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Investigating How Reading Enhances Empathy: A Longitudinal, Diary Study of Everyday Reading Habits

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Approval Page

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below,

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Abstract

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Empathy is the social glue that holds people together, and one way to enhance empathy is

through reading fiction. Though reading can enhance empathy, there is little understanding of the

mechanisms by which it does so. The purpose of this dissertation is to investigate how time spent

reading enhances empathy. I posit that two reading experience variables, narrative transportation

and reading flow, mediate the relationship between reading and empathy. This is because

transportation, feeling absorbed into a story, helps bring characters to life and increases readers'

emotional connections, and reading flow, a balance between skill and challenge while reading,

can increase enjoyment of reading and promote cognitive engagement with stories. In addition to

testing these relationships, the present study aimed to link reading to prosocial outcomes (e.g.,

donating). I conducted a longitudinal (27-day) diary study using a quasi-experimental design

with a group of adult, self-described avid readers and book club members ($n = 111$) who reported

about their reading activities, and a control group ($n = 100$) who reported about their leisure

activities. I used multilevel Bayesian path analysis to test narrative transportation and reading

flow as mediators of the relationship between time spent reading and empathy and emotion

recognition. I did not find evidence for a relationship between time spent reading and empathy

and emotion recognition nor did I find evidence for the hypothesized mediation. Empathy did not

change across the study. Emotion recognition did, however, and it was predicted by lifelong

reading, suggesting that lifelong reading can influence changes in emotion recognition, or theory of mind. Reading did not predict donation behavior, failing to link reading to prosocial behavior, but empathic concern, a facet of empathy, did predict donation behavior. Overall, the relationship between reading and empathy is complex. Reading in the long-term is likely to consistently exercise theory of mind abilities and improve them, though the process by which it does so was not detectable across the one month's time spent reading in this study. Though there was no conclusive explanation for the lack of relationship between time spent reading and empathy, one possibility is that reading does not enhance empathy, as defined here, but rather theory of mind abilities. Another possibility is that the effect of reading across one month's time attenuates with age and greater lifelong reading. The results also highlight the challenges in accurately assessing facets of empathy, given the proliferation of empathy measures used in the field. Based on analysis of readers' descriptions of how reading impacted them, the wide array of fiction available to readers can enhance empathy, but present results make clear there are important developmental and measurement issues that should be considered in future studies investigating specifically how reading enhances empathy.

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Chapter 1

Introduction

> The only effect I ardently long to produce by my writings, is that
> those who read them should be better able to imagine and feel the
> pains and joys of those who differ from them in everything but the
> broad fact of being struggling, erring human beings.
> – George Eliot (as cited in Allott, 1961)

Empathy is lauded as a crucial skill for navigating daily life (Hoffman, 2000; Zaki, 2018). It refers to the capacity for "feeling and understanding the emotions of others" (Segal et al., 2017, p. 2). At the same time, it positively influences many beneficial social outcomes. For instance, when people take time to consider others' thoughts and feelings, they often act more morally (Batson et al., 2015) and prosocially (Davis, 2015; FeldmanHall et al., 2015), and empathy is considered an indelible part of the social glue that holds people together (de Waal, 2009). The presence of empathy contributes to positive outcomes in varied domains, including reduced suspension rates following disciplinary action in schools (Okonofua et al., 2016) and improved patient recovery in medicine (Decety & Fotopoulou, 2015). Inversely, the absence of empathy contributes to worsened outcomes in other domains, including polarized politics (Morris, 2020) and developmental, behavioral issues (Moul et al., 2018). There has been much interest in understanding ways to promote empathy development given its potential for promoting positive social outcomes.

Efforts to cultivate empathy have largely been successful (Lam et al., 2011; Teding van Berkhout & Malouff, 2016). Empathy, broadly construed, is malleable and teachable across wide age ranges (Bluck et al., 2013; Farrant et al., 2012; Goldstein & Winner, 2012) and in different contexts (Batt-Rawden et al., 2013; McAllister & Irvine, 2002). This work on cultivating empathy has made clear that empathy development continues past the first few years of life (e.g.,

Allemand et al., 2015), and that people do not need to explicitly share experiences to empathize with others (Hoffman, 2008). Rather, one particularly promising approach to cultivating empathy is reading about others through fiction (Mar, 2018).

Authors and readers alike have long believed that reading fiction can instill in readers a newfound understanding of others. In short, fiction reading is commonly identified as one way to enhance empathy (Hakemulder, 2000; Keen, 2007; Vitz, 1990). Plato and Aristotle each wrote about the capacity for fictional stories to simulate diverse social experiences helping readers to better imagine and feel the pain and joy of others (Mar, 2018; Oatley, 2016). Readers experience empathy when they cry at a favorite character's death or come to see another's culture from a new perspective (Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017; Wolk, 2009). Of course, not all stories evoke such changes (Valkenburg & Peter, 2013), but many have the potential to exercise empathic abilities (Barnes, 2018; Mar & Oatley, 2008). There is increasing interest in understanding the relationship between reading and empathy because of the growing recognition that reading is a widespread, rich behavior among all culture that provides useful insights into the mind and brain (Jacobs & Willems, 2018; Willems & Jacobs, 2016). Reading enables people to recognize others' common humanity (Wolk, 2009), and, when it engages readers' empathy, it empowers readers to be better people by fostering greater connections to and concerns for others (Coyne et al., 2018).

Notably, I refer to reading fiction specifically because it differs from reading non-fiction in several important ways (Mar et al., 2006, 2009; Tamir et al., 2016). Non-fiction reading materials (e.g., chemistry textbooks) often stimulate propositional thinking (e.g., facts like $2 + 2 = 4$), whereas fiction reading materials often stimulate narrative thinking (e.g., temporally connected sequence of events); in doing so, fiction reading tends to focus on social interactions

(Bruner, 1991; Oatley, 2016). Because fiction reading materials activate socio-emotional mental processes that non-fiction reading materials do not, fiction reading is more likely to enhance empathy. In light of this, *reading* in this paper refers to reading fiction.

Though there is consensus that reading can enhance empathy (Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017), there is little evidence suggesting *how* reading enhances empathy. A lack of understanding of the mechanisms underlying how reading enhances empathy has impeded efforts to effectively use reading to enhance empathy. The way(s) reading enhances empathy is likely indirect (Valkenburg et al., 2016), suggesting there are mediating mechanisms that must be considered. Understanding the mediating mechanisms underlying the relationship between reading and empathy is important for two reasons. First, we need to better understand how, and to what extent, reading enhances empathy. Second, reading is a low-cost, readily available activity that many people engage in regularly (Willems & Jacobs, 2016). If the mechanisms through which reading contributes to empathy are better understood, empathy may be more effectively and intentionally developed.

This study seeks to examine how reading enhances empathy by investigating mediating mechanisms in this relationship. In addition, it seeks to determine the extent to which the expected growth in empathy is positively associated with real-world positive outcomes, such as donating to charity. In the following sections, I review leading definitions and conceptualizations of empathy and then describe the nature of reading. Following this, I outline research that establishes that reading does in fact enhance empathy. Next, I review theories that posit *how* reading may enhance empathy. I organize these theories within a media effects theoretical framework. Using this framing, I review extant literature that identifies the factors that are particularly influential in the relationship between reading and empathy, including age and

developmental changes associated with empathy. I also discuss the positive outcomes associated with empathy and reading and how they change with age. In addition to age, I consider experiential media responses associated with reading, such as transportation and reading flow, that enhance media effects. Finally, I propose a set of hypotheses and research questions that will guide this study and explain the proposed study methods.

Defining Empathy

A theoretically sound, empirically grounded definition of empathy is needed for investigating how reading enhances empathy. A concise definition of empathy has long eluded scholars (Wispé, 1986), and the current state of competing definitions and conceptualizations of empathy (Batson, 2009; de Vignemont & Singer, 2006) has largely been associated with obfuscation rather than nuanced insight (Burke et al., 2016; Decety & Cowell, 2014). A recent review of empathy found 43 definitions in the literature (Cuff et al., 2016), which often point to divergent conclusions. The proliferation of empathy definitions has resulted in many terms commonly used to describe different aspects of empathy, including experience sharing, mentalizing, social cognition, emotional or affective empathy, cognitive empathy, and theory of mind (Burke et al., 2016; Dodell-Feder & Tamir, 2018; Keysar et al., 2003; Shamay-Tsoory & Aharon-Peretz, 2007; Walter, 2012; Zaki & Ochsner, 2016). For example, one narrow definition—empathy as feeling what others feel—is not predictive of prosocial action and may even be negatively associated with it (Jordan et al., 2016), but another—empathy as mentalizing (i.e., perspective taking), experience sharing (i.e., self-other overlap), and demonstrating prosocial concern—is, clearly, predictive of prosocial action (Zaki & Ochsner, 2016).

Despite varied definitions, two common threads have emerged from the literature (Cuff et al., 2016). There is growing consensus that empathy is comprised of a complex interplay of

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affective and cognitive processes (Coplan, 2011; Walter, 2012; Zaki & Ochsner, 2016). In this study, I use *empathy* to refer to an affective and cognitive response that involves a unique combination of feeling, sharing, and understanding emotions and thoughts of others that is automatically elicited but is also shaped by cognitive processes, with recognition that the source of the response is outside the self (Cuff et al., 2016). In this study, I rely on a recently proposed conceptualization of empathy (Segal et al., 2017) for its clarity and comprehensiveness. This definition encapsulates the notion of "feeling and understanding the emotions of others," but goes beyond that in making explicit that empathy can be modulated by correctly (or incorrectly) recognizing other's emotions, cognitive control over one's own emotions, and one's relationship (or lack thereof) with others (de Vignemont & Singer, 2006; Ochsner et al., 2009; Zaki, 2014). This definition is preferred over previous definitions because it incorporates behavioral and social psychology findings and draws on recent social neuroscience findings (Decety & Jackson, 2004; Segal et al., 2017; Walter, 2012). A benefit of this grounded definition of empathy is it provides a springboard for thinking about how to measure empathy.

Conceptualizing Empathy

This study will conceptualize empathy as dependent on five interrelated components: (a) *affective responding*, affective change in response to others' emotions or behaviors; (b) *affective mentalizing*, cognitively comprehending the emotional state of others; (c) *self-other awareness*, maintaining an awareness of whether one's affective response is related to the self or to others' emotions; (d) *perspective taking*, adopting the thoughts and feelings of others; and (e) *emotion regulation*, managing the intensity, duration, and valence of one's emotional response to others (Segal et al., 2017). Each component contributes to empathy as a distinct psychological phenomenon (Decety & Cowell, 2014; Walter, 2012). Each must be considered to understand the

whole, as "empathy cannot be understood by fully deconstructing it into constituent parts" (Zaki

& Ochsner, 2012, p. 677). Rather, distinguishing these components is meant to provide a

heuristic for understanding the phenomena that, taken together, comprise empathy (de

Vignemont & Singer, 2006; Gerdes et al., 2011).

      The first component of empathy, affective responding, refers to emotional reactions to

external stimuli—feeling pain when seeing someone hit their thumb with a hammer or fear when

reading about characters in danger (Decety & Jackson, 2006; Segal et al., 2017; Walter, 2012).

Affective responding recruits the mirror neuron system (Decety & Jackson, 2004; Gallese, 2001;

Zaki et al., 2009), which enhances the emotional synchrony between people. Affective responses

are activated automatically, as they are attentional mechanisms meant to help people quickly

attune to important events in their surroundings (Öhman et al., 2001). Affective responses

contribute to empathy through creating an initial, simple emotional connection (or disconnection;

Zaki, 2014) between people.

      The second component, affective mentalizing, refers to comprehending the emotional

states of others and acts as a bridge between affective and cognitive dimensions of empathy

(Segal et al., 2017; Shamay-Tsoory & Aharon-Peretz, 2007). It involves discerning if someone is

happy, sad, angry, or scared. People can be surprisingly adept at this, even when limited to

relatively subtle written descriptions, as is the case with reading (Duval et al., 2011; Schnell et

al., 2011). The ability to infer emotions from subtle written cues is shaped by both automatic,

affective responding (e.g., activation of amygdala) and controlled, cognitive responding (e.g.,

executive control, prefrontal brain activity; de Vignemont & Singer, 2006; Decety, 2011). In

addition, emotional responses to events that are filtered through a top-down perspective (e.g.,

considering contextual factors, intentions) are distinct from bottom-up responses (e.g., visceral

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response to pain; Ochsner et al., 2009; Walter, 2012), though both influence empathy (Decety & Jackson, 2004, 2006). Affective mentalizing contributes to empathy by enabling people to accurately evaluate the affective states of others and to align their own affective states with others'.

The third component, self-other awareness, refers to distinguishing between affective responses that are other-induced and those that are self-induced (Decety & Jackson, 2004). Understanding oneself facilitates the ability to understand others—grasping what it feels like to be happy, sad, or angry is critical to inferring when others are happy, sad, or angry. An awareness of whether feelings are related to one's personal experiences or others' experiences alters the way individuals react to those feelings (Lamm et al., 2007). For instance, lacking self-other awareness can lead to personal distress. This occurs when individuals feel overwhelmed by someone else's distress (Decety & Jackson, 2006). When this happens, individuals may seek to alleviate their own suffering rather than help others. There are distinct neurological pathways for processing self- and other-related emotions and behaviors, though there are also overlapping areas of activation, related to the mirror neuron system (Walter, 2012; Zaki et al., 2009). This suggests self-regulatory processes are needed to prevent confusion between one's own and others' feelings (Decety & Jackson, 2004, 2006; Zaki & Ochsner, 2012). Self-other awareness contributes to empathy by helping people accurately monitor the source (i.e., self- or other-induced) of thoughts and feelings.

