) or internal descriptions (descriptions of emotions, intentions, and mental states), using a translated and enriched version of the original STOMP coding guide that contained definitions, examples, and key words for the two types of descriptions. An independent researcher then coded 20% of the data to assess the reliability of the coding. As interrater reliability was almost perfect (93.31%,  $\kappa = .86$ ), the codes of the first author were used in further analyses. A STOMP score

was calculated for each subject by taking the percentage of internal descriptions per subject. Seven participants indicated that they had seen one of the movies of which the excerpts were taken, in which case the STOMP score was only based on responses to the other excerpt. One participant had seen both movies, and as a result no STOMP score was calculated. Mean scores are reported in Table 5.2.

We used the *lme4* package (Bates et al., 2015) to fit linear mixed models for the continuous eye-tracking data (gaze duration) and generalized linear mixed models with a logit link function for the binary eye-tracking data (skip rate and rereading rate). In addition, we used the *lmerTest* package to estimate degrees of freedom and statistical significance for the linear mixed models (Kuznetsova et al., 2017). Variance Inflation Factors (VIFs) for the models were calculated with a function reported online (*R-Hack/Mer-Utils.R*, 2014). Predictors were scaled and centered for all analyses. In addition, lemma frequency was log-transformed. The eye-tracking data were analyzed at the word level. As the VPIP scores were available on the level of lexical units, these scores were transformed to the word level by giving all words belonging to a single lexical unit the same score.

We used an identical model structure for the analyses of skip rate, gaze duration, and rereading rate: all models included fixed effects of word length (continuous), word frequency (continuous), viewpoint marker category (factor with four levels: non-viewpoint marker, perceptual viewpoint marker, cognitive viewpoint marker, or emotional viewpoint marker), the measures of social cognition (the three IRI subscales, MET Emotional Empathy scores, Altercentric and Egocentric Intrusions taken from the VPT, and STOMP scores; all continuous), and ART scores (continuous) as well as interaction terms for the two-way interactions between viewpoint marker category and the measures of social cognition and between viewpoint marker category and ART scores. Finally, the models included by-subject random intercepts. Note that we did not add random slopes for viewpoint marker category, as this led to convergence issues. Hence, the formula for the models was as follows:

$$DV \sim \text{Word Length} + \text{Word Frequency} + \text{Viewpoint Marker Category} * (\text{ART Score}, \text{IRI Perspective Taking Score}, \text{IRI Personal Distress Score}, \text{IRI Fantasy Score}, \text{STOMP Score}, \text{MET Score}, \text{Altercentric Intrusion}, \text{Egocentric Intrusion}) + (1 \mid \text{Subject})$$

We used dummy coding for the categorical predictor viewpoint markers category, using non-viewpoint markers as a reference level. Hence, for the main effect of viewpoint marker category, each level of viewpoint marker category (perceptual, cognitive, emotional) was compared with the non-viewpoint markers. With this type of contrast coding, the intercept represents the mean of the dependent variable for the reference level, i.e., non-viewpoint markers. Similarly, the estimates of the main effects of the other continuous predictors



represent the effect estimate for the reference level, i.e., non-viewpoint markers. Estimates for the interactions between the other continuous predictors and the categorical variable viewpoint marker category indicate the difference between the estimate of the effect of the continuous variable for the reference level, i.e., non-viewpoint markers, and the estimate of the effect of the continuous variable for other levels of the categorical variable, i.e., the different categories of viewpoint markers.

The *sjPlots* package (version 2.8.7; Lüdtke, 2018) was used to produce output tables from the linear mixed models.

### 5.3 Results

The descriptive statistics for the measures of social cognition and reading-related individual differences are given in Table 5.2. The descriptive statistics for the eye-tracking measures by viewpoint marker category are given in Table 5.3.

**Table 5.2** Descriptive Statistics for Measures of Social-Cognitive Abilities and Reading-Related Individual Differences

Measure	<i>M</i> ( <i>SD</i> )	Cronbach's $\alpha$
Interpersonal Reactivity Index – Perspective Taking	4.98 (0.85)	.75
Interpersonal Reactivity Index – Personal Distress	3.57 (0.86)	.74
Interpersonal Reactivity Index – Fantasy	5.04 (1.09)	.85
Multifaceted Empathy Test – Emotional Empathy	5.02 (1.25)	.95
Visual Perspective-taking Task – Altercentric Intrusion (ms)	28.80 (83.05)	
Visual Perspective-taking Task – Egocentric Intrusion (ms)	86.90 (85.20)	
Spontaneous Theory of Mind Protocol (%)	36.17 (10.04)	
Author Recognition Test	6.61 (3.28)	

*Note.* Interpersonal Reactivity Index scores could vary between 1 and 7 for all subscales, scores on the Multifaceted Empathy Test could vary between 1 and 9, Altercentric Intrusion (Visual Perspective-taking Task) varied between -279.71 ms and 269.69 ms, Egocentric Intrusion (Visual Perspective-taking Task) varied between -77.49 ms and 305.99 ms, scores on the Spontaneous Theory of Mind Protocol could vary between 0 and 100, and scores on the Author Recognition Test could vary between -12 and 30.

**Table 5.3** Descriptive Statistics for the Eye-Tracking Data by Viewpoint Marker Category

Viewpoint marker category	Mean (SD)			Estimated marginal means (SE)		
	Skip rate	Gaze duration	Re-reading rate	Skip rate	Gaze duration	Re-reading rate
Non-viewpoint markers	.27 (.44)	244.67 (103.44)	.21 (.41)	.24 (.01)	242.04 (2.99)	.19 (.01)
Perceptual viewpoint markers	.29 (.45)	238.47 (100.73)	.20 (.40)	.26 (.01)	238.28 (3.25)	.19 (.01)
Cognitive viewpoint markers	.21 (.41)	244.59 (101.05)	.21 (.41)	.19 (.01)	247.38 (3.14)	.20 (.01)
Emotional viewpoint markers	.16 (.37)	259.72 (110.46)	.25 (.43)	.22 (.01)	246.76 (3.35)	.22 (.01)

### 5.3.1 Skip Rate

The estimates for the generalized linear mixed model predicting skip rate are given in Table 5.4. VIFs were below 2 for all predictors. As expected, there was a significant relationship between the control variables word length and word frequency, and skip rate for non-viewpoint markers. An increase in word length decreased the odds of skipping by 0.45 times (i.e., long words were skipped less often) and an increase in word frequency increased the odds of skipping by 1.13 times (i.e., high-frequent words were skipped more often).

There was also a significant relationship between viewpoint marker category and skip rate (see also Table 5.3). Compared with non-viewpoint markers, the odds of skipping perceptual viewpoint markers were increased by 1.12 times compared with non-viewpoint markers (i.e., these markers were skipped more often). On the other hand, the odds of skipping cognitive and emotional viewpoint markers were decreased by 0.71 and 0.88 times, respectively (i.e., these markers were skipped less often).

In addition, there were also significant main effects of IRI Perspective Taking scores, STOMP scores, and Egocentric Intrusion on skip rate for non-viewpoint markers. An increase in IRI Perspective Taking scores increased the odds of skipping non-viewpoint markers by 1.08 times. That is, readers with higher self-reported perspective-taking abilities were more likely to skip non-viewpoint markers. On the other hand, an increase in STOMP scores decreased the odds of skipping non-viewpoint markers by 0.92 times. That is, readers with a higher tendency to spontaneously mentalize were less likely to skip non-viewpoint markers. Finally, an increase in Egocentric Intrusion also decreased the odds of skipping non-viewpoint markers by 0.92 times. That is, readers with higher Egocentric Intrusion scores, i.e., poor visual perspective takers, were less likely to skip non-viewpoint markers.

Next, we inspected the interactions between specific viewpoint markers and predictors measuring social-cognitive abilities, to see whether there was a difference between the

effect of social-cognitive abilities on non-viewpoint markers and the effect of these abilities on specific types of viewpoint markers. In other words, the interactions allowed us to see whether there was a specific effect of certain social-cognitive abilities on the processing of viewpoint markers that surpasses the effect of these abilities on non-viewpoint markers.

There were significant interactions between viewpoint marker category (perceptual viewpoint markers) and both IRI Perspective Taking scores (Figure 5.1) and IRI Fantasy scores (Figure 5.2). There was a significantly more positive effect of both IRI Perspective Taking and IRI Fantasy scores on skip rate for perceptual viewpoint markers, compared with non-viewpoint markers. That is, for non-viewpoint markers, IRI Perspective Taking scores had a significantly positive effect and IRI Fantasy scores had a numerically positive but nonsignificant effect on skip rate. For perceptual viewpoint markers, however, the effects of these scores were even more positive. In other words, for perceptual viewpoint markers the odds of skipping increased more as a result of being a reader with a high tendency to take the perspective of others than for non-viewpoint markers.

In addition, there was a significant interaction between viewpoint marker category (cognitive viewpoint markers) and Altercentric Intrusion, such that there was a significantly more negative effect of Altercentric Intrusion on skip rate for cognitive viewpoint markers, compared with non-viewpoint markers (Figure 5.3). That is, for non-viewpoint markers, Altercentric Intrusion had a numerically positive but non-significant effect on skip rate, but for cognitive viewpoint markers the effect of Altercentric Intrusion was significantly more negative. In other words, for cognitive viewpoint markers the odds of skipping decreased more as a result of being an inflexible perspective taker than for non-viewpoint markers.

To follow up on these significant interactions, we ran two additional models on a subset of the data containing only perceptual viewpoint markers (for the interaction between perceptual viewpoint markers and the two IRI subscales) and a subset of the data containing only cognitive viewpoint markers (for the interaction between cognitive viewpoint markers and Altercentric Intrusion). The first follow-up model predicted skip rate for perceptual viewpoint markers with word length, word frequency, ART score, IRI Perspective Taking score and IRI Fantasy score as predictors, and by-subject random intercepts. This model confirmed that IRI Perspective Taking scores had a significant, positive effect on skip rate, such that an increase in IRI Perspective Taking scores increased the odds of skipping perceptual viewpoint markers by 1.13 times ( $SE = 0.05$ , 95% CI [1.04, 1.24],  $z = 2.74$ ,  $p = .006$ ; Supplementary Table 3 in Appendix A.2). The effect of IRI Fantasy scores was not significant in this model (odds ratio = 1.07,  $SE = 0.05$ , 95% CI [0.98, 1.17],  $z = 1.52$ ,  $p = .129$ ; Supplementary Table 3 in Appendix A.2). Hence, even though the effect of IRI Fantasy scores on skip rate for perceptual viewpoint markers differed significantly from the effect of IRI Fantasy scores on skip rate

for non-viewpoint markers, there was by itself no significant effect of IRI Fantasy scores on skip rate when just looking at perceptual viewpoint markers. In other words, although the tendency to take the perspective of others did increase the odds of skipping perceptual viewpoint markers specifically, the tendency to fantasize did not.

The second follow-up model predicted skip rate for cognitive viewpoint markers with word length, word frequency, ART score, and Altercentric Intrusion as predictors, and by-subject random intercepts. This model revealed that there was in fact no significant effect of Altercentric Intrusion on skip rate for cognitive viewpoint markers (odds ratio = 0.95,  $SE = 0.05$ , 95% CI [0.86, 1.04],  $z = -1.14$ ,  $p = .255$ ; Supplementary Table 4 in Appendix A.2). Hence, even though the effect of Altercentric Intrusion on skip rate for cognitive viewpoint markers differed significantly from the effect of Altercentric Intrusion on skip rate for non-viewpoint markers, there was by itself no significant effect of Altercentric Intrusion on skip rate when just looking at cognitive viewpoint markers. In other words, it was not the case that cognitive viewpoint markers specifically were skipped less often by readers who were poor visual perspective takers.

Note that even though there were significant effects of STOMP scores and Egocentric Intrusion on skip rate, there were no significant interactions between any of the viewpoint marker categories and Egocentric Intrusion. Hence, the effects of STOMP scores and Egocentric Intrusion on skip rate held for all content words and was not specific to any category of viewpoint markers.

All in all, the results showed that perceptual viewpoint markers were skipped more often than non-viewpoint markers, whereas cognitive and emotional viewpoint markers were skipped less often than non-viewpoint markers. Furthermore, we found that STOMP scores and Egocentric Intrusion decreased the odds of skipping (i.e., readers with a high tendency to mentalize and poor visual perspective takers skip less often), but these effects were not specific to viewpoint markers. In addition, IRI Perspective Taking scores increased the odds of skipping (i.e., readers with high self-reported perspective-taking abilities skip more often) in general, and even more so for perceptual viewpoint markers in particular. That is, readers with higher IRI Perspective Taking scores were more likely to skip perceptual viewpoint markers, more so than non-viewpoint marking words in general. Although the effect of IRI Fantasy scores on skip rate was also significantly more positive for perceptual viewpoint markers than for non-viewpoint markers, a follow-up analysis revealed no significant main effect of IRI Fantasy scores on skip rate when just looking at perceptual viewpoint markers. Similarly, the effect of Altercentric Intrusion on skip rate was significantly more negative for cognitive viewpoint markers than for non-viewpoint markers, but a follow-up analysis revealed no significant main effect of Altercentric Intrusion on skip rate when just looking at cognitive viewpoint markers.

**Table 5.4** Estimates for the Generalized Linear Mixed Model Predicting Skip Rate

Predictor	Odds ratio	SE	CI	z	p
(Intercept)	0.49	0.02	0.46 – 0.52	-20.61	< .001***
Word Length	0.45	0.00	0.44 – 0.46	-104.14	< .001***
Word Frequency	1.13	0.01	1.12 – 1.14	22.23	< .001***
Viewpoint Marker Category (Perceptual)	1.12	0.03	1.06 – 1.18	4.21	< .001***
Viewpoint Marker Category (Cognitive)	0.71	0.02	0.68 – 0.75	-14.09	< .001***
Viewpoint Marker Category (Emotional)	0.88	0.04	0.81 – 0.95	-3.16	.002**
ART Score	1.05	0.04	0.98 – 1.13	1.47	.141
IRI – Perspective Taking Score	1.08	0.04	1.00 – 1.17	2.05	.041*
IRI – Personal Distress Score	0.98	0.04	0.91 – 1.05	-0.56	.573
IRI – Fantasy Score	1.01	0.04	0.93 – 1.09	0.15	.884
STOMP Score	0.92	0.04	0.85 – 0.99	-2.18	.029*
MET – Emotional Empathy Score	0.96	0.04	0.89 – 1.05	-0.85	.396
VPT – Altercentric Intrusion	1.01	0.04	0.94 – 1.09	0.33	.741
VPT – Egocentric Intrusion	0.92	0.03	0.86 – 0.99	-2.23	.026*
Viewpoint Marker Category (Perceptual) *	0.99	0.03	0.94 – 1.05	-0.34	.737
ART Score					
Viewpoint Marker Category (Cognitive) *	1.04	0.02	0.99 – 1.09	1.62	.106
ART Score					
Viewpoint Marker Category (Emotional) *	1.04	0.04	0.96 – 1.12	0.89	.373
ART Score					
Viewpoint Marker Category (Perceptual) *	1.07	0.03	1.01 – 1.14	2.21	.027*
IRI – Perspective Taking Score					
Viewpoint Marker Category (Cognitive) *	0.99	0.03	0.94 – 1.05	-0.31	.759
IRI – Perspective Taking Score					
Viewpoint Marker Category (Emotional) *	1.04	0.05	0.94 – 1.14	0.73	.464
IRI – Perspective Taking Score					
Viewpoint Marker Category (Perceptual) *	1.01	0.03	0.96 – 1.07	0.51	.614
IRI – Personal Distress Score					
Viewpoint Marker Category (Cognitive) *	1.00	0.03	0.96 – 1.06	0.19	.846
IRI – Personal Distress Score					
Viewpoint Marker Category (Emotional) *	1.01	0.04	0.93 – 1.10	0.29	.773
IRI – Personal Distress Score					
Viewpoint Marker Category (Perceptual) *	1.09	0.04	1.03 – 1.17	2.72	.007**
IRI – Fantasy Score					
Viewpoint Marker Category (Cognitive) *	0.98	0.03	0.93 – 1.04	-0.68	.494
IRI – Fantasy Score					
Viewpoint Marker Category (Emotional) *	1.04	0.05	0.94 – 1.14	0.70	.484
IRI – Fantasy Score					
Viewpoint Marker Category (Perceptual) *	1.01	0.03	0.95 – 1.07	0.19	.850
STOMP Score					
Viewpoint Marker Category (Cognitive) *	1.02	0.03	0.97 – 1.08	0.82	.414
STOMP Score					
Viewpoint Marker Category (Emotional) *	1.00	0.05	0.91 – 1.09	-0.07	.947
STOMP Score					
Viewpoint Marker Category (Perceptual) *	0.97	0.03	0.91 – 1.04	-0.85	.395
MET – Emotional Empathy Score					

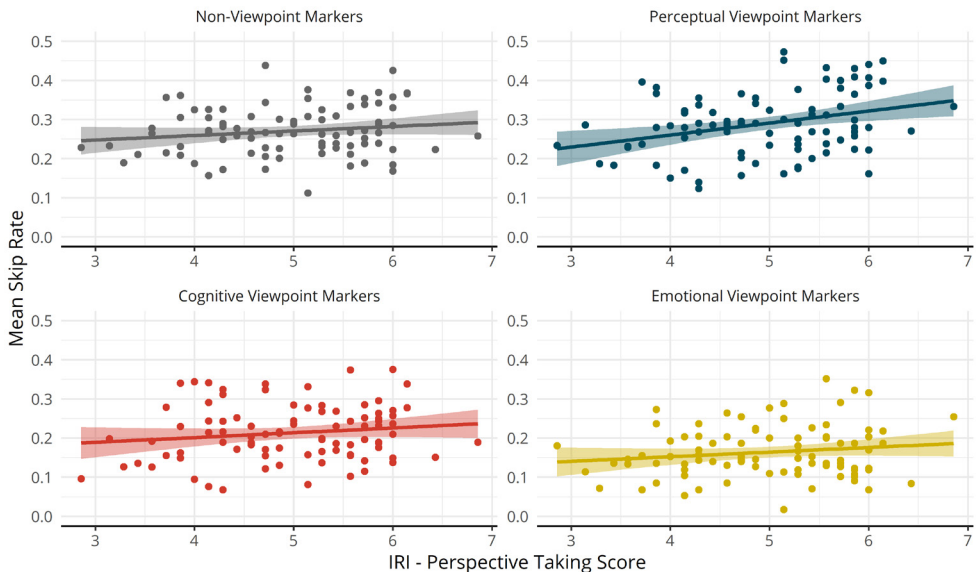
**Table 5.4** Continued

Viewpoint Marker Category (Cognitive) * MET – Emotional Empathy Score	1.01	0.03	0.96 – 1.08	0.46	.643
Viewpoint Marker Category (Emotional) * MET – Emotional Empathy Score	0.95	0.05	0.86 – 1.05	-1.02	.308
Viewpoint Marker Category (Perceptual) * VPT – Altercentric Intrusion	1.01	0.03	0.95 – 1.07	0.26	.798
Viewpoint Marker Category (Cognitive) * VPT – Altercentric Intrusion	0.94	0.02	0.90 – 0.99	-2.30	.021*
Viewpoint Marker Category (Emotional) * VPT – Altercentric Intrusion	1.04	0.05	0.96 – 1.14	0.98	.327
Viewpoint Marker Category (Perceptual) * VPT – Egocentric Intrusion	0.97	0.03	0.91 – 1.02	-1.24	.214
Viewpoint Marker Category (Cognitive) * VPT – Egocentric Intrusion	0.99	0.02	0.94 – 1.04	-0.53	.597
Viewpoint Marker Category (Emotional) * VPT – Egocentric Intrusion	0.92	0.04	0.84 – 1.00	-1.91	.056

*Note.* All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis. Dummy coding was used for the categorical predictor viewpoint marker category with non-viewpoint markers as the reference level. Hence, for the main effect of viewpoint marker category, all categories were compared with non-viewpoint markers. The intercept represents the mean odds ratios of skipping for non-viewpoint markers. The estimates of the other main effects represent the effect estimate for non-viewpoint markers. The estimates for the interaction terms represent the difference between the effect estimate for non-viewpoint markers and the effect estimate for that specific viewpoint marker category.

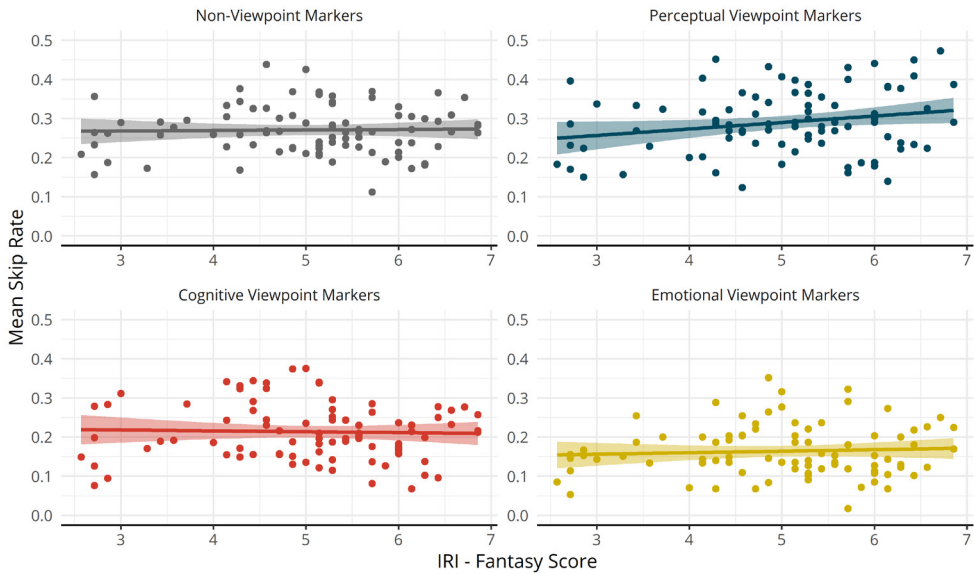
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Figure 5.1** The Relationships Between Mean Skip Rate and IRI Perspective Taking Score for the Different Categories of Viewpoint Markers



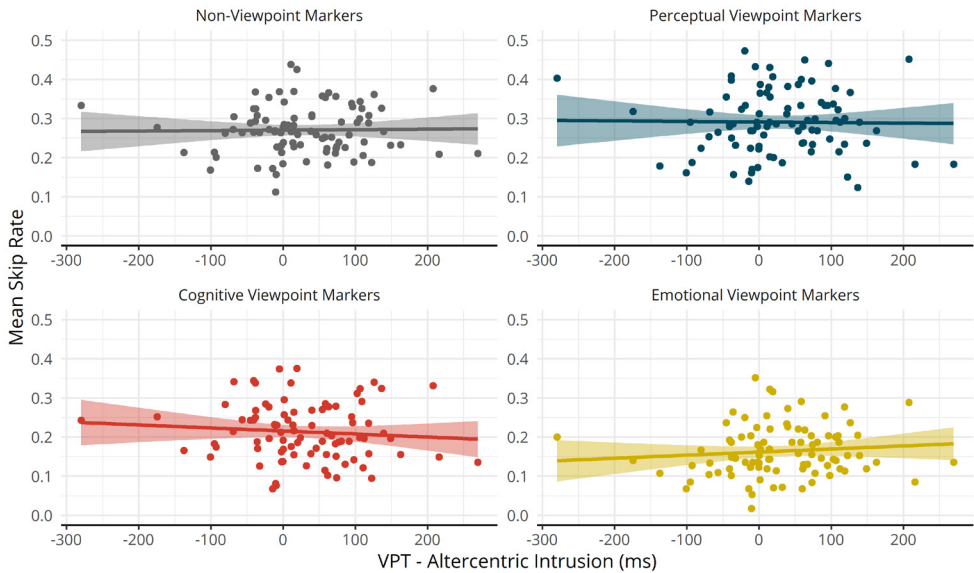
*Note.* Each dot represents a participant.

**Figure 5.2** The Relationships Between Mean Skip Rate and IRI Fantasy Score for the Different Categories of Viewpoint Markers



Note. Each dot represents a participant.

**Figure 5.3** The Relationship Between Mean Skip Rate and Altercentric Intrusion for the Different Categories of Viewpoint Markers



Note. Each dot represents a participant.

### 5.3.2 Gaze Duration

The estimates for the linear mixed model predicting gaze duration are given in Table 5.5. VIFs were below 2 for all predictors. As expected, there was a significant relationship between the control variables word length and word frequency, and gaze duration for non-viewpoint markers, such that an increase in word length increased gaze duration (i.e., longer words were read slower) and an increase in word frequency decreased gaze duration (i.e., words with a higher frequency were read faster) for non-viewpoint markers.

There was also a significant relationship between viewpoint marker category and gaze duration (see also Table 5.3). Compared with non-viewpoint markers, gaze durations were significantly decreased for perceptual viewpoint markers (i.e., faster reading), whereas gaze durations were significantly increased for cognitive and emotional viewpoint markers (i.e., slower reading).

In addition, there were also significant main effects of STOMP and ART scores on gaze durations for non-viewpoint markers. Both an increase in ART and STOMP scores decreased gaze durations. That is, readers with higher ART scores, indicative of print exposure, and readers with higher STOMP scores, indicative of a tendency toward spontaneous mentalizing, fixated non-viewpoint markers for a shorter duration.

Again, we inspected the interactions between specific viewpoint markers and predictors measuring social-cognitive abilities, to see whether there was a difference between the effect of social-cognitive abilities on non-viewpoint markers and the effect of these abilities on specific types of viewpoint markers. In other words, the interactions allowed us to see whether there was a specific effect of certain social-cognitive abilities on the processing of viewpoint markers that surpasses the effect of these abilities on non-viewpoint markers.

There was a significant interaction between viewpoint marker category (emotional viewpoint markers) and the Fantasy score of the IRI (Figure 5.4). There was a significantly more negative effect of the Fantasy score on gaze duration for emotional viewpoint markers, compared with non-viewpoint markers. That is, for non-viewpoint markers the Fantasy score had a numerically positive but non-significant effect on gaze duration, but for emotional viewpoint markers the effect of the Fantasy score was significantly more negative. In other words, for emotional viewpoint markers, gaze durations decreased more as a result of being a reader with a high tendency to fantasize than for non-viewpoint markers.

To follow up on this significant interaction, we ran an additional model on a subset of the data containing only emotional viewpoint markers, predicting gaze duration for these markers with word length, word frequency, ART score, and IRI Fantasy score as predictors, and by-subject random intercepts. This model revealed that there was in fact no significant effect of IRI Fantasy score on gaze duration when just looking at emotional viewpoint markers

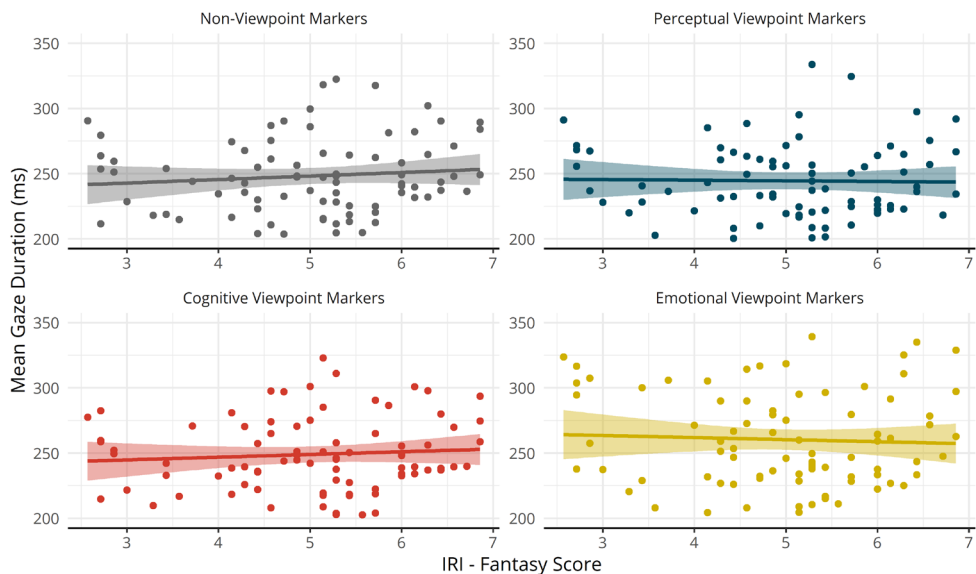


(estimate =  $-3.19$ ,  $SE = 4.17$ , 95% CI  $[-11.36, 4.97]$ ,  $t = -0.77$ ,  $p = 0.443$ ; Supplementary Table 5 in Appendix A.2). Hence, even though the effect of the IRI Fantasy score on gaze duration for emotional viewpoint markers differed significantly from the effect of the IRI Fantasy score on gaze duration for non-viewpoint markers, there was by itself no significant effect of the IRI Fantasy score on gaze duration for emotional viewpoint markers. In other words, it was not the case that emotional viewpoint markers specifically were read faster by readers with higher IRI Fantasy scores.

Note that even though there were significant effects of STOMP and ART scores on gaze duration, there were no significant interactions between any of the viewpoint marker categories and these scores. Hence, the effect of STOMP and ART scores held for all content words and was not specific to any category of viewpoint markers.

In sum, perceptual viewpoint markers were read relatively fast, whereas cognitive and emotional viewpoint markers were read relatively slow compared with non-viewpoint markers. In addition, we found that ART and STOMP scores decreased gaze durations overall. Although the effect of IRI Fantasy score on gaze duration was significantly more negative for emotional viewpoint markers compared with non-viewpoint markers, a follow-up analysis revealed that there was in fact no specific effect of IRI Fantasy scores on gaze duration when just looking at emotional viewpoint markers.

**Figure 5.4** The Relationship Between Mean Gaze Duration and IRI Fantasy Score for the Different Categories of Viewpoint Markers



Note. Each dot represents a participant.