The fourth component, perspective taking, also called cognitive empathy, refers to the ability to consider a situation or emotion from another's point of view—walking a mile in another's shoes (Cuff et al., 2016; Van der Graaff et al., 2014). It requires dedicated attentional effort and does not occur spontaneously, or even readily (de Vignemont & Singer, 2006; Keysar

et al., 2003; Royzman et al., 2003). Perspective taking helps individuals make meaning of others' reactions, but it requires more than simply placing oneself in someone else's shoes. It also requires consideration of other peoples' thoughts, feelings, and emotions, which is a cognitively complex task. People often filter others' perspectives through their own schemas (Frith & Frith, 2006), and placing oneself in another's position without also considering their thoughts and feelings is not perspective taking but a form of egocentrism (Galinsky & Moskowitz, 2000; Royzman et al., 2003). Perspective taking contributes to empathy by helping individuals to accurately interpret other peoples' feelings and to understand the beliefs, experiences, and contextual factors that give rise to their perspectives and feelings.

Finally, the last component, emotion regulation, refers to the ability to respond in controlled ways to others' emotions and to not be overwhelmed by them (Decety & Jackson, 2004). This is a critical component of empathy because individuals experiencing empathy must be able to manage and optimize their emotion levels to react appropriately. A lack of emotion regulation can lead to personal distress or emotional contagion (i.e., automatically mimicking or "catching" the emotions of others; Hatfield et al., 2009; Walter, 2012). Emotion regulation influences empathy through top-down, cognitive processes that improve in accuracy and efficiency with age (de Vignemont & Singer, 2006; Ochsner et al., 2009; Tousignant et al., 2017). Optimal levels of arousal can motivate one to focus on others (Hoffman, 2008; Lockwood et al., 2014), but too much emotional arousal can inhibit empathy. For example, people may seek to down-regulate arousal (leading to under-arousal) to avoid being overwhelmed by news of a natural disaster (Cameron & Payne, 2011). Emotion regulation contributes to empathy by helping people avoid being swept up in their own affective responses and providing the optimal level of stimulation to motivate empathic responding.

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This study will rely on this conceptualization (Segal et al., 2017) because it clarifies what constitutes empathy and what does not. This is needed as, to date, much research on reading and empathy has considered only either affective or cognitive dimensions of empathy, and this has led to inconsistent conclusions about the effects of reading on empathy (Burke et al., 2016; Dodell-Feder & Tamir, 2018). It is now clear that empathy is more than one or the other of these two dimensions, and what is needed is research that considers the complete empathy construct. In sum, this model provides a common lexicon for describing the complex, interconnected processes that comprise empathy, and it aligns well with other recent work that clarifies what empathy is (Coll et al., 2017; Coplan, 2011; Cuff et al., 2016).

Measuring Empathy

With a clear idea of what constitutes empathy, it makes sense to explore approaches to measuring the construct. The Empathy Assessment Index (EAI) is a self-report measure designed to assess each of the five components of empathy (Segal et al., 2017). There are no studies assessing how sensitive the EAI is to change, but the measure is conceptualized as being malleable and sensitive to change. Moreover, the measure is useful in the present study for both its breadth and clarity in assessing the whole empathy construct. Still, there are limitations to the Empathy Assessment Index that are common to all self-report measures of empathy. Specifically, most people overestimate their abilities to adopt others' perspectives and accurately recognize others' emotions (Israelashvili et al., 2019; Melchers et al., 2015), which suggests self-report measures may be inadequate for measuring all components of empathy, particularly the cognitive dimensions of the construct (Murphy & Lilienfeld, 2019). However, this limitation can be overcome by collecting data from other types of empathy measures.

Objective measures of emotion recognition represent one way to overcome limitations of self-report empathy measures. Objective measures of empathy are useful for assessing the construct, above and beyond self-report measures, because they provide unique predictive power in accounting for individuals' empathic abilities. A recent meta-analysis found that self-report measures only accounted for 1% of the variance in objective measures of cognitive components of empathy (Murphy & Lilienfeld, 2019). This does not indicate self-report measures are not useful, but, rather, points to the need for different types of measures of empathy to account for the whole construct. Considering this, the proposed study will include an objective measure of emotion recognition (i.e., affective mentalizing). Research into objective measures of emotion recognition has been spurred by recognition that they 2provide valid assessments of cognitively complex empathy abilities (Murphy & Lilienfeld, 2019; Teding van Berkhout & Malouff, 2016). Emotion recognition measures usually require individuals to correctly identify others' emotional states either from pictures (Baron-Cohen et al., 2001) or video clips (Schlegel et al., 2014). These tests are designed to mimic real-world social interactions. Multimodal tests that integrate both visual and auditory stimuli are considered the most ecologically valid and accurate assessments of emotion recognition abilities (Hall, 1978; Schlegel et al., 2014). Moreover, as a direct test of individuals' emotion recognition abilities, they do not rely on individuals' perceptions of their own abilities (Murphy & Lilienfeld, 2019). Considering this, it is clear an objective measure of emotion recognition, in addition to self-report, is needed to accurately measure empathy.

The Nature of Reading

There is consensus regarding what constitutes reading. Reading "is a complex cognitive process of decoding symbols for the intention of deriving meaning from print" (Neuman et al., 2014, p. 816). This definition is seemingly straightforward, but theories of reading

comprehension elucidate the cognitive complexity inherent in reading—reading comprehension requires integration of semantic decoding (Perfetti & Stafura, 2014), tracking of characters' mental states (Dore et al., 2018; Paris & Paris, 2003) and narrative arcs (Wassenburg et al., 2015), and recognition of emotional cues in texts (Altmann et al., 2012; Vega et al., 1996). When readers lack these comprehension skills, words remain simply words on the page; however, when readers have developed these skills, stories can leap off the page into readers' minds. Theories of reading comprehension make clear that many of the skills associated with empathy are also exercised by reading. For instance, fiction often focuses on human(-like) characters that evoke affective responses (Altmann et al., 2012). Readers' recognition that characters are relatable and their actions are understandable can spur interest in perspective taking (Kotovych et al., 2011). When readers emotionally connect to and adopt the perspectives of characters, they also begin to exercise affective mentalizing by attempting to gain a deeper understanding of characters. This process of coming to know story-world characters is similar to coming to know real-world others (Djikic et al., 2013). The parallels between these two processes makes clear reading can provide insight into understanding empathy (Burke et al., 2016; Willems & Jacobs, 2016).

Reading Enhances Empathy

Reading does not *always* enhance empathy, but there is consensus that it *can*, at least under certain circumstances (Burke et al., 2016). To understand the mechanisms through which reading enhances empathy, it is important to first identify the factors known to be relevant regarding how reading enhances empathy.

One factor has to do with the story content. Research suggests stories must prominently feature social interactions, which fiction often does (Oatley, 2016), to enhance empathy (Mar, 2018; Mar & Oatley, 2008). One study found that manipulating the clarity of characters'

emotions and thoughts (e.g., "angry," "mildly annoyed") influenced empathy (Kotovych et al., 2011). Another study found that identifying closely with stigmatized story characters reduced prejudice toward real-world stigmatized groups (Vezzali et al., 2015). Yet another study found reading stories featuring social content recruited neural pathways involved in theory of mind, whereas reading about non-social topics (e.g., geometry) did not (Tamir et al., 2016). Specifically, stories needed to feature interpersonal interactions between characters to involve theory of mind pathways. Abstract social content (e.g., encyclopedic description of a group's culture) did not involve theory of mind pathways. Others have replicated the need for a focus on characters' interpersonal interactions to influence empathy (Black & Barnes, 2015).

Two other factors related to story content concern literariness, referring to the degree that stories feature complex characters who promote reflection (Kidd & Castano, 2013; Koopman, 2016), and narrativity, referring to stories being presented as a connected sequence of events (Black & Barnes, 2015). Literariness is often assessed by including stories selected from prestigious anthologies (Kidd & Castano, 2013). Many stories considered "classics" (e.g., George Orwell's *1984*) are thought to be high in literariness. Even reading short passages from literary stories can enhance empathy (Kidd et al., 2016; Kidd & Castano, 2013, 2017; Pino & Mazza, 2016), albeit with small effects (Djikic et al., 2013; Koopman, 2015, 2016). Regarding narrativity, reading disjointed sentences from a story reduces the global coherence of a story and fails to activate the brain regions responsible for immersion and simulation that reading whole passages does (Kurby & Zacks, 2013). This is because readers need a baseline level of narrativity connecting between events to make inferences when reading (Graesser et al., 2015).

Another factor relevant to the ways reading enhances empathy has to do with the nature of the reader. Research finds that frequent—as compared to occasional—readers report greater

empathy because of reading, and they recognize emotions more accurately, even when controlling for verbal ability and personality characteristics (De Mulder et al., 2017; Mar et al., 2006, 2009). Understanding that reading is most likely to enhance empathy among frequent readers suggests changes in empathy may be slow to build (Djikic et al., 2013). This makes sense as readers' ability to immerse themselves in stories requires practice to become adept at building mental simulations and making inferences from subtle cues in stories (Jacobs & Willems, 2018; Mar 2018).

Overall, growing evidence regarding the circumstances under which reading enhances empathy points to two conclusions. Reading, indeed, enhances empathy (Dodell-Feder & Tamir, 2018), but changes in empathy related to reading are slow to build (Mumper & Gerrig, 2017). Thus, my proposed study is intended as a response to calls to move the field forward, by rigorously investigating how reading enhances empathy.

How Reading Enhances Empathy

What are the mechanisms through which reading enhances empathy, when it does? Several complementary theories provide some insight here. These theories highlight the features of stories and characteristics of readers that must be considered when investigating the mechanisms through which reading enhances empathy.

One prominent theory suggests reading enhances empathy because engagement with stories is like running a mental simulation of social experiences (Mar, 2018; Mar & Oatley, 2008; Oatley, 2016; Oatley & Djikic, 2018). Thinking of stories as simulations suggests that stories can provide social models of behavior and attitudes. The modeling approach draws on social learning theory, which proposes that people can learn how to act and think by watching others receive rewards and punishments (Bandura, 2009; Moyer-Gusé, 2008). Aside from

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modeling, readers' mental simulation of stories requires them to consider others' perspectives and emotions, and more engaging and effortful simulations enable greater connection to characters (Mar & Oatley, 2008). This suggests greater engagement in mental simulations can improve one's ability to accurately consider others' perspectives and emotions. Further, a fundamental component of stories as mental simulations is narrative thinking, referring to the way people understand others' actions as being influenced by past, present, and future emotions and feelings (Bruner, 1991). This is supported by evidence that the brain's systems for story simulations are the same ones used when thinking about real-world social interactions (Mar, 2011). Fictional stories that focus on human(-like) characters facilitate top-down affective responding when readers "witness" events happening to characters (Tamir et al., 2016). Readers then use their perspective taking abilities to make sense of characters' choices and actions (Oatley, 2016). Insights gained from descriptions of characters' thoughts, which are not normally accessible in real-world interactions, can exercise and improve readers affective mentalizing abilities (Oatley & Djikic, 2018).

Another aspect of the theory focuses on stories as abstractions of social experiences, which makes stories a particularly useful, tailored tool for enhancing empathy (Mar & Oatley, 2008). The notion of abstraction refers to how stories generally only include details necessary to understand plot and characters (e.g., stormy night as a portent) but exclude other, less relevant details (e.g., restroom breaks). By removing extraneous details, stories can provide readers insight into specific dilemmas or situations (e.g., *Diary of Anne Frank*, *Uncle Tom's Cabin*). Stories may focus on teaching moral themes (e.g., Lee et al., 2014) or expressing positive messages about underrepresented groups (e.g., Aronson et al., 2018; Johnson, 2013). The abstraction in stories makes lessons like these generalizable for readers. That is, one need not

have experienced enslavement to understand how detrimental slavery can be. Indeed, though simpler than real-world social interactions, story events can change schemas drawn upon for understanding and responding to real-world social experiences (Moyer-Gusé, 2008). In sum, the simulation and abstraction of social interaction inherent in reading can enhance empathy by exercising empathic skills used in real-world social situations (Mar & Oatley, 2008).

The theory of *imaginative engagement*, referring to the degree to which readers contribute creatively and imaginatively to stories, suggests imaginative engagement influences how deeply reading exercises empathic abilities (Barnes, 2018). This is because imaginative engagement motivates readers to move beyond passive consumption and toward actively contributing their own voice and interpretation to reading, though such engagement is not possible without well-developed reading comprehension abilities (e.g., Perfetti & Stafura, 2014). Imaginatively engaged readers deeply process plot and characters' actions, fill in gaps in meaning, and connect implicit threads linking characters' actions. In this way, imaginative engagement promotes greater perspective taking, affective mentalizing, and top-down affective responses. Again, an advanced level of cognitive development is required for readers to connect underlying threads embedded in stories. The impetus for imaginative engagement does not rely solely on the reader though. Characteristics of stories can also increase imaginative engagement, for example, featuring characters who are developed in relatable ways and with whom readers can build parasocial relationships (Barnes, 2018; Moyer-Gusé, 2008). Imaginative engagement reflects the way individuals come to understand others in real-world social experiences—through often opaque lenses that inherently leave some gaps in understanding. Imaginative engagement can enhance empathy by spurring readers to exert effort in understanding others, both in reality and in stories.

Lastly, theoretical reasoning points to readers as active agents in meaning making while reading (Narvaez, 2001, 2002), and this framing of the readers' perspective affects the understanding of how reading enhances empathy. Schemas—cultural, age-related, gender-related, and others—influence the comprehension of texts (Narvaez, 1998). Active meaning making with stories can reinforce existing schemas through assimilation, but it can also spur accommodation of new ideas and ways of thinking about and understanding others. For example, Harriet Beecher Stowe's *Uncle Tom's Cabin*, written in 1852, could be understood as a censure of the treatment of enslaved people at that time. Reading it in the 21st century, however, the story is useful both as a window into the past and as a timeless account of how not to treat other people. Readers do not automatically glean themes like these, as accommodating new ways to think about others requires effort (e.g., Cameron et al., 2019), but they can draw on their own experiences in connecting the plight of characters on the page to people in reality. Moreover, some stories may subtly present themes (stories as abstraction; Mar & Oatley, 2008) that some readers simply gloss over, but that other readers find compelling and moving. Readers as meaning makers (Narvaez, 2001, 2002) highlights ways readers partake in top-down affective responding, perspective taking, and affective mentalizing. They do not simply adopt the perspectives and emotions of characters or authors when they do so—readers bring their own schemas to the text, as in real-world social situations, and they comprehend stories with their own personal lens applied (e.g., Frith & Frith, 2006).

These theories highlight phenomena and features of stories relevant to understanding how reading enhances empathy, but they are limited in that they do not pose directly testable propositions. Taken together, these theories suggest reading enhances empathy through cognitively complex routes, above and beyond the complexity inherent in reading

comprehension. Based on these theories and the conceptualization of empathy in this study (Segal et al., 2017), reading most likely enhances the affective responding, mentalizing, and perspective taking components of empathy more than emotion regulation and self-other awareness. Past research supports this distinction (Black & Barnes, 2015; Mumper & Gerrig, 2017), referring to the effect reading has on social cognition (e.g., Mar, 2011, 2018). Though reading may affect these social-cognitive components more than others, evidence is growing that these components are interrelated and inextricable (Segal et al. 2017; Zaki & Ochsner, 2012), which supports reading enhancing empathy, broadly, still. These insights are informative, but there is a need for more rigorous investigations of how reading enhances empathy (Dodell-Feder & Tamir, 2018) grounded in a coherent framework for organizing insights from these theories. The media effects orientation of the Differential Susceptibility to Media Effects Theory (Valkenburg & Peter, 2013) suits this need.

Differential Susceptibility to Media Effects as a Framing Device

In addition to reading effects theories (Barnes, 2018; Mar & Oatley, 2008; Narvaez, 2001, 2002), the media effects perspective offers useful insights into ways that reading may enhance empathy (Valkenburg et al., 2016). Specifically, the Differential Susceptibility to Media Effects Theory (DSMT) Model proposes that reading is one type of media among many (e.g., television, radio), and that the process by which reading influences empathy can best be understood by considering the bidirectional relations between readers and stories (Valkenburg & Peter, 2013). The DSMT Model specifies what media effects to expect reading to evoke. As well, it specifies testable propositions that will guide this proposed study.

The DSMT Model situates reading squarely in the broader media effects field, and, in doing so, provides unique insight into how reading enhances empathy. Reading produces *media*

effects, short- and long-term within-person cognitive, emotional, and behavioral changes that

result from media use (Valkenburg & Peter, 2013). Reading can affect readers in specific ways,

on cognitive (e.g., observing character development), emotional (e.g., happiness when characters

succeed), and physiological (e.g., fear for characters in peril) levels (Valkenburg & Peter, 2013).

The DSMT Model also provides insights into how reading enhances empathy by highlighting

fundamental assumptions underlying media effects: media use is selective, and its effects can be

direct or indirect (Valkenburg et al., 2016). The first assumption that media use is selective

purports that individuals have limited attention and can only attune to select media messages;

thus, only messages readers attune to can influence them. People can scan the words on a page

without deriving meaning from the print, in which case they are not truly reading (Neuman et al.,

2014) because attention is required to derive meaning (Valkenburg et al., 2016). The second

assumption that media effects are indirect implies that reading by itself does not produce

changes. Readers must engage with stories in ways that evoke different cognitions, emotions,

and behavioral changes for reading to enhance empathy. This suggests there is a need to look

beyond time spent reading to specific cognitive, behavioral, and physiological mediating

variables to expand our understanding of how reading enhances empathy. Lastly, the third

assumption of the DSMT Model suggests the direct influence of media effects (e.g., fear,

amusement) are short lived but predictive of long-lasting changes (e.g., attitudinal, behavioral;

Valkenburg & Peter, 2013). Because the direct effects are short lived but impactful, studies using

short sampling timeframes that enhance ecological validity represent promising designs for fully

understanding the impacts of media effects.

Two propositions of the DSMT Model inform my understanding of reading specific

theories and my study design. Proposition 1 of the DSMT Model suggests there are three primary

differential susceptibility variables—developmental, dispositional, and social—that influence media effects (Valkenburg & Peter, 2013). Of these, developmental effects are of most interest here. The focus on developmental effects highlights how reading as an empathy-enhancing activity cannot be understood without considering age-related changes in empathy and reading. Personal characteristics (i.e., individual differences), like lifelong reading (Mar et al., 2009), are also influential in this relationship and will be assessed in this study. Social variables span the ecological context—from the micro-level (e.g., movie theater, at home) to the macro-level (e.g., historical time, culture). Social variables will not be central to the present investigation. As well, Proposition 2 of the DSMT Model suggests media responses (i.e., sources of cognitive, emotional, physiological changes) are also integral to understanding how reading enhances empathy (Valkenburg & Peter, 2013). Media responses vary, from connecting with characters to attitude change (Moyer-Gusé, 2008). However, experiences like narrative transportation and reading flow stand out as particularly influential media response variables (Green et al., 2004; McQuillan & Conde, 1996; Oatley, 2016).

With these two DSMT Model propositions in mind, a review of the developmental literature is useful for homing in on periods of the lifespan when reading is most likely to enhance empathy. As well, a review of media effects literature suggests transportation and reading flow may be media response states that closely align with theoretical expectations regarding how reading enhances empathy (Barnes, 2018; Mar & Oatley, 2008; Narvaez, 2001, 2002).

Development of Empathy and Reading

The present study will examine the way reading enhances empathy among a sample of adults. The decision to include adults, rather than children and adolescents, is an intentional one.

Components of empathy exhibit different rates of change with age, given their dependence on different affective and cognitive abilities (Hoffman, 2008; Zaki & Ochsner, 2016). As well, foundational reading comprehension skills develop across childhood (Sénéchal & LeFevre, 2002), but other skills that improve the capacity for reading to enhance empathy develop more later in life (e.g., mental simulations, emotional awareness; Dore et al., 2018; Van Der Bolt & Tellegen, 1995). Though the potential for reading to enhance empathy exists across the lifespan, adulthood stand out for several reasons.

Reading is not likely to enhance empathy among children because of developmental constraints on empathy and reading abilities. Elementary signs of empathy are present in infancy (Davidov et al., 2013; Geangu et al., 2011; Tousignant et al., 2017). Children develop perspective taking (Farrant et al., 2012), emotion regulation (Eisenberg & Fabes, 2006), and affective mentalizing abilities (Cheng et al., 2014) with age. Growth in these empathy abilities also tends to improve reading comprehension abilities. For example, theory of mind (i.e., recognizing others' as having their own internal thoughts and feelings) is central to both empathy (Shamay-Tsoory & Aharon-Peretz, 2007) and reading comprehension (Atkinson et al., 2017; Dore et al., 2018), and children's language skills predict both their emotional competence (Beck et al., 2012) and reading comprehension (Perfetti & Stafura, 2014). Still, children's capacity for mental simulation is simplistic compared to adults (Wassenburg et al., 2015), and they recognize fewer emotional cues in texts (Diergarten & Nieding, 2015), limiting their capacity for imaginative engagement (Barnes, 2018). Though facets of empathy development work synergistically with growing reading comprehension abilities, the cognitive complexities of reading and empathy suggest reading has a limited effect on empathy in childhood compared to later periods.

Empathy development continues across adolescence, but it is still relatively underdeveloped compared to empathy in adults. During adolescence, research suggests the influence of physiological factors on empathy development tapers off because of slowing physical growth (e.g., neurological changes) and the conclusion of puberty (Blakemore & Choudhury, 2006; Steinberg, 2005). Adolescence is when individuals begin to rely on prefrontal areas when considering others' emotions (Decety & Michalska, 2010), and they more efficiently regulate their affective responses to others than children (Mella et al., 2012). However, these processes continually undergo change and development with age until they asymptote in late adolescence (Decety et al., 2012). Psychological and social factors also exert a greater influence on empathy development with age. Adolescents' expanding cognitive abilities contribute to increasingly complex representations of the self and others (Decety & Sommerville, 2003), providing new ways for individuals to think about others (Decety & Jackson, 2004). These developing empathic abilities help adolescents navigate their increasingly complex social situations (Lam et al., 2012) and comprehend more complex emotions compared to children (Rieffe & Camodeca, 2016). Though adolescence is a time of growing capacity for and reliance on empathy, there are some age-related constraints on empathy development during adolescence that bring into question how likely reading is to enhance empathy among adolescents.

Changes in adolescents' reading abilities suggest reading could enhance empathy among adolescents, but it is unclear to what extent it does so. The development of reading abilities largely concludes in adolescence (García & Cain, 2014); as such, there are few studies of reading ability in adolescence and later (Duncan et al., 2016). Compared to children, though, adolescents have better semantic processing abilities (Duncan et al., 2016), can monitor and simulate more complex social situations mentally (Somerville, 2013), and comprehend a wider array of

emotions (Mouw et al., 2019). Adolescents do approach reading differently than children, reading for different outcomes (e.g., stories as cultural experiences) than younger ones (Valkenburg & Piotrowski, 2017; Van Der Bolt & Tellegen, 1995), but they still do not gain social insights from reading like adults do (Mouw et al., 2019; Narvaez et al., 2010). Lastly, though reading is low on their list of media preferences, reading is still a valued, engaging activity for many adolescents (Desmond, 2012; Schiefele et al., 2012). In sum, there is growth in empathic abilities during adolescence, but it is unclear whether and how much reading exercises adolescents' growing empathic abilities.

Empathy development continues (Allemand et al., 2015) and reaches full maturity in adulthood, which makes this a period of the lifespan when reading is well-suited to enhance empathy. For instance, emotion regulation and emotional complexity (i.e., experiencing positive and negative affect simultaneously) increase across much of adulthood (Hay & Diehl, 2011; Zimmermann & Iwanski, 2014). Perspective taking and altruistic concern slightly increase across young and middle adulthood (O'Brien et al., 2013; Sze et al., 2012). Young and midlife adults score and perform similarly on self-report empathy and emotion recognition measures (Bailey et al., 2018; Duval et al., 2011; Khanjani et al., 2015). They experience and understand greater emotional complexity and draw on more social experiences and schemas, compared to adolescents, that support empathic responding (Labouvie-Vief, 2015; Narvaez, 2005). As well, changes in empathy during adulthood are likely not age-related (Grühn et al., 2008). Rather, across 12 years in one study, within person changes best accounted for changes in empathy, suggesting controllable factors, like reading, can enhance empathy in adulthood. However, there is evidence for age-related declines in empathic abilities in late adulthood (see Beadle & de la Vega, 2019; Henry et al., 2013).

Adults' reading skills and habits also support reading as a way to enhance their empathy. Adult readers perform well at specifying and tracking characters' emotions in stories (Gygax & Gillioz, 2015), and they attune closely to subtle, emotional cues in texts (Mouw et al., 2019), which can enhance imaginative engagement (Barnes, 2018). Their emotional reactions tend to be stronger and more closely aligned with characters' emotions than child readers' (Diergarten & Nieding, 2015; Mouw et al., 2019). As well, adults perform better at extracting moral themes and social lessons from stories compared to children and young adolescents (Narvaez et al., 1999, 2010). Regarding reading behavior, adults, compared to adolescents, read more varied content (Botzakis, 2009) more frequently (Smith, 2000) and draw on different motivations for reading—varying from thinking of reading as important to self, reading to learn or be challenged, reading so others see one as a "reader" (Schiefele et al., 2012; Schutte & Malouff, 2007). These motivations are important, as thinking of reading as important to one's self makes reading intrinsically motivating and predicts greater reading frequency and enjoyment (Schutte & Malouff, 2007). For these reasons, adulthood is considered the most likely stage in the lifespan when everyday fiction reading will enhance empathy. Therefore, adults were featured in the present study. Moreover, the developmental perspective on reading and empathy also brings attention to another benefit of studying empathy and how reading enhances empathy. Namely, positive outcomes associated with empathy and reading tend to increase with age.