**Table 5.5** Estimates for the Linear Mixed Model Predicting Gaze Duration

Predictor	Estimate	SE	CI	t	p
(Intercept)	230.78	2.99	224.91 – 236.65	77.11	< .001***
Word Length	11.41	0.28	10.86 – 11.96	40.53	<.001***
Word Frequency	-7.04	0.27	-7.56 – -6.51	-26.07	< .001***
Viewpoint Marker Category (Perceptual)	-3.88	1.33	-6.49 – -1.27	-2.91	.004**
Viewpoint Marker Category (Cognitive)	5.35	1.05	3.30 – 7.40	5.11	<.001***
Viewpoint Marker Category (Emotional)	4.79	1.56	1.74 – 7.85	3.08	.002**
ART Score	-10.70	3.04	-16.66 – -4.75	-3.52	.001***
IRI – Perspective Taking Score	-1.69	3.43	-8.40 – 5.03	-0.49	.624
IRI – Personal Distress Score	-0.91	3.11	-7.00 – 5.19	-0.29	.771
IRI – Fantasy Score	0.29	3.59	-6.74 – 7.33	0.08	.935
STOMP Score	-7.38	3.38	-14.00 – -0.75	-2.18	.032*
MET – Emotional Empathy Score	5.11	3.70	-2.14 – 12.36	1.38	.170
VPT – Altercentric Intrusion	-0.74	3.07	-6.76 – 5.29	-0.24	.811
VPT – Egocentric Intrusion	2.46	3.08	-3.58 – 8.49	0.80	.427
Viewpoint Marker Category (Perceptual) * ART Score	2.07	1.35	-0.58 – 4.71	1.53	.125
Viewpoint Marker Category (Cognitive) * ART Score	-0.66	1.05	-2.72 – 1.40	-0.63	.530
Viewpoint Marker Category (Emotional) * ART Score	-1.78	1.56	-4.85 – 1.29	-1.14	.256
Viewpoint Marker Category (Perceptual) * IRI – Perspective Taking Score	2.21	1.52	-0.78 – 5.20	1.45	.147
Viewpoint Marker Category (Cognitive) * IRI – Perspective Taking Score	0.70	1.18	-1.61 – 3.00	0.59	.554
Viewpoint Marker Category (Emotional) * IRI – Perspective Taking Score	1.91	1.79	-1.59 – 5.42	1.07	.285
Viewpoint Marker Category (Perceptual) * IRI – Personal Distress Score	-1.66	1.38	-4.37 – 1.04	-1.21	.228
Viewpoint Marker Category (Cognitive) * IRI – Personal Distress Score	-1.35	1.07	-3.45 – 0.75	-1.26	.208
Viewpoint Marker Category (Emotional) * IRI – Personal Distress Score	-1.11	1.61	-4.27 – 2.04	-0.69	.489
Viewpoint Marker Category (Perceptual) * IRI – Fantasy Score	-2.74	1.60	-5.88 – 0.39	-1.71	.087
Viewpoint Marker Category (Cognitive) * IRI – Fantasy Score	-1.41	1.24	-3.84 – 1.02	-1.14	.256
Viewpoint Marker Category (Emotional) * IRI – Fantasy Score	-4.90	1.87	-8.57 – -1.23	-2.62	.009**
Viewpoint Marker Category (Perceptual) * STOMP Score	1.10	1.51	-1.86 – 4.05	0.73	.468
Viewpoint Marker Category (Cognitive) * STOMP Score	-2.14	1.17	-4.44 – 0.16	-1.82	.069
Viewpoint Marker Category (Emotional) * STOMP Score	-2.72	1.77	-6.19 – 0.74	-1.54	.123
Viewpoint Marker Category (Perceptual) * MET – Emotional Empathy Score	-0.14	1.65	-3.38 – 3.10	-0.08	.934

Viewpoint Marker Category (Cognitive) *	1.47	1.29	-1.07 – 4.01	1.14	.256
MET – Emotional Empathy Score					
Viewpoint Marker Category (Emotional) *	-1.83	1.95	-5.64 – 1.99	-0.94	.348
MET – Emotional Empathy Score					
Viewpoint Marker Category (Perceptual) *	-0.32	1.39	-3.03 – 2.40	-0.23	.819
VPT – Altercentric Intrusion					
Viewpoint Marker Category (Cognitive) *	-0.93	1.09	-3.06 – 1.20	-0.86	.391
VPT – Altercentric Intrusion					
Viewpoint Marker Category (Emotional) *	-0.65	1.61	-3.81 – 2.50	-0.41	.685
VPT – Altercentric Intrusion					
Viewpoint Marker Category (Perceptual) *	2.09	1.36	-0.58 – 4.76	1.54	.124
VPT – Egocentric Intrusion					
Viewpoint Marker Category (Cognitive) *	-1.34	1.07	-3.43 – 0.75	-1.26	.209
VPT – Egocentric Intrusion					
Viewpoint Marker Category (Emotional) *	-1.49	1.58	-4.59 – 1.60	-0.95	.344
VPT – Egocentric Intrusion					

*Note.* All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis. Dummy coding was used for the categorical predictor viewpoint marker category with non-viewpoint markers as the reference level. Hence, for the main effect of viewpoint marker category, all categories were compared with non-viewpoint markers. The intercept represents the mean gaze duration for non-viewpoint markers. The estimates of the other main effects represent the effect estimate for non-viewpoint markers. The estimates for the interaction terms represent the difference between the effect estimate for non-viewpoint markers and the effect estimate for that specific viewpoint marker category.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### 5.3.3 Rereading Rate

The estimates for the generalized linear mixed model predicting rereading rate are given in Table 5.6. VIFs were below 2 for all predictors. As expected, there was a significant relationship between the control variables word length and word frequency, and rereading rate for non-viewpoint markers, such that an increase in word length increased the odds of rereading by 1.14 times (i.e., long words were reread more often) and an increase in word frequency decreased the odds of rereading by 0.93 times (i.e., high-frequent words were reread less often) for non-viewpoint markers.

There was also a significant relationship between viewpoint marker category and rereading rate (Table 5.3). Compared with non-viewpoint markers, the odds of rereading cognitive and emotional viewpoint markers were increased by 1.07 and 1.16 times, respectively (i.e., these markers were reread more often). There was no significant effect of perceptual viewpoint markers on rereading rate compared with non-viewpoint markers.

In addition, there was also a significant main effect of ART scores on non-viewpoint markers. An increase in ART score increased the odds of rereading non-viewpoint markers by 1.10 times. That is, readers with higher ART scores, indicative of higher print exposure, reread non-viewpoint markers more often.

Again, we inspected the interactions between specific viewpoint markers and predictors measuring social-cognitive abilities, to see whether there was a difference between the effect of social-cognitive abilities on non-viewpoint markers and the effect of these abilities on specific types of viewpoint.

There were significant interactions between viewpoint marker category (cognitive viewpoint markers) and Egocentric Intrusion (Figure 5.5), and between viewpoint marker category (emotional viewpoint markers) and ART scores (Figure 5.6). There was a significantly more positive effect of Egocentric Intrusion on rereading rate for cognitive viewpoint markers, compared with non-viewpoint markers. That is, for non-viewpoint markers, Egocentric Intrusion had a numerically positive, near-significant effect on rereading rate, and this effect was significantly more positive for cognitive viewpoint markers. In other words, for cognitive viewpoint markers the odds of rereading increased more in relation to being a poor visual perspective taker than for non-viewpoint markers.

In addition, there was a significantly more negative effect of ART score on rereading rate for emotional viewpoint markers, compared with non-viewpoint markers. That is, for non-viewpoint markers, ART score had a significantly positive effect on rereading rate, but the effect of ART score was significantly more negative for emotional viewpoint markers, essentially meaning that contrary to non-viewpoint markers, rereading rate for emotional viewpoint markers was not affected by ART score.

To follow up on the first significant interaction, we ran an additional model on a subset of the data containing only cognitive viewpoint markers. This model predicted rereading rate for cognitive viewpoint markers with word length, word frequency, ART score, and Egocentric Intrusions as predictors, and by-subject random intercepts. This model confirmed that Egocentric Intrusion had a significant, positive effect on rereading rate, such that an increase in Egocentric Intrusion increased the odds of rereading cognitive viewpoint markers by 1.14 times ( $SE = 0.05$ ,  $CI [1.05 - 1.24]$ ,  $z = 3.03$ ,  $p = .002$ ; Supplementary Table 6 in Appendix A.2). In other words, readers with poor visual perspective-taking abilities were more likely to reread cognitive viewpoint markers specifically.

To sum up, cognitive and emotional viewpoint markers were found to be reread more often than non-viewpoint markers, whereas perceptual viewpoint markers did not differ significantly from non-viewpoint markers. In addition, we found that ART score increased the odds of rereading (i.e., readers with higher print exposure reread more often), except for emotional viewpoint markers. Finally, Egocentric Intrusion increased the odds of rereading for cognitive viewpoint markers specifically (i.e., poor visual perspective takers reread cognitive viewpoint markers specifically more often). The most important results are also schematically summarized in Figure 5.7.

**Table 5.6** Estimates for the Generalized Linear Mixed Model Predicting Rereading Rate

<b>Predictor</b>	<b>Odds ratio</b>	<b>SE</b>	<b>CI</b>	<b>z</b>	<b>p</b>
(Intercept)	0.21	0.01	0.19 – 0.23	-36.63	< .001***
Word Length	1.14	0.01	1.12 – 1.15	18.25	< .001***
Word Frequency	0.93	0.01	0.91 – 0.94	-10.96	< .001***
Viewpoint Marker Category (Perceptual)	1.00	0.04	0.93 – 1.07	-0.10	.921
Viewpoint Marker Category (Cognitive)	1.07	0.03	1.01 – 1.13	2.40	.017*
Viewpoint Marker Category (Emotional)	1.16	0.04	1.08 – 1.25	3.89	< .001***
IRI – Perspective Taking Score	0.91	0.04	0.83 – 1.00	-1.95	.051
IRI – Personal Distress Score	0.97	0.04	0.89 – 1.05	-0.75	.455
IRI – Fantasy Score	0.97	0.05	0.88 – 1.07	-0.60	.548
STOMP Score	1.08	0.05	0.98 – 1.18	1.53	.127
MET – Emotional Empathy Score	1.08	0.06	0.97 – 1.20	1.47	.141
VPT – Altercentric Intrusion	1.04	0.05	0.95 – 1.13	0.80	.426
VPT – Egocentric Intrusion	1.09	0.05	1.00 – 1.18	1.90	.057
ART Score	1.10	0.05	1.01 – 1.20	2.28	.023*
Viewpoint Marker Category (Perceptual) * IRI – Perspective Taking Score	1.01	0.04	0.93 – 1.10	0.29	.769
Viewpoint Marker Category (Cognitive) * IRI – Perspective Taking Score	1.02	0.03	0.96 – 1.08	0.62	.535
Viewpoint Marker Category (Emotional) * IRI – Perspective Taking Score	0.98	0.04	0.90 – 1.07	-0.42	.672
Viewpoint Marker Category (Perceptual) * IRI – Personal Distress Score	0.98	0.04	0.91 – 1.05	-0.57	.567
Viewpoint Marker Category (Cognitive) * IRI – Personal Distress Score	1.03	0.03	0.97 – 1.09	1.02	.309
Viewpoint Marker Category (Emotional) * IRI – Personal Distress Score	1.02	0.04	0.94 – 1.10	0.48	.630
Viewpoint Marker Category (Perceptual) * IRI – Fantasy Score	0.99	0.04	0.92 – 1.08	-0.13	.899
Viewpoint Marker Category (Cognitive) * IRI – Fantasy Score	0.96	0.03	0.90 – 1.02	-1.28	.199
Viewpoint Marker Category (Emotional) * IRI – Fantasy Score	1.02	0.05	0.93 – 1.12	0.48	.633
Viewpoint Marker Category (Perceptual) * STOMP Score	0.97	0.04	0.90 – 1.05	-0.67	.500
Viewpoint Marker Category (Cognitive) * STOMP Score	0.95	0.03	0.89 – 1.01	-1.65	.098
Viewpoint Marker Category (Emotional) * STOMP Score	0.97	0.04	0.89 – 1.06	-0.60	.549
Viewpoint Marker Category (Perceptual) * MET – Emotional Empathy Score	0.97	0.04	0.89 – 1.05	-0.81	.417
Viewpoint Marker Category (Cognitive) * MET – Emotional Empathy Score	1.02	0.03	0.95 – 1.09	0.53	.597

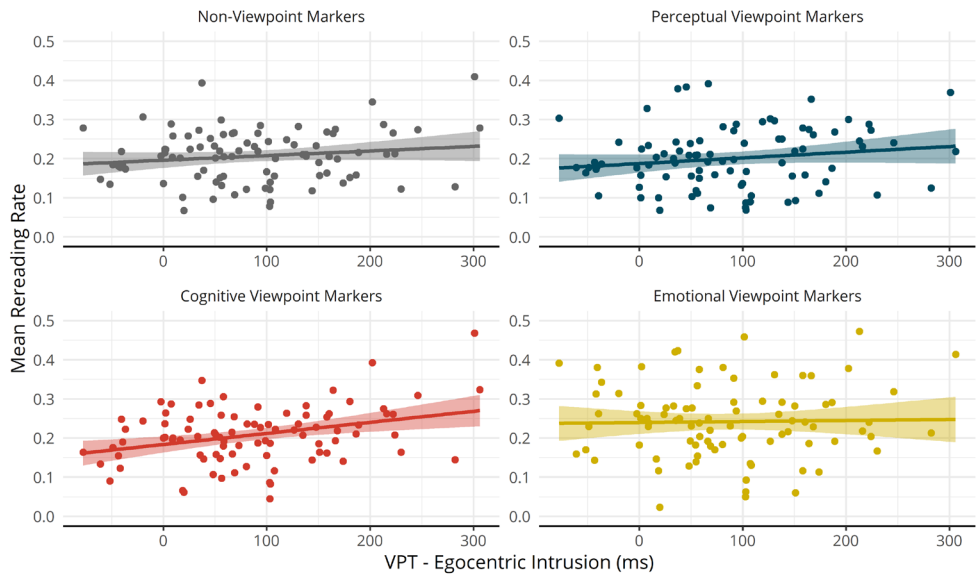
**Table 5.6** Continued

Viewpoint Marker Category (Emotional) * MET – Emotional Empathy Score	0.99	0.05	0.90 – 1.08	-0.31	.755
Viewpoint Marker Category (Perceptual) * VPT – Altercentric Intrusion	0.95	0.04	0.89 – 1.03	-1.28	.199
Viewpoint Marker Category (Cognitive) * VPT – Altercentric Intrusion	1.01	0.03	0.95 – 1.06	0.18	.855
Viewpoint Marker Category (Emotional) * VPT – Altercentric Intrusion	1.04	0.04	0.96 – 1.12	0.87	.384
Viewpoint Marker Category (Perceptual) * VPT – Egocentric Intrusion	1.00	0.03	0.93 – 1.07	-0.10	.919
Viewpoint Marker Category (Cognitive) * VPT – Egocentric Intrusion	1.07	0.03	1.01 – 1.13	2.42	.016*
Viewpoint Marker Category (Emotional) * VPT – Egocentric Intrusion	0.99	0.04	0.92 – 1.07	-0.29	.768
Viewpoint Marker Category (Perceptual) * ART Score	1.01	0.04	0.94 – 1.08	0.26	.794
Viewpoint Marker Category (Cognitive) * ART Score	1.04	0.03	0.98 – 1.09	1.31	.191
Viewpoint Marker Category (Emotional) * ART Score	0.92	0.03	0.85 – 0.99	-2.32	.020*

*Note.* All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis. Dummy coding was used for the categorical predictor viewpoint marker category with non-viewpoint markers as the reference level. Hence, for the main effect of viewpoint marker category, all categories were compared with non-viewpoint markers. The intercept represents the mean odds ratios of rereading for non-viewpoint markers. The estimates of the other main effects represent the effect estimate for non-viewpoint markers. The estimates for the interaction terms represent the difference between the effect estimate for non-viewpoint markers and the effect estimate for that specific viewpoint marker category.

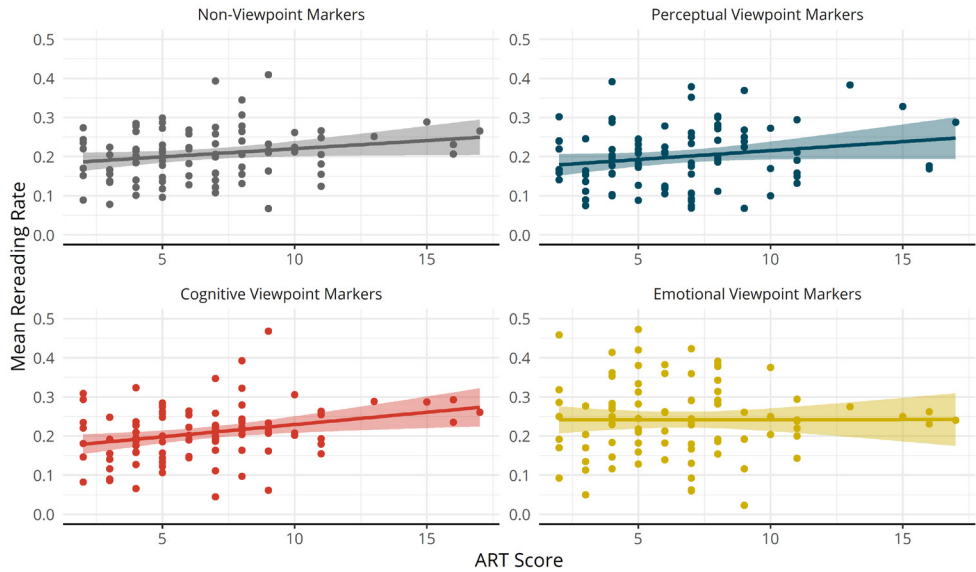
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Figure 5.5** The Relationships Between Mean Rereading Rate and Egocentric Intrusion for the Different Categories of Viewpoint Markers



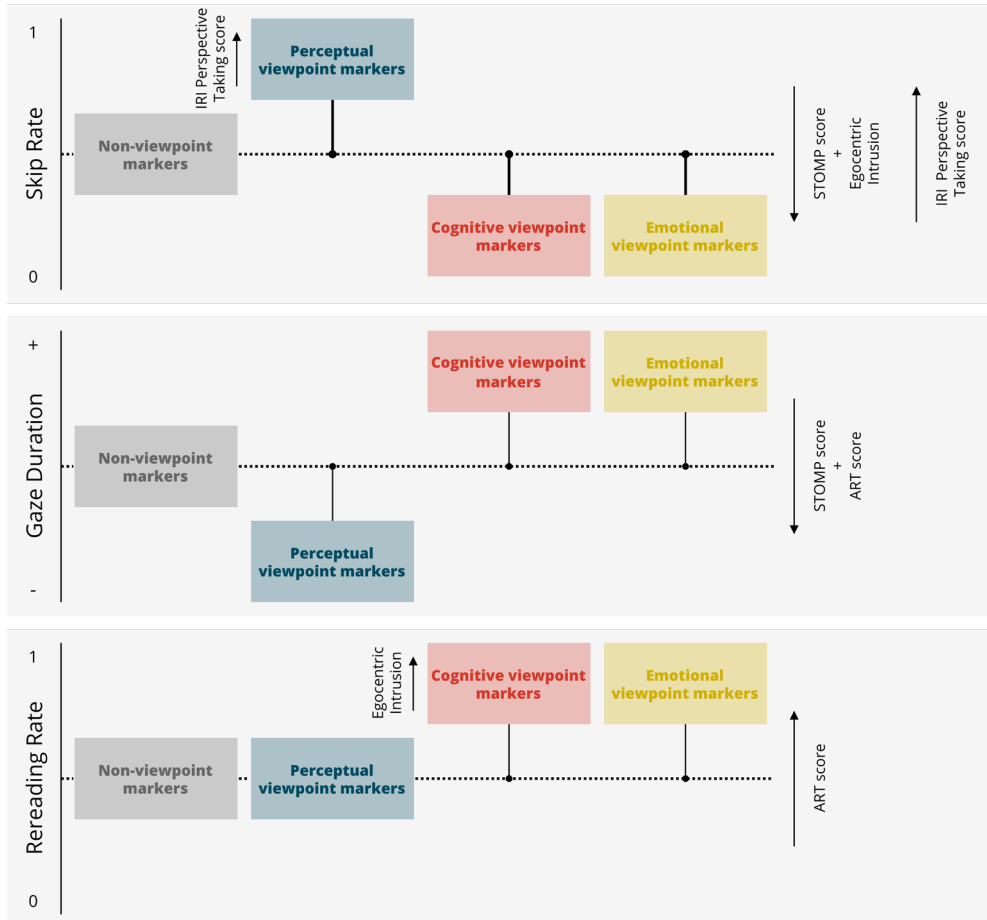
Note. Each dot represents a participant.

**Figure 5.6** The Relationships Between Mean Rereading Rate and ART Score for the Different Categories of Viewpoint Markers



Note. Each dot represents a participant.

Figure 5.7 Schematic Summary of the Results



*Note.* Compared with non-viewpoint markers, perceptual viewpoint markers were skipped more often, whereas cognitive and emotional viewpoint markers were skipped less often. Egocentric Intrusion and STOMP score decreased skip rate overall, and IRI Perspective Taking score increased skip rate overall, and for perceptual viewpoint markers specifically. Compared with non-viewpoint markers, perceptual viewpoint markers were fixated shorter, whereas cognitive and emotional viewpoint markers were fixated longer. STOMP score and ART score were related to decreased gaze durations overall. Compared with non-viewpoint markers, perceptual viewpoint markers did not differ in terms of rereading rate, whereas cognitive and emotional viewpoint markers were reread more often. ART score was related to increased rereading rate overall, and Egocentric Intrusion was related to increased rereading rate for cognitive viewpoint markers specifically.



## 5.4 Discussion

In this chapter we set out to investigate the relationship between the processing of markers of narrative viewpoint and social cognition. Specifically, we investigated how the linguistic processing of perceptual, cognitive, and emotional viewpoint markers during narrative reading is modulated by individual differences in social-cognitive abilities. We first looked at the effect of different types of viewpoint markers on eye movements and found diverging patterns of reading behavior for perceptual viewpoint markers on the one hand, and cognitive and emotional viewpoint markers on the other. Crucially, we also found that social-cognitive abilities modulated the effect of different viewpoint markers on eye movements, suggesting that the processing of narrative viewpoint engages these abilities during reading. In what follows, we will first discuss the differences in reading behavior for the three types of viewpoint markers. We will then focus on the role of social-cognitive abilities and the implications of our findings.

### 5.4.1 Diverging Patterns of Reading Behavior for Different Viewpoint Dimensions

As expected, we found that cognitive and emotional viewpoint markers were skipped less, fixated longer, and reread more often compared with non-viewpoint marking content words. By contrast, however, perceptual viewpoint markers were fixated shorter and skipped more often than other non-viewpoint marking content words. They also did not differ in terms of rereading rate from other non-viewpoint marking content words. In other words, whereas cognitive and emotional viewpoint markers were processed relatively slowly, perceptual viewpoint marker were processed relatively quickly compared with other content words, suggesting that the processing of perceptual narrative viewpoint is linguistically and/or conceptually simpler compared with the processing of cognitive and emotional narrative viewpoint (see also M. Mak & Willems, 2018).

When looking at the linguistic side of perceptual versus cognitive and emotional perspective taking, it should first be noted that we controlled for differences in word length and word frequency in our analyses. Hence, the differences between perceptual viewpoint markers on the one hand, and cognitive and emotional viewpoint markers on the other, cannot be explained in terms of these basic linguistic characteristics. However, there might be additional semantic and syntactic differences between these viewpoint dimensions that could lead to differences in processing. For example, perceptual verbs such as *to see* and *to hear* are often classified as factive verbs (e.g., Givón, 1972), that is, expressing information that is assumed to be true, whereas most cognitive verbs such as *to think* and emotional verbs such as *to feel* are nonfactives. Expressions of perception are thus one-dimensional in that they are implicative of the “truth” of what they express, while expressions of cognition and emotion are semantically multidimensional, referring to the speaker’s stance toward the “truth” of what they express. Furthermore, in English, verbs of cognition have been found

to be used with a sentential complement (*I think that it's raining*) more often than verbs of perception (*I see that it's raining*), which are more commonly used in simpler syntactic frames, such as in combination with direct objects (*I see rain*; Davis & Landau, 2020). As such, verbs of cognition and emotion might be semantically and syntactically more complex and thus take more time to process. In line with this hypothesis, Davis and Landau (2020) found that regardless of syntactic frame, children aged between two and five years produced more verbs of perception (e.g., *to see, to hear*) than verbs of cognition (e.g., *to know, to think*). This finding is also in line with accounts of theory of mind and language acquisition that argue that children's perceptual understanding develops first, and subsequently serves as a model for understanding more abstract mental states such as beliefs (Gopnik et al., 1994).

Nonetheless, in our study, viewpoint markers were not only verbs but also other types of content words. Another potential linguistic difference between the different types of viewpoint markers is therefore the distribution of word classes. For example, whereas the class of perceptual viewpoint markers contained mostly verbs, emotional viewpoint markers were rarely verbs and more often nouns and adjectives. However, perceptual and cognitive viewpoint markers were very similar in their proportion of different word classes, and yet differed in terms of reading behavior. All in all, more research is needed to understand how perceptual perspective taking on the one hand, and cognitive and emotional perspective taking on the other, differ, both linguistically and conceptually.

#### **5.4.2 The Role of Individual Differences in Social-Cognitive Abilities**

Besides the differences in reading behavior for the different categories of viewpoint markers, we found that individual differences in social-cognitive abilities affected the processing of both words in general and, crucially, perceptual and cognitive viewpoint markers specifically. First, we found that Egocentric Intrusion, a measure derived from the Visual Perspective-taking Task (Samson et al., 2010) that reflects the interference of one's own perspective when taking someone else's perspective, and scores on the Spontaneous Theory of Mind Protocol (Rice & Redcay, 2015), reflecting the spontaneous tendency to mentalize, decreased skip rate. That is, poorer perspective takers and readers with a high tendency to mentalize were less likely to skip words overall. In addition, scores on the Perspective Taking subscale of the Interpersonal Reactivity Index (Davis, 1983) increased skip rate, such that readers who are more likely to take the perspective of others, were more likely to skip words. Finally, scores on the Spontaneous Theory of Mind Protocol also decreased gaze durations for words overall, such that readers with high tendency to mentalize looked at words less long. Although the finding that STOMP scores decrease the odds of skipping words seems to contradict the other findings, the overall picture seems to be that readers with better social-cognitive abilities are faster readers (i.e., more skipping, shorter durations) in general.

The main aim of the study, however, was to see how social-cognitive abilities modulated the linguistic processing of viewpoint markers specifically. We found that readers with higher scores on the Perspective Taking subscale of the Interpersonal Reactivity Index were more likely to skip perceptual viewpoint markers in particular. Moreover, readers who experienced more egocentric intrusion and were thus less flexible perspective takers, were particularly more likely to reread cognitive viewpoint markers. These results cautiously suggest that besides a general facilitatory effect of social-cognitive abilities on linguistic processing, perspective-taking abilities facilitate the processing of at least perceptual and cognitive viewpoint markers. That is, the better these abilities (i.e., more self-reported perspective taking in daily life, more flexible visual perspective taking), the higher the likelihood that readers will skip perceptual viewpoint markers and not reread cognitive viewpoint markers.

What is puzzling, however, is why these two measures of perspective taking affect the processing of perceptual and cognitive viewpoint markers specifically, and not of all types of viewpoint markers. This might first and foremost be an issue of power: the stimulus narrative contained more than twice as many cognitive viewpoint markers as emotional viewpoint markers. Hence, future studies could look at more balanced narratives that contain an equal amount of perceptual, cognitive, and emotional viewpoint markers to see whether in such a case social-cognitive abilities affect the processing of all viewpoint dimensions. Alternatively, it could be the case that specific aspects of social-cognitive abilities are in fact related to specific types of narrative viewpoint processing. More detailed studies are needed to further elucidate the details behind these relationships.

All in all, our findings provide a first, modest piece of evidence that processing narrative viewpoint engages social-cognitive abilities, and that a weakness in these abilities thus leads to a delay in processing. As such, our findings corroborate earlier studies that have shown that social-cognitive abilities play a role in narrative processing (e.g., Atkinson et al., 2017; Mason & Just, 2009; Pavias et al., 2016; Pelletier & Wilde Astington, 2004). Moreover, we extend these findings by showing that these abilities are specifically related to the linguistic processing of narrative viewpoint, furthering our understanding of the exact aspects of narrative reading that social-cognitive abilities are implicated in. Our findings also resonate with developmental studies on the relationship between theory of mind and narrative comprehension in general (Atkinson et al., 2017; Pavias et al., 2016; Pelletier & Wilde Astington, 2004), and the acquisition and processing of epistemic markers, verbs of cognition, and verbs of emotion specifically (Antonietti et al., 2006; Grazzani & Ornaghi, 2012; Moore et al., 1990; Ornaghi & Grazzani, 2013). Interestingly, our study reveals that the relationship between social cognition and the processing of viewpoint markers such as verbs of cognition holds into adulthood.

A possible explanation for the finding that social-cognitive abilities facilitate the linguistic processing of narrative viewpoint could be that readers with high social-cognitive abilities have better linguistic or reading skills, for example because they read more often (Djikic et al., 2013b; Lenhart et al., 2020; Mar et al., 2006; Mumper & Gerrig, 2017) or because social cognition (partially) relies on language, as is often argued for the relationship between language development and theory of mind development (e.g., Baird & Astington, 2005). Note, however, that we controlled for print exposure, as measured with the Author Recognition Test (Stanovich & West, 1989), in our analyses. Hence, there seems to be a unique contribution of social-cognitive abilities to the linguistic processing of viewpoint, independently of print exposure. To completely rule out this explanation, however, future research would benefit from including more measures of reading habits and skills.

Another conceivable explanation for the facilitatory effect of social-cognitive abilities could be that readers with high social-cognitive abilities process viewpoint markers faster because in light of these abilities, viewpoint markers become (partially) redundant. That is, readers who can afford to do so might use their social-cognitive abilities to make sense of the viewpoints of characters, rather than depending too much on the linguistic cues that are provided in the text. In other words, these readers might use their social-cognitive abilities to decrease the demand on linguistic processing. On the other hand, readers with relatively poor social-cognitive skills might need to rely more on explicit markers of viewpoint, leading to slower linguistic processing. In other words, there might be a trade-off between using social-cognitive or linguistic means to engage in narrative perspective taking.

This hypothesis is supported by a study on individual differences in perspective shifting: Duff (2018) found that, overall, readers were more likely to take the perspective of a character, rather than a narrator, when interpreting sentences that contained a verb of cognition (e.g., *to know* or *to believe*) compared with when the sentences contained no such predicate. However, this effect was found to interact with scores on the Autism Quotient questionnaire such that readers with high scores on this questionnaire were most sensitive to the presence of verbs of cognition. That is, unlike other participants, readers with high scores on the AQ took the perspective of the character almost exclusively when a verb of cognition was present. This suggests that readers with poor social-cognitive abilities are more sensitive to linguistic expressions of perspective.

The explanation that readers with better social-cognitive abilities rely less on textual cues such as viewpoint markers than readers with poor social-cognitive abilities also raises new questions. For example, how do readers with varying levels of social-cognitive abilities process narratives in which viewpoint markers are largely lacking and the contents of characters' minds has to be inferred based on external descriptions of behavior? If the proposed explanation holds, we would expect that readers with poor social-cognitive abilities would

be impeded in their attempts to understand or identify with story characters, because their ability to do so largely depends on explicit markers of viewpoint. On the other hand, readers with high social-cognitive skills would be able to compensate for the lack of explicit viewpoint marking with their social-cognitive abilities. An experiment in which the presence or absence of viewpoint markers is manipulated within narratives could be designed to test this hypothesis.

All in all our results suggest that linguistic markers of narrative viewpoint play a role in engaging social-cognitive abilities during reading. This finding is also of relevance for research on the positive effects of narratives on social cognition. If markers of narrative viewpoint engage social-cognitive abilities, then these abilities might be strengthened through repeated exposure to and engagement with narratives (Mar, 2018). Hence, markers of narrative viewpoint might be an interesting candidate in the search for textual determinants of the social-cognitive potential of narratives (see also Koopman & Hakemulder, 2015). Note that a recent study did not find a difference in the effect of a *single* exposure to a narrative with or without direct access to the inner worlds of protagonists on social-cognitive abilities (internal vs. external focalization; Wimmer et al., 2021). By contrast, reasoning from the present findings, it may be hypothesized that a study that combines such a textual approach with the individual differences approach outlined here, might reveal interesting patterns of results.

In conclusion, our experiment showed that individual differences in social cognition affect the linguistic processing of narratives, and specifically narrative viewpoint. Future research will need to further unravel what this means for narrative processes such as narrative empathy and identification, and, ultimately, the impact of narratives on social cognition.



# Chapter 6

## Engagement with Narrative Characters: The Role of Social-Cognitive Abilities and Linguistic Viewpoint

**This chapter has been published as:**

Eekhof, L. S., van Krieken, K., Sanders, J., & Willems, R. M. (2023).

Engagement with narrative characters:

The role of social-cognitive abilities and linguistic viewpoint.

*Discourse Processes*, 60(6), 411–439.

<https://doi.org/10.1080/0163853X.2023.2206773>

## Abstract

This chapter explores the role of text and reader characteristics in character engagement experiences. In an online study, participants completed several self-report and behavioral measures of social-cognitive abilities and read two literary narratives in which the presence of linguistic viewpoint markers was varied using a highly controlled manipulation strategy. Afterward, participants reported on their character engagement experiences. A principal component analysis on participants' responses revealed the multidimensional nature of character engagement, which included both self- and other-oriented emotional responses (e.g., empathy, personal distress) as well as more cognitive responses (e.g., identification, perspective taking). Furthermore, character engagement was found to rely on a wide range of social-cognitive abilities but not on the presence of viewpoint markers. Finally, and most importantly, we did not find convincing evidence for an interplay between social-cognitive abilities and the presence of viewpoint markers. These findings suggest that readers rely on their social-cognitive abilities to engage with the inner worlds of fictional others, more so than on the lexical cues of those inner worlds provided by the text.