Positive Outcomes of Empathy and Reading

Positive outcomes associated with empathy, including altruism (Batson et al., 2015) and prosocial behavior (Davis, 2015; FeldmanHall et al., 2015), are compelling reasons to study empathy (Zaki & Ochsner, 2016). However, there remains a question as to whether and to what extent reading contributes to these positive outcomes (Dodell-Feder & Tamir, 2018). Evidence of

a relationship between reading and positive outcomes associated with empathy would provide greater impetus for understanding how reading enhances empathy and support the value of reading as an effective strategy to enhance empathy. The evidence suggests reading does contribute to empathy-related positive outcomes, and, beyond that, these positive outcomes become more impactful with age.

Given that reading can enhance empathy, there is likely a connection between reading and positive outcomes associated with empathy. Empathy promotes prosocial outcomes in several ways (Zaki, 2018), and reading can contribute to such outcomes (Coyne et al., 2018). Empathy motivates altruism, expressing a concern for others without expecting something in return, because empathy helps people view others as similar to themselves (Batson et al., 2015). Reading provides an exercise in connecting with and responding to others in this way (Van Der Bolt & Tellegen, 1995; Vitz, 1990; Wolk, 2009). Perspective taking, which reading exercises, amplifies empathic prosocial behavior by increasing perceived self-other overlap (Davis, 2015; Lamm et al., 2007). The overlap motivates a desire to help similar others and decreases stereotyped reasoning by "humanizing" others (Galinsky & Moskowitz, 2000). Empathy also acts as a moral force that provides emotional meaning to moral action (Zaki, 2018), and reading may act as a "moral laboratory" (Hakemulder, 2000, p. 11) that helps contextualize moral values. The laboratory metaphor suggests readers are exposed to moral dilemmas and safely "observe" characters' behaviors in stories, without experiencing dilemmas themselves. In this way, reading can help expand one's moral imagination (i.e., learning new ways to act virtuously; Deitcher, 2013) and evoke moral emotions (Haidt, 2003) that prime prosocial action (Aquino et al., 2011), help people overcome stereotypes and prejudices (Vezzali et al., 2015), and motivate donating behavior (Freeman et al., 2009; Koopman, 2015). Reading stories with prosocial themes

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promotes prosociality by enhancing empathy (Johnson, 2012; Johnson et al., 2013). In sum, empathy reliably promotes positive outcomes, and reading, when it enhances empathy, likely contributes to these positive outcomes.

The outcomes associated with empathy among adults further supports the value of promoting empathy, through reading, during this period. Positive outcomes of empathy are impactful in childhood and adolescence but less so than in adulthood. For instance, during childhood, positive outcomes of empathy tend to benefit children and those immediately around them—bringing a teddy bear to a friend (Hoffman, 2008) or donating stickers to someone in need (Williams et al., 2014). Parents reading to children predicts greater socio-emotional competence (Karniol, 2012) and prosocial behavior (Schapira & Aram, 2020). Adolescents' empathy negatively predicts bullying behavior (van Noorden et al., 2015) and promotes prosociality (Padilla-Walker & Christiansen, 2011). However, dispositional altruistic concern is associated with young adults' willingness to donate organs, motivating individuals to look past fears of bodily harm (Cohen & Hoffner, 2013). Adults' empathy is positively associated with charitable giving to friends and strangers (Beadle et al., 2015; Sze et al., 2012) and volunteer efforts (Davis et al., 1999). Other-oriented volunteering, compared to self-oriented, can reduce mortality risk in older adults (Konrath et al., 2012). Brain maturation contributes to more complex moral reasoning (Decety et al., 2012). This becomes apparent in young adulthood (Eisenberg et al., 2005) when altruistic concern and perspective taking become closely associated with care-based moral action (e.g., alleviating others' distress; Skoe, 2010). These developmental insights provide clear impetus for investigating how reading enhances empathy among adults.

Adulthood represents the lifespan stage when reading likely contributes the most to empathy development and brings about the most impactful positive outcomes associated with

empathy. In light of this, the DSMT Model (Valkenburg & Peter, 2013) serves as a useful framework by highlighting developmental perspectives regarding how reading enhances empathy and for helping to formulate specific testable hypotheses derived from reading-specific theories (e.g., Mar & Oatley, 2008). Moreover, the DSMT Model also points to other influential factors to consider when investigating the relationship between reading and empathy—media response variables.

Media Response Variables

In addition to considering characteristics of readers, it is necessary to also consider how characteristics of media (e.g., plot, theme, verisimilitude) influence readers to fully understand how reading influences empathy (Valkenburg & Peter, 2013). Different media evoke different media responses (e.g., emotions, attitude change; Bandura, 2009; Barnes, 2015; Moyer-Gusé, 2008), and some media responses are more impactful than others. Transportation and reading flow are phenomenologically rich media responses (Green & Brock, 2002; Thissen et al., 2018). The highly engaging nature of transportation and reading flow makes them likely to evoke stronger media effects (Valkenburg & Peter, 2013), which also makes them more likely to exercise empathic abilities.

Narrative Transportation

Narrative transportation is likely to mediate the relationship between reading and empathy because it helps bring stories to life, drawing on empathic abilities to do so. Narrative *transportation* refers to the melding of attention, emotion, and mental imagery in a way that "transports" readers into stories (Green & Brock, 2000, 2002), or the feeling of getting lost in a story. Transportation makes stories feel more real (Green & Brock, 2002) and is integral to thinking of stories as simulations (Mar & Oatley, 2008). Indeed, neuroimaging evidence shows

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the brain tracks the "physical" location and activity of story characters and updates its mental simulation as stories change, recruiting similar areas as those used in real-world situations (Speer et al., 2009). Readers have highly varied transportation experiences with individual (Carpenter & Green, 2012) and story-specific differences (van Laer et al., 2014). Still, when readers are transported, the feeling amplifies emotional reactions (Green & Dill, 2012), which can exercise affective responding, perspective taking, and affective mentalizing abilities (Oatley, 2016). This conclusion is further supported by evidence that stories are interpreted using similar neural networks that contribute to empathy (Decety, 2011; Mar, 2011; Tamir et al., 2016).

The link between empathy and transportation is not just theoretical—empirical findings support transportation as a mediator between reading and empathy. Transportation into news stories about stigmatized groups (e.g., elderly, prisoners, immigrants) increases empathy for individuals in those groups (Oliver et al., 2012). One study found transportation into a story about a counter-stereotypical female Muslim character increased empathy for and decreased negative attitudes toward Muslim people (Johnson, 2013). Transportation increased affective responding and mentalizing, which promoted perspective taking and attenuated prejudiced attitudes. Another study found transportation evoked stronger emotional reactions and greater prosocial behavior (e.g., helping a researcher with an unrelated task) after reading, even controlling for dispositional empathy (Johnson, 2012). This was replicated in a study manipulating reading instructions to influence transportation (Johnson et al., 2013). Readers in the imagery generation condition were more transported, which led to stronger empathic feelings and more prosocial behavior, compared to those in the semantic focus condition. Greater transportation into stories can increase perspective taking and altruistic concern across one week's time (Bal & Veltkamp, 2013). Overall, theoretical reasoning and empirical evidence

provide confidence that transportation is an influential mechanism in the relationship between reading and empathy.

Reading Flow

Reading flow is also likely to mediate the relationship between reading and empathy because it stimulates readers to think more deeply about stories, like imaginative engagement (Barnes, 2018). *Reading flow* refers to an emergent balance between absorption into stories and smooth processing of the story (Thissen et al., 2018). The balance is based on readers' skill levels (e.g., vocabulary, emotion recognition) and challenge levels inherent in media (e.g., historical vernacular, characters' perspectives). For example, some readers may think of Shakespeare's work as artful while others think of him as waxing poetic, and this may be related to experiencing reading flow. Much of the betrayal, humor, and emotion that characterizes Shakespeare's works is readily lost on passive readers but can be highly engaging and enjoyable for motivated readers (e.g., Barnes, 2018; Narvaez, 2001, 2002). Reading flow has been shown to increase reading frequency by promoting enjoyment of reading (Thissen et al., 2018), which is a primary motivation for media use, like reading (Konijn, 2012). As well, reading flow occurs more in response to reading challenging stories (McQuillan & Conde, 1996), the likes of which may help readers think of others in a new light and which are often perceived as challenging but meaningful (Oliver & Raney, 2011). That challenging stories spur new thoughts about others further supports the link between reading flow and the exercise of empathic abilities. In sum, evidence suggests reading flow mediates the relationship between reading and empathy.

Past research has sometimes conflated transportation and reading flow because of the similarities between them, but, in this study, the two are considered theoretically and empirically distinct. Similarities between transportation and flow include loss of self-awareness, narrowing

of attention, and distortion of time (Green & Dill, 2012; Nakamura et al., 2019). Smooth

processing of stories, a component of reading flow, is associated with greater transportation

(Vaughn et al., 2010). However, transportation can be experienced as relaxing (Green et al.,

2004), whereas reading flow is clearly dependent on the presence of a challenge (Thissen et al.,

2018), and other work suggests these two are not as strongly correlated as they seem (e.g.,

Mitchell, 2019). Taken together, these findings support the two being distinct.

Other Individual Differences

Other media response variables, besides transportation and reading flow, likely influence

the relationship between reading and empathy (Valkenburg & Peter, 2013). For example,

lifelong reading represents a potential confounds if it were not assessed (Kidd & Castano, 2013;

Mumper & Gerrig, 2017).

Lifelong reading is strongly, positively associated with empathy in reading studies (Black

& Barnes, 2015; De Mulder et al., 2017; Panero et al., 2016; Samur et al., 2018). *Lifelong*

reading refers to habitual reading, across years of time (Mar et al., 2006). It is assessed with the

Author Recognition Test (Acheson et al., 2008; Moore & Gordon, 2015), which requires

respondents to identify authors' name from a list of real and fake author names, rather than just

report about their reading habits. This is useful as self-report about one's reading habits is subject

to potential recall bias (Sudman et al., 1996) and socially desirable responding (Hart et al., 2015).

Moreover, higher scores on the Author Recognition Test are positively correlated with other

indicators of habitual reading (e.g., vocabulary size, diary studies of reading; Mar et al., 2006,

2009), and the positive association between lifelong reading and empathy is robust (Mumper &

Gerrig, 2017).

Current Study

This dissertation sought to answer the central question, how does reading enhance empathy? I examined this question with a quasi-experimental, diary study of media use among a sample of adult readers (reading group) and another group selected because they likely read less frequently (leisure group). To be clear, this was not an intervention designed to enhance empathy, but an investigation of how reading enhances empathy in everyday life among a purposefully selected sample of readers (e.g., Creswell & Creswell, 2018). A secondary question was, to what extent does reading enhance empathy and promote real-world positive outcomes? The first six hypotheses relate to the question of how reading enhances empathy, and the seventh one relates to the question of to what extent reading promotes real-world positive outcomes of empathy.

Hypothesis 1: Time spent reading will be positively associated with gains in self-reported empathy (H1a) and objective emotion recognition (H1b). Reading is expected to enhance both empathy and emotion recognition (Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017).

Hypothesis 2: The relationship between time spent reading and empathy will be moderated by lifelong reading behavior, such that those with lower author recognition scores will show greater gains in empathy (H2a) and emotion recognition (H2b) compared to those with higher author recognition scores.

Hypothesis 3: There will be greater growth in the affective responding (H3a), affective mentalizing (H3b), and perspective taking (H3c) components of empathy than in the emotion regulation and self-other awareness components (Segal et al., 2017).

Hypothesis 4: Time spent reading will be positively associated with transportation (H4a) and reading flow (H4b).

Hypothesis 5: Transportation (H5a) and reading flow (H5b) will partially mediate the relationships of time spent reading to empathy and time spent reading to emotion recognition.

Hypothesis 6: Those in the reading group will show greater gains in empathy (H6a) and emotion recognition (H6b) than those in the leisure group.

Hypothesis 7: Empathy (H7a) and emotion recognition (H7b) will be positively associated with donating one's compensation.

In addition to these hypotheses, it is unclear whether empathy and emotion recognition will be related (e.g., Murphy & Lilienfeld, 2019) when using the updated conceptualization of empathy (Segal et al., 2017). Thus, I propose a research question: Will empathy and emotion recognition be significantly correlated with each other (RQ1)?

Chapter 2

Method

Participants

Participants ($N = 252$) were recruited using criterion and snowball sampling techniques (Henry, 2009) through various channels, such as social media (e.g., Instagram, Facebook), college professors recruiting students, and Amazon Mechanical Turk (MTurk) workers. Several participants completed the pretest but did not complete the posttest ($n = 36$) and so were dropped from the study, with most ($n = 26$) dropped from the reading group. This resulted in an 86% study completion rate. As well, some participants were dropped ($n = 5$) for reporting no reading across the study or for not paying attention to surveys while completing them (e.g., scoring very low on the objective emotion recognition measure). These exclusions resulted in a final sample of 211 participants.

There were 111 participants in the reading group. Reading group participants mostly consisted of young adults ($M_{age} = 33.4$, $SD = 13.1$, range = 18-71) who were hig1hly educated (80% completed a bachelor's degree or higher), mostly female (86%, 4% genderqueer), and mostly White (80%, 10% Asian, and 3% of less Latinx, Black, Middle Eastern, or Multiracial). Many participants were members of different book clubs (31%), a few were English literature students (7%), but most were self-identified avid readers (62%). This demographic makeup is similar to other book club groups (Sedo, 2003). Criteria for being in the reading group included: (a) self-identifying as an "avid" reader, (b) who was planning to read at least one self-selected fiction book across the next month, (c) who was at least 18 years old, and (d) who was willing to engage in the study for one month. Reading group participants were mostly recruited through personal connections and social media outreach; however, an individual with a popular

"Bookstagram" Instagram shared the study with their 28,000 followers, and 31% of participants joined the study from that post. Several liberal arts college professors also shared recruitment messages with students.

There were 100 participants in the leisure group. Leisure group participants mostly consisted of young adults (M_{age} = 32.1, SD = 11.3, range = 19-72) who were well educated (62% completed a bachelor's degree of higher), majority female (59%, 3% genderqueer), and ethnically diverse (56% White, 24% Asian, 9% Black and Multiracial, respectively, and 1% Latinx and American Indian, respectively). Leisure group participants were mostly recruited through the /r/SampleSize subreddit and MTurk. Bots and inattentive humans were screened from the Reddit users (n = 24) by assessing their emotion recognition scores. Bots and inattentive humans tended to score much lower than actively engaged humans. With the MTurk users, bots (Chmielewski & Kucker, 2020) were screened by using TurkPrime's "Pro Features" (Litman et al., 2017) that help direct surveys to high-quality respondents who consistently pass attention checks. As well, participants were required to complete a short "essay" describing their favorite leisure time activities and provide their email address. If their essay was convincingly written to suggest they were attentive humans, they were invited to complete the pretest and continue in the study (n = 73). Criteria for being in the leisure group included: (a) being at least 18 years old and (b) willing to engage in the study for one month.

This final sample size was deemed sufficient based on power analyses using an OLS framework. Though the OLS framework is applicable here (Hancock & French, 2013), there are caveats worth addressing when conducting power analyses for multilevel structural equation modeling (MSEM). Power analyses for MSEM are complicated by the large number of variables affecting model fit and precision (e.g., level 1 and 2 variances, factor loadings, factor

covariances; Hoyle & Gottfredson, 2015; Maas & Hox, 2005; McNeish, 2017; Preacher et al., 2011; Wolf et al., 2013). One recommendation is to consider the weakest links, which tend to be indirect effects (Wolf et al., 2013). Indirect effects were only relevant in the mediation model using the reading groups' responses, and I estimated the indirect effect would be small to medium in size, based on previous research (Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017). Given this, power analysis in G*Power (Faul et al., 2009) suggested an ideal sample of 160 participants in the reading group, with the following parameters: R^2 increase with eight predictors, f^2 effect size = 0.11, α = .05, and power = .85. However, because I used validated scales for reliable constructs and expected to have adequate level 1 data (6-9 data points), a minimum sample size of 100 participants was considered sufficient (Christ et al., 2017; Maas & Hox, 2005; Preacher et al., 2011) for both the reading and leisure groups.

I used a snowball sampling approach to recruit participants, and I used a criterion sampling approach to ensure participants met eligibility requirements (Creswell & Creswell, 2018). Participants in both groups had to be (a) 18 or older, (b) fluent in English, and (c) complete both the pre- and posttest of the study. In addition, those included in the reading group had to (d) be English literature students, in a book club, or consider themselves "avid readers" and (e) were planning to read at least one fiction book in the upcoming month. These two additional criteria for the reading group were implemented to maximize the likelihood participants would be reading frequently, the main characteristic of interest in this study.

Measures

All measures are included in Appendix A.

Empathy

Empathy was measured using the Empathy Assessment Index (EAI; Segal et al., 2017), a 21-item measure of self-reported empathy that assesses the five components of empathy—affective responding (5 items), affective mentalizing (3 items), perspective taking (5 items), emotion regulation (4 items), and self-other awareness (4 items). Example items include "When I see someone receive a gift that makes them happy, I feel happy myself" (affective responding) and "I can tell the difference between my own and someone else's feelings" (self-other awareness). Respondents indicated how often they feel what is described from 1 (*never*) to 6 (*always*), and higher scores represent greater empathy. Internal consistency for the subscales was acceptable (Cronbach's $\alpha > .69$) and good overall ($\alpha = .86$). Though there are presently too few data to assess how sensitive EAI items are to changes across short time periods, the EAI is conceptualized as a change-sensitive instrument, capable of detecting small changes over time (E. Segal, personal communication, December 16, 2020).

To supplement quantitative findings related to the EAI, I included a free response question asking participants' if and how their empathic responding changed over the course of the study. Reading group participants were asked, "Do you feel that time you spent reading recently, particularly during the study, impacted the ways you think about or interact with other people?" For comparison, leisure group participants were asked, "Do you feel that your outlook toward other people and others' perspectives has changed over the past month?" The qualitative responses were analyzed to identify themes that emerged, and, in reading group participants' responses, to gauge whether they supported theoretical expectations about how reading enhances empathy (e.g., Barnes, 2018; Mar & Oatley, 2008; Narvaez, 2002).

Emotion Recognition

Emotion recognition abilities were measured with the Geneva Emotion Recognition Test-Short (GERT-S; Schlegel & Scherer, 2016). The test is an objective measure of emotion recognition and directly draws on empathic abilities, including affective responding, mentalizing, and perspective taking. It consists of 42 short video clips with sound (duration 1-3 seconds) in which 10 different actors (5 female, 5 male) express 14 different emotions (e.g., joy, interest, anger). Respondents select which emotion was displayed from the 14 response options after each clip and receive a score of 1 (*correct*) or 0 (*incorrect*). Higher scores represent greater emotion recognition abilities. The test takes about 10 minutes to complete. Actors are presented from the waist up, providing gestural cues, and pronounce a string of made up syllables without meaning, conveying emotional cues through their voice. The benefits of the GERT-S are that the stimuli are multimodal (i.e., sound, sight), and it assesses objective abilities. The GERT-S has shown good internal consistency and construct validity (Schlegel & Scherer, 2016). As well, the GERT-S is sensitive to change in emotion recognition abilities across short periods of time (e.g., 4 weeks; Lamothe et al., 2018; Schlegel et al., 2017).

Prosocial Behavior

Real-world prosocial behavior was measured by giving participants the option to donate their compensation to a book-related charity (e.g., Book Aid International; Freeman et al., 2009; Koopman, 2015). I donated all compensation earmarked this way on participants' behalf. This measure was not normally distributed, as most participants either donated all ($n = 68$) or none ($n = 107$) of their compensation, so this variable was dichotomized (1 = yes donation, 0 = no donation).

Planned Reading Behavior

In the reading group, participants were asked about their planned reading behavior during the period of the study. They listed titles of up to five books, minimum of one, they planned to read across the following month. They planned to read 3.56 books, on average ($SD = 1.35$), covering a total of 386 books. Book titles from the pretest were piped into subsequent surveys, so participants were explicitly cued about each book they were reading in their diary survey responses. They also listed the genre(s) of the books they were reading, with response options like "Classic literature," "Romance," "Science fiction," "Mystery," etc. They were asked why they were reading their books, with response options including "For a book club," "For class," "For leisure," and an open-ended option.

Diary Survey Measures

The diary survey measures differed between the reading and leisure groups. Reading group participants completed measures of transportation, reading flow, and reading behavior, whereas leisure group participants reported about their leisure activities. Though the questions differed between groups, they were designed to be comparable in both time (e.g., < 5 minutes) and content (e.g., unobtrusive questions about everyday activities).

Reading Behavior. Reading group participants reported about their reading activity and surroundings while reading. The first question in each survey was: (a) Did you spend time reading since you were last surveyed? If no, they were asked if they already completed that book, and then moved on to the next block of questions. This happened for each book. If yes, a block of questions followed. These included (b) how much time did you spend reading since you were last surveyed? Response options were presented in 30-minute blocks (e.g., *More than 30 minutes but less than 1 hour*), ranging from 1 (*Less than 30 minutes*) to 9 (*More than 4 hours*). (c) Why were you reading? Response options included "I had to," "I wanted to," and "I both had to and

wanted to." (d) While reading, were there other people around you? If yes, how many? (e) Were you distracted by other things while reading? Response options ranged from 1 (*Not at all*) to 7 (*Very much*). (f) About how long has it been since you last spent time reading? Respondents entered an amount of time (e.g., 1 hour, 2 days). (g) Are there any thoughts or feelings related to your reading experience(s) that you want to share? This was an open-ended, optional question in each survey.

Transportation. Reading group participants reported on narrative transportation, which was measured with the 6-item Transportation Scale-Short Form (Appel et al., 2015). The short form is strongly correlated with the original scale (Green & Brock, 2000), and, though items tap different constructs (i.e., cognition, emotion, imagination), they load well onto one general factor (Appel et al., 2015). An example item is "I was mentally involved in the story while reading." Response options ranged from 1 (*Not at all*) to 7 (*Very much*), and higher scores represent greater transportation. Participants were asked to recall how transported they felt during their most recent reading experience(s), since last surveyed. This was done for each book mentioned in the pretest. Internal consistency for the items was good (α = .81).

Reading Flow. Reading group participants reported about reading flow, which was measured with the 8-item Reading Flow Short Scale (RFSS; Thissen et al., 2018). Example items from the two subscales include "I felt optimally challenged while reading" (absorption), and "During reading I became so oblivious that I was completely unaware of myself" (smooth processing). The items load well onto the two factors, and there is evidence for convergent validity with measures of reading self-efficacy and enjoyment (Thissen et al., 2018). Further, RFSS scores were positively associated with recalled reading flow experiences after reading a detailed description of reading flow, and scores on the midpoint for absorption and smooth

processing correlated with the greatest enjoyment of reading. Response options range from 1 (*Strongly disagree*) to 7 (*Strongly agree*), and higher scores indicate greater flow. Participants were asked to recall to what degree they were in flow during their most recent reading experience(s), since last surveyed. This was done for each book mentioned in the pretest. Internal consistency for the items was good ($\alpha = .85$).

Leisure Activities. Leisure group participants reported on time spent on leisure activities like exercising, reading fiction books, and using social media. They were asked if they had spent any time on any of these activities (*yes, no*). If yes to any of them, they indicated how much time they spent on those activities, in 30-minute blocks (e.g., Less than 30 minutes, More than 30 minutes but less than 1 hour). There was a free response option to describe their activities. These questions were designed to be like those in the reading group (i.e., focus on time spent on everyday activities) that would take a similar amount of time to complete as the reading group and that would reduce measurement reactivity (e.g., not cueing participants about empathy; Barta et al., 2012).

Person-level Measures

Lifelong Reading. Lifelong reading was measured with the Author Recognition Test (Moore & Gordon, 2015). The test requires respondents to select names they recognize from a list of 50 fiction authors (e.g., T. S. Eliot) and 50 foil authors (e.g., Gary Curwen) in a check-all-that-apply format. Responses are scored as 1 (*correct*), 0 (*not selected*), or -1 (*incorrect*). Scores are summed, with foil selection lowering one's score. Higher scores are indicative of greater lifelong reading and are positively associated with everyday reading behavior. The test discriminates well between avid readers and less avid readers (Moore & Gordon, 2015).

Social Desirability. Social desirability was measured with a 14-item adaptation of the Balanced Inventory of Desirable Responding, Short Form (Hart et al., 2015). The scale assesses one's tendency toward self-deceptive enhancement (SDE; 7 items) and impression management (IM; 7 items). Example items include "I never regret my decisions" (SDE) and "I never cover up my mistakes" (IM). The scale loads onto two distinct but related factors (Hart et al., 2015). Response options range from 1 (*Strongly disagree*) to 7 (*Strongly agree*), and higher scores represent greater socially desirable responding. Internal consistency was good overall ($\alpha = .80$). A non-significant correlation between this measure and other measures indicates participants were likely not responding in socially desirable ways.

Supplemental Measures

Given that all participants were in the midst of a global pandemic while data collection was happening, I decided to add a question to gauge the influence that COVID-related lockdowns might have had on participants' responses. Participants were asked to answer a free-response question, "Do you feel that COVID-related measures in your life influenced your reading habits/leisure activities over the past month?" I expected many participants to respond in the affirmative, given COVID-related lockdowns impacted many aspects of most people's lives (Mata et al., 2021). I analyzed the qualitative responses to identify emergent themes. I expected responses would provide insight into how lockdowns impacted participants' behavior during the study and to gauge whether those impacts were so influential as to make the results disparate and ungeneralizable compared to behaviors before (or after) lockdown. However, I did not have expectations as to what themes would emerge from their responses.

I also included a measure of *empathic concern* from the Interpersonal Reactivity Index (IRI; Davis 1983) to supplement the other empathy measures, as the IRI has been shown to be

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sensitive to change as a result of reading (Bal & Veltkamp, 2013; Djikic et al., 2013). Though the IRI does not directly measure empathy (Segal et al., 2017), it is closely related to empathy (Zaki, 2020) and is the most widely used empathy measure, to date (Konrath et al., 2011). The scale consists of 6-items, and an example item is, "When I see someone being taken advantage of, I feel kind of protective toward them." Response options ranged from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Scores are averaged, and higher scores indicate greater empathic concern. It had good internal consistency at pretest and posttest (αs > .82).

Procedure

Appendix B provides a flow chart outlining the study procedures for the two groups. All procedures were deemed exempt from review by CGU's IRB Board. In the reading group, participants first completed an interest survey, which functioned as a screener tool. Participants were told the study was an investigation of everyday reading behaviors, and, if they were planning to read fiction across the next month, then they could begin the study by providing their email address. Appendix C shows an example of the study overview participants viewed. After completing the screener, participants were emailed a link to the pretest survey, which included the empathy, emotion recognition, empathic concern, and planned reading behavior measures. Reading behavior questions included the number, titles, and genre(s) of book(s) they planned to read during the study. Participants also completed person-level measures (i.e., lifelong reading, social desirability) and demographics. These person-level variables were measured at the pretest to reduce potential sensitizing effects on responses associated with participating in the study (Rosenbaum & Johnson, 2016).