## 6.1 Introduction

From desperately trying to figure out why our favorite character makes a seemingly bad decision, to cheering along when they finally succeed in reaching their goal, the ways in which we engage with the inner worlds of characters are at the heart of narrative processing. Cognitive and emotional engagement with characters has been the subject of both literary studies and the empirical study of fiction. Previous research has established that readers' trait empathy increases their tendency to engage with characters' inner lives (e.g., Koopman, 2015; Wimmer et al., 2021). Moreover, some studies tentatively suggest that perspectivization techniques also play a role in the emergence of character engagement experiences (e.g., Habermas & Diel, 2010; Sato et al., 2012). However, not much attention has been paid to the interplay between these reader and textual characteristics. Therefore, we studied how various facets of character engagement are a function of individual differences in social-cognitive abilities, linguistic viewpoint markers (i.e., textual markers that provide access to the inner worlds of characters), and their interaction.

### 6.1.1 Dimensions of Character Engagement

When reading narratives, readers will cognitively and emotionally engage with the minds of characters. Previous research has provided various terms and theories that can be grouped under the broader umbrella of character engagement to explain this process (Coplan, 2010). Among these, identification and narrative empathy are used most often. The term identification usually refers to the imaginative process by which readers come to lose awareness of their external role as a reader and take up the internal perspective of one of the characters (Cohen, 2001, 2008; see also Kaufman & Libby, 2012, who have used the term experience-taking for the same process). Identification usually involves both a cognitive, affective, and perceptual dimension, as readers may align themselves with both the thoughts, beliefs, goals as well as feelings and perceptions of characters (Cohen, 2001). In other words, identification can be seen as a form of perspective taking in which the reader takes the first-person, internal perspective of a character (Tal-Or & Cohen, 2010). However, as Carroll (2011) notes, both scholars and lay consumers of narratives can also use identification to refer to a range of other character engagement processes, such as "wanting to be like a character" or simply "liking a character".

Focusing mostly on the emotional aspects of character engagement, others have used the concept of empathy to explain the relationship between readers and characters. Keen (2006, 2007) describes narrative empathy as the experience of sharing a character's feelings (see also Zillmann, 1995) and argues that it should be seen as a separate process from identification. Nevertheless, she argues that it is not clear yet what the relationship between narrative empathy and identification is, and whether one necessarily follows from the other or not.

In a more elaborate account, Coplan (2004) shows that narrative empathy can co-occur with other emotional reactions and reflections in the reader, specifically stressing the importance of self-other awareness. Coplan argues that experiences of narrative empathy will leave readers aware of their own identity, even as they take on the perspective of the fictional other. As a result, readers might simultaneously experience empathy *and* discern their own emotional reactions to the story. These reactions might include feelings of sympathy, care, or compassion toward the characters (i.e., feelings that are directed at the mental states of characters but are not necessarily identical to those states). This is especially true when the reader knows more about the unfolding narrative events than the character (Coplan, 2004; Goldman, 2011; Keen, 2013; Oatley, 1995). Finally, sharing characters' mental states, especially unpleasant ones, can also lead to feelings of personal distress in the reader (i.e., a self-oriented, aversive reaction toward characters' experiences; Decety & Lamm, 2009; Keen, 2013).

Altogether, it is clear that character engagement is a complex and multifaceted phenomenon. The terminology used to explain the experiences and processes involved in character engagement, however, is somewhat opaque (Cohen, 2008; Goldman, 2011). Coplan (2004, 2010) has argued that identification and empathy are often vaguely defined, used interchangeably and inconsistently, and do not do justice to the highly complex nature of character engagement. That is why some scholars have argued for a more pluralist view on character engagement (e.g., Bortolussi et al., 2018; Cohen, 2008; Coplan, 2004). On such accounts, character engagement is highly dynamic both in terms of intensity, frequency, and the target of readers' engagement, and depends on various psychological processes that readers "move in and out of" (Cohen, 2008, p. 1). Beyond these theoretical and semantic considerations, character engagement is an important aspect of narrative processing and has been the focus of many empirical studies as well.

### **6.1.2 Determinants of Character Engagement**

Empirical research on the determinants of character engagement has focused on both reader-related and text-related aspects. Readers differ in their tendency to engage with the mental worlds of characters. Although not much research has been conducted on these individual differences (but see Rain & Mar, 2021 for a recent example), empirical research has established that trait empathy positively affects sympathy and empathy for characters (Habermas & Diel, 2010; Koopman, 2015, 2016), empathic concern for and perspective taking with characters (van Lissa et al., 2018), and identification with characters (Koopman, 2016; Wimmer et al., 2021). These relationships suggest that engaging with the minds of "fictional others" at least partially depends on readers' real-life social-cognitive abilities (see also Eekhof et al., 2021).

Compared with the limited literature on the relationship between reader characteristics and character engagement, there is a large body of work investigating how textual aspects of

narratives influence character engagement (for a theoretical account see e.g., Keen, 2007). Both the content and form of narratives have been found to impact character engagement. For example, characteristics of story characters (Cohen et al., 2018; Hoeken et al., 2016; Kaufman & Libby, 2012; Komeda et al., 2013; Tsay & Krakowiak, 2011) and topic severity (e.g., Habermas & Diel, 2010) are both content-related aspects of narratives that have been reported to affect character engagement.

Research on form-related aspects of narratives has mostly focused on the effect of perspectivization techniques. Perspective or viewpoint refers both to the point of view from which the objects and events in a narrative are depicted and the way this is linguistically expressed through perspectivization techniques (Eekhof et al., 2020; Niederhoff, 2013b; J. Sanders, 1994; Vandelanotte, 2017). On a text-global level, perspective may be established through the use of grammatical perspective (i.e., the use of first-, second-, or third-person pronouns to refer to characters), or different types of narration (e.g., an omniscient narrator who has access to and describes the inner world of the characters vs. an external narrator who only reports on externally visible events). More local perspectivization techniques include the use of viewpoint markers that give readers access to the internal perspectives of characters, such as verbs of perception (e.g., *to see*, *to feel*), epistemic words (e.g., *should*, *possibly*), or emotion words (e.g., *happy*, *sad*; Eekhof et al., 2020; van Krieken et al., 2017) and the use of thought reports (Vandelanotte, 2017).

Various aspects of narrative perspective seem to play a role in readers' engagement with characters. For example, it has been argued that a first-person perspective would be more conducive for character engagement because the story is told from the perspective of the experiencing character (e.g., Oatley, 1999). However, results from empirical studies looking at the effects of global manipulations of grammatical perspective (consistent use of first-person pronouns vs. third-person pronouns) are mixed. Chen et al. (2017) found more identification when readers read first-person narratives, and Kaufman and Libby (2012) reported that identification was highest in first-person narratives with an in-group character. However, no effects of narrative perspective on narrative empathy and identification were found by van Lissa et al. (2018) and Wimmer et al. (2021).

Taking a slightly different approach, de Graaf et al. (2012) used stories that featured two characters and manipulated from whose perspective the stories were told. In one condition, one character's thoughts and perceptions were in focus, and, in addition, this character was referred to with first-person pronouns, whereas the other character was referred to with third-person pronouns. In the other condition, the roles were reversed and the same narratives were told through the perspective of the other character. The results showed that participants identified more with the character from whose perspective the narrative was told. This finding was replicated by Hoeken et al. (2016).

Focusing specifically on the representation of characters' experiences and perceptions, Sato et al. (2012) manipulated the degree to which readers were given access to the inner world of one central character in various short narratives. Versions of each narrative told by a so-called omniscient narrator who has access to and reports on the inner worlds of character were compared with versions in which an objective narrator only reported on the externally observable events of the narrative. After reading each narrative, participants performed a picture-verification task in which they had to confirm as quickly as possible whether the action presented in the picture was reported in the narrative. It was found that after reading a narrative told by an omniscient narrator (compared with an objective narrator), readers were faster to respond to pictures that represented the narrative action from the viewpoint of the performer of the action (i.e., an internal perspective) than to pictures that represented the narrative action from the viewpoint of an observer (i.e., external perspective). These findings suggest that representing the inner world of a character invites readers to take up the internal perspective of a character, rather than simulate the narrative events from an external perspective.

In addition, Habermas and Diel (2010) found that a story told from an omniscient perspective that contained explicit references to the protagonist's inner world elicited more sympathetic reactions from readers than the same story told from an impersonal, external perspective in which very few references to the protagonist's inner world were included. Similarly, van Peer and Pander Maat (2001) found that readers experienced more sympathy for the character whose thoughts were represented in the narrative. Nevertheless, Wimmer et al. (2021) found no effect of whether a text provided insight in a character's inner life (so called internal focalization) or not (so called external focalization) on identification.

All in all, previous research has established that character engagement is multifaceted and that it depends on reader's trait empathy. Research on the textual determinants of character engagement has provided mixed results but suggests that perspectivization techniques might still play a role. In more recent years, there has been a call to study the interaction between text and reader characteristics, because "neither the textual nor the reader dimension works in isolation" (Fernandez-Quintanilla, 2020, p. 141; see also Eekhof et al., 2022b).

In a previous study, we found evidence for this interaction showing that individual differences in social-cognitive abilities affect the linguistic processing of narrative perspective, specifically the processing of linguistic viewpoint markers (Eekhof, van Krieken, et al., 2021). Viewpoint markers are content words that express the subjective perspectives of characters (Eekhof et al., 2020). For example, perceptual viewpoint markers such as perception verbs (e.g., *to smell*, *to see*) give readers access to the perceptions and sensations of characters. Cognitive viewpoint markers such as cognition verbs (e.g., *to think*, *to hope*) and modal adverbs (e.g., *possibly*, *maybe*) express the thoughts, beliefs, and intentions of characters, and, finally,

emotional viewpoint markers such as emotion adjectives (e.g., *angry, joyful*) mark the emotions of characters. In an eye-tracking study we found that readers with better perspective-taking abilities and higher self-reported perspective-taking tendencies processed markers of character's perceptual and cognitive perspective faster than readers with poor perspective-taking abilities.

Based on these findings, we tentatively suggested that narrative perspective taking might draw both on the reader's social-cognitive abilities as well as perspectivization techniques in the narrative (i.e., the presence of linguistic viewpoint markers). Crucially, we hypothesized a trade-off between these two aspects, such that readers with better social-cognitive abilities might be less reliant on the presence of viewpoint markers to engage with the inner worlds of characters, and hence, in line with our findings, process these markers faster. On the other hand, readers who have relatively poor social-cognitive abilities need to rely fully on the presence of explicit cues about the mental states of characters and thus take longer to read these cues. In other words, we proposed that readers can draw on two possible resources to successfully engage with the minds of fictional others: social-cognitive abilities and textual cues. This implies that depending on their social-cognitive disposition, some readers might benefit more from textual cues than others when it comes to experiencing character engagement. This could explain why studies that have not taken into account individual differences between readers when studying the effects of textual manipulations on character engagement, have found mixed results. We set out to further explore these ideas in this study.

### 6.1.3 Current Study

We designed a study to explore how both text-related aspects (i.e., the relative presence of linguistic viewpoint markers) and reader-related aspects (i.e., social-cognitive abilities) influence character engagement. The following research question was formulated:

*How do the presence or absence of narrative viewpoint markers and readers' social-cognitive abilities interact to create experiences of character engagement?*

We had three hypotheses regarding this research question. First, we hypothesized that the presence of viewpoint markers would positively affect character engagement in general, as these markers cue the reader to engage in perspective taking and give the reader access to the inner worlds of characters. This prediction is in line with hypotheses by van Krieken et al. (2017) and findings by de Graaf et al. (2012), Habermas and Diel (2010), Hoeken et al. (2016), van Peer and Pander Maat (2001), and Sato et al. (2012), as described above.

Second, we hypothesized that social-cognitive abilities would have a positive effect on character engagement in general. As described above, previous research has established

that trait empathy positively affects character engagement (Habermas & Diel, 2010; Koopman, 2015, 2016; van Lissa et al., 2018; Wimmer et al., 2021), and we hypothesized that other social-cognitive abilities such as perspective-taking abilities would similarly benefit character engagement.

Finally, and most crucial to our interest in the interplay between the presence of linguistic viewpoint markers and social-cognitive abilities, we hypothesized there would be an interaction between these two factors. In line with our earlier finding (Eekhof, van Krieken, et al., 2021) that readers with better perspective-taking abilities process viewpoint markers faster and the line of reasoning explained above, we specifically hypothesized that the effect of social-cognitive abilities on character engagement would be stronger for narratives in which viewpoint markers are relatively scarce. When linguistic cues are lacking, social-cognitive abilities are all that readers can rely on, enhancing their importance, whereas in the presence of viewpoint markers, all readers should be able to engage with characters to some degree regardless of their social-cognitive abilities. Another way of looking at this interaction is that for readers with relatively poor social-cognitive abilities, we expected large differences in character engagement between the conditions with and without viewpoint markers, whereas we expected similar levels of character engagement for both conditions for readers with relatively high social-cognitive abilities.

## 6.2 Method

An online study with a within-subject design was preregistered (<https://osf.io/2vdmg>) and carried out to test the effect of viewpoint markers and social-cognitive abilities on character engagement. Another preregistered study (<https://osf.io/m2rtx>) was designed to pretest the stimulus materials. Due to the COVID-19 pandemic, both the pretest and main study were conducted online. All our materials, data, and analysis scripts are publicly available on the Open Science Framework (<https://osf.io/xygew>).

### 6.2.1 Participants

Participants were recruited to take part in the main study in return for £5.25 via the online crowd-sourcing platform Prolific. We aimed to recruit approximately 350 native speakers of Dutch with no history of reading disorders, aged between 18 and 70 years. This sample size was based on a power simulation in which we used data from a previous study (Eekhof, van Krieken, et al., 2021) to estimate how many participants would be necessary to achieve a power of around 80% to detect both main effects, for which we estimated a coefficient estimate of -0.3, and interaction effects, for which we estimated a coefficient estimate of 0.3, partially using data from a previous study (Eekhof, van Krieken, et al., 2021). Further details on the power simulation can be found in the preregistration on the Open Science Framework.

In total, 358 participants finished the study. After data collection, four participants were removed because they answered more than one comprehension check incorrectly for at least one of the stories. Another two participants were removed because they took longer than the established cut-off point of 109 minutes to complete the experiment. This cut-off point was established automatically by Prolific based on the estimated completion time of 42 minutes. Finally, three participants were removed because they had read one of the narratives before. No participants had to be removed based on the attention check questions<sup>15</sup>.

The final data set consisted of 349 participants (186 women, 155 men, 8 other) aged between 18 and 69 years ( $M = 29.09$ ,  $SD = 10.70$ ). The sample consisted mostly of working adults (51%) and students (41.26%). 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 (Approval Number 2018-3568).

## 6.2.2 Materials

### 6.2.2.1 Narratives

We selected two short Dutch fictional narratives previously published by professional authors and manipulated them to create two versions of each narrative: an impoverished viewpoint version and an enriched viewpoint version. The narratives were selected based on the following criteria. As first-person narratives are by definition more subjective, the relative absence of viewpoint markers is rather uncommon and unnatural in such narratives. We therefore decided to use narratives told from a third-person perspective. For the same reason, we aimed for narratives that struck a good balance between action descriptions and mental descriptions, so there would be enough narrative material to create both an impoverished viewpoint and enriched viewpoint version. Finally, we selected narratives with one central main character who could be the target for participants' character engagement.

The first narrative, *De Invaller* ("The Substitute"), was written by René Appel, a renowned and best-selling author, and previously published in a Dutch newspaper.<sup>16</sup> This narrative tells the story of a girl who is being followed by a man, who eventually turns out to be one of her former high school teachers. However, by the end of the story it turns out that his intentions might not be as innocent as he claims and that the girl's initial intuitions about the man might have been correct. The second narrative, *Koorddanser* ("Tightrope Walker"), was written by Jasmijn Kam, a young and upcoming writer, and published on the website of a yearly

15 Four participants initially failed the attention check criterion. However, these participants later reported to have misunderstood the instructions of the attention check items. After verifying this, their data were included in the final data set.

16 Source: Appel, R. (2003, June 16). *De Invaller*. *NRC Handelsblad*. Available online at: <https://www.nrc.nl/nieuws/2003/06/16/de-invaller-7642950-a1353672>

literary award for Dutch short stories<sup>17</sup>. This narrative centers around a main character who somewhat reluctantly takes an older lady to the circus in a nearby French town because his aunt asks him to.

We manipulated both narratives to create an impoverished viewpoint and an enriched viewpoint version, taking the original texts as a basis. To facilitate the manipulation, we first analyzed the original narratives as follows. We divided each original text into lexical units. Then, the first and second author independently coded each unit of the narratives for the presence of perceptual (i.e., verbs of perception, verbs of bodily sensation, and morphologically related content words), cognitive (i.e., verbs of cognition, modal epistemic verbs and adverbs, and morphologically related content words), and emotional viewpoint markers (i.e., verbs and adjectives of emotion, and morphologically related content words) using the Viewpoint Identification Procedure, which we developed in a previous study (Eekhof et al., 2020). Interrater agreement was almost perfect for both *De Invaller* (97.78%,  $\kappa = .86$ ) and *Koorddanser* (98.43%,  $\kappa = .87$ ). Disagreements were resolved by discussion between the first and second author, leading to the viewpoint ratings reported for the original narratives in the first column of Table 6.1. Next, we marked cases of thought report and speech report (direct, indirect, and free indirect style) and identified the referents for all viewpoint markers and thought reports (i.e., identify the character whose inner world is represented by these markers and reports). We then developed the two highly controlled and reproducible manipulation strategies described below to create two versions of each narrative, as exemplified in Table 6.2.

#### 6.2.2.1.1 Impoverished Viewpoint Versions

The following procedure was used to create the impoverished viewpoint versions. We removed all viewpoint markers and thought reports except if they were embedded in speech reports. This was done because in these cases viewpoint markers or thought reports cannot be considered true markers of *internal* perspective. We proceeded with the removal of all other viewpoint markers and thought reports as follows:

- 1) If it was possible to remove a viewpoint marker while leaving the rest of the sentence it was embedded in largely intact, we did so. For example, “A young couple was talking **earnestly** (*emotional viewpoint marker*) in hushed tones” became “A young couple was talking in hushed tones”.
- 2) If removing a viewpoint marker led to an ungrammatical or incomprehensible sentence, or if the whole sentence was a thought report, we rephrased or replaced these sentences,

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17 Source: Kam, J. (2019, February 12). *Koorddanser*. *J.M.A. Biesheuvelprijs*. Available online at: <https://www.jmabiesheuvelprijs.nl/?p=733>



taking care to use as much of the original wording as possible (e.g., the use of pronouns or names to refer to characters):

- a) Sentences with perceptual viewpoint markers were rephrased as, or replaced by, an external description of the object or scene that was perceived by a character. For example, “He **hears** (*perceptual viewpoint marker*) the splashing of the shower and, very distantly, Helène’s voice” became “The shower splashes and very distantly, Helène is having a conversation”.
- b) Thought reports or sentences with cognitive and/or emotional viewpoint markers were rephrased as, or replaced by, external descriptions of characters’ behavior or the story world, from which the eliminated internal viewpoint could in principle be inferred by the reader, at least to a rough degree. For example, “**Embarrassed** by her own **fear, distrust** and **panic** (*all emotional viewpoint markers*), she sat down on the couch” became “She sat down on the couch, leaned back, and held her hand to her forehead”. In this case, the eliminated emotional viewpoint markers could be inferred by the reader based on the added description of the character’s behavior.
- c) Finally, in some rare cases we added descriptions of the story world that were not relevant to the plot of the story to make up for longer sentences that were removed. For example, the thought report “There wasn’t a damn person to be seen. How could she have been so stupid as to take this road?” became “The park was poorly lit and completely deserted. She cursed out loud”. However, we decided not to add too many filler sentences to the impoverished versions, as adding extra details to the plot might introduce a confound in the design of the study.

#### 6.2.2.1.2 Enriched Viewpoint Versions

The following procedure was used to create the enriched viewpoint versions of each narrative. We counted the number of viewpoint markers of each dimension (perceptual, cognitive, and emotional) that were not embedded in speech reports as well as the number of thought reports in the original narratives. Throughout the texts, we then added viewpoint markers and thought reports referring to the main character and in line with the plot of the narrative, so as to double the original number of viewpoint markers and thought reports not embedded in speech reports (Table 6.1).

Descriptive information for the original, impoverished, and enriched versions of the narratives can be found in Table 6.1. Note that only the enriched viewpoint versions and the impoverished viewpoint versions were used in the experiment. Although the enriched versions of both narratives were slightly longer, there were no significant differences in word length (De Invalier:  $t(1529) = -0.36, p = .72, d = -0.02, 95\% \text{ CI} [-0.12, 0.08]$ ; Koorddanser:  $t(2203) = 0.13, p = .90, d = 0.01, 95\% \text{ CI} [-0.08, 0.09]$ ) or log-transformed lemma frequency (taken from SUBTLEX-NL corpus, Keuleers et al., 2010) for either of the narratives (De Invalier:  $t(1467) = 0.70, p = .49, d = 0.04, 95\% \text{ CI} [-0.07, 0.14]$ ; Koorddanser:  $t(2151) = 0.85, p = .40, d = 0.04, 95\% \text{ CI} [-0.05, 0.12]$ ).

**Table 6.1** Descriptive Statistics for the Different Versions of the Narratives

Story	Text characteristic	Original narrative	Enriched viewpoint version	Impoverished viewpoint version
De Invalier	Number of words	743	875	713
	Number of lexical units	719	845	686
	Number of perceptual viewpoint markers (%)			
	Total	21 (2.92%)	41 (4.85%)	1 (0.15%)
	Embedded in speech reports	1 (0.14%)	1 (0.12%)	1 (0.15%)
	Not embedded in speech reports	20 (2.78%)	40 (4.73%)	0 (0.00%)
	Number of cognitive viewpoint markers (%)			
	Total	36 (5.00%)	54 (6.39%)	18 (2.62%)
	Embedded in speech reports	18 (2.50%)	18 (2.13%)	18 (2.62%)
	Not embedded in speech reports	18 (2.50%)	36 (4.26%)	0 (0.00%)
	Number of emotional viewpoint markers (%)			
	Total	8 (1.11%)	15 (1.78%)	1 (0.15%)
	Embedded in speech reports	1 (0.14%)	1 (0.12%)	1 (0.15%)
	Not embedded in speech reports	7 (0.97%)	14 (1.66%)	0 (0.00%)
Number of thought reports	8	16	0	
Number of lexical units within speech reports (%)	169 (23.51%)	169 (20.00%)	171 (24.93%)	
Mean word length ( <i>SD</i> )	4.39 (2.40)	4.42 (2.43)	4.47 (2.43)	
Mean log-transformed lemma frequency ( <i>SD</i> )	10.82 (2.94)	10.81 (2.97)	10.70 (3.09)	

**Table 6.1** Continued

Koorddanser	Number of words	1104	1198	1048
	Number of lexical units	1084	1175	1030
	Number of perceptual viewpoint markers (%)			
	Total	24 (2.21%)	44 (3.75%)	4 (0.39%)
	Embedded in speech reports	4 (0.37%)	4 (0.34%)	4 (0.39%)
	Not embedded in speech reports	20 (1.85%)	40 (3.40%)	0 (0.00%)
	Number of cognitive viewpoint markers (%)			
	Total	43 (3.97%)	59 (5.02%)	27 (2.62%)
	Embedded in speech reports	27 (2.49%)	27 (2.30%)	27 (2.62%)
	Not embedded in speech reports	16 (1.48%)	32 (2.72%)	0 (0.00%)
	Number of emotional viewpoint markers (%)			
	Total	8 (0.74%)	14 (1.19%)	2 (0.19%)
	Embedded in speech reports	2 (0.19%)	2 (0.17%)	2 (0.19%)
	Not embedded in speech reports	6 (0.55%)	12 (1.02%)	0 (0.00%)
	Number of thought reports	0	3	0
	Mean word length ( <i>SD</i> )	4.35 (2.23)	4.40 (2.26)	4.39 (2.22)
	Number of lexical units within speech reports (%)	243 (22.42%)	243 (20.68%)	243 (23.59%)
	Mean log-transformed lemma frequency ( <i>SD</i> )	10.82 (3.16)	10.82 (3.14)	10.71 (3.23)

*Note.* Only the enriched viewpoint and impoverished viewpoint versions of the narratives were used in the experiment.

**Table 6.2** Excerpts from the Two Viewpoint Conditions of the Two Narratives

Story	Original narrative	Impoverished viewpoint version	Enriched viewpoint version
De Invalier	Suddenly she stood up, took her wallet from her purse, put a twenty euro bill on the bar and, almost running, left the café. She barely <b>heard</b> Joost call out that she still needed to get change. <i>Quickly, quickly.</i> With trembling hands she took her bicycle key out of the pocket of her jeans and opened the lock. As she cycled away, she <b>saw</b> a red spot coming from the café out of the corner of her eye. "HEY!" the man called out, and then something else, but she couldn't <b>understand</b> it.	Suddenly she stood up, took her wallet from her purse, put a twenty euro bill on the bar and, almost running, left the café. "You still need to get your change!" Joost called after her. Quickly and with trembling hands she took her bicycle key out of the pocket of her jeans and opened the lock. As she cycled away, something red came out of the café. "HEY!" the man called out, "Wait!", but she quickly cycled on and turned the corner at the intersection at the end of the street.	Suddenly she stood up, <b>panic-struck</b> , took her wallet from her purse, put a twenty euro bill on the bar and, almost running, left the café without <b>looking</b> back. She barely <b>heard</b> Joost call out that she still needed to get change. <i>Quickly, quickly, she wanted to leave.</i> With trembling hands she <b>looked</b> for her bicycle key in the pocket of her jeans and <b>tried</b> to open the lock. As she cycled away, she was <b>startled</b> to <b>see</b> a red spot coming from the café out of the corner of her eye. "HEY" she <b>heard</b> the man call out, and then something else, but she couldn't <b>understand</b> it.
Koorddanser	When the two women have left together, Daan remains seated at the side of the pool for a while. The sun reflects on the water, it's bright to his eyes. He <b>hears</b> crickets in the bushes. A small lizard shoots past, then <b>seems startled</b> by itself and sits dead still a few inches from his left hand. The creature's belly moves up and down at lightning speed. Daan very slowly moves his right hand toward the reptile to catch it and then very quickly brings his fingers down around the creature like a cage.	When the two women have left together, Daan remains seated at the side of the pool for a while. The sun reflects on the water, it's bright to his eyes. Crickets chirp in the bushes. A small lizard shoots past and then suddenly sits dead still a few inches from his left hand. The creature's belly moves up and down at lightning speed. Daan very slowly moves his right hand toward the reptile to catch it and then very quickly brings his fingers down around the creature like a cage.	When the two women have left together, Daan <b>decides</b> to remain seated at the side of the pool for a while. The sun reflects on the water, it <b>hurts</b> his eyes. He <b>hears</b> crickets in the bushes. A small lizard shoots past, then <b>seems startled</b> by itself and sits dead still a few inches from his left hand. Daan <b>observes</b> how lightning fast the belly of the creature moves up and down. He very slowly moves his right hand toward the reptile to catch it and then very quickly brings his fingers down around the creature like a cage.

*Note.* Thought reports are printed in italics. Viewpoint markers are printed in bold, with perceptual viewpoint markers in blue, cognitive viewpoint markers in red, and emotional viewpoint marked in yellow.

### 6.2.2.1.3 Pre-Test

To test our textual manipulation and ensure that there were no significant differences in perceived textual fluency between the different versions of the narratives, we conducted a pretest with the effect of condition (enriched viewpoint vs. impoverished viewpoint) on textual fluency tested within-subjects (see the preregistration on the Open Science Framework for more details). 53 participants (43 women, 9 men, 1 other) from the Radboud University participant pool, aged between 18 and 54 years ( $M = 21.43$ ,  $SD = 6.07$ ) rated the stories for perceived textual fluency using five 7-point Likert scale items (e.g., *This story reads easily*; *This story is well written*; 1 = *disagree*, 7 = *agree*) in an online study administered via Qualtrics.

Responses on the five Textual Fluency items were averaged per participant, per story (see also Table 6.4). Reliability for this index variable was good ( $\alpha = .90$ ). There was no significant difference in Textual Fluency ( $t(52) = 2.01$ ,  $p = .05$ ,  $d = 0.42$ , 95% CI [0.03, 0.81]) between the enriched condition ( $M = 5.31$ ,  $SD = 1.21$ ) and the impoverished condition ( $M = 4.77$ ,  $SD = 1.38$ ). However, as can be seen from the means, there was a near-significant trend toward the impoverished viewpoint versions being perceived as less fluent. In addition, we conducted another paired t-test and found that irrespective of condition, *Koorddanser* ( $M = 4.57$ ,  $SD = 1.36$ ) was found to be significantly less fluent than *De Invaller* ( $M = 5.51$ ,  $SD = 1.10$ ;  $t(52) = -3.76$ ,  $p < .05$ ,  $d = -0.76$ , 95% CI [-1.16, -0.36]). We expected, however, that this latter difference might have arisen because participants not only judged the textual fluency of the different texts but also the content. As *Koorddanser* has a slightly more complex plot, this might have influenced readers' judgments.

Based on the results of this pretest, we decided to make the following adjustments for the main study. First, because we did not find a significant difference in perceived textual fluency between the different conditions, we did not adapt the manipulations, except for fixing two minor spelling errors. Next, we decided to include the Textual Fluency items in the main experiment with slightly rephrased instructions, stressing that we were interested in judgments about language use, not about content or plot. Since there was a near-significant difference between the two versions in the pretest, we opted to use Textual Fluency scores as a control variable in the analyses of the main experiment.

### 6.2.2.2 Measures of Character Engagement

Although there are ongoing efforts to develop so-called online measures of narrative engagement (see e.g., Kaakinen & Simola, 2020; Sukalla et al., 2016), we decided to measure character engagement after reading using self-report questionnaires. In addition to the fact that questionnaires are easier to implement in an online study, the advantage of this approach is that, unlike with psychophysiological measures, it is easier to tap into the various different dimensions of character engagement. In line with the pluralist accounts

of character engagement described in the Introduction, we therefore combined items from three different questionnaires to measure various aspects of character engagement. First, we used the 14 items of the EDI scale reported in Igartua (2010) and originally developed in Spanish by Igartua and Páez (1998) to measure identification. Igartua (2010) found two underlying components in a principal component analysis: half of the items were related to the experience of becoming the character and loss of self-awareness (e.g., *I thought I was like the characters or very similar to them*). The other items were related to cognitive and emotional empathic reactions to the character (e.g., *I tried to imagine the characters' feelings or emotions*). The scale has not been validated but has frequently been used to measure pre- and post-intervention differences in empathy levels in healthcare professionals (e.g., Ward et al., 2018).

Next, we used 11 items that Busselle and Bilandzic (2009) created during the development of their Narrative Engagement scale to measure readers' tendency to take the perspective of the main character and share their emotions. Five items belonged to the Empathy subscale (e.g., *At important moments in the story, I could feel the emotions the characters felt*) and six items belonged to the Cognitive Perspective Taking subscale (e.g., *I could understand why the characters felt the way they felt*). As only three of these items are included in the final Narrative Engagement Scale, these subscales have not been validated independently.

Finally, we used the Comprehensive State Empathy Scale, developed by Levett-Jones et al. (2017). This questionnaire consists of 30 items, distributed over six subscales. The Empathic Concern subscale consists of the following statement followed by six different adjectives (e.g., *moved, tender*): *On a scale of 1-7 please rate the extent to which you experienced each of these feelings in response to X's story*. Similarly, the Distress subscale consisted of six adjectives (e.g., *distressed, troubled*). The Shared Affect subscale consisted of four items (e.g., *I actually felt X's distress*). The Empathic Imagination subscale consisted of four items (e.g., *I found myself imagining myself in X's shoes*). The Helping Motivation subscale also consisted of four items (e.g., *I experienced a strong urge to help X*). Finally, the Cognitive Empathy subscale consisted of six items (e.g., *I feel confident that I could accurately describe how X felt*). All items were translated to Dutch and presented with 7-point Likert scales (1 = *disagree*, 7 = *agree*).

### **6.2.2.3 Measures of Social-Cognitive Abilities**

#### **6.2.2.3.1 Interpersonal Reactivity Index**

We included two self-report measures of trait empathy. First, we administered the Interpersonal Reactivity Index (IRI; Davis, 1983), a validated measure that consists of 28 items, divided over four subscales, assessing participants' tendency to feel concerned about others (Empathic Concern, e.g., *I am often quite touched by things that I see happen*), tendency to engage with fiction characters (Fantasy, e.g., *When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me*), tendency

to feel emotionally disturbed when seeing someone else go through a negative emotional experience (Personal Distress, e.g., *Being in a tense emotional situation scares me*), and tendency to take the perspective of others (Perspective Taking, e.g., *I sometimes try to understand my friends better by imagining how things look from their perspective*). A Dutch translation was used (Eekhof et al., 2021, adapted from De Corte et al., 2007 and M. Mak & Willems, 2018), and all items were presented with 7-point Likert scales (1 = *disagree*, 7 = *agree*).

The IRI has been validated (M. H. Davis, 1983; De Corte et al., 2007), and its subscales have been found to be related to personality traits such as agreeableness (Empathic Concern), neuroticism (Personal Distress), and openness (Perspective Taking; De Corte et al., 2007) as well as to aspects of emotional intelligence (all subscales; De Corte et al., 2007). Moreover, scores on the Perspective Taking subscale of the IRI have been found to be significantly correlated with several behavioral measures of emotion recognition (Israelashvili et al., 2019). Nevertheless, the IRI has also been criticized, both from a conceptual and psychometric standpoint. Baldner and McGinley (2014) note that some of the subscales of the IRI do not necessarily reflect what is now understood to be empathy. For example, personal distress focuses on self-oriented emotional reactions, even though empathy is usually understood to be other-directed. In addition, Wang et al. (2020), among others, have criticized the ways in which IRI is usually scored (e.g., calculating one mean score). We nevertheless decided to include the IRI because the individual subscales could be considered to reflect social-cognitive abilities or processes that might impact character engagement, even if they do not necessarily reflect trait empathy. To address the issues raised by Wang et al. (2020), we calculated a mean score for each subscale separately.

#### 6.2.2.3.2 Basic Empathy Scale

Based on Baldner and McGinley's (2014) recommendations, we also added a more recent self-report measure of trait empathy: the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006). This validated questionnaire consists of ten items measuring Cognitive Empathy (e.g., *I can often understand how people are feeling even before they tell me*), defined as the ability to understand what someone else is feeling, and ten items measuring Affective Empathy (e.g., *After being with a friend who is sad about something, I usually feel sad*), defined as the tendency to share someone else's feelings. All items were translated to Dutch by the authors and presented with 7-point Likert scales (1 = *disagree*, 7 = *agree*).

The Cognitive Empathy subscale has been found to be negatively related to alexithymia (the inability to express emotions in words; Jolliffe & Farrington, 2006). Moreover, both subscales of the BES have been found to be significantly correlated with personality traits such as extraversion, agreeableness, and openness (Jolliffe & Farrington, 2006) as well as behavioral measures of mindreading (Čavojoová et al., 2012)

### 6.2.2.3.3 *Spontaneous Theory of Mind Protocol*

We added the Spontaneous Theory of Mind Protocol (STOMP) as a more implicit measure of social-cognitive abilities (Rice & Redcay, 2015). During this task, participants watch two 2- to 3-minute soundless video clips taken from existing Hollywood movies. The first video clip shows two neighbors observing a woman in an apartment, who is caught by a man while she is on the look-out for something. The video clip was taken from the movie *Rear Window* (1954). The second video clip shows a girl distracting a boy she has just been on a date with, because her friend, who secretly followed them during the date, has to escape from his car. This video clip was taken from the movie *John Tucker Must Die* (2006). Participants saw both video clips in a random order and were asked to describe the scene they had just seen in approximately seven to ten sentences.

Participants' responses are argued to reflect their spontaneous mentalizing tendencies, and scores have been found to correlate with cortical thickness of brain areas typically associated with theory of mind (Rice & Redcay, 2015). Research has shown that this measure is sensitive enough to measure individual variability in a neurotypical adult population (Rice & Redcay, 2015; Warnell & Redcay, 2019).

### 6.2.2.3.4 *Multifaceted Empathy Test*

Finally, we included the emotional empathy trials of the Multifaceted Empathy Test (MET; Dziobek et al., 2008) as an implicit measure of trait emotional empathy. The original MET also contains emotion recognition trials similar to the often used Reading the Eyes in the Mind Task (Baron-Cohen et al., 2001), that is, participants are asked to match one of four emotion words to a picture of a person. We decided not to include the emotion recognition trials, however, because we found the scores on these trials to have very poor internal reliability in a previous study (Eekhof, van Krieken, et al., 2021). In the emotional empathy trials of the MET, participants are asked to rate to what degree seeing a picture of a person experiencing an emotion (e.g., a woman crying, a little girl looking at a wrapped present) makes them feel that same emotion using a 9-point Likert scale (1 = *not at all*, 9 = *very much*). There were 40 pictures in total, presented in a randomized order.

Although the MET was originally developed for use in patient populations (e.g., patients with an autism spectrum disorder diagnosis, Dziobek et al., 2008), a previous study with a neurotypical sample did not show evidence of ceiling effects (Eekhof, van Krieken, et al., 2021). This suggests that the emotional empathy trials can be used to detect individual differences in trait emotional empathy in nonclinical adult populations.

## 6.2.2.4 **Measures of Reading Habits**

As previous research has shown that exposure to fiction affects character engagement (e.g., Koopman, 2015, 2016; van Lissa et al., 2018), we decided to measure and control for



participants' reading habits. Participants completed three measures of reading habits. First, we used a Dutch version of the Author Recognition Test (ART), created by Brysbaert and colleagues (2020). This test consists of a list of 132 names, 90 of which are names of existing well-known Dutch and international authors. The other 42 names are foils. Participants are instructed to select the names of authors they have heard of and are told that one point will be subtracted for each foil they select.

In addition to the ART, participants were presented with two questions measuring self-reported exposure to fiction, either by reading or listening, or by watching (e.g., *How often did you read or listen to fiction?*). We used the genre distinctions used in Kuijpers et al. (2020) as examples of what we meant by fiction (e.g., novels, story collections, fairy tales). Each item was presented with seven response options taken from Kuijpers et al. (2020): 1 = *Never in the past year*; 2 = *Once in the past year*; 3 = *About once every three months in the past year*; 4 = *About once every month in the past year*; 5 = *About once a week in the past year*; 6 = *More than once a week in the past year*; 7 = *Almost every day in the past year*.

Finally, we also created four items to measure participants' exposure to fiction during their childhood years (e.g., *My parents or caregivers regularly read to me from fiction books (e.g., picture books, novels, stories, fairy tales)*). We hypothesized that exposure to narratives during the years that reading and narrative competencies develop might still affect readers' current experiences when reading narratives. Three of these items were presented with 7-point Likert scales (1 = *disagree*, 7 = *agree*). One item (*As a child (under age 12), compared with peers, I read...*) was presented with a 7-point scale ranging from *Much less* to *Much more*.

### 6.2.2.5 Additional Measures

We embedded three attention check items within some of the other measures (e.g., *Check the third option from the right for this item*) to make sure that participants paid sufficient attention during the study. We aimed to exclude participants who missed more than one of these attention checks, but, as described above, no participants had to be excluded based on this criterion.

The same comprehension questions that were created for the pretest were used (three multiple choice questions per narrative, four response options each) as an additional attention check. Participants who answered more than one of these questions incorrectly for one or both of the stories were removed from the data set (see Participants).

We also included the five perceived Textual Fluency items from the pretest after each narrative. The instructions were slightly rephrased, however, based on the experiences from the pretest: *"Below are a couple of statements about the style of writing of the story you have just*

*read. They concern the language and not the content of the story. Indicate to what degree you agree with these statements”.*

Finally, we included a multiple choice question to check whether participants had read any of the narratives before (response options: *yes, no, maybe/not sure*). Participants who were sure they had read at least one of the narratives were removed from the data set (see Participants).

### 6.2.3 Procedure

The study was conducted online using the survey site Qualtrics (Provo, UT). After signing for informed consent, participants first completed some demographic questions. Then, half of the participants first completed the measures of social-cognitive abilities and reading habits in a randomized order. Next, these participants read the two narratives (with order counterbalanced) in two different conditions (with condition counterbalanced) and filled in the measures of character engagement as well as the comprehension check and Textual Fluency items after finishing each narrative. The other half of the participants completed the reading part of the study first, and then completed the batch of social-cognitive and reading habits measures in a randomized order. Finally, participants were thanked for their time and redirected to Prolific, where they were compensated for their participation. Participants who were included in the final data set took on average 45 minutes to complete the study.

### 6.2.4 Data Analysis

All data were analyzed in RStudio (version 2022.02.0, R version 4.1.2; R Core Team, 2020). We calculated mean scores per participant for the four subscales of the IRI, the two subscales of the BES, the MET<sup>18</sup>, the Reading Habits Fiction and Childhood items, and the Textual Fluency items.

STOMP scores were calculated by chunking participants' responses into clauses representing individual information units and coding these chunks according to an extended codebook developed in an earlier study (Eekhof, van Krieken, et al., 2021), which can be found on the Open Science Framework. In short, each chunk was coded as either being an external (i.e., physical descriptions, descriptions of physical inferences) or internal description (i.e., descriptions of emotions, intentions, and mental states). A score was calculated for each participant by taking the percentage of internal descriptions out of all chunks. If a participant indicated they had seen one of two movies that the video clips were taken from, their STOMP score was only based on their response to the other video clip. If participants had seen both movies, no STOMP score was calculated. This was the case for two participants.

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18 Due to experimenter error, one MET item was presented with a 7-point scale instead of a 9-point scale. This item was disregarded in the analyses. Hence, the MET score is based on the mean of the remaining 39 items.

An independent researcher coded 10% of the data to ensure the reliability of the codebook. Inter-rater reliability was good (96.32%,  $\kappa = .91$ ). Hence, the ratings of the first author were used in further analyses.

Finally, ART scores were calculated by taking the number of correctly identified authors and subtracting the number of selected foils. The descriptive statistics for the measures of social-cognitive abilities and reading habits are given in Table 6.3. The Textual Fluency scores are given in Table 6.4.

**Table 6.3** Descriptive Statistics for the Measures of Social-Cognitive Abilities and Reading Habits

Measure	<i>M</i> ( <i>SD</i> )	Min	Max	Cronbach's $\alpha$
Interpersonal Reactivity Index – Empathic Concern	5.10 (1.00)	2.14	7.00	.79
Interpersonal Reactivity Index – Fantasy	5.17 (1.05)	1.71	7.00	.81
Interpersonal Reactivity Index – Personal Distress	3.68 (1.07)	1.00	6.71	.82
Interpersonal Reactivity Index – Perspective Taking	4.97 (0.89)	2.14	7.00	.75
Basic Empathy Scale – Affective Empathy	4.98 (0.97)	2.00	7.00	.85
Basic Empathy Scale – Cognitive Empathy	5.56 (0.79)	2.89	7.00	.85
Spontaneous Theory of Mind Protocol (%)	33.01 (10.76)	5.26	88.89	
Multifaceted Empathy Test – Emotional Empathy	4.76 (1.26)	1.00	7.92	.95
Author Recognition Test	26.66 (15.85)	1.00	88.00	
Reading Habits – Fiction	4.66 (1.18)	1.00	7.00	
Reading Habits – Childhood	5.50 (1.39)	1.00	7.00	.80

*Note.* No Cronbach's alpha was calculated for Reading Habits – Fiction as this measure was comprised of only two items.

We entered the character engagement items from the three questionnaires in a Principle Component Analysis (PCA) with oblique rotation (see Results) using the *GPARotation* package (Bernaards & Jennrich, 2005) and the *psych* package (Revelle, 2013). For the main analyses, we fit linear mixed models using the *lme4* package (Bates et al., 2015). Degrees of freedom and *p* values were estimated using the *lmerTest* package (Kuznetsova et al., 2017). Variance Inflation Factors (VIFs) were calculated with a function reported online (*R-Hack/Mer-Utils.R*, 2014). All continuous predictors were scaled and centered. We fit separate models for each of the components extracted with the PCA on the character engagement questionnaires. However, for two of the six extracted components we ran into singularity issues (i.e., the variance for the by-participant intercepts was estimated as 0). This meant we were unable to fit any linear mixed models for these components. Moreover, as the design of our study did not allow us to run an ordinary linear regression instead either, we decided not to further analyze these components.

For the other four components, we started out with a model structure that included fixed effects of condition, all measures of social-cognitive abilities, as well the interaction between these measures and condition, fixed effects of the three measures of reading habits (ART, Fiction Habits, Childhood Habits), and textual fluency score as well as by-subject random intercepts. However, the Empathic Concern subscale of the IRI and the Affective Empathy subscale of the BES were highly correlated ( $r(347) = .70, p < .001$ ), and VIFs were relatively high for these predictors (around 2.60 for all models). Hence, we decided to pull out the Empathic Concern subscale of the IRI for all analyses. We favored the Affective Empathy subscale, because the BES is a more recently validated scale. This decision is in line with the preregistration of our analyses. As a result, the model structure for the reported linear mixed models is as follows:

*Character Engagement Component ~ Condition \* Social-Cognitive Abilities Scores (3 IRI Subscales [Fantasy, Personal Distress, Perspective Taking], 2 BES subscales [Affective Empathy, Cognitive Empathy], STOMP, MET) + Reading Habits (ART, Fiction, Childhood) + Textual Fluency + (1 | Subject)*

We used effects coding with (-0.5, 0.5) weights for the binary factor condition. Consequently, the intercept estimate of the model output reflects the grand average of the mean of the dependent variable for the enriched viewpoint condition and the mean of the dependent variable for the impoverished viewpoint condition. The estimate of the effect of condition reflects the difference between the enriched viewpoint condition and the impoverished condition. The estimates of the effects of the other continuous predictors reflect the average effect of that predictor across the two viewpoint conditions. Finally, the estimate of the interaction effects between condition and the other continuous predictors reflects the difference between the effect of that continuous predictor for the enriched viewpoint condition and the effect of that continuous predictor for the impoverished viewpoint condition.

In other words, this type of contrast coding allows us to see the overall effect of social-cognitive abilities and reading habits on character engagement (main effects), the overall effect of the relative presence of viewpoint markers (main effect of condition) as well as how the effect of social-cognitive abilities differs depending on the presence of viewpoint markers (interaction effects).

Because we ran four separate models for our main analyses we followed a reviewer's advice to use a Bonferroni correction to control for multiple comparisons. As a result, we used a stricter inference criterion ( $\alpha = .05/4 = .0125$ ) than we originally preregistered.

## 6.3 Results

### 6.3.1 Textual Fluency

Responses on the five Textual Fluency items were averaged per participant, per story (Table 6.4). Reliability for this index variable was good ( $\alpha = .88$ ). There was no significant difference in Textual Fluency ( $t(348) = 1.67, p = .10, d = 0.13, 95\% \text{ CI} [-0.02, 0.28]$ ) between the enriched condition ( $M = 5.01, SD = 1.36$ ) and the impoverished condition ( $M = 4.84, SD = 1.30$ ). Again, we also conducted a paired t-test for the difference between the two narratives and found that irrespective of condition, *Koorddanser* ( $M = 4.35, SD = 1.30$ ) was found to be significantly less fluent than *De Invaller* ( $M = 5.50, SD = 1.09; t(348) = -13.61, p < .05, d = -0.96, 95\% \text{ CI} [-1.12, -0.81]$ ).

**Table 6.4** Descriptive Statistics for the Perceived Textual Fluency Scores of the Pre-Test and Main Experiment

Study	Narrative	Mean Textual Fluency Score ( <i>SD</i> ) - enriched viewpoint condition	Mean Textual Fluency Score ( <i>SD</i> ) - impoverished viewpoint condition
Pre-test	De Invaller	5.80 (1.04)	5.16 (1.09)
	Koorddanser	4.73 (1.14)	4.45 (1.52)
Main experiment	De Invaller	5.66 (1.07)	5.35 (1.08)
	Koorddanser	4.39 (1.32)	4.30 (1.29)

### 6.3.2 Principal Component Analysis on Character Engagement Items

All 55 items of the various character engagement questionnaires were entered in a PCA with oblique rotation (oblimin). Sampling adequacy was more than adequate (KMO = .98; all KMOs for individual items > .90). Bartlett's test of sphericity confirmed that the correlations between the various items were big enough to perform a PCA ( $\chi^2(1,485) = 37,468.05, p < .001$ ). However, the determinant was smaller than the value of .0001 recommended by Field et al. (2012), which could be a sign of multicollinearity. As the nature of our PCA was exploratory, we did not consider this a problem. Moreover, a PCA on a subset of the items ( $n = 20$ ) for which the determinant was larger than .0001 produced an outcome very similar to the PCA on the full set of items ( $N = 55$ ).

We obtained eigenvalues for all 55 components from an initial PCA. Based on Kaiser's criterion and inspection of the scree plot, we retained six components that had eigenvalues larger than 1 and together explained 71% of the variance. The factor loadings of the final PCA based on the pattern matrix and structure matrix can be found on the Open Science Framework.

The first component seems to reflect a tendency to cognitively engage with the characters' mental states (strongest loading item: *My understanding of X is unclear (-)*), hence, we named

this component “Cognitive Perspective Taking With Character”. The second component seems to reflect an imaginative process by which readers simulate the experiences of characters (strongest loading item: *I found myself trying to imagine what X was experiencing*), hence, we named this component “Empathic Imagination Toward Character”. The third component seems to reflect self-centered feelings of distress elicited by reading the stories (strongest loading item: *In response to X’s story I felt upset*), hence, we named this component “Story-Induced Personal Distress”. The fourth component seems to reflect forms of engagement that fit under the broader descriptor of identification (strongest loading item: *I thought that I would like to be like or act like X*), hence, we named this component “Character Identification”. The fifth component seems to reflect positive, other-directed feelings toward the character (strongest loading item: *In response to X’s story I felt tender*), hence, we named this component “Sympathy Toward Character”. Finally, the sixth component seems to reflect feelings of care as well as an urge to help characters (strongest loading item: *I experienced a strong urge to help X*), hence, we named this component “Motivation to Help Character”. The correlations between the different components are reported in Table 6.5. All components significantly and positively correlated to each other.

**Table 6.5** Correlations Between the Six Extracted Components With 95% Confidence Intervals Between Square Brackets

Variable	1	2	3	4	5
1. Cognitive Perspective Taking Toward Character					
2. Empathic Imagination Toward Character	.60** [.55, .64]				
3. Story-Induced Personal Distress	.44** [.37, .49]	.47** [.41, .52]			
4. Character Identification	.56** [.50, .61]	.51** [.45, .56]	.50** [.44, .55]		
5. Sympathy Toward Character	.27** [.20, .34]	.26** [.19, .32]	.22** [.15, .29]	.28** [.21, .35]	
6. Motivation to Help Character	.46** [.40, .52]	.53** [.47, .58]	.45** [.39, .51]	.36** [.30, .43]	.12* [.05, .19]

*Note.* A Bonferroni correction was applied to control for multiple comparisons. Hence the critical alpha was set to .0033 (= .05/15).

\*  $p < .0033$ , \*\*  $p < .001$

As reported above, we were unable to fit any linear mixed model for the Cognitive Perspective Taking component and the Motivation to Help Character component due to singularity issues for the by-participant random intercept. In the next step of the analysis we therefore only analyzed how social-cognitive abilities and the presence of viewpoint markers affected the four other components: Empathic Imagination Toward Character, Story-Induced Personal Distress, Character Identification, and Sympathy Toward Character.

### **6.3.3 Main Analysis on Extracted Character Engagement Components**

#### **6.3.3.1 Empathic Imagination Toward Character**

The estimates for the linear mixed model predicting Empathic Imagination Toward Character are given in Table 6.6. VIFs were below 2 for all predictors. There was no significant effect of condition. There were, however, positive effects of three measures of social-cognitive abilities: the Fantasy and Perspective Taking subscales of the IRI, and the Emotional Empathy score of the MET (Figure 6.1)<sup>19</sup>. Finally, Textual Fluency score had a positive effect on Empathic Imagination Toward Character. There were no significant interaction effects between condition and any of the measures of social-cognitive abilities.

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19 A reviewer noted that the significant relationships between the various dimensions of character engagement and self-reported measures of social-cognitive abilities might be caused by surface similarities between the items of the various questionnaires used. We have therefore included a comparison of the items that make up the relevant character engagement dimensions and the items that make up the measures of social-cognitive abilities for the significant relationships on the Open Science Framework (see Data Availability Statement). This comparison does not suggest that any found effects can be explained by these surface similarities, as evidenced by the small overlap in phrasing between the items.

**Table 6.6** Estimates for the Linear Mixed Model Predicting Empathic Imagination Toward Character

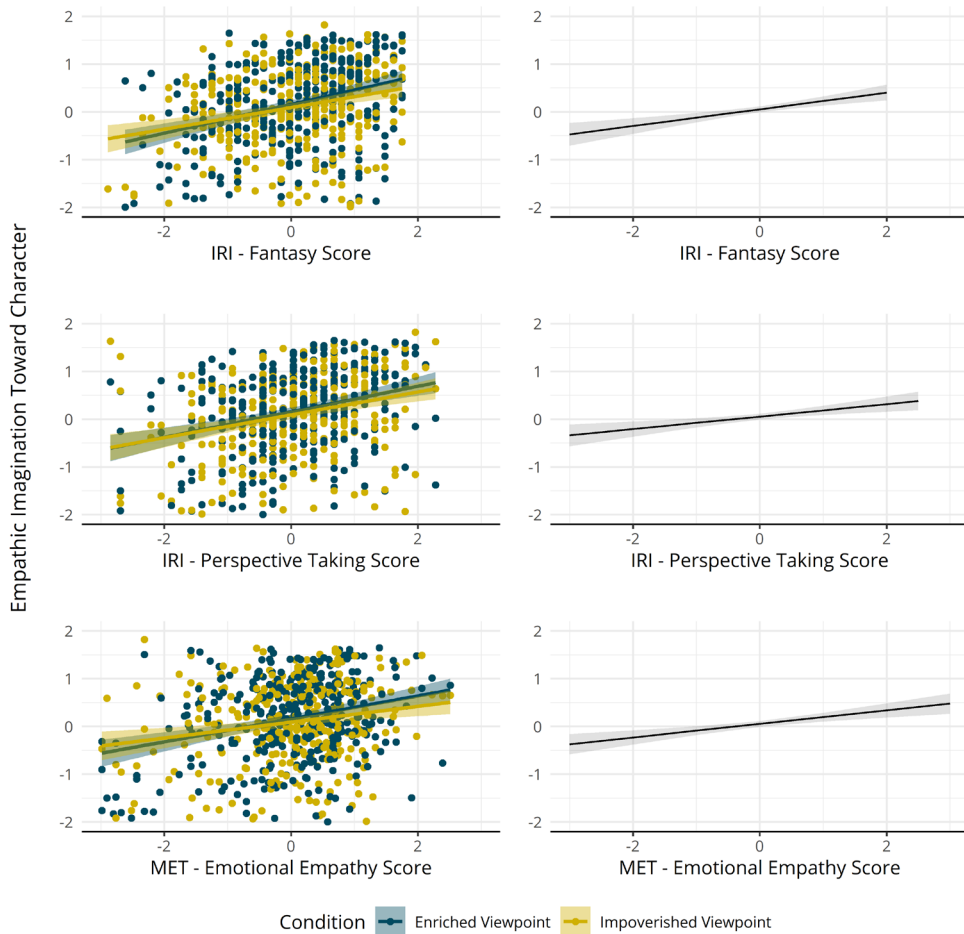
Predictor	Estimate	SE	CI	t	p
(Intercept)	0.00	0.03	-0.06 – 0.06	-0.03	.978
Condition (Enriched viewpoint)	0.11	0.05	0.01 – 0.21	2.06	.040
BES – Affective Empathy Score	-0.04	0.04	-0.12 – 0.05	-0.84	.402
BES – Cognitive Empathy Score	0.00	0.04	-0.08 – 0.08	-0.03	.972
IRI – Fantasy Score	0.20	0.04	0.13 – 0.28	5.27	< .001**
IRI – Perspective Taking Score	0.14	0.04	0.06 – 0.21	3.71	< .001**
IRI – Personal Distress Score	0.02	0.04	-0.05 – 0.09	0.61	.543
MET – Emotional Empathy Score	0.14	0.03	0.08 – 0.21	4.19	< .001**
STOMP Score	0.04	0.03	-0.02 – 0.10	1.24	.217
ART Score	-0.02	0.03	-0.09 – 0.04	-0.72	.474
Reading Habits – Fiction Score	0.06	0.04	-0.01 – 0.13	1.66	.098
Reading Habits – Childhood Score	0.05	0.03	-0.02 – 0.11	1.33	.183
Textual Fluency Score	0.51	0.03	0.46 – 0.57	17.86	< .001**
Condition (Enriched viewpoint) *	0.07	0.07	-0.07 – 0.22	1.00	.318
BES – Affective Empathy Score					
Condition (Enriched viewpoint) *	0.09	0.07	-0.04 – 0.22	1.32	.187
BES – Cognitive Empathy Score					
Condition (Enriched viewpoint) *	-0.06	0.06	-0.18 – 0.06	-0.96	.337
IRI – Fantasy Score					
Condition (Enriched viewpoint) *	-0.01	0.06	-0.13 – 0.11	-0.23	.819
IRI – Perspective Taking Score					
Condition (Enriched viewpoint) *	0.09	0.06	-0.03 – 0.21	1.49	.138
IRI – Personal Distress Score					
Condition (Enriched viewpoint) *	0.00	0.06	-0.12 – 0.11	-0.09	.932
MET – Emotional Empathy Score					
Condition (Enriched viewpoint) *	-0.02	0.05	-0.13 – 0.08	-0.44	.657
STOMP Score					

*Note.* All continuous predictors were scaled and centered for analysis. Effects coding with (-0.5, 0.5) weights were used for the binary predictor Condition.

\*  $p < .0125$ , \*\*  $p < .001$



**Figure 6.1** Scatterplots (Left Column) and Effects Plots With Predicted Values Based on the Linear Mixed Model (Right Column) for the Relationships Between Empathic Imagination Toward Character and the Fantasy Subscale (IRI), the Perspective Taking Subscale (IRI), and Emotional Empathy Score (MET)



*Note.* Predictors have been scaled and centered.

### 6.3.3.2 Story-Induced Personal Distress

The estimates for the linear mixed model predicting Story-Induced Personal Distress are given in Table 6.7. VIFs were below 2 for all predictors. There was no significant effect of condition. There was, however, a positive effect of the Emotional Empathy score of the MET (Figure 6.2). In addition, Textual Fluency score had a positive effect on Story-Induced Personal Distress. There were no significant interaction effects between condition and any of the measures of social-cognitive abilities.

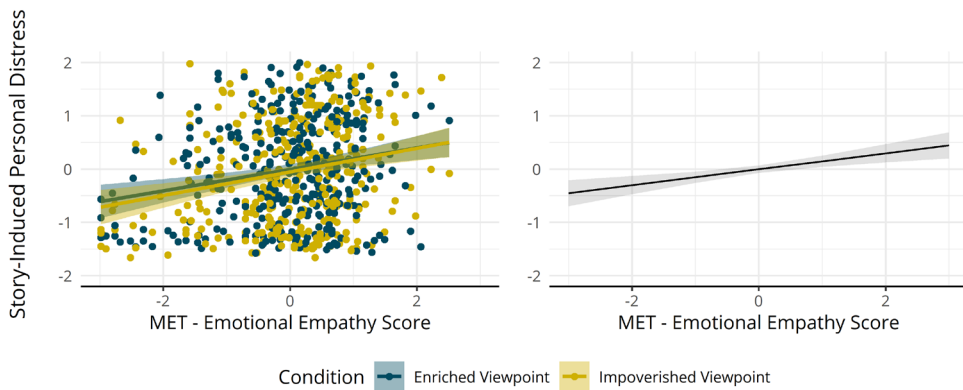
**Table 6.7** Estimates for the Linear Mixed Model Predicting Story-Induced Personal Distress

Predictor	Estimate	SE	CI	t	p
(Intercept)	0.00	0.04	-0.07 – 0.08	0.13	.899
Condition (Enriched viewpoint)	-0.02	0.06	-0.14 – 0.11	-0.24	.810
BES – Affective Empathy Score	0.12	0.05	0.02 – 0.22	2.30	.022
BES – Cognitive Empathy Score	-0.05	0.05	-0.14 – 0.04	-1.15	.251
IRI – Fantasy Score	0.07	0.04	-0.02 – 0.15	1.47	.143
IRI – Perspective Taking Score	0.03	0.04	-0.06 – 0.11	0.63	.528
IRI – Personal Distress Score	0.03	0.04	-0.05 – 0.11	0.75	.455
MET – Emotional Empathy Score	0.14	0.04	0.06 – 0.22	3.59	< .001**
STOMP Score	0.01	0.04	-0.06 – 0.08	0.31	.757
ART Score	-0.03	0.04	-0.11 – 0.04	-0.86	.387
Reading Habits – Fiction Score	-0.04	0.04	-0.12 – 0.04	-0.93	.351
Reading Habits – Childhood Score	0.06	0.04	-0.02 – 0.14	1.56	.120
Textual Fluency Score	0.36	0.03	0.30 – 0.43	10.72	< .001**
Condition (Enriched viewpoint) *	-0.05	0.09	-0.23 – 0.12	-0.60	.547
BES – Affective Empathy Score					
Condition (Enriched viewpoint) *	0.07	0.08	-0.08 – 0.23	0.92	.357
BES – Cognitive Empathy Score					
Condition (Enriched viewpoint) *	0.05	0.07	-0.10 – 0.20	0.65	.513
IRI – Fantasy Score					
Condition (Enriched viewpoint) *	-0.03	0.07	-0.17 – 0.12	-0.34	.731
IRI – Perspective Taking Score					
Condition (Enriched viewpoint) *	-0.05	0.07	-0.20 – 0.09	-0.74	.461
IRI – Personal Distress Score					
Condition (Enriched viewpoint) *	0.01	0.07	-0.12 – 0.15	0.20	.844
MET – Emotional Empathy Score					
Condition (Enriched viewpoint) *	0.01	0.06	-0.11 – 0.14	0.19	.850
STOMP Score					

Note. All continuous predictors were scaled and centered for analysis. Effects coding with (-0.5, 0.5) weights were used for the binary predictor Condition.

\*  $p < .0125$ , \*\*  $p < .001$

**Figure 6.2** Scatterplot (Left Column) and Effects Plot With Predicted Values Based on the Linear Mixed Model (Right Column) for the Relationship Between Story-Induced Personal Distress and Emotional Empathy Score (MET)



*Note.* Predictors have been scaled and centered.

### 6.3.3.3 Character Identification

The estimates for the linear mixed model predicting Character Identification are given in Table 6.8. VIFs were below 2 for all predictors. There was no significant effect of condition. There were, however, positive effects of two of the measures of social-cognitive abilities: the Fantasy subscale of the IRI and the Emotional Empathy score of the MET (Figure 6.3). In addition, the Cognitive Empathy subscale had a negative effect on Character Identification (Figure 6.3). Finally, Textual Fluency score had a positive effect. There were no significant interaction effects between condition and any of the measures of social-cognitive abilities.