To attenuate challenges associated with recruiting online (e.g., bots posing as participants; Chmielewski & Kucker, 2020), recruitment procedures differed slightly in the

leisure group. Participants (*n* = 24) were recruited first from Reddit, and they had to score above

a 17 on the GERT-S and correctly respond to two attention check questions to be included in the

study. Those who did not meet these criteria (*n* = 912) were removed. I switched to recruiting on

MTurk after pulling my study from Reddit. As an extra safeguard against recruiting bots into the

study, MTurk participants (*n* = 73) wrote an "essay" about their favorite leisure activities[1] to

determine if they were likely human, in addition to meeting the Reddit-group inclusion criteria.

Those who did not meet these criteria (*n* = 231) were removed.

Approximately 3 days after completing the pretest, participants in both conditions

received a link to their first diary survey. During the pretest, participants selected when they

wanted to receive their diary surveys (anytime between 9 am and 9 pm). Timing was consistent

across the study period to reduce response burden (Gunthert & Wenze, 2012). Participants

continued receiving diary surveys on a fixed interval, every 3 days, across 27 days (nine surveys,

in total). Surveys for reading group participants focused on reading activity across the prior 3

days. If participants reported no reading, they completed filler questions about mood,

mindfulness, and an open-ended question to describe how their week was going. Filler questions

were intended to dissuade participants from simply reporting no reading. Surveys for leisure

group participants focused on mood and leisure activities across the prior 3 days. All participants

received one survey email reminder after 24 hours, if they did not complete their diary survey.

Within 24 hours of completing the last diary survey, participants were sent the posttest

survey, which included the empathy, emotion recognition, empathic concern, and prosocial

behavior measures, as well as the supplemental free-response questions (i.e., COVID-related

impacts, study impacts on behavior, perspectives on changes in empathy). As compensation,

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[1] One MTurk participant described their favorite leisure activity as fiction reading, so I invited them into the reading group.

participants received $2 for completing the pretest, $0.50 for each completed diary survey, and

$1 for completing the posttest. They received a bonus of $0.50, $1.00, and $1.50 for completing

at least 3, 6, or 9 diary surveys, respectively, to encourage continued participation. In total,

participants could receive up to $10.50 in compensation. They had the option to donate any part

of this compensation to charity. This option was presented to them at the end of the posttest,

when they learned how much they were receiving in compensation and prior to debriefing.

Analysis Plan

Quantitative Analyses

I used multilevel path analysis to test most of my hypotheses because of the hierarchical

nature of diary data (i.e., within-person level 1 diary response, between-person level 2 response)

requires taking account of between- and within-levels of variance (Nezlek, 2012). I used a 1-1-2

mediation design (Krull & MacKinnon, 2001), referring to time spent reading (level 1)

predicting transportation and reading flow (level 1) predicting empathy and emotion recognition

(level 2). This design (i.e., level 2 outcome) cannot be fit with traditional multilevel modeling, so

a flexible SEM framework must be used (Card, 2012; Christ et al., 2017; Preacher et al., 2010).

In light of this, I used Mplus to run analyses (Muthén & Muthén, 2017). In path analysis, all

measures are treated as observed variables, so composites were calculated. I used Bayesian

estimation (as opposed to maximum likelihood) because it has several advantages, including

increased power with small sample sizes (e.g., $N = 100$), low Type I error rates, and probabilistic

interpretation (i.e., likelihood of results being true given the hypothesis; Miočević et al., 2017;

Yuan & MacKinnon, 2009). For all analyses, I used the default, diffuse priors in Mplus (Muthén

& Muthén, 2017). This approach lets the data "speak for themselves" in the posteriors (Yuan &

MacKinnon, 2009, p. 306) and produces estimates similar to or more precise than the maximum likelihood approach (Miočević et al., 2017).

Hypotheses 1-5 (i.e., reading enhancing empathy, partially mediated by transportation and reading flow) were tested using path analysis. Hypothesis 6 (i.e., differences in empathy between groups) was tested using one-way ANCOVA. Hypothesis 7 (i.e., empathy and donating) was tested using logistic path analysis, with group predicting donation behavior or not. Ancillary hypotheses (i.e., lifelong reading and empathy; need for affect, mind reading motivation and transportation) were tested using path analysis, specifying the different predictors and outcomes of interest. As well, RQ1 was assessed using path analysis, looking at the strength of relationship between self-report and objective empathy scores.

Qualitative Analyses

Free responses to questions about how participants' empathy changed, how COVID-related lockdowns impacted participants, and how participating in the study impacted participants' behaviors were analyzed using a conventional content analysis (Hsieh & Shannon, 2005). This approach was useful because I did not have a priori expectations about what participants might describe as having an impact on their empathy or how COVID-related lockdowns or the study design might influence them. Rather, the content analysis approach allowed for examining participants' unique perspectives and the development of themes based on their perspectives.

Measurement Reactivity

Finally, an important consideration with longitudinal diary data is measurement reactivity, referring to systematic biasing of instrumentation and procedures on the validity of data (e.g., testing effects pertinent to diary studies; Barta et al., 2012). Measurement reactivity

was not expected to be a significant issue in this study. The main sources of reactivity (i.e., feeling like one is being observed, social desirability, satisficing when responding) were attenuated by (a) spacing out diary responses across days, (b) measuring social desirability and asking about innocuous behaviors (i.e., reading), and (c) keeping diary surveys short. To increase confidence that measurement reactivity was not an issue, participants were asked to answer a free-response question, "Do you feel that participating in this study influenced your reading habits/leisure activity choices over the past month?" Using content analysis, qualitative responses were coded and emergent themes that shed light on how the study procedure influenced participants, if it did, were identified. Further, I assessed reactivity by checking the statistical assumption of stationarity. Stationarity requires that participants' responses do not vary systematically because of simply time (McNeish & Hamaker, 2020). That is, responses at measurement occasion 1 should not be correlated with responses at measurement occasion 2 any more than they are with responses at measurement occasion 3. To check stationarity, I regressed outcomes of interest on measurement occasion as a variable. If there is no relationship between measurement occasion and outcomes of interest, stationarity is established.

Chapter 3

Results

Preliminary Analyses

Data Cleaning and Assumptions

Data cleaning entailed assessing whether participants completed an adequate number of diary surveys and whether they paid attention to the surveys while responding (i.e., acceptable scores on the GERT-S, passing attention checks). In the reading group, participants completed most diary surveys ($M = 8.5$, $SD = 0.86$). One participant completed only five diaries; however, no results were significantly different when their data were excluded, so their data were retained to maintain power. Five participants had unacceptably low GERT-S scores on either the pretest or posttest (range = 6-11) and were removed. All others responded appropriately to attention checks. In the leisure group, participants completed most diary surveys ($M = 8.85$, $SD = 0.85$), and all completed six or more. Three participants' GERT-S scores were winsorized from scores of 14 or 15 to 16, to reduce the effect of negative outliers. All responded appropriately to attention checks.

Statistical assumptions were checked for all variables by examining quantile-quantile plots, histograms, boxplots, skew, and kurtosis. Other than the donation measure (which was dichotomized), all variables were normally distributed with skew and kurtosis between -1 and 1. I present zero-order correlations among within- and between-variables separately. Means, SDs, and correlations among diary-level variables are in Table 1. All variables were positively correlated, as expected. Means, SDs, and correlations among person-level variables are in Table 2. Relationships among person-level variables were generally in the directions expected.

Table 1

Zero-order Correlations, Means, and Standard Deviations for Diary-level Variables

	1	2	3
1 Time spent reading	—		
2 Transportation	**.15**	—	
3 Reading flow	**.12**	**.73**	—
M	4.07	5.69	5.44
SD	2.55	0.91	0.94

Note. Correlations significant at $p < .001$. Average time spent reading between diaries corresponds to "more than 1.5 hours but less than 2 hours."

Table 2

Zero-order Correlations, Means, and Standard Deviations for Person-level Variables (Reading Group Only)

	1	2	3	4	5	6	7	8	9	10	11	12
1 Time reading[a]	—											
2 Transportation[a]	.18	—										
3 Reading Flow[a]	.15	**.77**	—									
4 Pre-EAI	-.06	**.24**	.17	—								
5 Post-EAI	-.13	**.36**	**.32**	**.81**	—							
6 Pre-GERT[b]	**.22**	**.22**	.15	.09	.11	—						
7 Post-GERT[b]	.15	.11	.11	.05	.04	**.69**	—					
8 ART[c]	-.01	.02	.15	-.01	.06	.16	.17	—				
9 Social Desire	-.02	.07	.18	**.39**	**.35**	.09	.04	.05	—			
10 Age	.01	-.05	.17	.10	.16	**-.20**	-.13	**.41**	**.28**	—		
11 Education	.03	.11	.19	.17	.15	.12	.18	**.19**	.02	**.22**	—	
12 Gender	.16	-.04	.15	.11	.09	.01	.18	.06	.13	.13	.09	—
M	4.06	5.63	5.36	4.44	4.46	27.14	29.34	23.64	3.73	33.50	5.21	1.09
SD	1.74	0.70	0.75	0.56	0.54	4.51	4.79	9.58	0.84	13.03	1.34	0.95

Note. Pre- refers to pretest. Post- refers to posttest. EAI = Empathy Assessment Index, GERT = Geneva Emotion Recognition Test-Short, ART = Author Recognition Test, Social Desire = social desirability. Gender: 0 = male, 1 = female; genderqueer individuals ($n = 5$) were excluded for correlations with gender for interpretability. Bolded correlations are significant at $p < .05$.
[a]Based on within-person average time spent reading between diaries.
[b]Possible range of 0 to 42.
[c]Possible range of -50 to 50.

Though participants were not randomly assigned to groups (so results are not widely generalizable), it is useful to assess similarities and differences between groups to see how comparable results were. Comparisons between groups along relevant demographic and background characteristics can be found in Table 3. As expected, the reading group had greater lifelong reading compared to the leisure group. They also reported reading between diaries more often than the leisure group. After excluding missing responses, reading group participants reported some reading (of at least one book) in 72% of diaries (677 times); whereas leisure group participants reported some reading in 17% of diaries (154 times).

Table 3

Comparison of Demographic and Background Characteristics Between Groups

Variable	Reading Group M (*SD*)/count	Leisure Group M (*SD*)/count	Statistic	Value	Comparison
Age	33.5 (13.0)	32.1 (11.3)	*F*	0.72	Similar
Education	5.21 (1.34)	4.56 (1.29)	χ^2	17.52**	Reading higher
Gender	86% female	59% female	χ^2	23.93***	Reading more female
Ethnicity	81% White	56% White	χ^2	21.61***	Reading less diverse
Social Desire	3.73 (0.84)	3.76 (0.85)	*F*	0.08	Similar
ART	23.4 (9.35)	14.9 (9.28)	*F*	45.55***	Reading higher
Reading responses	72%	17%	χ^2	544.31***	Reading higher

Note. Comparison column is a summary of how reading group participants compared to leisure group participants. Social Desire = social desirability, ART = Author Recognition Test, a measure of lifelong reading. Gender: 0 = male, 1 = female, 2 = genderqueer. ART scores ranged from -50 to 50. Reading responses refers to number of responses when reading occurred as a proportion of all responses. **$p < .01$. ***$p < .001$.

Timing of Responses

Timing of responses was an important consideration in this study because transportation and reading flow are short-lived effects (Green & Brock, 2002; Thissen et al., 2018). This makes them vulnerable to recall biases as more time passes between those experiences and responding about those experiences (Gunthert & Wenze, 2013; Sudman et al., 1996). The diary design

helped attenuate these possible biases, as reading group participants reported about their reading experiences, on average, within 27.5 hours ($SD = 24.25$ hrs, median = 23.8 hrs). The time to complete diary surveys was also similar between groups, as intended, with reading group participants completing them in 21 minutes, on average ($SD = 135$ minutes) and leisure group participants completing them in 17 minutes, on average ($SD = 110$ minutes), $F (1, 1817) = 0.53$, $p = .469$.

Intraclass Correlations and Data Levels

Data had a three-level structure: responses for each book constituted level 1, responses for each diary constituted level 2, and individuals constituted level 3. There was inadequate data to estimate a three-level model though, largely because of the semi-continuous nature of reading responses. Time spent reading was a semi-continuous variable consisting of two parts (Malone & Lubansky, 2012). Participants responded (1) yes or no to time spent reading, and (2) if yes, how much time was spent reading. Participants did not report reading about the same book with regularity though. For each book mentioned in the pretest, participants could report about reading nine times. They reported reading each book, on average, between 0.74 to 2.65 ($SD =$ 1.26 to 1.94) times. In turn, intraclass correlation (ICC), referring to how much variance is accounted for by different levels, for transportation and reading flow attributable to different books was negligible (.00-.01), and responses were collapsed across books. Participants could also report about their reading on up to five different books in each diary. Across the study period, participants read, on average, more than three books each ($M = 3.56$, $SD = 1.35$), but they only reported on one book ($M = 0.89$, $SD = 0.77$) per diary, on average. ICC for transportation and reading flow attributable to different diaries was also negligible (.00-.03), and responses were collapsed across diaries. There were within-person differences in transportation (ICC = .43)

and reading flow (ICC = .49), not attributable to books or diary responses, which justified the multilevel approach to analyses though (Nezlek, 2012). Considering this, all subsequent analyses consist of within- and between-person components for all variables.