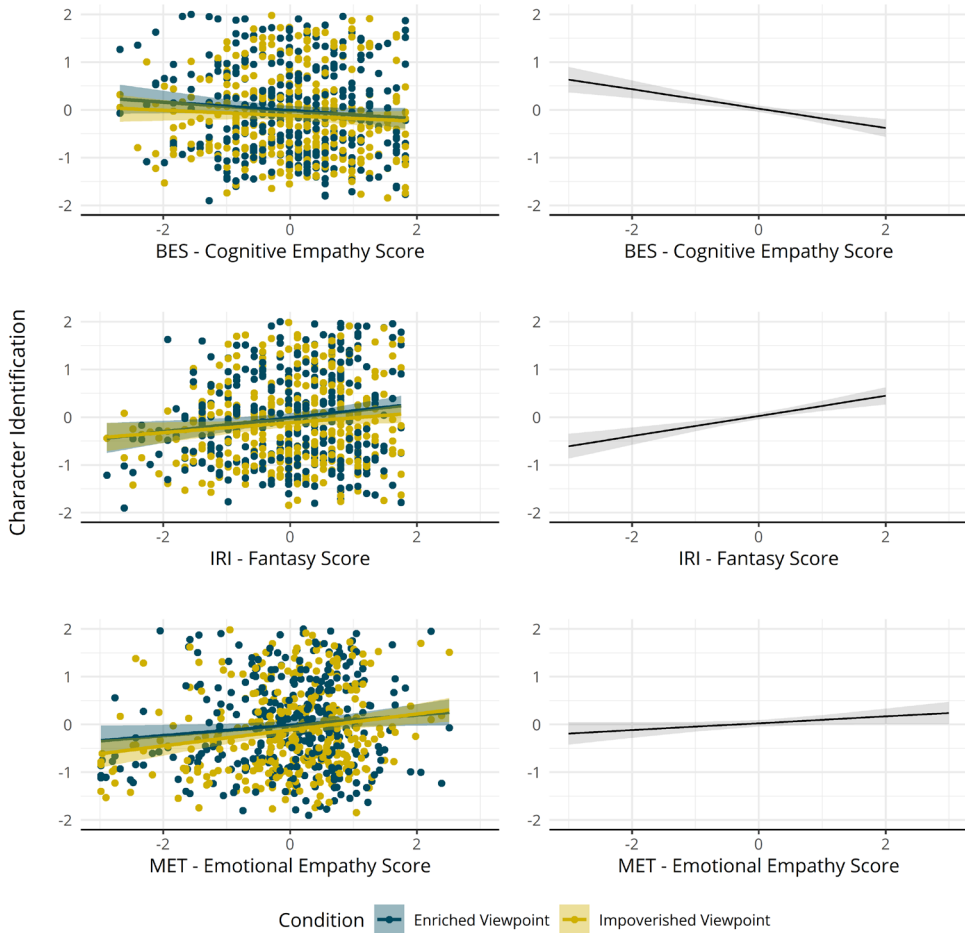
**Table 6.8** Estimates for the Linear Mixed Model Predicting Character Identification

Predictor	Estimate	SE	CI	t	p
(Intercept)	0.00	0.03	-0.06 – 0.07	0.08	.939
Condition (Enriched viewpoint)	0.05	0.06	-0.08 – 0.17	0.76	.448
BES – Affective Empathy Score	0.11	0.05	0.02 – 0.21	2.34	.019
BES – Cognitive Empathy Score	-0.21	0.04	-0.30 – -0.12	-4.78	< .001**
IRI – Fantasy Score	0.16	0.04	0.07 – 0.24	3.67	< .001**
IRI – Perspective Taking Score	0.02	0.04	-0.06 – 0.10	0.51	.613
IRI – Personal Distress Score	0.03	0.04	-0.05 – 0.11	0.70	.487
MET – Emotional Empathy Score	0.11	0.04	0.04 – 0.18	2.89	.004*
STOMP Score	0.04	0.03	-0.03 – 0.10	1.03	.304
ART Score	0.04	0.04	-0.03 – 0.11	1.04	.299
Reading Habits – Fiction Score	-0.02	0.04	-0.10 – 0.05	-0.60	.551
Reading Habits – Childhood Score	-0.04	0.04	-0.12 – 0.03	-1.07	.285
Textual Fluency Score	0.42	0.03	0.35 – 0.48	12.61	< .001**
Condition (Enriched viewpoint) *	-0.05	0.09	-0.22 – 0.12	-0.56	.575
BES – Affective Empathy Score					
Condition (Enriched viewpoint) *	0.01	0.08	-0.14 – 0.17	0.18	.858
BES – Cognitive Empathy Score					
Condition (Enriched viewpoint) *	0.11	0.07	-0.04 – 0.25	1.47	.143
IRI – Fantasy Score					
Condition (Enriched viewpoint) *	-0.02	0.07	-0.17 – 0.12	-0.32	.747
IRI – Perspective Taking Score					
Condition (Enriched viewpoint) *	0.04	0.07	-0.10 – 0.18	0.57	.568
IRI – Personal Distress Score					
Condition (Enriched viewpoint) *	-0.08	0.07	-0.21 – 0.06	-1.11	.269
MET – Emotional Empathy Score					
Condition (Enriched viewpoint) *	-0.03	0.06	-0.15 – 0.10	-0.40	.688
STOMP Score					

*Note.* All continuous predictors were scaled and centered for analysis. Effects coding with (-0.5, 0.5) weights were used for the binary predictor Condition.

\*  $p < .0125$ , \*\*  $p < .001$

**Figure 6.3** Scatterplots (Left Column) and Effects Plots With Predicted Values Based on the Linear Mixed Model (Right Column) for the Relationships Between Character Identification and the Cognitive Empathy Subscale (BES), the Fantasy Subscale (IRI), and Emotional Empathy Score (MET)



Note. Predictors have been scaled and centered.

#### 6.3.3.4 Sympathy Toward Character

The estimates for the linear mixed model predicting Sympathy Toward Character are given in Table 6.9. VIFs were below 2 for all predictors. There was no significant effect of condition. There was, however, a negative effect of the Personal Distress subscale of the IRI (Figure 6.4). On the other hand, the Emotional Empathy score of the MET had a positive effect (Figure 6.4). In addition, the Fiction score of the Reading Habits questionnaire had a negative effect on Sympathy Toward Character, whereas Textual Fluency score had a positive effect. Finally, there was a significant interaction between viewpoint condition and the Perspective

Taking subscale of the IRI. The interaction was such that the effect of the Perspective Taking subscale was significantly more positive in the enriched viewpoint condition, compared with the impoverished viewpoint condition (Figure 6.5).

A summary of the results is visualized in Figure 6.6.

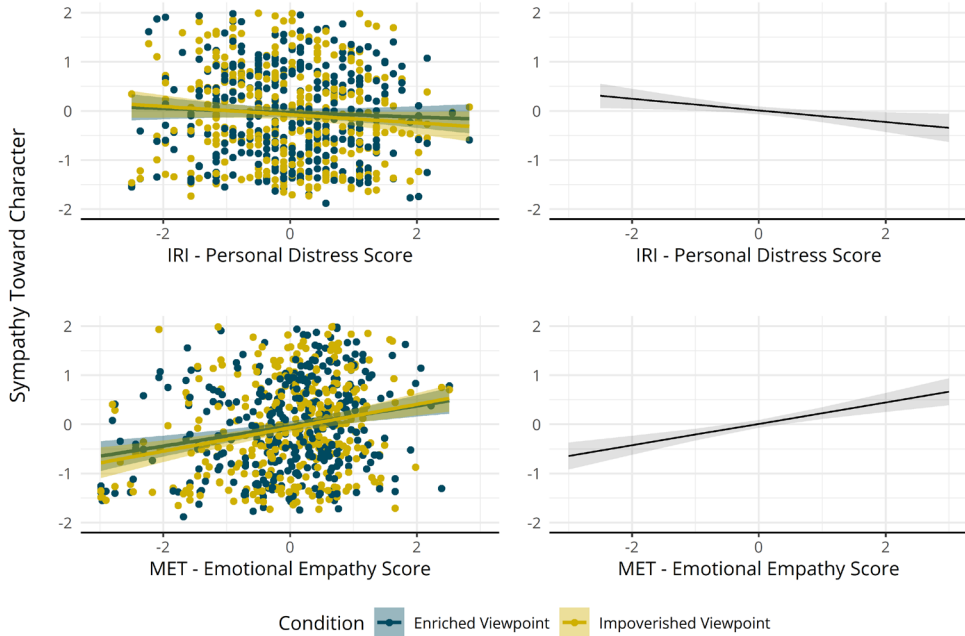
**Table 6.9** Estimates for the Linear Mixed Model Predicting Sympathy Toward Character

Predictor	Estimate	SE	CI	t	p
(Intercept)	0.00	0.04	-0.08 – 0.08	0.04	.966
Condition (Enriched viewpoint)	0.02	0.06	-0.09 – 0.13	0.31	.759
BES – Affective Empathy Score	0.06	0.06	-0.05 – 0.17	1.01	.313
BES – Cognitive Empathy Score	-0.12	0.05	-0.22 – -0.01	-2.24	.025
IRI – Fantasy Score	0.05	0.05	-0.05 – 0.15	0.94	.350
IRI – Perspective Taking Score	-0.02	0.05	-0.11 – 0.08	-0.41	.683
IRI – Personal Distress Score	-0.13	0.05	-0.22 – -0.04	-2.77	.006*
MET – Emotional Empathy Score	0.27	0.04	0.18 – 0.36	6.08	< .001**
STOMP Score	0.03	0.04	-0.12 – 0.05	-0.84	.400
ART Score	-0.02	0.04	-0.11 – 0.07	-0.47	.641
Reading Habits – Fiction Score	-0.15	0.05	-0.24 – -0.05	-3.15	.002*
Reading Habits – Childhood Score	0.05	0.05	-0.04 – 0.14	1.11	.268
Textual Fluency Score	0.19	0.03	0.13 – 0.25	5.97	< .001**
Condition (Enriched viewpoint) *	0.01	0.08	-0.14 – 0.16	0.15	.884
BES – Affective Empathy Score					
Condition (Enriched viewpoint) *	-0.12	0.07	-0.26 – 0.02	-1.74	.082
BES – Cognitive Empathy Score					
Condition (Enriched viewpoint) *	0.08	0.07	-0.05 – 0.21	1.20	.232
IRI – Fantasy Score					
Condition (Enriched viewpoint) *	0.16	0.06	0.04 – 0.29	2.56	.011*
IRI – Perspective Taking Score					
Condition (Enriched viewpoint) *	0.02	0.06	-0.10 – 0.15	0.39	.696
IRI – Personal Distress Score					
Condition (Enriched viewpoint) *	-0.11	0.06	-0.23 – 0.01	-1.79	.073
MET – Emotional Empathy Score					
Condition (Enriched viewpoint) *	-0.02	0.06	-0.13 – 0.09	-0.39	.698
STOMP Score					

Note. All continuous predictors were scaled and centered for analysis. Effects coding with (-0.5, 0.5) weights were used for the binary predictor Condition.

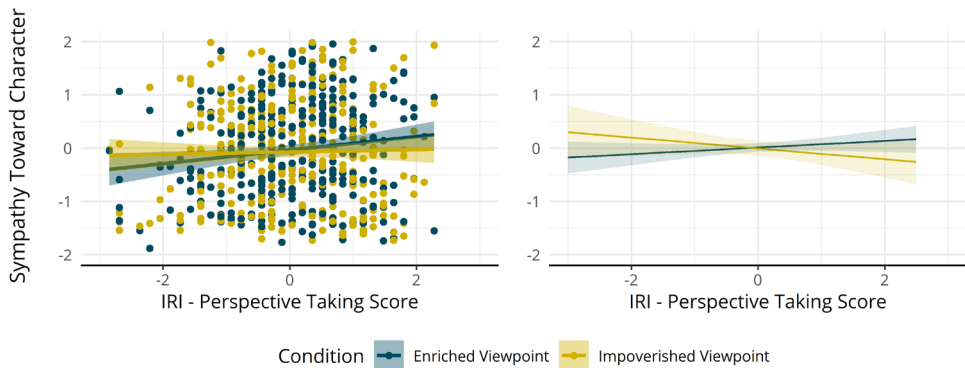
\*  $p < .0125$ , \*\*  $p < .001$

**Figure 6.4** Scatterplots (Left Column) and Effects Plots With Predicted Values Based on the Linear Mixed Model (Right Column) for the Relationships Between Sympathy Toward Character and the Personal Distress Subscale (IRI) and Emotional Empathy Score (MET)



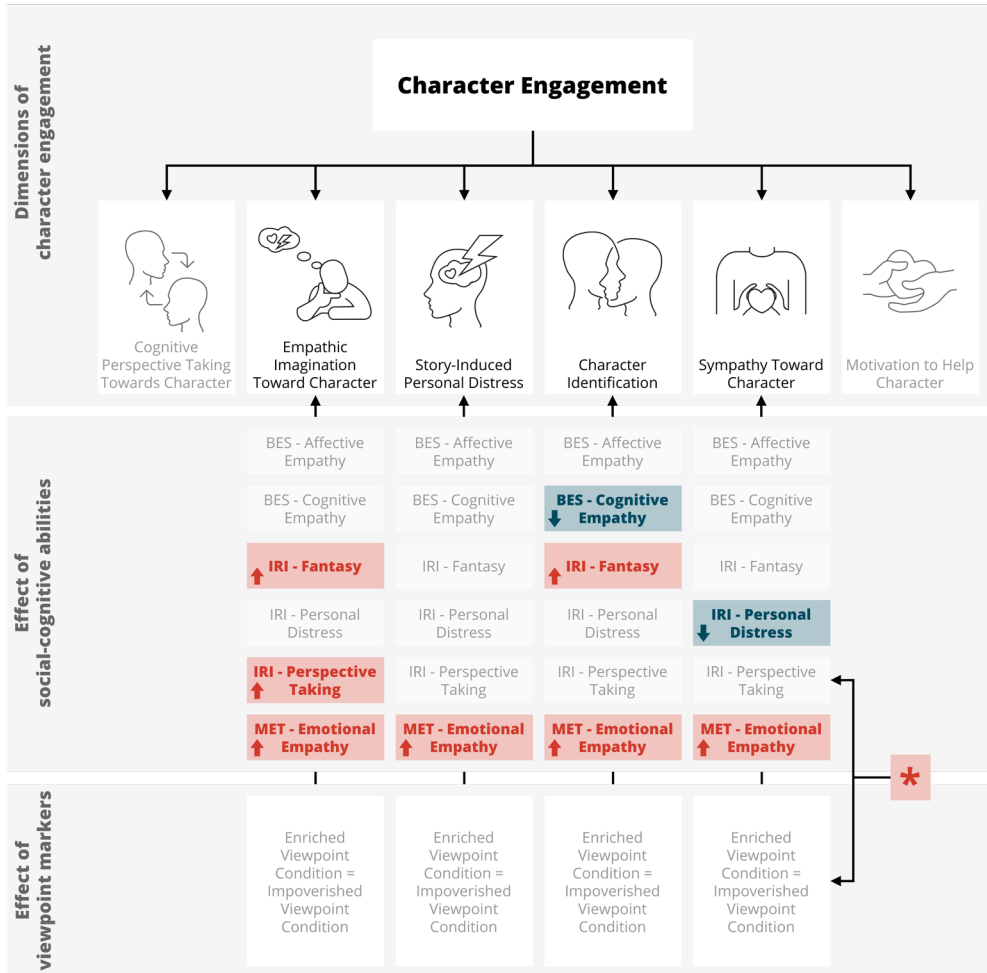
Note. Predictors have been scaled and centered.

**Figure 6.5** Scatterplot (Left Column) and Effects Plot With Predicted Values Based on the Linear Mixed Model (Right Column) for the Interaction Between Sympathy Toward Character, Viewpoint Condition, and Perspective Taking Subscale (IRI)



Note. Predictors have been scaled and centered.

Figure 6.6 Summary of the Results



### 6.4 Discussion

In this study we set out to explore the role of reader- and text-related aspects in character engagement experiences during narrative reading. Specifically, we investigated how social-cognitive abilities, the presence of perceptual, cognitive, and emotional viewpoint markers in narratives, and their interplay impact the various ways in which readers relate to characters' inner worlds during reading of narratives.



### 6.4.1 Character Engagement and Social-Cognitive Abilities

The first step of our analyses provides evidence for the multidimensional nature of character engagement: we extracted six components from a variety of questionnaires measuring different aspects of character engagement using a PCA. These components reflect the tendency to engage in cognitive perspective taking toward characters, empathically imagine the inner worlds of characters, experience personal distress as a reaction to the story, identify with characters, experience sympathy toward characters, and, finally, feel motivated to help characters. Moreover, the finding that all of these dimensions were positively related to each other suggests that participants can relate to characters' inner worlds in various ways, ranging from highly empathic and character-oriented to aversive and self-oriented, either simultaneously or dynamically within a single narrative reading. These findings provide further support for the pluralist account of character engagement (e.g., Bortolussi et al., 2018; Cohen, 2008; Coplan, 2004). As we relied on readers' reconstructions of their experiences after reading, future research will need to further elucidate how the dimensions of character engagement we found map onto moment-by-moment narrative processing as evidenced by psychophysiological measures.

Next, analyzing four of these components in more detail, we found that readers' social-cognitive abilities affect all dimensions of character engagement. Emotional or affective empathy, measured as the tendency to share the emotions of people in pictures (MET; Dziobek et al., 2008), positively affected all four components (i.e., Empathic Imagination Toward Character, Story-Induced Personal Distress, Character Identification, and Sympathy Toward Character). This is in line with earlier studies that reported a positive effect of trait empathy on sympathy and empathy for characters (Habermas & Diel, 2010; Koopman, 2015, 2016), empathic concern for and perspective taking with characters (van Lissa et al., 2018), and identification with characters (Koopman, 2016; Wimmer et al., 2021). These results show that the ability or tendency to share others' emotions is of importance for all forms of engaging with the inner worlds of fictional others. Somewhat surprisingly, an additional self-report measure of affective empathy (Affective Empathy subscale of the BES; Jolliffe & Farrington, 2006) did not significantly affect any of the components, although the effects on Story-Induced Personal Distress and Character Identification were numerically similar and approached significance.

Other aspects of social cognition had more local effects on specific dimensions of character engagement. For example, cognitive empathy, as measured with the Cognitive Empathy subscale of the BES (Jolliffe & Farrington, 2006), was only found to have an effect on Character Identification. Crucially, however, unlike emotional or affective empathy, this was a negative effect. This suggests that having a rapid, cognitive understanding of others' mental states hinders a merging of the reader's and character's perspectives. A possible explanation for

this finding could be that taking a more cognitive or “cold” route toward understanding others creates a more distanced form of perspective taking toward fictional characters.

Furthermore, readers’ tendency to adopt and switch between different perspectives in their daily lives, as measured with the Perspective Taking subscale of the IRI (Davis, 1983), only positively impacted Empathic Imagination Toward Character. This is an indication that the tendency to engage with characters’ inner worlds through an imaginative perspective-taking process is related to readers’ real-life perspective-taking tendencies. The fact that Perspective Taking did not impact other dimensions of character engagement, most notably identification, is somewhat surprising since identification is often defined as a specific form of perspective taking (e.g., Tal-Or & Cohen, 2010).

In addition, the Personal Distress subscale of the IRI (M. H. Davis, 1983) had a negative effect on Sympathy Toward Character, suggesting that a predisposition to experience self-oriented reactions to emotional events hinders other-oriented emotional reactions toward fictional characters undergoing such events.

Finally, the Fantasy subscale of the IRI (M. H. Davis, 1983) was found to have a positive impact on Empathic Imagination Toward Character and Character Identification. This subscale reflects the tendency to be immersed in fictionalized works such as written narratives, a trait that is sometimes called transportability. Although it is part of the IRI, which was designed to measure trait empathy, it is debatable to what degree transportability should be seen as part of social cognition. Nevertheless, the Fantasy subscale had a positive effect on two dimensions of character engagement. This indicates that a disposition to become immersed in fictional worlds involves a tendency to engage with the characters in those worlds. The finding that transportability was not related to Story-Induced Personal Distress is consistent with the fact that personal distress is an aversive reaction rather than an experience that makes the reader want to approach the narrative.

Taken together, the analysis of the impact of social-cognitive abilities on character engagement suggests that the ability to engage with fictional characters depends on a wide range of social-cognitive abilities that people use in daily life to engage with “real” others. Interestingly, readers’ print exposure and reading habits, both current and during early childhood, had little to no impact on character engagement. This again suggests that the tendency to engage with characters’ minds is guided by readers’ real-life social-cognitive abilities and is not necessarily developed as a separate ability through repeated exposure to narratives.

Finally, by increasing the range of social-cognitive abilities under investigation beyond trait empathy, we found that social cognition does not always facilitate character engagement:

whereas most social-cognitive abilities had a positive effect on character engagement, cognitive empathy, for example, had a detrimental effect on character identification. Together these findings show that the relationship between narrative reading and social cognition is far more complex than previously thought and that more nuanced studies and theorizing are necessary to study the role that different aspects of social cognition play during reading (see also Eekhof et al., 2022).

As the data for this study were collected during the COVID-19 pandemic, we were unable to include behavioral measures of social-cognitive abilities that require in-person testing, such as reaction time measures, tasks that require extensive instructions for participants, or tests that rely on interaction between participant-participant or participant-researcher dyads. As such, we acknowledge that our results rely on self-report and lab-based measures of social cognition. Although these measures have been validated in previous research, they may be susceptible to social desirability bias or poor self-assessment. Therefore, it is important that attempts to replicate or extend our findings make use of other measures that reflect real-time behavioral expressions of social cognition.

#### **6.4.2 Character Engagement and Linguistic Viewpoint**

Next, we looked at the effect of the relative presence of perceptual, cognitive, and emotional viewpoint markers on character engagement. Having created an impoverished and enriched viewpoint version of two Dutch literary narratives using a newly developed and tightly controlled manipulation strategy, we were able to analyze whether the degree to which narratives contain linguistic cues about the inner worlds of characters influences how much readers engage with these characters. Contrary to our hypotheses, the presence or absence of viewpoint markers did not significantly affect any of the dimensions of character engagement that we investigated. This finding contradicts some of the earlier work that did find an effect of linguistic viewpoint on sympathy (Habermas & Diel, 2010; van Peer & Pander Maat, 2001) but is in line with the study by Wimmer et al. (2021), who found no effect of internal focalization on identification. These mixed results might partially be explained by the varying operationalizations of linguistic viewpoint or character engagement. However, we believe these findings also show that the effects of linguistic viewpoint, if they exist at all, are subtle and may or may not arise, depending on slight differences in linguistic operationalization or measurement. As such, markers of characters' perceptual, cognitive, and emotional viewpoint do not seem to play a major role in character engagement, as measured in this study, especially compared with the large effects of social-cognitive abilities. It thus seems that in the neurotypical sample we studied, the implied presence of an experiencing character in the narrative is enough of a cue to engage with the mind of that character.

Although we did not find evidence that the presence of viewpoint markers plays a role in the self-reported experiences of character engagement, this does not mean that viewpoint markers do not play any role. As we only measured the intensity of character engagement experiences and not the content of these experiences, future research could investigate how the presence of viewpoint markers affects other, more qualitative constructs that fall under the umbrella of character engagement, such as empathic accuracy. For example, it might be the case that readers arrive at more consistent and accurate interpretations of the mental states of characters when viewpoint markers are present, whereas narratives that provide fewer descriptions of the inner worlds of characters might lead to more diverse interpretations. In such a case, the intensity or “quantity” of readers’ character engagement experiences might be similar across viewpoint conditions, but the content or “quality” of these experiences might still differ as a function of the presence of viewpoint markers. Future studies could combine our design with a more qualitative approach to study how readers’ interpretations of characters’ inner worlds are affected by viewpoint markers and other perspectivization techniques. A limitation of our study that should be addressed in future research is that we did not control for any confounding factors of our manipulation related to comprehensibility beyond our self-report measure of textual fluency.

Interestingly, the idea that textual cues play a relatively minor role compared with individual differences between readers resonates with other recent findings from empirical literary studies. For example, Hartung and colleagues (2017) found that most readers preferred to simulate narratives either from a first-person, internal perspective or from a third-person, external perspective, regardless of whether first- or third-person pronouns were used to refer to the protagonist. Similarly, our studies suggest that readers who have the tendency to emotionally engage with others in daily life will also do so when reading a narrative, regardless of whether that narrative provides rich descriptions of the inner world of its characters or not.

### **6.4.3 The Interaction Between Text and Reader**

Finally, we were interested in the interplay between social-cognitive abilities and the presence of viewpoint markers. Based on earlier findings (Eekhof, van Krieken, et al., 2021), we hypothesized that there might be a trade-off between social-cognitive abilities and linguistic cues during narrative perspective taking, such that social-cognitive abilities are more relevant when linguistic cues of characters’ viewpoints are relatively scarce. However, we only found evidence for such an interaction for the Sympathy Toward Character dimension. Contrary to our expectations, however, the effect of self-reported perspective-taking tendencies on Sympathy Toward Character was stronger when viewpoint markers were present. A possible explanation could be that the presence of viewpoint markers serves as a cue to readers to engage their perspective-taking abilities. In other words, viewpoint markers might remind readers that there is a fictional mind that can be the target of their perspective-taking efforts.

As a result, readers with better perspective-taking skills will sympathize more with a character once they have been cued to do so by the viewpoint markers. However, since the effect only showed up in one character engagement dimension and for only one measure of social-cognitive abilities, we refrain from drawing any further conclusions based on this finding.

Besides the interaction between the presence of viewpoint markers and individual differences in self-reported perspective-taking abilities for readers' sympathy for characters, we did not find any evidence for an interplay between social-cognitive abilities and the presence of viewpoint markers. On the whole, social-cognitive abilities seem to play an equally important role in the enriched and impoverished viewpoint versions of the narratives. As such, our findings suggest that readers first and foremost depend on their social-cognitive abilities to engage with the inner worlds of characters, and that viewpoint markers do not function as an alternative strategy that especially readers with poor social-cognitive abilities can rely on to engage with fictional characters.

These findings challenge our earlier theorizing about individual differences in narrative perspective taking (Eekhof, van Krieken, et al., 2021). We speculated that readers with better social-cognitive abilities rely less on linguistic cues of characters' viewpoint and that this is why these readers were found to process viewpoint markers faster in our eye-tracking study (Eekhof, van Krieken, et al., 2021). However, the lack of a consistent interaction between the presence of viewpoint markers and social-cognitive abilities in the current study means we did not find convincing evidence for that hypothesis. Rather, our previous and current results suggest that perspective-taking abilities simply facilitate both the processing of linguistic markers of perspective and character engagement. As such, social cognition seems to play a role in narrative comprehension both on the micro and macro level. Crucially, as we controlled for print exposure in both experiments, it is unlikely that readers with better social-cognitive abilities are simply faster and more engaged readers, for example, because of their frequent exposure to narratives. Instead, social-cognitive abilities seem to have a unique facilitative effect on the processing of characters' viewpoints.

Importantly, our findings do not only shed light on the role of social-cognitive abilities during narrative processing but are also of relevance for research on the beneficial effect of narratives on social cognition. One of the tenets of the idea that exposure to narratives can strengthen social-cognitive abilities is the assumption that these abilities are activated and hence trained during reading (Mar, 2018). Our finding that individual differences in social-cognitive abilities affect character engagement suggests that these abilities do indeed play a role during reading (see also Mar, 2011). Whether repeated activation of these abilities during reading ultimately leads to a training effect remains a topic of ongoing research and debate (see e.g., Eekhof et al., 2022b; Mar, 2018). A central question in this debate is whether certain types of narratives provide a better training context for social-cognitive abilities than

others. Interestingly, our finding that social-cognitive abilities play an equally important role in stories with and without linguistic cues of characters' inner worlds, suggests that the absence of viewpoint markers does not provide an extra challenge and thus training opportunity for readers' social-cognitive abilities.

All in all, our findings suggest that character engagement is a complex and multifaceted process that mostly depends on individual differences in social-cognitive abilities. Interestingly, we found diverging effects of these social-cognitive abilities: whereas emotional or affective empathy seems to facilitate character engagement across the board, perspective taking only had an effect on empathic imagination. Moreover, a more cognitive, rather than affective, approach to understanding others seems to hinder at least identification. We believe our study is a promising step toward a more nuanced empirical approach to mapping out character engagement processes and their determinants.







# Chapter 7

Discussion



In this dissertation I set out to study the possible relationships between social cognition and the processing of written narratives. Previous theorizing suggests that social-cognitive abilities play an important role during narrative processing and help readers make sense of the minds and actions of narrative characters. Consequently, exposure to narratives has been argued to engage and train readers' social-cognitive abilities. Encouragingly, empirical studies suggest that life-time exposure to written narratives is indeed positively related to social-cognitive performance. However, studies on the direct impact of reading a single narrative on social-cognitive abilities are mixed and based on this earlier body of research, it remains unclear when the social-cognitive potential of narratives does or does not arise. Furthermore, if the processing of written narratives engages and relies on social-cognitive abilities, this does not only imply that reading narratives leads to individual differences in these abilities but also that existing individual differences in social-cognitive abilities between readers affect the reading of narratives. However, the role that these individual differences play during the processing of written narratives has primarily been studied in the context of general reading comprehension in emergent readers. As such, it is yet unclear how social-cognitive abilities impact narrative processing in neurotypical adults and what specific aspects of narrative processing rely on these social-cognitive abilities.

The aim of this dissertation was therefore to contribute to a more nuanced understanding of the ways in which narrative processing relies on, engages, and strengthens social-cognitive abilities by exploring the following questions:

- (1) How does exposure to narratives affect social-cognitive abilities in neurotypical adults?*
- (2) How do social-cognitive abilities affect the processing of narratives in neurotypical adults?*

In what follows I will discuss the main findings of the research presented in this dissertation. I will then provide an integrated account of the relationship between social cognition and narrative, based on the contributions of this dissertation. I subsequently discuss the implications of these contributions for theory and practice. I will conclude with the strengths and limitations of my research. Throughout the discussion I will highlight opportunities for future research.

## 7.1 Overview of Main Findings

After introducing the relevant concepts and questions in the Introduction (**Chapter 1**), the dissertation started off with the development of a lexical identification procedure that can be used to identify lexical markers of perceptual, cognitive, and emotional viewpoint (**Chapter 2**). Because I hypothesized that perspective taking and the processing of linguistic viewpoint play an important role in the possible relationships between social cognition and narrative,

this chapter explored how these three dimensions of viewpoint can be lexically expressed by different types of content words (e.g., modal adverbs, verbs of sensation, emotion adjectives). The contribution of the ViewPoint Identification Procedure (VIP) is twofold: first, the procedure can be used to analyze the expression of viewpoint across various textual and narrative genres to analyze, characterize, and compare different texts (see e.g., **Chapter 4** and **Chapter 5**). Second, the VIP can be used as an objective tool that can guide the manipulation of viewpoint in narratives (see e.g., **Chapter 6**).

Having developed a procedure that allowed me to further elucidate the role of viewpoint and perspective taking in the relationship between social cognition and narrative, I then addressed the research questions above in two parts. **Part I** of the dissertation focused on the possible effect that written narratives, given their potential to trigger perspective taking in readers, have on the social-cognitive abilities of neurotypical adults. **Part II** focused on the possible effects that social-cognitive abilities have on narrative processing in neurotypical adults, focusing specifically on the linguistic processing of viewpoint and perspective taking.

### **7.1.1 Part I: From Reading Narratives to Reading Minds**

**Part I** explored the potential effect that exposure to written narratives might have on readers' social-cognitive abilities. Because a large body of research that studies the impact of narratives on social cognition already exists, this part of the dissertation started off with a literature review (**Chapter 3**) that reflected on previous empirical research. The review showed that although evidence from correlational and longitudinal studies robustly supports the idea that exposure to narrative fosters social-cognitive development, studies looking at the direct, causal effect of a single written narrative on social-cognitive performance have produced mixed findings. Moreover, a clear theory as to why narratives would have a direct, short-term effect on social-cognitive performance was found to be currently lacking. I also concluded that previous research has often oversimplified the three relevant dimensions in the relationship between social cognition and narrative: the text, the reader, and the social-cognitive abilities involved, and that this might explain some of the mixed findings. By assuming that any narrative will positively affect any reader's social-cognitive performance, mostly operationalized as scores on the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001), these studies fail to map out the potentially complex circumstances in which the social-cognitive potential of narratives may (or may not) arise. As such, I argued that future research should study 1) the specific text characteristics that drive the effects of narratives on social cognition, arguing that linguistic viewpoint may likely play a role, 2) individual differences in readers' sensitivity to the effect of narratives, for example with respect to emotional sensitivity, and 3) the various aspects of social cognition potentially affected by narratives beyond empathy and mindreading.

The study in **Chapter 4** addressed an issue related to the third recommendation of the literature review by exploring *why*, rather than *if*, reading a single narrative would impact social cognition. In line with suggestions from previous research, I hypothesized that reading a narrative increases readers' social curiosity, i.e., their interest in other people. This might in turn increase performance on measures of social-cognitive abilities because social-cognitive performance is known to partially depend on motivation. Unexpectedly, however, this study found that reading a narrative, as opposed to a piece of exposition, decreased readers' social curiosity. Although at odds with previous theorizing, this finding can convincingly be explained as a fatiguing effect: a single exposure to a narrative engages and thus temporarily fatigues social-cognitive abilities rather than making readers more motivated to put these abilities to use. Although these findings contradict the idea that reading a single narrative enhances social-cognitive performance, they are in line with accounts that posit that only repeated and prolonged exposure to narratives makes for a positive and lasting impact on social cognition. The metaphor of reading as exercising a muscle was used to explain these two different effects: because narrative processing relies on social-cognitive abilities, reading a narrative likely induces a small social-cognitive fatigue effect in the short run, much like engaging a muscle for a few minutes tires that muscle. The repeated use of these abilities, however, might still create a training effect in the long run, much like regularly working out enhances muscle strength over a longer time. In other words, the findings of this chapter strongly suggest that there are different mechanisms at play with regard to the effect of written narratives on social cognition depending on the time scale we investigate. This might also explain part of the mixed results found in the literature review in **Chapter 3**, which showed that the long-term associations between reading habits and social cognition are rather robust, whereas the evidence in favor of an immediate effect of narratives on social cognition is not.

In sum, the first part of the dissertation contributed to a more nuanced understanding of the ways in which written narratives may impact social cognition and the possibilities for studying this impact in a more fine-grained fashion in future research.

### 7.1.2 Part II: From Reading Minds to Reading Narratives

In **Part II** I focused on the ways in which social-cognitive abilities affect the processing of written narratives. If reading narratives relies on social-cognitive abilities, this should not only have positive consequences for these abilities in the long run. We should also be able to see existing differences in readers' social-cognitive disposition reflected in narrative processing. As I argued that narrative perspective taking relies on social cognition, reading processes related to viewpoint and perspective taking in particular should be impacted by readers' social-cognitive disposition. This includes processes on a micro scale, such as the processing of linguistic viewpoint, and processes on a macro scale, such as character engagement.

Applying the identification procedure (VIP) developed in **Chapter 2** to a journalistic narrative, I analyzed how individual differences in social-cognitive abilities affect the processing of lexical markers of viewpoint in the eye-tracking study reported in **Chapter 5**. This study showed that the processing of linguistic viewpoint is affected by both viewpoint dimension (perceptual, cognitive, or emotional) and the social-cognitive disposition of readers. First, I found that lexical markers of perceptual viewpoint were processed relatively fast, whereas lexical markers of both cognitive and emotional viewpoint were processed relatively slowly. This suggests that perceptual perspective taking is inherently different than cognitive and emotional perspective taking. Crucially, the analyses also showed that readers' perspective-taking abilities (both self-reported and performance-based) facilitated the processing of lexical markers of perceptual and cognitive viewpoint. I argued that this supports the idea that narrative perspective taking relies on social-cognitive abilities. More specifically, I hypothesized the existence of a trade-off between the use of social-cognitive resources and the use of lexical cues in the process of narrative perspective taking. I speculated that readers rely on their social-cognitive abilities to make sense of the perspectives of characters but that readers with inadequate abilities may need to rely more heavily on explicit lexical cues of these perspectives. In other words, I hypothesized that good mindreaders can afford to process lexical markers of viewpoint faster.

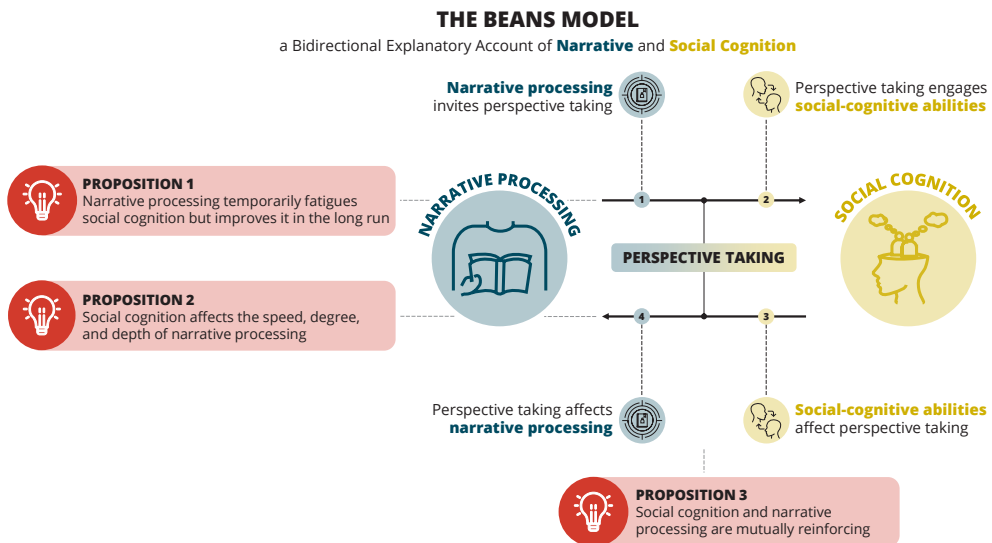
This hypothesis was put to the test in the final study of this dissertation (**Chapter 6**). In this study I investigated how readers' social-cognitive abilities and the relative presence of lexical markers of viewpoint interact to give rise to various experiences of character engagement. Using the VIP as a basis (**Chapter 2**), a manipulation strategy was developed that allowed me to create both an enriched viewpoint version and an impoverished viewpoint version of two literary narratives. The character engagement experiences of the participants who read these narratives showed that character engagement is a multidimensional phenomenon that first and foremost relies on readers' social-cognitive disposition, rather than the presence of lexical viewpoint markers. Although narratives are by definition viewpointed and some traces of linguistic viewpoint will thus always be present in written narratives, the findings of this study suggest that relatively little linguistic expression of perceptual, cognitive, and emotional viewpoint is necessary for perspective taking to occur in readers. In conclusion, social-cognitive abilities were found to facilitate narrative perspective taking in the form of engaging with narrative characters' minds, regardless of how much explicit linguistic detail was given about these minds. These findings do not support the hypothesis developed in **Chapter 5** but rather suggest that social-cognitive abilities simply facilitate narrative perspective taking, both on a micro and macro scale, during reading.

Having summarized the main findings of this dissertation, I will now proceed to present an account of the relationship between narrative and social cognition that integrates the contributions of my research.

## 7.2 BEANS: An Integrated View on the Bidirectional Relationship Between Narratives and Social Cognition

Figure 7.1 visualizes the newly developed Bidirectional Explanatory Account of Narrative and Social cognition (BEANS) model, in which I present the bidirectional and cyclical relationship between social cognition and narrative, as supported by the findings of this dissertation. In short, the model posits that perspective taking is a central process that binds social cognition and narrative. As described in the Introduction, in a narrative context, perspective taking refers to the process of entering the minds of characters and aligning one's viewpoint with the viewpoint of the character. Narratives invite readers to engage in perspective taking by representing the minds of experiencing characters (Arrow 1). As we have seen in Chapter 6, the degree to which the narrative contains explicit lexical cues of these experiencing minds does not seem to be crucial for perspective taking. Rather, any narrative text seems to afford perspective taking as a result of the implied presence of an experiencing mind. The process of perspective taking engages and thus relies on readers' real-life social-cognitive abilities (Arrow 2, supported by Chapter 5). In other words, readers (partially) make use of the same abilities they use to make sense of real, physical others, to engage with fictional others presented to them in writing. As a result, existing individual differences in these abilities affect the process of perspective taking (Arrow 3, supported by Chapter 5). Ultimately, this affects how the narrative is processed (Arrow 4, supported by Chapter 6).

Figure 7.1



The model predicts several outcomes both related to the social-cognitive disposition of the reader (left side of Figure 7.1) and the processing of the text (right side of Figure 7.1). All of these predictions are either supported or inspired by the findings of this dissertation and provide plenty of opportunities for future research. The predicted outcomes can be grouped under three larger propositions that I will discuss below. The first proposition is related to the effect that narratives have on social cognition (Arrows 1 and 2). The second proposition is related to the reverse relationship: the effect that social cognition has on narrative processing (Arrows 3 and 4). The third and final proposition relates to the way these two relationships reinforce each other. Ultimately, the BEANS model aims to contribute to understanding the broader mechanisms that are at play in the relationship between social cognition and narrative.

### **7.2.1 Proposition 1: Narrative Processing Fatigues Social-Cognitive Abilities in the Short Run but Improves Social-Cognitive Abilities in the Long Run**

The first proposition that follows from the BEANS model concerns the impact of narrative processing on social-cognitive abilities. Previous accounts of the impact of written narratives on social cognition have argued that processing narratives engages social-cognitive abilities (e.g., Mar, 2018). Several empirical studies have confirmed that social-cognitive processes are indeed activated during reading (e.g., Mar, 2011). The BEANS model extends these findings and proposes that the process of perspective taking as evoked by narrative texts is instrumental in the engagement of social-cognitive abilities during reading, because perspective taking requires readers to make sense of the minds of the narrative characters. This is indirectly supported by the eye-tracking study reported in Chapter 5, which found that social-cognitive abilities affected the speed with which readers process linguistic markers of viewpoint, and Chapter 6, which found that social-cognitive abilities affected experiences of character engagement. If social-cognitive abilities affect these aspects of narrative perspective taking, I reasoned in these chapters, this suggests that narrative perspective taking engages and relies on these abilities. Future studies should attempt to find more direct evidence for this underlying assumption of the first proposition. For example, fMRI studies could elucidate whether the processing of linguistic viewpoint activates areas commonly associated with mindreading. The combined use of fMRI and eye tracking during narrative reading that was recently introduced by M. Mak et al. (2023) is a promising technique for this purpose.

Crucially, the first proposition of the BEANS model does not only suggest that narrative perspective taking engages existing social-cognitive abilities, but that by doing so, it also affects these abilities. What these effects look like depends on the time scale we investigate. In the short run, the engagement of social-cognitive abilities brought about by narrative reading might induce a fatiguing effect. Evidence for such an effect was found in Chapter 4, which concluded that social curiosity was lower for readers exposed to a single narrative, than readers exposed to a single expository text. In this sense, social-cognitive abilities can



be seen as muscles that become sore after a limited period of intense use. In the long run, however, social-cognitive abilities are argued to benefit from exposure to narratives. Much like in the case of muscles, a temporary fatigue is still compatible with such a long-term training effect. Moreover, these seemingly contradictory effects are in line with the findings of the literature review in Chapter 3. Indeed, previous evidence in favor of the long-term relationship between exposure to written narratives and social cognition is rather robust, whereas the evidence that supports the idea that reading a single narrative boosts, rather than fatigues social-cognitive abilities is not (see also Quinlan et al., 2022).

More research is needed to further support the first proposition of the BEANS model. The found fatiguing effect should be replicated by future studies. Moreover, to establish a true causal long-term effect of narratives on social cognition, more longitudinal studies are required. Although some promising longitudinal studies have found a positive effect of narratives on social cognition in children (e.g., H. W. Mak & Fancourt, 2020; Rose et al., 2018), longitudinal studies with adults are still lacking. Indeed, controlling for the amount and type of narrative exposure in adults would be very challenging due to the ubiquity of narratives in daily life. As such, the effect of the narratives adults are assigned to read in experimental studies will always be small in the light of all other narratives that they come across in the same time frame as part of daily life. An alternative strategy could be to assign participants a restrictive “narrative diet”, meaning that participants are asked to avoid narratives as much as possible during a certain time frame, and study whether a control group that consumes narratives as usual outperforms this group on measures of social cognition after a certain amount of time.

In sum, the first proposition of BEANS is that narrative processing fatigues social-cognitive abilities in the short run but improves social-cognitive abilities in the long run.

### **7.2.2 Proposition 2: Social-Cognitive Abilities Affect the Speed, Degree, and Depth of Narrative Processing**

The second proposition that follows from the BEANS model concerns the role that social-cognitive abilities play during narrative processing. The BEANS model proposes that narrative perspective taking is the central reading process that relies on social-cognitive abilities, and that, as a result, readers’ social-cognitive disposition affects both quantitative (speed and degree) and qualitative (depth) aspects of narrative perspective taking. With regard to the former, the eye-tracking study reported in Chapter 5 supports the contention that social-cognitive abilities affect the *speed* of narrative perspective taking. Specifically, it showed that readers’ self-reported and behaviorally assessed perspective-taking abilities facilitated the processing of perceptual and cognitive viewpoint markers. In addition, social-cognitive abilities were found to affect the *degree* to which readers engaged with the minds of narrative characters in Chapter 6. It remains to be seen whether the latter is because readers

with a better social-cognitive disposition have enhanced ability, for example because of their faster linguistic processing of viewpoint, or tendency to engage with characters' minds, or both. This could be studied by teasing apart effects of social-cognitive abilities on the ability to make sense of characters' minds, for example by asking readers open questions about the characters' motivations or feelings, on the one hand, and the spontaneous tendency to engage with the minds of characters, for example by having readers summarize a narrative and rating the degree to which they volunteer information about characters' mental states (much like in the Spontaneous Theory of Mind Protocol; Rice & Redcay, 2015), on the other hand.

This last point also relates to a final prediction the BEANS model makes, namely that social-cognitive abilities might also affect the qualitative *depth* of readers' narrative perspective taking. This means that enhanced social-cognitive abilities might lead readers to more fine-grained, deep, or more justified interpretations of characters' inner worlds. As this hypothesis has not been tested in this dissertation, future research will need to clarify how social cognition impacts these qualitative aspects of perspective taking during narrative reading, most likely using qualitative measures. For example, interviews or think-aloud studies could be used to gain an understanding of the kind of interpretations of characters' perspective readers arrive at and how this is supported by their social-cognitive disposition. Future research will also need to further elucidate how the effects of social-cognitive abilities on the speed, degree, and depth of narrative perspective taking are related. For example, it could be the case that the enhanced speed with which readers with better social-cognitive abilities engage in low-level aspects of narrative processing, leaves them with more cognitive resources that are available for the more qualitative aspects of perspective taking (for a similar rationale, see Eekhof et al., 2021).

Finally, because narrative perspective taking is a crucial aspect of making sense of narrative characters, their actions and motivations, social-cognitive abilities will undoubtedly also affect other outcomes related to narrative processing in general, such as overall comprehension. Although this idea is supported by research on emergent readers (Atkinson et al., 2017; Boerma et al., 2017; Lecce et al., 2021; McIntyre et al., 2018; Pavias et al., 2016; Pelletier & Wilde Astington, 2004), research on the effect of social-cognitive disposition on narrative comprehension is relatively understudied in adults. This might partially be explained by the fact that it is hard to measure the subtle differences in comprehension that might be expected in the neurotypical adult population. To test this final hypothesis, more fine-grained measures of narrative comprehension will need to be developed.

In sum, the second proposition of the BEANS model is that social-cognitive abilities affect the speed, degree, and depth of narrative processing.

### **7.2.3 Proposition 3: Narrative Processing and Social-Cognitive Abilities Are Mutually Reinforcing**

The final proposition of the BEANS model argues that the two relationships between social cognition and narrative (i.e., the effect of narrative exposure on social cognition and the effect of social cognition on narrative processing) mutually affect and reinforce each other. This is to say that the interplay between social cognition and narrative can ultimately be described as an upward spiral in which the growth of social-cognitive and narrative abilities go hand in hand. This is also visible in the cyclical trajectory of the four arrows in the BEANS model in Figure 7.1: when readers engage with narratives, they are invited to practice perspective taking (Arrow 1), relying on their existing social-cognitive abilities (Arrow 2). Through repeated and prolonged exposure to narratives, these abilities are strengthened (Arrow 2). Subsequently, these strengthened abilities make for faster and more meaningful perspective taking during future encounters with narratives (Arrow 3), leading to positive reading outcomes such as better comprehension and increased reading pleasure (Arrow 4). In turn, this may increase readers' motivation and ability to read more narratives (Arrow 1), and thus, more opportunities to engage and foster social-cognitive abilities (Arrow 2), which will in turn lead to more rewarding forms of narrative perspective taking (Arrow 3) and processing (Arrow 4). Summarizing the previous in terms of the central propositions: readers will approach narratives with some level of existing social-cognitive abilities, these abilities are engaged and strengthened through repeated and prolonged exposure to narratives (proposition 1). These enhanced social-cognitive abilities will subsequently make for faster and more rewarding forms of narrative perspective taking (proposition 2), resulting in an integrated pattern of mutually reinforcing influences (proposition 3).

The idea that narrative processing and social-cognitive abilities are mutually reinforcing has received little attention in previous research. Within the field of emergent reading abilities, Dore et al., (2018) mention that their model on the effect of Theory of Mind on reading comprehension could be extended to include the reverse relationship as well. In addition, Jackson (2022) studied the possibility that lifetime exposure to narratives enhances social-cognitive abilities, which in turn enhances reading comprehension. She found that scores on the Reading the Mind in the Eyes Test (RMET) were positively correlated to both lifetime exposure to narratives and reading comprehension, although there was no evidence in the data for a mediation relationship such that print exposure indirectly affected reading comprehension through Theory of Mind. However, since the design of this study was correlational, it does not provide direct evidence for the idea that social-cognitive abilities and narrative processing mutually reinforce each other. In fact, an alternative explanation for these findings could be that people with better social-cognitive abilities like to read more often, thus explaining the positive correlation between RMET scores and print exposure, and are also more skillful readers, thus explaining the positive correlation between RMET scores and reading comprehension. As such, the results of Jackson's (2022) study could also

be taken as evidence for a one-sided relationship in which social-cognitive abilities affect narrative processing but not vice versa.

Finding direct evidence for a mutually reinforcing relationship in neurotypical adults is challenging. Longitudinal studies could provide initial support for this proposition. For example, a possibility could be to measure social-cognitive abilities and lifetime exposure to narratives at time 1 (T1), and social-cognitive abilities and measures of narrative perspective taking and processing at time 2 (T2). If a mutually reinforcing relationship between narrative and social cognition exists, we should both find that 1) social-cognitive abilities at T1 positively predict narrative perspective taking and processing at T2, and that 2) narrative exposure at T1 predicts social-cognitive abilities at T2. A downside of such a set-up is that the expected effect sizes in a neurotypical adult sample are small and may only become visible after a very long time. A longitudinal study could therefore be extended with an experimental approach such as the media diet described above. For example, after the measurements at T1, the participant group could be split up into one group that consumes narratives as usual, and one group that is asked to avoid narratives as much as possible. Again, at T2 social-cognitive abilities and narrative perspective taking and processing are measured. We would then expect to see that 1) the narratives-as-usual group shows a larger increase in social-cognitive abilities between T1 and T2 than the restricted group, supporting the idea that long-term repeated exposure to narratives enhances social-cognitive abilities, and that 2) a stronger positive correlation between the increase in social-cognitive abilities between T1 and T2, on the one hand, and narrative perspective taking and processing at T2, on the other hand, can be observed in the group that has consumed narratives as usual than in the group that has avoided narratives. The latter would provide support for the idea that an increase in social-cognitive abilities, brought about by repeated and prolonged exposure to narratives, in turn enhances narrative processing. However, besides the ethical considerations of such a study, a design like this comes with some practical challenges, most notably the fact that it will be hard to rule out all other types of narrative input besides written narratives that may also engage social cognition. A final option might be to study populations in which larger effect sizes are to be expected, such as adults with below average social-cognitive abilities or neurotypical adults who have very little exposure to written narratives in daily life. In such cases, a long-term experimental intervention in which narrative exposure is heightened, as opposed to a “business-as-usual” group, might lead to clearer results. Finally, a qualitative approach, such as long-term observation of reading habits and abilities, and social-cognitive skills, combined with interviews or focus groups might provide additional insights.

To conclude, the final proposition of the BEANS model integrates the two directions of the relationship between narrative and social cognition by proposing that the processing of narratives and the development of social-cognitive abilities mutually reinforce each other. Testing this hypothesis will require an interdisciplinary and multimethod approach.

## 7.3 Implications

The findings of this dissertation have implications for our thinking about social cognition and narrative, which will be discussed in Section 7.3.1, as well as for practical contexts in which social cognition and narrative play important roles, which will be discussed in Sections 7.3.2.

### 7.3.1 Theoretical Implications

#### 7.3.1.1 Implications for the Study of Social Cognition

The empirical study of social cognition has mostly focused on either mindreading or empathy. The research in this dissertation, however, underlines the importance of studying social cognition as a multidimensional and dynamic phenomenon. For example, Chapter 6 found that readers used various strategies to engage with narrative characters, ranging from cognitive, other-oriented strategies, to more affective, self-oriented strategies, and that the use of these different strategies was positively correlated. This suggests that, at least when it comes to understanding others on paper, we can simultaneously use or switch between different ways to engage with the mental states of others. The finding that the different measures of social-cognitive abilities used in Chapters 5 and 6 showed divergent patterns of association with reading behavior provides additional support for the differentiation of various abilities falling under the general header of social cognition. Finally, although the measures used in this dissertation cannot distinguish between the different mechanisms underlying social-cognitive abilities as proposed by Theory Theory, Simulation Theory, and Interactive Theory, these findings do provide indirect support for pluralist accounts of social cognition, which argue that people use various processes or means to make sense of others (e.g., Andrews et al., 2021; Gallagher, 2015).

In addition, the findings of this dissertation do not only support a conceptualization of social cognition as being multidimensional and dynamic within individuals but also across individuals. By showing that individual differences in social-cognitive abilities play a meaningful role in the daily life of neurotypical adults, this dissertation underlines the importance of continuing the study of social cognition beyond the early developmental years (see also Kilford et al., 2016). This means that we have to focus on understanding social cognition as not just entailing a set of skills that need to be mastered once at a certain age but rather a skill set that indeed starts to be acquired in early childhood but continues to develop throughout the lifetime to various degrees of mastery. Such a conceptualization is more in line with the intuition that many people have that not everyone is equally skilled at understanding how other feels or what others think. In addition, such a conceptualization also sparks a range of interesting questions for future research, for example regarding the role of individual differences in social-cognitive abilities in other domains, such as conversational interaction (see e.g., Trott & Bergen, 2019), storytelling (see e.g., van Duijn et al., 2022; van Schuppen et al., 2021), or writing (see e.g., Maslej et al., 2017). To sum up, this dissertation furthers our understanding of social cognition in neurotypical adults as being multidimensional, dynamic, and variable.

Finally, the research in this dissertation raises fascinating questions about the similarities and differences in the ways we make sense of others in face-to-face interactions versus others in narratives. Whereas in daily life the others we engage with are mostly presented to us as physical beings who provide us with multimodal cues about their inner worlds, narrative others are presented to us as black letters on white paper. The finding that our “real-life” social-cognitive abilities nevertheless affect how we make sense of the minds of narrative others suggests that social cognition at least partially relies on mechanisms that are applicable in both of these contexts. Mechanisms as proposed by Simulation Theory (e.g., Gallese & Goldman, 1998) or Theory Theory (e.g., Botterill, 1996) seem likely candidates in that respect. That is, both real-life encounters and written narratives may provide input that can trigger simulation processes or rule-based reasoning that lead to an understanding of others’ mental states. For example, both perceiving someone’s posture and behavior in real life, and simulating what a character’s posture and behavior look like based on written descriptions may feed into a process of imagining what that person or character feels or thinks. On the other hand, Interaction Theory proposes that we can directly perceive the mental states of others in their bodily expressions (Zahavi, 2008). Although this may be the case for real-life encounters, it is much harder to imagine how direct perception would play a role during narrative reading. Future studies will need to use innovative and fine-grained measures of social cognition to study how different contexts, such as real-life interaction or reading, rely on different or overlapping social-cognitive mechanisms.

### ***7.3.1.2 Implications for the Study of Narrative and Viewpoint***

The research in this dissertation furthers our understanding of narratives in general, and narrative viewpoint specifically. First, the findings of Chapter 2 and Chapter 5 lend support to the previously developed Linguistic Cues Framework (van Krieken et al., 2017), which argues that several dimensions of viewpoint can be distinguished. The development of the VPIP (Chapter 2) confirmed that three of these dimensions, perceptual, cognitive, and emotional viewpoint, can indeed be teased apart on a linguistic level. Moreover, the eye-tracking study in Chapter 5 showed that at least the perceptual dimension of viewpoint can be dissociated from the cognitive and emotional dimensions on a processing level. These findings support the multidimensional conceptualization of viewpoint and stress the importance of distinguishing between different dimensions of viewpoint in future analytical and empirical studies on narrative viewpoint. In addition, these findings extend the conceptualization of viewpoint as proposed by van Krieken et al. (2017) by showing that the different dimensions of viewpoint might be related to different forms of cognitive processing. For example, the finding that perceptual viewpoint markers were read relatively fast suggests that these markers are perhaps related to perceptual simulation (Barsalou, 2008; M. Mak & Willems, 2018), which can be loosely defined as the rapid and relatively effortless process by which readers activate brain areas related to perception during reading, arguably to make sense

of what the story world looks like. On the other hand, cognitive and emotional viewpoint markers might be related to more effortful forms of perspective taking.

The findings of this dissertation also contribute to and challenge our understanding of the relationship between the linguistic expression of viewpoint in the text, on the one hand, and the psychological process of perspective taking in the reader, on the other hand. Many of the central assumptions about narrative perspective taking from literary studies and narratology, such as hypotheses about the effects of viewpoint on narrative identification and narrative empathy (e.g., Farner, 2014), have long gone without empirical testing. The VPIP can be used in future studies to further investigate the relationship between viewpoint and perspective taking. The findings of this dissertation provide some first clues about the relationship between viewpoint and perspective taking. First, the eye-tracking study in Chapter 5 showed that individual differences in social-cognitive abilities affect the processing of lexical viewpoint markers, suggesting that perspective taking is not just a linguistic matter but also a social-cognitive one. Second, the research in Chapter 6 showed that the degree to which readers engaged with the characters' minds was not significantly impacted by the relative presence of perceptual, cognitive, and emotional viewpoint markers. This shows that there is no clear one-to-one relationship between the presence of viewpoint markers on the side of the text, and the occurrence of perspective taking on the side of the reader. Future research on viewpoint will have to acknowledge and further investigate the role of individual differences between readers in this respect.

### **7.3.2 Practical Implications**

#### **7.3.2.1 Implications for Education**

Narrative reading and mindreading are closely related to the goals of academic as well as personal development that are central to both primary and secondary education. The idea that these two abilities mutually affect and reinforce each other, as supported by the findings of this dissertation, thus have direct implications for education.

With regard to the possible effects of narratives on social-cognitive development, the research in this dissertation supports the idea that repeated and prolonged exposure to narratives is necessary for any social-cognitive benefits to arise. This underlines the importance of fostering a healthy and sustainable habit of reading in children, rather than exposing them to narratives only briefly and irregularly. As such, a dedicated weekly reading afternoon might be able to lastingly affect students' social cognition but an annual reading week likely will not. Moreover, irregular and infrequent exposure to narratives might even have a detrimental effect, as children may mostly experience the short-term fatiguing effect of narratives and fail to reap the long-term rewards that come with repeated and prolonged exposure. As a result, children may start associating reading primarily with effort, rather than pleasure, which in turn might set off a negative spiral (rather than the positive reinforcing relationship

described above) such that children do not enjoy reading, consequently do not practice their reading and perspective-taking abilities as much, and do not develop the skill set necessary to engage in rewarding forms of reading. Therefore, education should focus on providing the contexts in which children can develop the reading skills and perspective-taking abilities necessary to sustain a beneficial habit of narrative reading.

Second, the idea that social-cognitive abilities facilitate narrative processing underlines the importance of approaching reading as not just a purely linguistic ability but as relying on a broader spectrum of skills. Thus, reading education might benefit from an approach that focuses not only on the more technical aspects of reading, such as reading comprehension or reading speed, but also on the social and emotional aspects, such as narrative perspective taking and character engagement (see e.g., Schrijvers et al., 2019). Making children aware of what they can bring to the table beyond linguistic skill when it comes to reading may also increase children's enthusiasm about narratives, which might in turn encourage more reading, with all its possible benefits. Ultimately, the proposition that narrative reading and mindreading mutually reinforce each other encourages the idea of a curriculum in which reading education and social-cognitive development are integrated. For example, narratives, both published ones and personal accounts written by students, can be used as tools for fostering empathy among students, and, conversely, students can be encouraged to use their social-cognitive skill set to make sense of the narratives they are assigned to read all throughout their education.

All this being said, implementing this kind of reading education is not easy in a time in which reading is in decline among young people and their parents. For example, a survey found that Dutch 13- to 19-year-olds' reading time declined by almost 40% in just five years (2013-2018; Wennekers et al., 2018; see also Swart et al., 2023). This begs the question whether young people have the necessary motivation and skills to engage in meaningful narrative reading in the first place, or whether the processes described in this dissertation are just for the happy few. At the same time, young people are exposed to narratives more than ever through visual media such as films and TV shows (DUO Onderwijsonderzoek, 2017). Future research will have to elucidate whether engagement with these visual narratives similarly engages, relies on, and contributes to social-cognitive development.

### ***7.3.2.2 Implications for Strategic Storytelling***

Narratives are often used in functional contexts such as health communication, internal and external branding, and politics, to inform and influence people's beliefs, attitudes, or behavior (e.g., Barker & Gower, 2010; Graaf et al., 2016; Polletta, 2008; J. Sanders & Krieken, 2019; Woodside et al., 2008). One of the proposed mechanisms for the persuasive power of narratives is that narratives present relatable characters that can serve as role models and targets of readers' identification (e.g., Bandura, 2001; de Graaf et al., 2012; Slater & Rouner,



2002). When readers identify with these characters, they might adopt the beliefs, attitudes, values, or intentions of these characters, potentially leading to real-life outcomes, such as behavioral change. Previous research on the role of identification in narrative persuasion has often focused on the effect that the form, content, and context of narratives might have on identification (e.g., Graaf et al., 2016). The research in this dissertation, however, suggests that not only message characteristics but also reader characteristics can influence whether identification and other character engagement experiences arise during reading. In other words, not every reader might be equally able to identify with the characters that are presented in strategic narratives. As a result, the persuasive success of a narrative will partially depend on readers' social-cognitive disposition. Although most neurotypical adults will possess the necessary social-cognitive skills to engage in the type of identification or character engagement that narrative persuasion is argued to rely on, communication specialists need to be aware of the disposition of their audience when designing narrative interventions. Narrative texts, as can be found in, for example, patient brochures or the websites of government campaigns, might be less suitable to persuade audiences with below average social-cognitive abilities. Although the presence of lexical viewpoint markers was not found to affect the character engagement of neurotypical adults, such viewpoint techniques could perhaps be of use for less social-cognitively equipped audiences if a written narrative campaign or intervention is nevertheless desirable.

## 7.4 Strengths and Limitations

This dissertation has contributed to our understanding of the link between social cognition and narrative by using an interdisciplinary, multimethod, ecologically valid, and integrated approach. First, the research in this dissertation is firmly rooted in a broad range of academic fields. The concepts, theories, and hypotheses that were studied in the various chapters mostly find their origin in literary studies and the philosophy of mind. I have approached these ideas with the empirical tool set from psychology, cognitive neuroscience, and psycholinguistics. Finally, I have applied the linguistic rigor from analytical fields such as cognitive linguistics and narratology. All in all, this leads to an innovative and nuanced appreciation of the ways social cognition and narrative are inextricably bound up.