Measurement Reactivity

Measurement reactivity was a concern in this study, as the assumption of stationarity was violated, albeit to a minor degree. Among reading group participants, measurement occasion (e.g., Diary 1, Diary 2) had an insignificant but negative effect on time spent reading (B = -0.06, SD = 0.03, 95% CI [-0.12, 0.01]), such that the further along they were in the study, the less time they reported spending reading. Similarly, among leisure group participants, measurement occasion had an insignificant but negative effect on time spent reading (B = -0.04, SD = 0.03, CI [-0.10, 0.03]). However, among reading group participants, measurement occasion had a significant, positive effect on transportation (B = 0.09, SD = 0.03, CI [0.02, 0.15]) and reading flow (B = 0.12, SD = 0.03, CI [0.05, 0.18]). That is, the further along they were in the study, the more likely people were to report experiencing transportation and reading flow. Measurement occasion only exerted a small effect though, explaining 1.4% of the variance. Evidence for measurement reactivity indicates there are potential confounds that temper the interpretation of results in this study.

This small but appreciable degree of reactivity was also evidenced, particularly in the reading group, in participants' responses to the question about how the study influenced their behaviors. Roughly half (52%) said participating in the study might have or did impact their reading habits between a little to a moderate amount (M = 2.64, SD = 0.91, range = 1-5) on a 1-5 response scale. The most common theme that emerged, which 23 respondents referenced, was (a) feeling motivated and/or pressured to read more than one typically would: "It helped me

remember to set aside more time for reading (as opposed to other hobbies)." Another theme, which 6 respondents referenced, was (b) feeling like they had to persist with the five books mentioned in the pretest rather than changing books when they wanted: "Impacted the book choices I made as I tried to follow the ones I listed between completing other books not listed on initial survey." The last theme to emerge, which 4 respondents referenced, was (c) being more aware of their reactions while reading: "Usually I am unaware of how much I read, I was just more conscious of when I was reading." These qualitative responses do not fully account for measurement reactivity effects, but they do offer useful insights into how measurement reactivity manifested in this study.

Reactivity was less of a concern among leisure group participants. A minority (32%) of participants reported that the study might have or did impact their leisure activity choices, and, when it did, it was felt between a little to a moderate amount ($M = 2.62$, $SD = 1.04$, range = 1-5) on a 1-5 response scale. The most common theme that emerged, which 6 respondents referenced, was (a) they became more aware of how they were spending their free time: "It made me focus on what I was actually doing each day, like who I spent my time with and how." Another theme, which 3 respondents referenced, was (b) the study procedure made them prioritize activities they find enjoyable: "I think this study made me think more about how I spend my time each day. It made me realize that I needed to socialize more." Overall, qualitative responses suggest participating in the study did not impact either groups' empathy nor did it impact leisure group participants' reading habits.

Primary Analyses

For all hypothesis tests using path analyses, one must assess assumptions inherent in the model, like convergence and fit, to ensure the estimates from the model can be validly

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interpreted (van de Schoot et al., 2014). Path models were estimated using two independent

Markov Chain Monte Carlo chains (Muthén & Muthén, 2017) with 15,000 iterations. Model

convergence was assessed using Gelman-Rubin criteria (Gelman & Rubin, 1992), and the model

was considered to have successfully converged if potential scale reduction (PSR) values were

l.01 or less (Muthén & Asparouhov, 2012). I assessed model fit by examining two criteria: (a)

the 95% CI for the difference between the observed and replicated goodness-of-fit chi-square

values (χ^2 CI)—the interval should be approximately symmetrical and centered around 0 for a

good fitting model—and (b) the posterior predictive *p*-value (PPP), referring to the proportion of

chi-squared values obtained in the simulated data that exceed that of the actual data (van de

Schoot et al., 2014). The PPP should be greater than .05, and values close to .50 indicate a very

good fitting model. For all hypothesis tests, except the mediation model, the model converged

and fit the data well. Hence, I do not report model evaluation statistics for most hypothesis tests.

As noted, I used Bayesian estimation, and I report model estimates that are conceptually similar

to frequentist statistics. I report credibility intervals, rather than confidence intervals, and a *SD*

for the posterior distribution of data around point estimates, which is akin to *SE*. The interval and

SD help to gauge the degree of uncertainty around estimates, and, rather than assessing *p*-values,

intervals that do not include zero are considered statistically significant.

Transportation and Reading Flow as Mediators

The conceptual mediation model for Hypotheses 1, 4, and 5 is presented in Figure 1, and

model estimates can be found in Table 4. I controlled for gender and social desirability in these

analyses because they were significantly correlated with empathy (see Table 2). The first part of

the model (*X → Y Model*) fit the data well: PSR = 1.00, 95% χ^2 CI [-17.15, 21.58], PPP = .408. I

did not find support for Hypothesis 1 though, as time spent reading between diaries did not

positively predict empathy or emotion recognition. The lack of a relationship between time spent

reading between diaries and empathy and emotion recognition likely indicates there was no

underlying mediation in the data. The second part of the model ($X \rightarrow M$ *Model*) fit the data well:

PSR = 1.00, χ^2 CI [-11.02, 10.67], PPP = .497. I did find support for Hypothesis 4, as time spent

reading between diaries positively predicted transportation and reading flow. The third part of

the model (X & $M \rightarrow Y$ *Model*) did not fit the data well: PSR = 1.00, χ^2 CI [33.95, 96.75], PPP <

001. The lack of model fit suggests estimates for this model cannot be validly interpreted.

Moreover, I did not find support for Hypothesis 5, as transportation and reading flow did not

partially mediate the relationship between time spent reading between diaries and empathy and

emotion recognition. The effect of time spent reading between diaries on empathy was miniscule

through both transportation (indirect = 0.01, *SD* = 0.01) and reading flow (indirect = 0.01, *SD* =

0.01). Similarly, the effect of time spent reading between diaries on emotion recognition was

miniscule through both transportation (indirect = -0.02, *SD* = 0.07) and reading flow (indirect =

0.01, *SD* = 0.06). In sum, there was no evidence for transportation and reading flow acting as

mediators between time spent reading between diaries and empathy or emotion recognition.
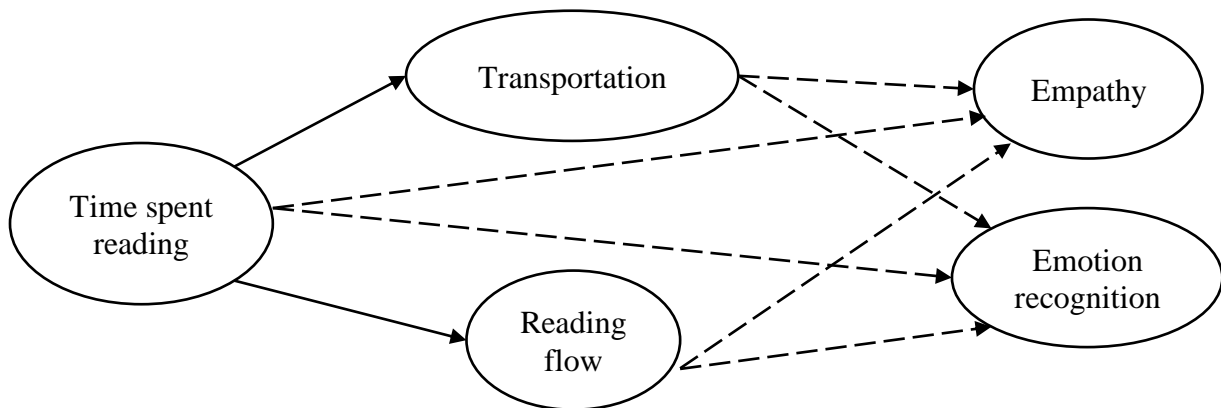

Figure 1. Conceptual mediation model showing paths from time spent reading between
diaries to empathy and emotion recognition. Solid paths are significant at *p* < .05. Dashed
paths are not significant. Path estimates are presented in Table 4.

Table 4

Mediational Testing of Transportation and Reading Flow as Mediators Between Time Spent Reading and Empathy and Emotion Recognition

Predictor	Outcome	Estimate	SD	95% CI
X → Y Model				
Time spent reading	Empathy	-0.09	0.07	[-0.22, 0.03]
Time spent reading	Emotion recognition	0.02	0.09	[-0.15, 0.19]
X → M Model				
Time spent reading	Transportation	**0.15**	**0.03**	**[0.09, 0.21]**
Time spent reading	Reading flow	**0.11**	**0.03**	**[0.05, 0.18]**
X & M → Y Model				
Time spent reading	Empathy	**-0.12**	**0.06**	**[-0.25, -0.01]**
Transportation	Empathy	0.09	0.08	[-0.07, 0.25]
Reading flow	Empathy	**0.16**	**0.08**	**[0.01, 0.31]**
Time spent reading	Emotion recognition	0.02	0.09	[-0.15, 0.19]
Transportation	Emotion recognition	-0.10	0.11	[-0.30, 0.12]
Reading flow	Emotion recognition	0.08	0.11	[-0.14, 0.27]

Note. Standardized estimates are reported, controlling for gender, social desirability, and pretest empathy and emotion recognition scores. Bolded estimates are significant.

Lifelong Reading and Empathy

In subsequent analyses, all predictors were grand mean centered, except time spent reading between diaries since it is on an interpretable metric without centering. I also controlled for social desirability and gender in analyses relating to empathy, since they were correlated with empathy (see Table 2).

Several hypotheses concerned the relationship between lifelong reading and empathy and between lifelong reading and emotion recognition. I did not find support for Hypothesis 2, as lifelong reading did not moderate gains in empathy or emotion recognition (see Table 5), nor did follow-up analyses suggest lifelong reading and time spent reading interacted to influence components of empathy individually. In other words, time spent reading between diaries had the same, minimal effect on empathy, its individual components, and emotion recognition, regardless of how much lifelong reading a participant already had.

Table 5

Moderation Effect Between Time Spent Reading and Lifelong Reading on Empathy and Emotion Recognition

Outcome	Estimate	SD	95% CI
Empathy	0.01	0.11	[-0.20, 0.22]
Emotion recognition	-0.15	0.11	[-0.36, 0.08]
Affective responding	-0.08	0.11	[-0.31, 0.14]
Affective mentalizing	0.03	0.11	[-0.19, 0.24]
Perspective taking	0.08	0.11	[-0.14, 0.29]

Note. Standardized estimates are reported. Estimates of empathy and its components were controlling for social desirability and gender.

I did not find support for Hypothesis 3 either. Time spent reading between diaries did not predict greater growth in the affective responding, affective mentalizing, or perspective taking components of empathy (see Table 6), nor did follow-up analyses suggest time spent reading between diaries predicted change in the emotion regulation or self-other awareness components of empathy. Time spent reading between diaries could have enhanced some components of empathy more than others, but present findings suggest it had little effect on any component of the construct.

Table 6

Effect of Time Spent Reading on Different Components of Empathy

Outcome	Estimate	SD	95% CI
Affective responding	-0.05	0.07	[-0.14, 0.10]
Affective mentalizing	-0.11	0.07	[-0.24, 0.03]
Perspective taking	-0.06	0.06	[-0.23, 0.12]
Emotion regulation	-0.06	0.07	[-0.19, 0.07]
Self-other awareness	-0.08	0.07	[-0.16, 0.11]

Note. Standardized estimates are reported, controlling for pretest scores, social desirability, and gender.

Comparison of Growth in Empathy between Groups

For Hypothesis 6, I expected the reading group would show greater gains in empathy and emotion recognition than the leisure group. Comparisons between groups at pretest and posttest

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are presented in Table 7. At the pretest, reading and leisure group participants had similar empathy scores, $B = -0.02$, $SD = 0.07$, 95% CI [-0.15, 0.12], and similar emotion recognition scores, $B = 0.10$, $SD = 0.06$, CI [-0.01, 0.22]. At the posttest, reading and leisure groups had similar empathy scores, $B = -0.01$, $SD = 0.07$, CI [-0.15, 0.13], but reading group participants had higher emotion recognition scores than leisure group participants, $B = 0.16$, $SD = 0.06$, CI [0.05, 0.27]. This difference held even after controlling for pretest emotion recognition scores, $B = 0.10$, $SD = 0.04$, CI [0.04, 0.18]. Delving deeper, the difference between groups was not predicted by time spent reading between diaries; instead, it was predicted by lifelong reading ($B = 0.18$, $SD = 0.07$, CI [0.04, 0.32]). Taking lifelong reading into account, group membership was no longer a significant predictor ($B = 0.10$, $SD = 0.06$, CI [-0.02, 0.22]). It was surprising that lifelong reading predicted greater emotion recognition scores at posttest, but not at pretest. This could be due, at least partly, to a repeated testing effect, but it may also suggest that reading exercises and improves emotion recognition abilities, even if it does not enhance empathy.