Second, the findings of my research are supported by various methodologies, ranging from explorations of readers' introspection, as reported in both existing validated questionnaires and newly developed questions, to testing of readers' behavior with the use of eye tracking and behavioral tasks, such as the newly developed State Inventory of Social Curiosity (SISC; Chapter 4). Moreover, the relationships between written narratives and social cognition were studied across various narrative contexts, ranging from journalistic narratives, to popular works of narrative fiction, to award-winning literary short stories, published in various easily

accessible outlets, such as newspapers, magazines, and ebooks. This approach contributes to the ecological validity of the research findings and furthers our understanding of the processing and impact of written narratives that readers are likely to encounter in daily life.

Finally, the distinctive contribution and strength of this dissertation is that it studies both directions of the relationship between social cognition and narrative, and integrates these in the BEANS model. Thus far, research has mostly focused on the effect of narrative exposure on social cognition, and the scarce literature on the reversed effect has mostly been limited to the study of emergent reading. By integrating these two approaches, we do not only gain a new understanding of how mindreading and narrative reading mutually influence and reinforce each other but also deepen our understanding of each of these relationships separately.

That being said, the research presented in this dissertation has certain limitations that future studies may address. First, the study of individual differences in social cognition in neurotypical adults hinges on the reliable and valid measurement of these individual differences. Although measures were available that were suitable for the purposes of this dissertation (see the Introduction for a discussion of these measures), it is important to mention that approximately half of these measures relied on participants' self-report and that one of the behavioral measures, the Multifaceted Empathy Test (Dziobek et al., 2008), was originally developed for use in non-neurotypical populations. In other words, there is still a lot to be gained in the measurement of subtle differences in social-cognitive disposition between neurotypical adults, especially when it comes to behavioral measures.

Second, this dissertation has focused solely on print narratives written for recreational purposes. However, in our daily lives we come across many different forms of narratives. These include the stories we tell each other (Labov, 2010), the micronarratives we share on social media (e.g., J. Sanders, 2019), and the visual narratives we consume in our free time. Moreover, narratives are becoming more and more popular as a tool for strategic communication. As such, we might come across narratives at work (Barker & Gower, 2010), in commercials (J. Sanders & van Krieken, 2018), and in health care contexts (Graaf et al., 2016). The decline in leisure reading (Swart et al., 2023; Wennekers et al., 2018) combined with the ubiquity of other types of narratives in daily life (DUO Onderwijsonderzoek, 2017) thus begs the question how other narrative media are related to social cognition. Existing research has produced mixed results. On the one hand, studies suggest that exposure to TV shows might positively impact social cognition in adults, both in the short term (Black & Barnes, 2015a) and long run (Black & Barnes, 2020). On the other hand, studies on children have found both positive effects of watching children's movies in four- to six-year-olds (Mar et al., 2010) as well as detrimental effects of exposure to background television in three- to six-year-olds (Nathanson et al., 2013). Finding out exactly under which circumstances visual

and other narrative media positively or negatively affect social cognition is a crucial avenue for future research.

## 7.5 Concluding Remarks

This dissertation studied the fascinating and intricate ways in which mindreading and narrative reading are related in neurotypical adults. It described the crucial role that perspective taking plays in these relationships. By definition, narratives are vehicles for perspective: by presenting us the world from the point of view of other experiencing minds, they intrinsically invite us to temporarily shift our perspective and see, think, and feel through the eyes and minds of the other. Doing so requires us to put our social-cognitive abilities, such as our mindreading, empathic, and perspective-taking abilities, to work. Those who excel in these abilities in daily life will therefore also find it easier to process narratives: in this dissertation these people were found to read the lexical items that express the viewpoints of characters faster and were shown to engage with the minds of these characters more deeply. Putting these abilities to work in a narrative context may in turn also have a beneficial effect after reading. But the beneficial effects of reading narratives are not a simple given and depend on the complex interplay between the text, the reader, and the social-cognitive abilities under consideration. Moreover, different effects might arise, depending on the time scale we investigate. This dissertation found that reading a narrative can be best thought of as a social-cognitive work-out: it tires our “social-cognitive muscles” and makes us slightly less interested to engage with others. If we foster a sustainable habit of reading narratives, however, over time we might train our mindreading muscles and be rewarded with an enhanced ability to take the perspective of others, both as we encounter them in real life and as they are presented to us on paper. Ultimately then, reading narratives and reading minds are inextricably bound up, like two sides of a coin we might call perspective taking. As we grow and develop our perspective taking abilities throughout our lives, the interrelationship between narrative reading and mindreading may become visible as small but meaningful dependencies.



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English Summary  
Nederlandse Samenvatting  
Appendices  
Data Management  
Acknowledgements  
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List of Publications



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## English Summary

Having a good conversation with friends in a crowded pub or curling up alone on the sofa with a suspenseful book: at first glance, these two forms of pastimes have little in common. Yet social interaction and reading stories share something essential. Both a good conversation and an enjoyable reading experience require us to empathize with other people and to try to understand what they are thinking and feeling. In short, in both cases we need to take on someone else's perspective. In social interaction, these are the perspectives of "real" others; in stories, these are the perspectives of (fictional) characters.

The everyday skills we use to empathize with others are referred to as social-cognitive abilities. These abilities include processes such as empathy and "reading" other people's minds. In my dissertation, I investigated how these social-cognitive abilities and story reading are related.

### How does reading stories affect our social-cognitive abilities?

The possible relationship between social cognition and stories goes two ways. On the one hand, it is possible that by reading stories, we get a better understanding of others around us. In short, that by occasionally curling up with a book, we eventually become better at understanding our friends. Proponents of this theory see stories as *simulators* of sorts: according to researchers like Raymond Mar and Keith Oatley, stories are simulations of our real social world. Indeed, unlike informational texts, stories always focus on the experiences and perspectives of people, namely the characters. Just as a pilot can improve his flying skills in a flight simulator or children can learn how to sustain themselves in adult life by playing a simulation game such as *The Sims*, we might improve our social-cognitive skills by reading about other people's inner worlds in stories.

In the first part of my dissertation, I investigated this theory. To do this, I first reviewed the existing research on the effect of reading stories on social cognition. From that previous research, a mixed picture emerged. Research on children shows that reading or being read to at an early age improves social-cognitive skills later on. Among adults we also see that regular reading is associated with better understanding of the inner world of others. In adult research, however, the question is what leads to what: do the participants in these studies owe their social-cognitive skills to their frequent reading, as the theory suggests? Or is the reverse the case and do empathetic people simply like reading more?

To solve this issue, a number of experiments have been conducted in which researchers divided participants into multiple groups. Each group was given something different to read: a literary story, a popular story, an informative article, or nothing at all. Then the researchers

tested the social-cognitive skills of each group. An initial study seemed to suggest that the participants who had read a literary story performed better on the tests they were subjected to afterwards than the participants in the other groups. This was seen as evidence that reading stories, even reading a single story, does have a direct, positive effect on social-cognitive skills in adults as well. Follow-up research, however, was less unequivocal. Some researchers were able to find similar results, but other studies did not show that reading a story had a direct, positive effect on social cognition.

Based on my literature review, I concluded that the evidence for the theory that reading stories makes us more empathic is mixed. In the long term, stories do seem to have a positive effect: if we have been exposed to stories a lot at a young age, we benefit later, and a lifelong habit of reading also seems to have positive effects. But what reading a single story does to our social-cognitive abilities in the short term remains unclear. To find out, new studies are needed that pay more attention to (1) the specific linguistic characteristics of stories that may have an effect on social cognition, (2) the differences between readers and the extent to which they are receptive to stories, (3) how stories affect different aspects of social cognition.

In line with the third point, I designed a study in which I investigated whether reading a single story might not necessarily make us better at understanding other people's inner world, but simply makes us more curious about that inner world. In some previous studies, that increased curiosity may have led participants to do better on the social-cognitive tests they underwent after reading a story. To my surprise, however, I actually found that reading a story lowered, rather than heightened, participants' social curiosity. I explained this as follows: because stories invite us to empathize with fictional characters, we have to use our social-cognitive skills. These skills therefore become temporarily fatigued, leading to a reduced ability or motivation to use those skills again immediately after reading the story. After reading a story, people are therefore less interested in other people. After reading an informative text, however, people appeared to be more interested in other people, possibly because these texts are less social and therefore do not appeal to or exhaust our social-cognitive abilities as much.

That stories deplete our social-cognitive skills in the short term, but are also known to have a positive effect in the long term seems contradictory at first glance, but can be explained using the metaphor of a muscle. Just as doing ten push-ups temporarily fatigues our arm muscles, reading one story temporarily exhausts our social-cognitive "muscles". In the long run, however, repeating a set of push-ups daily or weekly does have a positive effect on our muscles. In a similar way, regular and long-term exposure to stories also has a strengthening effect on social cognition. Therefore, the conclusion of the first part of the dissertation is that reading a single story may have a slightly exhausting effect on our social-cognitive abilities,



but that developing a consistent habit of reading strengthens our social-cognitive abilities in the long term.

### **How do our social-cognitive abilities affect the way we read stories?**

As mentioned, the relationship between social cognition and stories can also work in the other direction: to understand a story and the characters in that story, we use our social-cognitive abilities, which means that how well-developed our social-cognitive abilities are affects how we read a story. In other words, how well we can empathize with other people around us possibly also influences how well we can get involved with a story and its characters. I investigated this in the second part of my dissertation. Interestingly, very little has been written about the role that social-cognitive abilities play during story reading. The literature that does exist mainly describes that these abilities are important for the development of reading skills in children. Whether existing differences in social-cognitive abilities still have an influence on the reading behavior of healthy adults and which aspects of reading are subject to that influence is unclear.

My theory at the beginning of this dissertation was that social-cognitive abilities still play a major role during story reading even in adults and especially during the processing of narrative viewpoint. In this context, viewpoint (or perspective) refers to the phenomenon that stories are always told from the point of view of a specific character. Thus, stories are not simple enumerations of facts and events, but narrations of characters' experiences and their views on those facts and events. Narrative viewpoint is expressed in stories through, among other techniques, the use of viewpoint markers: words like *see* or *pain*, which express what a character perceives; words like *thought* or *maybe*, which express what a character thinks, believes, or wants; and words like *love* or *angry*, which express what a character feels. In a chapter in the introductory part of the dissertation, I developed a method for identifying these viewpoint markers in a text. This method can form the basis for various forms of analytical and experimental research on narratives and viewpoint. Consequently, this method also plays an important role in various studies of my dissertation.

In the first study of the second part of this dissertation, I investigated how social-cognitive abilities influence the processing of narrative viewpoint by looking at how people read viewpoint markers. To do this, I used an eye-tracking camera, which measured what participants looked at while reading a long story. This study showed that participants with better social-cognitive abilities sped up their reading when they encountered viewpoint markers that expressed characters' perceptions and thoughts. My explanation for this finding was that readers who are very good at empathizing with others in real life may not need these explicit viewpoint markers and therefore read them faster. These readers may already understand what is going on in the characters' minds and do not need to rely on actual words to arrive at that understanding.

In the second study, I explored this idea further by studying how viewpoint markers on the one hand and participants' social-cognitive abilities on the other affect how well readers could empathize with the main character of a story. To investigate this, I manipulated two stories so that each story appeared in a version with viewpoint markers (enriched version) and a version without viewpoint markers (impoverished version). In the enriched versions, the stories gave many explicit clues about the characters' inner world through the use of words such as *pain*, *thought*, or *love*. In the impoverished versions, only the characters' behavior and actions were described and participants had to draw their own conclusions about the characters' underlying ideas and feelings. The latter may require a greater social-cognitive effort.

However, the results showed that the extent to which participants were engaged with the characters of stories depended not so much on the extent to which viewpoint markers were present in the text, but mainly on participants' social-cognitive abilities. Readers who are good at understanding others in everyday life are apparently also more engaged with the inner world of the characters in stories, regardless of the extent to which those stories provide explicit clues about what those characters perceive, think, and feel. These two studies together thus seem to suggest that social-cognitive abilities help readers take the perspective of story characters, both on a micro scale, while reading words that express characters' perspectives, and on a macro scale, while understanding characters' inner world.

All in all, I concluded that even in healthy adults, social-cognitive abilities still play a role during story reading and specifically during the processing of narrative viewpoint. Readers who know how to empathize with others in everyday life also process narrative characters' perspective more quickly and intensively.

### **Integration: social cognition and story reading reinforce each other**

In the final chapter of this dissertation, I integrate the findings of the first and second parts into a new model. In this model, I argue that there is a cyclical and reinforcing relationship between social cognition and reading that can be described as follows: story reading invites us to take the perspective of characters. To do so, we use our social-cognitive abilities. If we read regularly and thus often engage our social-cognitive muscles, our social-cognitive abilities will strengthen in the long run. And that in turn leads to us being able to process stories faster, better, and deeper. What I did not investigate in this dissertation but what may well be possible is that this improved processing in turn makes reading more fun and inspiring, which in turn makes people read more, trains their social-cognitive abilities even more, and makes reading stories even more effortless and fun. In short, the link between social cognition and reading stories can be seen as a continuous cycle in which the development of social-cognitive abilities and the development of reading abilities fuel each other.

## Nederlandse Samenvatting

In een drukke kroeg een goed gesprek voeren met vrienden of alleen wegkruipen op de bank met een spannend boek: op het eerste gezicht hebben deze twee vormen van tijdverdrijf weinig met elkaar te maken. Toch hebben sociale interactie en het lezen van verhalen iets essentieels met elkaar gemeen. Zowel voor een goed gesprek als een plezierige leeservaring is het noodzakelijk dat we ons inleven in de ander en proberen te begrijpen wat die ander denkt en voelt. Kortom, in beide gevallen moeten we ons verplaatsen in het perspectief van de ander. In interactie zijn dat de perspectieven van “echte” anderen, bij verhalen zijn dat de perspectieven van (fictieve) personages.

De dagelijkse vaardigheden die we gebruiken om ons in te leven in anderen worden in de psychologie aangeduid als sociaal-cognitieve vaardigheden. Onder die noemer vallen onder andere processen zoals empathie en het “lezen” van andermans gedachten. In mijn proefschrift heb ik onderzocht hoe deze sociaal-cognitieve vaardigheden en het lezen van verhalen met elkaar samenhangen.

### Hoe beïnvloedt het lezen van verhalen onze sociaal-cognitieve vermogens?

De mogelijke relatie tussen sociale cognitie en verhalen gaat twee kanten op. Aan de ene kant is het mogelijk dat we door het lezen van verhalen beter worden in het begrijpen van anderen om ons heen. Kortom, dat we door af en toe met een boek weg te kruipen, op den duur beter worden in het begrijpen van onze vrienden. Voorstanders van deze theorie zien verhalen als een soort *simulators*: volgens onderzoekers zoals Raymond Mar en Keith Oatley zijn verhalen nabootsingen van onze echte sociale wereld. Anders dan in informatieve teksten staan in verhalen immers altijd de ervaringen en perspectieven van mensen, namelijk de personages, centraal. Net zoals een piloot zijn vliegkunsten kan verbeteren in een vluchtsimulator of kinderen kunnen leren hoe je jezelf staande houdt in het volwassen leven door een simulatiespel zoals *The Sims* te spelen, zouden we mogelijk onze sociaal-cognitieve vaardigheden verbeteren door te lezen over de binnenwerelden van andere mensen in verhalen.

In het eerste deel van mijn proefschrift heb ik deze theorie onderzocht. Ik heb hiervoor eerst al het bestaande wetenschappelijk onderzoek naar het effect van het lezen van verhalen op sociale cognitie doorgespit. Uit dat eerdere onderzoek kwam een gemengd beeld naar voren. Onderzoek bij kinderen laat zien dat op jonge leeftijd veel lezen of voorgelezen worden later zorgt voor betere sociaal-cognitieve vaardigheden. Ook bij volwassenen zien we dat regelmatig lezen samenhangt met een beter begrip van de binnenwereld van anderen. Bij het onderzoek naar volwassenen is het echter de vraag wat tot wat leidt: hebben de proefpersonen in deze studies hun sociaal-cognitieve vaardigheden inderdaad te danken

aan hun vele lezen, zoals de theorie suggereert? Of is het omgekeerde het geval en houden empathische mensen gewoon meer van lezen?

Om dat laatste vraagstuk op te lossen zijn er een aantal studies uitgevoerd waarin onderzoekers proefpersonen opdeelden in meerdere groepen. Elke groep kreeg iets anders te lezen: een literair verhaal, een populair verhaal, een informatief artikel of helemaal niks. Daarna testten de onderzoekers de sociaal-cognitieve vaardigheden van elke groep. Een eerste studie leek te suggereren dat de proefpersonen die een literair verhaal hadden gelezen na afloop beter scoorden op de testjes waaraan ze onderworpen werden dan de proefpersonen in de andere groepen. Dit werd opgevoerd als bewijs dat het lezen van verhalen, zelfs het lezen van één enkel verhaal, ook bij volwassenen wel degelijk een direct, positief effect heeft op sociaal-cognitieve vaardigheden. Vervolgonderzoek was echter minder eenduidig. Sommige onderzoekers vonden later hetzelfde effect, maar uit andere studies bleek niet dat het lezen van een verhaal een direct, positief effect had op sociale cognitie.

Op basis van mijn literatuurstudie concludeerde ik dat het bewijs voor de theorie dat we van verhalen lezen mensen beter leren begrijpen gemengd is. Op de lange termijn lijken verhalen wel degelijk een positief effect te hebben: als we op jonge leeftijd veel in aanraking zijn gekomen met verhalen hebben we daar later profijt van, en een leven lang een gewoonte onderhouden van veel lezen lijkt ook positief uit te pakken. Maar wat het lezen van één verhaal op de korte termijn met onze sociaal-cognitieve vermogen doet, blijft onduidelijk. Om dat uit te zoeken zijn er nieuwe studies nodig die meer aandacht hebben voor (1) de specifieke talige eigenschappen van verhalen die mogelijk een effect hebben op sociale cognitie, (2) de verschillen tussen lezers en de mate waarin ze ontvankelijk zijn voor verhalen, (3) de manier waarop verhalen een invloed hebben op verschillende aspecten van sociale cognitie.

Aansluitend op het derde punt ontwierp ik daarom een studie waarin ik onderzocht of het lezen van een enkel verhaal ons mogelijk niet per se beter maakt in het begrijpen van de binnenwereld van andere mensen, maar simpelweg meer nieuwsgierig maakt naar die binnenwereld. Die nieuwsgierigheid leidde er in een aantal eerdere studies wellicht toe dat proefpersonen beter hun best gingen doen op de sociaal-cognitieve testen die ze ondergingen na het lezen van een verhaal. Tot mijn verbazing vond ik echter juist dat het lezen van een verhaal de sociale nieuwsgierigheid van proefpersonen verlaagt. Ik verklaarde dit als volgt: doordat verhalen ons uitnodigen om ons in te leven in fictieve personages moeten we gebruik maken van onze sociaal-cognitieve vaardigheden. Deze vaardigheden raken daardoor tijdelijk vermoeid, wat leidt tot een verminderd vermogen of een verminderde motivatie om die vaardigheden direct na het lezen van het verhaal wéér in te zetten. Na het lezen van een verhaal zijn mensen daarom minder geïnteresseerd in andere mensen. Na

het lezen van een informatieve tekst bleken mensen juist wél meer geïnteresseerd te zijn in andere mensen, mogelijk omdat deze teksten juist geen sociale insteek hebben en onze sociaal-cognitieve vermogens dus niet of minder aanspreken of uitputten.

Dat verhalen op de korte termijn onze sociaal-cognitieve vaardigheden als het ware uitputten maar op de lange termijn toch een positief effect hebben lijkt op het eerste gezicht tegenstrijdig, maar kan uitgelegd worden aan de hand van de metafoor van een spier. Net zoals we met het doen van tien push-ups onze armspieren tijdelijk vermoeien, putten we met het lezen van één verhaal onze sociaal-cognitieve “spieren” tijdelijk uit. Op de lange termijn heeft het dagelijks of wekelijks herhalen van een set push-ups echter wél een positief effect op onze spieren. Op zo’n zelfde manier heeft ook het regelmatig en langdurig lezen van verhalen een versterkend effect op sociale cognitie. De conclusie van dit eerste deel van het proefschrift is dan ook dat het lezen van één verhaal mogelijk een licht uitputtend effect heeft op onze sociaal-cognitieve vermogens, maar dat het ontwikkelen van een consistente gewoonte van lezen op de lange termijn onze sociaal-cognitieve vermogens versterkt.

### **Hoe beïnvloeden onze sociaal-cognitieve vermogens de manier waarop we verhalen lezen?**

Zoals gezegd kan de relatie tussen sociale cognitie en verhalen ook de andere kant op werken: om een verhaal en de personages in dat verhaal te begrijpen maken we gebruik van onze sociaal-cognitieve vaardigheden en dat betekent dat hoe goed onze sociaal-cognitieve vermogens zijn van invloed is op hoe we een verhaal lezen. Kortom: hoe goed we ons kunnen inleven in andere mensen om ons heen beïnvloedt mogelijk ook hoe goed we ons kunnen inleven in een verhaal. Dit onderzocht ik in het tweede deel van mijn proefschrift. Opvallend genoeg is er nog maar weinig geschreven over de rol die sociaal-cognitieve vaardigheden spelen tijdens het lezen van verhalen. De weinige literatuur die er wél is beschrijft vooral dat zulke vaardigheden belangrijk zijn voor het ontwikkelen van leesvaardigheden bij kinderen. Of bestaande verschillen in sociaal-cognitieve vaardigheden nog steeds een invloed hebben op het leesgedrag van gezonde volwassenen en welke aspecten van lezen dan aan die invloed onderhevig zijn, is onduidelijk.

Mijn theorie aan het begin van dit proefschrift was dat sociaal-cognitieve vaardigheden ook bij volwassenen nog een grote rol spelen tijdens het lezen en dan vooral bij het verwerken van narratief perspectief. Perspectief verwijst hier naar het fenomeen dat verhalen altijd verteld worden vanuit het oogpunt van een specifiek personage. Verhalen zijn dus geen eenvoudige opsommingen van feiten en gebeurtenissen, maar vertellingen van de ervaringen van personages en hun kijk op die feiten en gebeurtenissen. Narratief perspectief komt onder andere tot uiting in verhalen door het gebruik van perspectiefmarkeerders, woorden zoals *zien* of *pijn*, die uitdrukken wat een personage waarneemt, woorden zoals *gedachte* of

*misschien*, die uitdrukken wat een personage denkt, gelooft, of wil, en woorden zoals *verliefd* of *boos*, die uitdrukken wat een personage voelt. In een hoofdstuk in het inleidende gedeelte van het proefschrift heb ik een methode ontwikkeld om deze perspectiefmarkeerders in een tekst te kunnen aanwijzen. Deze methode kan de basis vormen voor verschillende vormen van analytisch en experimenteel onderzoek naar verhalen en perspectief. In de studies van mijn proefschrift speelt deze methode dan ook regelmatig een rol.

In de eerste studie van het tweede deel van dit proefschrift heb ik onderzocht hoe sociaal-cognitieve vaardigheden het verwerken van narratief perspectief beïnvloeden door te kijken naar hoe mensen zulke perspectiefmarkeerders lezen. Hiervoor heb ik gebruik gemaakt van een oogbewegingscamera, die bijhield waar proefpersonen naar keken tijdens het lezen van een lang verhaal. Uit dit onderzoek bleek dat proefpersonen met betere sociaal-cognitieve vaardigheden sneller gingen lezen als ze perspectiefmarkeerders tegenkwamen die gingen over de waarnemingen en gedachten van personages. Mijn verklaring voor deze bevinding was dat lezers die zich in het echte leven heel goed kunnen inleven in anderen, zulke expliciete perspectiefmarkeerders mogelijk niet nodig hebben en ze daarom sneller lezen. Deze lezers begrijpen wellicht uit zichzelf al wat er in personages omgaat en hebben daar geen woorden voor nodig.

In de tweede studie onderzocht ik deze verklaring nader door te bestuderen hoe perspectiefmarkeerders enerzijds en de sociaal-cognitieve vaardigheden van proefpersonen anderzijds beïnvloeden hoe goed lezers zich kunnen inleven in het hoofdpersonage van een verhaal. Om dit te onderzoeken manipuleerde ik twee verhalen zodat ik van elk verhaal een versie mét perspectiefmarkeerders had (verrijkte versie) en een versie zónder perspectiefmarkeerders (verarmde versie). In de verrijkte versies gaven de verhalen dus veel expliciete aanwijzingen over de binnenwereld van de personages door het gebruik van woorden zoals *pijn*, *gedachte* of *verliefd*. In de verarmde versies werden alleen het gedrag en de handelingen van de personages beschreven en moesten de proefpersonen zelf hun conclusies trekken over de achterliggende ideeën en gevoelens van de personages. Dat laatste vergt mogelijk een grotere inspanning van de sociaal-cognitieve vaardigheden.

Uit de resultaten bleek echter dat de mate waarin proefpersonen betrokken waren bij de personages van verhalen niet zozeer afhing van de mate waarin er perspectiefmarkeerders aanwezig waren in de tekst, maar vooral afhing van de sociaal-cognitieve vaardigheden van de proefpersonen. Lezers die in het dagelijks leven goed zijn in het begrijpen van anderen zijn kennelijk ook meer betrokken bij de binnenwereld van de personages in verhalen, ongeacht de mate waarin die verhalen expliciet aanwijzingen geven over wat die personages waarnemen, denken en voelen. Deze twee studies samen lijken dus te suggereren dat sociaal-cognitieve vaardigheden lezers helpen bij het innemen van het perspectief van

verhaalpersonages, zowel op een kleine schaal, namelijk bij het lezen van woorden die uitdrukking geven aan het perspectief van personages, als op grotere schaal, namelijk bij het begrijpen van de binnenwereld van personages.

Al met al concludeerde ik in het tweede deel van het proefschrift dat ook bij gezonde volwassenen sociaal-cognitieve vaardigheden nog steeds een rol spelen bij het lezen van verhalen en specifiek bij het verwerken van narratief perspectief. Lezers die zich in het dagelijks leven goed weten in te leven in anderen lukt het ook om het perspectief van verhaalpersonages snel en intensief te verwerken.

### **Integratie: sociale cognitie en het lezen van verhalen versterken elkaar**

In het laatste hoofdstuk van dit proefschrift integreer ik de bevindingen van het eerste en tweede deel in een nieuw model. Met dit model beargumenteer ik dat er een cyclische en versterkende relatie bestaat tussen sociale cognitie en lezen die als volgt te beschrijven is: het lezen van verhalen nodigt ons uit om het perspectief van personages in te nemen. Om dat te kunnen doen gebruiken we onze sociaal-cognitieve vaardigheden. Als we regelmatig lezen en onze sociaal-cognitieve spieren dus vaak aanspannen, zullen onze sociaal-cognitieve vaardigheden op de lange termijn aansterken. En dat leidt er weer toe dat we verhalen sneller, beter en dieper kunnen verwerken. Wat ik in dit proefschrift niet heb onderzocht maar wat wel mogelijk is, is dat die betere verwerking er vervolgens weer voor zorgt dat lezen leuker en inspirerender wordt, waardoor mensen meer gaan lezen, hun sociaal-cognitieve vermogens nóg meer trainen en het lezen van verhalen nóg makkelijker en leuker wordt. Kortom, het verband tussen sociale cognitie en het lezen van verhalen kan worden gezien als een opwaartse spiraal waarin de ontwikkeling van sociaal-cognitieve vermogens en de ontwikkeling van leesvermogens elkaar aanzwengelen.

## Appendices

### A.1 Non-Exhaustive List of Dutch Markers of Perceptual, Cognitive, and Emotional Viewpoint

This is an updated version of the viewpoint marker list published in Eekhof et al. (2020).

#### A.1.1 Perceptual Viewpoint Markers

##### A.1.1.1 Verbs of Perception

aangapen	(een) glimp opvangen (van)
aankijken	gluren
aanraken	herkennen ( <i>als in waarnemen</i> )
aanstaren	horen
aantreffen	inkijken
aanzien	inspecteren
afluisteren	karteren
afspeuren	kennisnemen (van)
aftasten	keuren
bekijken	kijken
beloeren	knippen
bemerken	letten (op) ( <i>als in toezicht houden op</i> )
beschouwen ( <i>als in bekijken</i> )	lezen
bespeuren	loensen
bespieden	loeren
bespioneren	lokaliseren
bestuderen	lonken
betasten	luisteren
betrappen	meemaken
bewonderen ( <i>als in bekijken met ontzag</i> )	merken
bezichtigen	meten
bezien	nagaan
blikken	nakijken
blootleggen	natrekken
checken	navorsen ( <i>als in waarnemen</i> )
detecteren	neuzen
doorkijken	observeren
ervaren ( <i>als in gewaarworden</i> )	onderscheiden
fixeren	ondervinden
gadeslaan	onderzoeken ( <i>als in waarnemen</i> )
gapen (naar)	ontdekken ( <i>als in gewaarworden</i> )
gewaarworden	onthullen



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ontwaren	verstaan
opletten	vinden ( <i>als in ontdekken</i> )
opmerken	visiteren
opmeten	voelen ( <i>door middel van zintuigen</i> )
opnemen	volgen
opsporen	waarnemen
opvangen	zien
overschouwen	zoeken
overzien ( <i>als in overkijken</i> )	
peilen	
proeven	
registreren	
rondkijken	
rondsnuffelen	
rondstaren	
rondtasten	
rondzoeken	
ruiken	
scannen	
schouwen	
smaken	
snuffelen	
snuffen	
snuiven	
speuren	
spieden	
spioneren	
spotten	
staren	
starogen	
tasten	
testen	
toehoren	
toekijken	
toezien (op)	
turen	
uitkijken	
vergelijken	
verkennen	
vernemen	

### **A.1.1.2 Verbs of Bodily Sensation**

bijten	pijnigen
bonzen	prikkelen
branden	prikken
draaien	samentrekken
dreunen	schokken ( <i>van lichaam</i> )
duizelen	schrijnen
gloeien	sidderen
gonzen	smarten
grieven	steken
hongereren	stinken
jeuken	suizen
kietelen	tintelen
kloppen	tollen
kriebelen	wankelen
leed doen	zinderen
lijden (aan fysieke pijn)	

## A.1.2 Cognitive Viewpoint Markers

### A.1.2.1 Verbs of Cognition

aanduiden	betekenen ( <i>als in waarde hebben</i> )
aannemen	betwijfelen
aantonen	bevelen
aanvaarden	bevestigen
accepteren	bevinden
achten	beweren
achterhouden	bewijzen
afdoen	bezighouden (met)
afwegen	bidden
afvragen	blijken
analyseren	classificeren
appreciëren	concentreren
argwanen	concluderen
avoueren	confirmeren
beamen	considereren
bedenken	controleren
bedoelen	dagen
beduiden	definiëren
begeren	dementeren
begrijpen	denken
begrip tonen	diagnosticeren
behartigen	dorsten
behoeven	dromen (van)
beijveren	dulden
beïnvloeden ( <i>door mensen</i> )	durven
bekennen	eren
bekrachtigen	erkennen
bekronen	ervaren ( <i>als in ondervinden</i> )
belijden	evalueren
belonen	fantaseren
beoordelen	fatteren
bepalen	focussen
beschikken	gelden
beschouwen ( <i>als in overwegen en beoordelen</i> )	geloven
beseffen	gissen
beslissen	goedkeuren
besluiten	goedvinden
bestempelen	gunnen

haken (naar)	negeren
herinneren	neigen
herkennen ( <i>als in zich herinneren</i> )	noemen
herzien	ondergaan
hoeven ( <i>epistemisch modaal</i> )	onderkennen
hongereren (naar)	onderschatten
hoogachten	onderzoeken ( <i>als in analyseren</i> )
hopen	ontdekken ( <i>als in te weten komen</i> )
hunkeren	onthouden
identificeren	ontkennen
incasseren	ontzeggen
indelen	ontzien
indenken	oordelen
(zich) inhouden	opbiechten
inschatten	openbaren
intrigreren	opgeven
inzien	opmaken (uit)
karakteriseren	opvallen
kenmerken	opvatten
kennen	ordenen
kenschetsen	overdenken
kiezen	overnemen
klasseren	overpeinzen
kunnen ( <i>epistemisch modaal</i> )	overschatten
letten (op) ( <i>als in aandacht schenken aan</i> )	overwegen
liegen	overzien ( <i>als in beoordelen</i> )
lijken	peinzen
lukken	permitteren
lusten	plannen
lusten ( <i>als in willen</i> )	pogen
maskeren	presumeren
menen	raden
moeten ( <i>epistemisch modaal</i> )	rangschikken
mogen ( <i>epistemisch modaal</i> )	ratificeren
nadenken	realiseren
nakomen	redeneren
nastreven	respecteren
navorsen ( <i>als in uitzoeken</i> )	rubriceren
nazien	schatten
neerkomen (op)	schikken (in)

selecteren	verklaren
simuleren	verlangen
smachten	verleiden
snakken	verloochenen
snappen	vermoeden
speculeren	veronderstellen
staven	veroordelen
stellen	veroorloven
suggereren	verraden
terugblikken (op)	versterken
terugzien (op)	vertrouwen
thuisbrengen	verwachten
toegeven	verwerpen
toekennen	verzoeken
toelaten	vinden ( <i>als in van mening zijn</i> )
toeleggen	visualiseren
toestaan	volhouden
toewijzen	voltooien
tolereren	voorhebben
trachten	voorkomen
typeren	voornemen
uitdenken	vooronderstellen
uitkiezen	voorstellen
uitkijken (naar)	voorwenden
uitselecteren	voorzien
uitverkiezen	wagen
uitzoeken	wanen
vastleggen	wantrouwen
vaststellen	weigeren
veinzen	wennen
verbeelden	wensen
verbloemen	weten
verdenken	willen
verdienen ( <i>van straf</i> )	zien ( <i>als in interpreteren als</i> )
verdragen	zorgen (dat)
vereenzelvigen	zullen ( <i>epistemisch modaal</i> )
vergeten	
verheerlijken	
verhullen	
verkiezen	

**A.1.2.2 Epistemic Modal Adverbs**

allicht

beslist

blijkbaar

echt

gewoonlijk

kennelijk

klaarblijkelijk

misschien

mogelijk

mogelijkerwijs

natuurlijk

normaal

normaliter

ogenschijnlijk

schijnbaar

vast

vermoedelijk

waarachtig

waarlijk

waarschijnlijk

wellicht

werkelijk

wezenlijk

zeker

### A.1.3 Emotional Viewpoint Markers

#### A.1.3.1 Verbs of Emotion

aandoen	boeien
aangrijpen	chagrijnen
aanstaan	charmeren
aantasten	choqueren
aantrekken	deemoedigen
aanvoelen	demoraliseren
affronteren	deprimeren
afleiden	deren
afmatten	desillusioneren
afschrikken	druilen
afzien	duchten
agiteren	duizelen
alarmeren	embarrasseren
amuseren	enerveren
beangstigen	enthousiasmeren
bedaren	ergeren
bedroeven	fascineren
behagen	frustreren
beklagen	generen
(zich) bekommeren	genieten
bekoren	geruststellen
beledigen	geven (om)
belgen	glimlachen
beminnen	grieven
bemoedigen	grijnzen
benauwen	grijnzen
benijden	gruwelen (van)
beroeren	haten
beschamen	hinderen
beschimpen	honen
betoveren	houden (van)
betreuren	huilen
bevallen	imponeren
bevredigen	inspireren
bewenen	interesseren
bewonderen ( <i>als in waarden</i> )	intimideren
bezighouden	inzitten
biologeren	irriteren

janken	opvrolijken
jubelen	opwekken
kalmeren	opwinden
kniezen	opzien (tegen)
koesteren	opzweepen
krenken	overdonderen
kwellen	overrompelen
kwetsen	overvallen
lachen	overweldigen
lenigen	panikeren
liefhebben	piekeren
lijden ( <i>emotioneel</i> )	pijnigen
loven	plezieren
meeleven	prijzen
meelijden	prikkelen
mijmeren	provoceren
minachten	raken
missen	relaxen
mokken	roeren
neerkijken (op)	rouwen
onderhouden	rusten
ontgoochelen	schokken
onthutsen	schreien
ontmoedigen	schrikken
ontnuchteren	smaden
ontroeren	smarten
ontspannen	spijten
ontstellen	stillen
ontstemmen	stimuleren
ontzetten	sussen
opbeuren	tarten
(zich) opfokken	tegenvallen
ophitsen	teisteren
opkikkeren	tekeergaan
opluchten	teleurstellen
opmonteren	tergen
oppassen	terneerslaan
opruien	terroriseren
opschrikken	tobben
(zich) opvreten	trammelanten



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treffen	verontrusten
treiteren	verontwaardigen
treuren	verpletteren
troosten	verpozen
uitkijken ( <i>als in oppassen</i> )	verrassen
uitlachen	verrukken
uitputten	verschrikken
vallen (op)	versmaden
verachten	verstoren
verafschuwen	vertoornen
verbazen	vertroosten
verbijsteren	vervelen
verblijden	vervoeren
verbluffen	vervreemden
verdrieten	verwarren
vereren	verwonderen
verfoeien	verzachten
vergenoegen	verzoenen
vergrammen	vleien
verheffen	voelen ( <i>van emoties</i> )
verheugen	voldoen
verhinderen	vrezen
verijdelen	waarderen
(zich) verkneukelen	walgen
verlichten	wanhopen
verlustigen	worstelen
vermaken	wroegen
vermoeien	zwellen
vernederen	zwijmelen

### **A.1.3.2 Adjectives of Emotion**

aangedaan	dol
aangenaam	dolblij
afgrijselijk	doodop
afgunstig	doodsbang
afwezig	dreigend
akelig	driftig
angstig	droef
apart	droefgeestig
arrogant	droevig
bang	dromerig
bedaard	eenzaam
bedroefd	effen
begerig	eigenaardig
behaaglijk	ellendig
beheerst	emotieloos
behoedzaam	emotioneel
belabberd	empathisch
beledigd	energiek
benieuwd	enthousiast
beroerd	erbarmelijk
beschaamd	ernstig
bevredigd	euforisch
bevreemd	extatisch
bevrijd	fantastisch
bezorgd	fijn
bezwaard	fijngevoelig
blij	flink
boos	geagiteerd
brutaal	geamuseerd
capricieus	gebelgd
chagrijnig	gedeprimeerd
content	geërgerd
curieus	geestdriftig
daadkrachtig	gefrustreerd
dankbaar	geïntimideerd
dartel	geïrriteerd
depressief	gek
diepbedroefd	gekweld
dociel	gekwetst

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gelukkig	krachtig
gematigd	krampachtig
gemotiveerd	krankzinnig
gepassioneerd	kwaad
gepijngd	kwetsbaar
geprikkeld	kwiek
geraakt	laatdunkend
gerust	lastiggevallen
geschokt	lethargisch
gespannen	levendig
getroffen	levenloos
gevoelig	lichtgeraakt
gevoelsvol	lichthartig
grappig	liefhebbend
grillig	log
guitig	loom
hartstochtelijk	luchtig
hatelijk	lui
heetgebakerd	lustig
heethoofdig	lyrisch
heftig	machteloos
hevig	mat
hoogdravend	meegaand
hooghartig	meegevend
hoopvol	melancholiek
hoorndol	melancholisch
hopeloos	mismoedig
huiverig	misnoegd
hunkerend	misselijk
hysterisch	mistroostig
idiot	moe
impulsief	moedeloos
ingetogen	naar
inschikkelijk	naargeestig
jaloers	neerslachtig
jolig	nerveus
kalm	nieuwsgierig
koelbloedig	nijdig
koelbloedig	nonchalant
krachtdadig	nostalgisch

nuchter	opvliegend
onaangedaan	overhaast
onaangenaam	overmand
onbekommerd	overrompeld
onberekenbaar	overstuur
onbeschaamd	overwinnend
onbezonnen	panisch
ondeugend	passief
ongeduldig	perplex
ongedurig	pijnlijk
ongedwongen	pompeus
ongehaast	prettig
ongelukkig	prikkelbaar
ongemakkelijk	radeloos
ongerust	razend
ongewoon	redelijk
onlogisch	relaxed
onmachtig	religieus
onpasselijk	rusteloos
onrustig	rustig
onstuimig	schalks
ontdaan	schamper
ontevreden	schertsend
ontgoocheld	schuldig
ontmoedigd	schuw
ontroerd	sentimenteel
ontspannen	sereen
ontstemd	serieus
ontzagwekkend	smachtend
ontzet	smekend
onverstoord	sober
onwelgevallig	somber
onzeker	spannend
op zijn gemak	speels
opgeblazen	spiritueel
opgelucht	sterk
opgeruimd	stijf
opgetogen	stoer
opgewekt	stomverbaasd
opgewonden	suf

sympathiek	vervelend
tactvol	verwachtingsvol
tartend	verward
teer	verwonderd
teergevoelig	vitaal
teleurgesteld	vol verlangen
terneergeslagen	voldaan
tevreden	voldaan
toegeeflijk	voorzichtig
toegenegen	vredig
toegewijd	vreemd
treurig	vreselijk
triest	vreugdeloos
trionfantelijk	vreugdevol
trionferend	vrolijk
trots	vurig
tureluurs	waaninnig
uitbundig	waardeloos
uitgelaten	walgend
uitgeput	wanhopig
verbaasd	wantrouwend
verbitterd	weekhartig
verblijdend	wellustig
verbolgen	woedend
verdrietig	woelig
vergenoegd	zalig
vergevingsgezind	zegepralend
verheugd	zegevierend
verlegen	zenuwachtig
verliefd	zenuwslopend
vermoeid	zonderling
verontrust	zuiver ( <i>van geweten</i> )
verontwaardig	zwaarmoedig
verrast	zwak
verrukt	zwart
verschrikkelijk	zwartgallig
verschrikt	
versteld	
verstomd	
verveeld	

## A.2 Supplementary Tables for Chapter 5

**Supplementary Table 1** Examples of the Three Categories of Viewpoint Markers (Presented as Lemmas) From the Stimulus Narrative

<b>Perceptual viewpoint markers</b>	<b>Cognitive viewpoint markers</b>	<b>Emotional viewpoint markers</b>
Vinden ("to find")	Willen ("to want")	Voelen ("to feel")
Onherkenbaar ("unrecognizable")	Verwachten ("to expect")	Paniek ("panic")
Zien ("to see")	Poging ("attempt")	Uitkijken ("to watch out")
Loeren ("to spy on")	Eer ("honour")	Verdwaasd ("foolish")
Blikken ("looks")	Voorstellen ("to imagine")	Grijns ("grin")
Horen ("to hear")	Moeten ("to need to")	Spannend ("tense")
Aanhoren ("to listen to")	Durven ("to dare")	Gek ("mad")
Bestuderen ("to explore")	Ondeugd ("mischief")	Geluk ("happiness")
Turen ("to peer")	Weten ("to know")	Radeloosheid ("desperation")
Getuige ("witness")	Sceptisch ("sceptic")	Verzoend ("reconciled")

**Supplementary Table 2** Contingency Table for the Relationship Between Word Class and Viewpoint Marker Category

Word class		Non-viewpoint markers	Perceptual viewpoint markers	Cognitive viewpoint markers	Emotional viewpoint markers
Adjective	Count	248	1	13	20
	% Within viewpoint marker category	9.88	1.16	8.90	33.89
	Standardized Residual	-0.30	-2.60	-0.44	5.77
Adverb	Count	321	0	1	0
	% Within viewpoint marker category	12.79	0.00	0.69	0.00
	Standardized Residual	1.91	-3.14	-3.85	-2.60
Noun	Count	997	3	10	20
	% Within viewpoint marker category	39.72	3.49	6.85	33.90
	Standardized Residual	2.44	-5.09	-5.96	-0.36
Verb	Count	847	82	117	18
	% Within viewpoint marker category	33.75	95.35	80.14	30.51
	Standardized Residual	-3.45	8.63	8.26	-0.93
NA	Count	97	0	5	1
	% Within viewpoint marker category	3.87	0.00	3.43	1.70
	Standardized Residual	0.49	-1.78	-0.16	-0.79

*Note.* Word class information was taken from the SUBTLEX-NL corpus (Keuleers et al., 2010). Words from the stimulus narrative that were not in the corpus are marked as NA (not available). These mostly included names and proper nouns (e.g., *Joske*), complex compounds (e.g., *botsautomuntjes*, “bumper car coins”), and other uncommon words (e.g., *vermolmd*, “moldered”). A chi-square test of independence for the relation between word class and viewpoint marker category was significant:  $\chi^2(12) = 302.62, p < .001$ .

**Supplementary Table 3** Estimates for the Generalized Linear Mixed Model Predicting Skip Rate for Perceptual Viewpoint Markers Only

Predictor	Odds ratio	SE	CI	z	p
(Intercept)	0.56	0.02	0.51 – 0.61	-13.06	< .001***
Word Length	0.40	0.02	0.37 – 0.44	-22.37	< .001***
Word Frequency	1.03	0.05	0.93 – 1.13	0.50	.618
ART Score	1.05	0.05	0.97 – 1.15	1.21	.227
IRI – Perspective Taking Score	1.13	0.05	1.04 – 1.24	2.74	.006**
IRI – Fantasy Score	1.07	0.05	0.98 – 1.17	1.52	.129

*Note.* All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Supplementary Table 4** Estimates for the Generalized Linear Mixed Model Predicting Skip Rate for Cognitive Viewpoint Markers Only

Predictor	Odds ratio	SE	CI	z	p
(Intercept)	0.34	0.02	0.31 – 0.38	-21.12	< .001***
Word Length	0.46	0.02	0.43 – 0.50	-19.11	< .001***
Word Frequency	1.14	0.05	1.05 – 1.25	2.98	.003**
ART Score	1.11	0.05	1.01 – 1.23	2.20	.028*
VPT – Altercentric Intrusion	0.95	0.05	0.86 – 1.04	-1.14	.255

Note. All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Supplementary Table 5** Estimates for the Linear Mixed Model Predicting Gaze Duration for Emotional Viewpoint Markers Only

Predictor	Estimate	SE	CI	t	p
(Intercept)	224.23	4.87	214.68 – 233.77	46.04	< .001***
Word Length	13.45	2.03	9.47 – 17.43	6.63	< .001***
Word Frequency	-14.79	2.56	-19.81 – -9.77	-5.78	< .001***
ART Score	-12.82	4.16	-20.97 – -4.66	-3.08	.002**
IRI – Fantasy Score	-3.19	4.17	-11.36 – 4.97	-0.77	.443

Note. All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Supplementary Table 6** Estimates for the Generalized Linear Mixed Model Predicting Rereading Rate for Cognitive Viewpoint Markers Only

Predictors	Odds ratio	SE	CI	z	p
(Intercept)	0.25	0.01	0.22 – 0.27	-28.96	< .001***
Word Length	1.03	0.04	0.96 – 1.11	0.92	.357
Word Frequency	1.06	0.05	0.98 – 1.16	1.47	.141
ART Score	1.14	0.05	1.04 – 1.24	2.96	.003**
VPT – Egocentric Intrusion	1.14	0.05	1.05 – 1.24	3.03	.002**

Note. All continuous predictors were scaled and centered for analysis. Word frequency was log-transformed for analysis.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$



## Data Management

### Chapter 2

The coded narratives and the analysis scripts reported in Chapter 2 (*VPIP: A Lexical Identification Procedure for Perceptual, Cognitive, and Emotional Viewpoint in Narrative Discourse*) are openly available under a CC-BY 4.0 license in the Radboud Data Repository:

Eekhof, L. S., van Krieken, K., & Sanders, J. (2023). *ViewPoint Identificaton Procedure Data Set (1.0)* [Data set]. Radboud University. <https://doi.org/10.34973/85CM-1V03>

### Chapter 4

The anonymized data set collected for Chapter 4 (*Does Reading about Fictional Minds Make Us More Curious about Real Ones?*) as well as the analysis scripts and materials are openly available under a CC-BY 4.0 license on the Open Science Framework:

Eekhof, L. S., & Mar, R. A. (2023). *Does Reading about Fictional Minds Make Us More Curious about Real Ones?* [Data set]. Open Science Framework. <https://doi.org/10.17605/OSF.IO/4EJCU>

### Chapter 5

The anonymized data set collected for Chapter 5 (*Reading Minds, Reading Stories: Social-Cognitive Abilities Affect the Linguistic Processing of Narrative Viewpoint*) is openly available under a CC-BY 4.0 license in the Radboud Data Repository:

Eekhof, L. S., & Willems, R. M. (2022). *Reading Minds, Reading Stories Data Set (1.0)* [Data set]. Radboud University. <https://doi.org/10.34973/ZB8X-XE75>

The analysis scripts and materials are stored on the Open Science Framework:  
<http://www.osf.io/xdjtp>

### Chapter 6

The anonymized data set collected for Chapter 6 (*Engagement with Narrative Characters: The Role of Social-Cognitive Abilities and Linguistic Viewpoint*) is openly available under a CC-BY 4.0 license in the Radboud Data Repository:

Eekhof, L. S., van Krieken, K., Sanders, J., & Willems, R. M. (2023). *Engagement with Narrative Characters Data Set (1.0)* [Data set]. Radboud University. <https://doi.org/10.34973/G18A-BK09>

The analysis scripts and materials are stored on the Open Science Framework:  
<https://osf.io/xygew/>

### **Personal Data and Privacy**

The only personal data that were collected in the context of this dissertation were 1) participant identifiers via the SONA participant pool (Chapter 5 and 6) and the crowdsourcing platform Prolific (Chapter 4 and 6), 2) paper consent forms (Chapter 5), and 3) personal data necessary to process the payment of participants if they were recruited via SONA (Chapter 5 and 6). Participant identifiers were removed from all data sets and replaced by random numbers before publication. Scans of the paper consent forms are stored separately from the research data in the Radboud Data Repository for the purposes of scientific integrity but are not openly available. Physical copies of these forms were stored for six months after data collection and then destroyed. Personal data related to participant compensation were removed after use. As a result, all data sets have been anonymized and no data can be traced back to individual participants.

## Acknowledgements

Ever since the beginning of my academic career I've had a fascination with acknowledgements sections in dissertations, as they allowed me a little peek into the minds and lives of other scholars I admired. Over the past five years I often fantasized about writing my own acknowledgements, especially when I was on the verge of giving up the whole PhD endeavor altogether. Thinking about the people who helped me along the way and the possibility to thank them by dedicating the last section of my dissertation to them often kept me going. I've always admired people who were able to write concise acknowledgements, mentioning only those who were absolutely essential to completing the dissertation. But now that it's finally my time, I feel blessed that this final part of the dissertation is taking up this much space. It definitely takes a village to obtain a doctorate. So please bear with me as I thank the wonderful people in my life in a chaotic mixture of Dutch and English, starting with my supervisors:

**Roel**, dit dankwoord moet natuurlijk bij jou beginnen. Toen ik tijdens het tweede jaar van mijn research master door een studiecrisis ging, liet jij me kennis maken met de wereld van de "gecontextualiseerde psycholinguïstiek" (zo noemden we dat, geloof ik). Een summer school werd een stage, werd een scriptie, werd een onderzoeksassistentenschap, werd een dissertatie. Dank voor je vertrouwen, je humor en voor onze goede gesprekken over literatuur, filosofie, statistiek en de "voors en tegens" van de academische wereld. In het bijzonder ook veel dank voor je geduld en kalmte, vooral als ik het zelf weer eens niet zag zitten (ook al liet ik dat misschien niet altijd merken): wat er ook voorbij kwam aan hoogte- en dieptepunten, jij was een constante factor en baken van rust.

**Kobie**, als begeleider was je altijd hands-on betrokken bij mijn project: bij de eindeloze pogingen tot het manipuleren en analyseren van verhalen, bij het schrijven, bij de momenten van theoretische "perspectief-paniek", bij het nadenken over het onderwijs dat ik gaf. En dat alles altijd met de nodige gezelligheid, humor en snacks! Het briefje met "succes de komende weken", dat in de eerste dagen van de lockdown bij de chocolade zat die jullie als begeleiders op jouw initiatief naar mij opstuurden, heb ik bewaard als hilarisch aandenken aan de twee bizarre coronajaren maar ook als aandenken aan jouw warme betrokkenheid. Bedankt voor alles!

**José**, bedankt voor je enthousiasme vanaf het allereerste begin van dit project, voor je analytische scherpte, je aanmoediging en je hartelijkheid. En in het bijzonder ook dank dat je me zoveel kansen hebt geboden om lezingen te geven, in commissies plaats te nemen en betrokken te zijn bij het onderwijs. Ik heb altijd het gevoel gehad dat je pal achter me stond, ook toen je decaan en later zelfs rector magnificus werd en je het ongelooflijk druk kreeg. Op momenten dat het even tegenzat, hing jij altijd als eerste aan de telefoon met

precies de juiste woorden. Je bent heel bescheiden maar het mag gezegd worden: je bent een geweldige promotor en een inspirerend voorbeeld!

**Raymond**, it was such an honor for me to work with you in my final year. Even though you're not an official supervisor, I very much consider you a mentor. Your research has inspired much, if not all of the work in this dissertation, and your guidance during my final project has been immensely helpful. I feel so grateful to have had the opportunity to join your amazing (and amazingly well organized) lab. Thank you so much for your help, your insights on my research, your warm welcome at York University, our wonderful coffee meetings in Toronto, and the fun outings we had with the lab.

Next, I would like to thank my colleagues at the Centre for Language Studies and beyond. First and foremost, the brilliant people of the **Narrative, Cognition and Communication group**: it's been great to work with you and learn from you. I also want to thank the **Language and Communication Effects group**, headed by **Enny Das**, for welcoming me once the NCC group was disbanded. A special shout-out to my fellow PhD students and (former) office-mates: **Alex Titus, Beatrice Schofield, Clarissa de Vries, Elena Savinova, Evi Dalmaijer, Ilona Plug, Lynn de Rijk, Mesian Tilmatine, Mieke Breukelman, Rianne van den Bergh, Saskia Mooijman, Stefanie Ramachers, and Xin Gao**. A huge thank you to **Marloes Mak**, the first ever NCC PhD student and a great example to all of us who came after her. Thank you for your help with basically every aspect of this journey: from statistics to eye tracking, to surviving my first conference in Egmond aan Zee! Thank you **Myrthe Faber** for being somewhat of a secret back-up supervisor who is both successful and relatable, for being a sharer of great academic memes, and for supporting me in rough times! Thank you **Linde van Schuppen** for listening to my proto-philosophical rants, for inspiring me with your much more developed philosophical views, for our co-writing, co-teaching, co-commuting, co-viewpointing, and co-struggling sessions and for always making me laugh. I'm so grateful we were on this PhD journey together! Thank you **Inge Stortenbeker**, for introducing me to Blommers Coffee, for inspiring me with your amazing data visualizations, and for being an awesome paranymp! A massive thank you to **Fransina Stradling** for our wonderful collaborations and endless discussions about empathy and narratives.

Thank you **Margret van Beuningen** and **Bob Rosbag** for managing the Humanities Lab so well, and **Henk van den Heuvel** for helping with data management. Thank you **Susanne Brouwer** for your patience and help with my bi-annual statistical questions. Thank you to the Graduate School of Humanities, (formerly) coordinated by **Peter van der Heiden** and **Suzanne van de Liefvoort**, and the International Max Planck Research School for Language Sciences, coordinated by **Kevin Lam**, for providing me with all the necessary training and social activities to complete this dissertation and for standing up for PhD students during

and in the aftermath of the pandemic. Thank you everyone at **IGEL** and **ELIT** for always inspiring me during conferences, for organizing great opportunities for training, and for your interest in and feedback on my work. Thank you also to everyone else I'm forgetting but who has contributed to my research in whatever small or big way and especially to those who make the research at universities possible and pleasant but never see their names reflected in or on books and articles.

Thanks to the **Christine Mohrmann Stipendium**, which was awarded to me by the university in 2021, I was able to spend three months at York University in Toronto, Canada. Words cannot express how meaningful this time has been for my research and my personal life. My dear Torontonians, **Jessica, Joshua, Rebecca, Ronda, Chantelle, Eric, Miranda**, all the other students and research assistants from Social and Personality Psychology, and everyone from Dodgy Darko starring Jake Gyllenball: spending three months with you easily made up for two miserable COVID years. You gave me a renewed passion for my research and the motivation to finish this dissertation. But most of all you gave me friendship, a love for raccoons, a wonderful birthday party, blue hair, and an endless stream of messages across the ocean. I can't believe my luck that I've met all of you! A special shout-out to **Joshua, Jessica, and Rebecca** for helping me proofread my dissertation! Thank you **Buddhika Bellana** for a wonderful afternoon at Glendon Campus. And finally, my warmest thanks to **Lisa Ellenwood, Rio and family** for hosting me during this fantastic time.

Ik wil ook graag alle scholieren, bibliotheekmedewerkers en leerkrachten bedanken die ik heb mogen vertellen over mijn onderzoek en die mij steeds weer dwongen om nog preciezer onder woorden te brengen waar het uiteindelijk allemaal om gaat: de magie en kracht van verhalen! Bedankt aan iedereen van **Kletsoppen** en **Pre-University College** voor het mogelijk maken van deze lessen en workshops.

Dan nog alle mensen die de helft van de tijd geen bal snapten van waar ik allemaal mee bezig was in Nijmegen, maar die toch een immense bijdrage hebben geleverd aan deze dissertatie door mij in tijden van academische voorspoed aan te moedigen en mij in tijden van academische tegenspoed steeds te wijzen op waar het écht om draait in het leven. Bedankt lieve vrienden van **Kamerkoor JIP**: zingen met jullie betekent alles voor me. Bedankt **Marja** van Trollenwol en iedereen van de **Driebergse breiclub**: breien helpt! **Anouk**, bedankt voor alle gezelligheid in Nijmegen, Driebergen én in de trein, en bedankt dat ik je Nijmeegse fiets, aka de breimobiel, zo vaak mocht lenen! Bedankt dappere mensen van **Extinction Rebellion Utrecht** voor onze hoopgevende strijd voor een leefbare toekomst! Bedankt, oud-huisgenoten en oud-studiegenoten van de bachelor en research master Taalwetenschap aan de Universiteit Utrecht.

Jarenlang schrijven aan een dissertatie is hard werken, maar het zwarte gat dat na de afronding van dit project lonkte, onder ogen komen, dát vond ik de allergrootste uitdaging. Mijn dank gaat dan ook uit naar iedereen die mij zo liefdevol opving toen deze reis dan echt tot een einde kwam. Lieve **Francis**, dankjewel dat je mij zomaar in huis nam en me zo zorgzaam en geduldig bijstond in alles wat ik doormaakte. Lieve **Pippa**, dankjewel voor je dagelijkse digitale oppep- en voorleessessies. Lieve **Celine, Marten, Julia, Geertje**, dankjulliewel dat jullie er altijd voor mij zijn! Dear **Johanna** and **Jessica**, thank you for your wisdom and loving friendship!

Tot slot, mijn allerdierbaarste familie. **Opa en oma van der Heide**, aan wie ik veel van mijn taalgevoel te danken heb: bedankt dat jullie altijd zo betrokken en trots zijn! **Opa en oma Eekhof**, van wie ik mijn liefde voor wol geërfd heb, maar die dat helaas niet meer hebben mogen meemaken: ik mis jullie! **Papa en mama**, van wie ik heb geleerd om hard te werken, creatief te denken en veel te lezen. En die mij bovenal altijd hebben laten zien wat het leven de moeite waard maakt: muziek, kunst, poëzie, natuur, humor, elkaar! Dankjulliewel! Mijn lieve zusje, **Yente**, die als geen ander mijn gedachten kan lezen en die er altijd voor me is. Aan jou draag ik het resultaat van mijn harde werken op, en ik hoop dat we elkaar nu kunnen beloven dat we stoppen met altijd zo verschrikkelijk ons best doen! Liefste schatten, er zijn geen woorden om uit te drukken hoe ongelooflijk veel ik van jullie hou!

En dan, tot slot: het hoofdstuk 'PhD' liep al bijna ten einde toen zich onverwacht nog een nieuw en dierbaar personage aandiende in mijn levensverhaal. Lieve **Giel**, ik hou belachelijk veel van jou en ik kan niet wachten om te ontdekken hoe ons gezamenlijke verhaal zal verdergaan! Hopelijk mogen we elkaar nog héél veel avonden voorlezen voor het slapen gaan.

## About the Author

Lynn Eekhof (\*1993, Groningen, The Netherlands) studied linguistics at Utrecht University. After obtaining her bachelor's degree (cum laude) with a thesis on theoretical syntax, she shifted her focus to psycholinguistics during her research master, which she completed under supervision of dr. Roel Willems at the Centre for Language Studies (Radboud University, Nijmegen). She graduated cum laude in 2017 with a thesis on the role of verb tense during narrative mental simulation. After working as a junior researcher at Radboud University, Lynn was awarded a PhD grant by the Centre for Language Studies in 2018. The research presented in this dissertation was supported by this grant.

During her PhD appointment Lynn was involved in teaching various courses for the bachelor and master programs of Communication and Information Sciences at Radboud University. She also contributed to various outreach projects and workshops that promoted reading and linguistic awareness in children. Among other things, she volunteered at the VoorleesExpress, gave workshops on behalf of the Kletsoppen Festival, visited various elementary schools, and collaborated with the BiebBoys, an educational project of Library Gelderland Zuid. Lynn also organized various discussion groups for an international audience of researchers under the header 'Empathy & Narrative' together with Fransina Stradling (University of Huddersfield, UK).

Lynn has received various awards and recognition for her research. She was a finalist in the annual pitch competition Radboud Talks (2019), received an Outstanding Student Paper Award by the International Society for the Empirical Study of Literature (2022), and was awarded the Christine Mohrmann Stipendium (2021), which allowed her to visit York University (Toronto, Canada) as an International Visiting Research Trainee at the department of Social and Personality Psychology in the spring of 2022. The study reported in Chapter 4 of this dissertation was conducted under supervision of prof. dr. Raymond Mar during this visit.

## List of Publications

**Eekhof, L. S.**, & Mar, R. A. (2023). Does reading about fictional minds make us more curious about real ones? *Language and Cognition*, Advance Online Publication. <https://doi.org/10.1017/langcog.2023.30>

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**Eekhof, L. S.**, Kuijpers, M. M., Faber, M., Gao, X., Mak, M., van den Hoven, E., & Willems, R. M. (2021). Lost in a Story, Detached from the Words. *Discourse Processes*, 58(7), 595–616. <https://doi.org/10.1080/0163853X.2020.1857619>

**Eekhof, L. S.**, van Krieken, K., Sanders, J., & Willems, R. M. (2021). Reading Minds, Reading Stories: Social-Cognitive Abilities Affect the Linguistic Processing of Narrative Viewpoint. *Frontiers in Psychology*, 12, 698986. <https://doi.org/10.3389/fpsyg.2021.698986>

**Eekhof, L. S.**, van Krieken, K., & Sanders, J. (2020). VPIP: A Lexical Identification Procedure for Perceptual, Cognitive, and Emotional Viewpoint in Narrative Discourse. *Open Library of Humanities*, 6(1), 18. <https://doi.org/10.16995/olh.483>

**Eekhof, L. S.**, Eerland, A., & Willems, R. M. (2018). Readers' Insensitivity to Tense Revealed: No Differences in Mental Simulation During Reading of Present and Past Tense Stories. *Collabra: Psychology*, 4(1), 16. <https://doi.org/10.1525/collabra.121>

Schotanus, Y. P., **Eekhof, L. S.**, & Willems, R. M. (2018). Behavioral and Neurophysiological Effects of Singing and Accompaniment on the Perception and Cognition of Song. *Proceedings of ICMPC15/ESCOM10*, 389–394.