Table 7
Means (SD) for Empathy and Emotion Recognition Scores for Each Group

	Reading Group *M (SD)*	Leisure Group *M (SD)*	Comparison
Pretest			
Empathy	4.44 (0.56)	4.29 (0.60)	Similar
Emotion recognition	27.1 (4.51)	26.0 (4.31)	Similar
Posttest			
Empathy	4.46 (0.54)	4.33 (0.58)	Similar
Emotion recognition	29.3 (4.79)	27.4 (4.95)	Reading higher

Note. Comparison column is a summary of how reading group participants compared to leisure group participants.

Qualitative Insights into How Reading Enhances Empathy

Though quantitative analyses did not suggest fiction reading exerted much effect on facets of empathy (i.e., H3 & H6), qualitative responses to the question about whether

participants felt time spent reading impacted how they think about or interact with other people indicated otherwise. Though only some reading group participants (67 of 111) were asked this question, most of these respondents (72%) said time spent reading might have or did impact their empathy between a little and a moderate amount ($M = 2.75$, $SD = 0.89$, range = 1-5). In describing how their own empathy changed, the most common theme to emerge, which 8 respondents referenced, was that reading provided a way to gain greater understanding of others. One reader poignantly noted:

> Particularly while reading The Bell Jar, I gave a lot of thought to mental health/suicide/ grief/loss and how that affects the people in my life. I had empathy for the character while also feeling a tinge of annoyance, which I felt was probably a pretty reasonable equivalent of how people often feel towards people in their lives who are going through hard things.

Another respondent noted, "I think that the more I read about others' experiences (even fictional characters) and the empathy and understanding I feel for them and their stories, the more that empathy and understanding translates to my real-world interactions with people," and another said, "I became more aware about people around me and their emotions and their thought process. Reading helps me learn more about others and myself."

A second theme to emerge, which 5 respondents referenced, was that reading provided greater insight into experiencing emotions. One participant noted, "The two stories I read both had a great deal of sadness in them…Most of the time, I only focus on positive emotions, so reading…made me more aware of "negative" emotions," and another said, "I feel that reading made me more cognizant of the nuances in emotions," accurately concluding that "I think I did better on the post-test than the pre-test in regards to the [emotion recognition] videos."

A third theme to emerge, which 5 respondents referenced, was that reading provided a form of social interaction during lockdown. For instance, one reader noted, "Most of the books I read were re-reads…on a re-read, I feel like I can gain greater insight into the characters," and another said, "I am very isolated due to COVID. Reading makes me at least feel a connection to others." Overall, qualitative data provide some support for the conclusion that reading can enhance facets of empathy.

Insights from these qualitative responses were also useful for providing some support for the theoretical expectations regarding how reading enhances empathy. For instance, the idea that reading serves as a form of social interaction suggests reading may act as a medium for mental simulation of social experiences (Mar & Oatley, 2008). One participant reported reading "5th grade interest" novels so they could build more engaging curricular materials for their students. Reading fifth grade material, this respondent reasoned, offered insight into how these students think and feel. There was also support for readers using imaginative engagement—contributing one's own thoughts and perspectives to the interpretation and understanding of stories (Barnes, 2018)—to better understand real-world others. For instance, one respondent noted, "If I have empathy for a character…and understand why a 'good' character would do a 'bad' thing, I can see real people in that way too." Finally, several participants reported that they were reading fiction as a means of better understanding other people. A respondent described how, "I am always looking for books that expand my worldview and let me step into the shoes of different kinds of people." This quotation suggests at least one participant sought out books that could spur accommodative thinking (Narvaez, 2002). Similarly, the respondent who described reading *The Bell Jar*, with its focus on mental health issues, noted the book helped instill in them a newfound way of thinking about and interacting with real-world others facing similar issues.

For comparison, I also asked leisure group participants to report on the extent to which their empathy changed. This was done to increase confidence that changes in empathy among reading group participants were more likely associated with reading rather than factors like being under lockdown. A majority (54%) of leisure group participants said their "outlook toward other people and others' perspectives" might have or did change over the past month between a little to a moderate amount ($M = 2.74$, $SD = 0.83$, range = 1-5). Their reasons for feeling this way were highly varied compared to reading group participants though. Some reported that they became more empathic. For instance, one respondent noted, "During the past month I have realized more that I have to take my own personal feelings out of assessments I make of others' feelings and just see them for [who] they are," and another wrote, "Just being around people more has made me realize I have to be more aware and tolerant." However, others reported that their empathy levels had dropped: "I am feeling more bitter towards others after being forced into a caregiving role," and another said, "I'm more annoyed and frustrated with people than I used to be." These responses suggest that the mechanisms underpinning changes in leisure group participants' empathy were not the same ones influencing reading group participants, and none reported that reading had an impact on them.

Donation Behavior and Empathy

Since donation was dichotomized, estimates here are reported in probit units—regression coefficients give the change in z-score of the outcome for a one unit change in the predictor. I did not find support for Hypothesis 7, as neither empathy ($B = 0.16$, $SD = 0.09$, 95% CI [-0.01, 0.33]) nor emotion recognition ($B = 0.10$, $SD = 0.08$, CI [-0.06, 0.26]) predicted whether participants would donate their compensation. Although not significant, empathy scores did have a marginally positive effect on donation behavior. Despite facets of empathy not predicting

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donating, as a follow-up, I examined whether there were differences in donating at the group level. Reading group participants (coded 1) were more likely to donate their compensation than leisure group participants (coded 0), even controlling for empathy and emotion recognition, $B = 0.31$, $SD = 0.07$, CI [0.18, 0.44]. Because of the differences at the group-level, I assessed whether empathy and emotion recognition scores predicted donating among reading group participants only. Still, neither empathy ($B = 0.21$, $SD = 0.12$, CI [-0.04, 0.42]) nor emotion recognition ($B = 0.09$, $SD = 0.12$, CI [-0.14, 0.31]) predicted donation behavior. In sum, reading group participants were more likely to donate their compensation, but the reason for this was not related to individuals' empathy or emotion recognition scores.

Empathy and Emotion Recognition

The answer to RQ1 (i.e., whether empathy was related to emotion recognition) is that empathy was not associated with emotion recognition at pretest or posttest (see Table 8). To follow-up, I examined whether the perspective taking or affective mentalizing components of empathy were uniquely associated with emotion recognition. This turned out not to be the case at either pretest or posttest. These results suggest there was a weak relationship between empathy and emotion recognition abilities. Pretest empathy scores explained 1.3% of the variance in pretest emotion recognition scores, and posttest empathy scores explained 0.9% of the variance in posttest emotion recognition scores. In sum, the relationship between the updated conceptualization of empathy (Segal et al., 2017) and objective emotion recognition abilities was weak, just as it has been found to be with other self-report empathy and emotion recognition measures (Israelashvili et al., 2019; Murphy & Lilienfeld, 2019).

Table 8

Components of Empathy Predicting Emotion Recognition

Variable	Estimate	SD	95% CI
Pretest			
Empathy	0.10	0.06	[-0.03, 0.21]
Perspective taking	0.08	0.06	[-0.05, 0.20]
Affective mentalizing	0.04	0.07	[-0.10, 0.16]
Posttest			
Empathy	0.08	0.07	[-0.05, 0.20]
Perspective taking	0.05	0.07	[-0.09, 0.18]
Affective mentalizing	0.06	0.07	[-0.08, 0.19]

Note. Standardized estimates are reported, controlling for social desirability and gender.

Supplemental Analyses

As noted, I collected data for supplemental analyses related to how COVID-related lockdowns impacted participants and a measure of empathic concern, to assess another facet of empathy. Among reading group participants, a majority (69%) reported that COVID-related lockdowns might have or did impact their responses between a moderate amount to a lot ($M = 3.52$, $SD = 0.99$, range = 2-5). In describing how lockdowns impacted participants' reading habits, two common themes emerged. They noted that (a) they had more time to read: "I have a lot more time to read (don't go out as much as I used to)," but some also noted (b) COVID-related stress in their life made it more difficult to focus on reading: "More mentally/emotionally tired, less inclined to pick up a book." There were similar responses among leisure group participants, with a majority (79%) saying lockdowns might have or did impact their leisure activities between a moderate amount to a lot ($M = 3.47$, $SD = 0.93$, range = 2-5). In describing how lockdowns impacted their leisure activities, two themes emerged. Participants noted most frequently that (a) there were fewer activities to engage in: "Would really love to eat inside restaurants. It also really harmed a lot of friendships." Many also, understandably, noted (b) fear

of COVID made them limit their interactions with other people and their leisure activity choices: "I don't enjoy taking a walk as much because I'm constantly pulling up my mask and avoiding people on the sidewalk." In short, lockdowns impacted participants' reading and leisure activities in different ways. Reading group participants had more time to read, and leisure group participants had fewer activities to participate in.

Finally, there were also differences between groups related to empathic concern. Reading group participants reported greater empathic concern ($M = 5.67$, $SD = 0.78$) than leisure group participants ($M = 5.28$, $SD = 0.93$) at pretest (Group $B = 0.19$, $SD = 0.06$, 95% CI [0.07, 0.30]). They also reported higher scores ($M = 5.65$, $SD = 0.73$) than leisure group participants ($M = 5.29$, $SD = 0.91$) at posttest (Group $B = 0.18$, $SD = 0.06$, CI [0.07, 0.29]), though there were no changes across time for either group. Among reading group participants, time spent reading was not associated with posttest empathic concern ($B = 0.01$, $SD = 0.11$, CI [-0.20, 0.22]) nor was lifelong reading ($B = 0.04$, $SD = 0.07$, CI [-0.10, 0.17]). Notably, though, empathic concern was positively predictive of donation behavior (probit $B = 0.37$, $SD = 0.08$, CI [0.21, 0.51]). Surprisingly, there was no association between empathic concern and social desirability ($B = 0.09$, $SD = 0.07$, CI [-0.04, 0.21]), even though empathic concern was positively associated with empathy and empathy was positively associated with social desirability. As a convergent validity check, I assessed the relations between empathic concern, empathy, and emotion recognition. Results showed empathic concern was strongly associated with empathy but weakly associated with emotion recognition (see Table 9). In short, compared to leisure group participants, reading group participants reported greater empathic concern, and this predicted greater donation behavior; however, time spent reading did not predict donation behavior in either group. Moreover, results suggest that the different facets of empathy are related but distinct.

Table 9

Zero-order Correlations Between Empathic Concern and Facets of Empathy

	1	2	3	4	5	6
1 Pre-IRI	—					
2 Post-IRI	.79***	—				
3 Pre-EAI	.40***	.40***	—			
4 Post-EAI	.44***	.50***	.80***	—		
5 Pre-GERT	.05	.10	.12	.10	—	
6 Post-GERT	.14*	.11	.18**	.09	.68***	—

Note. Pre- refers to pretest. Post- refers to posttest. IRI = Interpersonal Reactivity Index. EAI = Empathy Assessment Index. GERT = Geneva Emotion Recognition Test-Short.

*p < .05. **p < .01. ***p < .001.

Chapter 4

Discussion

The purpose of this study was to better understand the mechanisms undergirding how reading enhances empathy. It was designed to address calls in the field for more rigorous and substantial studies of the relationship between fiction reading and empathy (Dodell-Feder & Tamir, 2018). To my knowledge, the study covered the longest time span (27 days) and collected the most measurements (9 diaries) of any published study on the topic. Though it has been established that reading *can* enhance empathy (Mumper & Gerrig, 2017), the question of *how* it does so is undeniably complex and not fully answered here. In this section, I summarize and highlight notable findings that emerged, and I explain how they connect to prior work, while unpacking their theoretical and practical implications. I conclude with limitations of this study and directions to move the field forward.

Summary of Findings

There was mixed support for the hypotheses in this study. For one, I did not find evidence that transportation or reading flow mediated the relationship between time spent reading between diaries and empathy or emotion recognition. Time spent reading did increase transportation and reading flow, but, over the course of the study, time spent reading had little effect on empathy, its individual components (e.g., perspective taking, affective mentalizing) or emotion recognition. As well, there was not a relationship between lifelong reading and empathy, although lifelong reading positively predicted reading group participants' emotion recognition abilities, a finding in line with past research (Mar et al., 2006, 2009; Mumper & Gerrig, 2017).

Other hypotheses proposed that facets of empathy would predict donation behavior. Results showed empathy had a marginal, positive influence on donation behavior, but emotion

recognition had little influence. In line with past research (Davis, 2015; FeldmanHall et al., 2015), empathic concern had the strongest influence on donation behavior of the three facets of empathy. As well, like with other self-report empathy measures (Murphy & Lilienfeld, 2019), there was a lack of a relationship between self-report empathy and objective emotion recognition. Finally, supplemental analyses suggested COVID-related lockdowns influenced participants' reading and leisure habits, but not so much that results cannot be generalized to participants' habits before lockdowns were instituted. These analyses also point to empathic concern as the most prominent difference between groups among the facets of empathy. This was surprising because I expected reading group participants to be higher on each of the facets of empathy compared to leisure group participants (e.g., Bal & Veltkamp, 2013; Djikic et al., 2013; Kidd & Castano, 2013). Still, even though there were group differences in empathic concern, these differences were not attributable to time spent reading or lifelong reading.

Inconclusive Evidence Regarding How Reading Enhances Empathy

Unexpectedly, findings were inconclusive regarding the central question of this dissertation: How does reading enhance empathy? There was little quantitative support for theoretical (Barnes, 2018; Mar & Oatley, 2008; Narvaez, 2002) and empirical (Bal & Veltkamp, 2013; Dodell-Feder & Tamir, 2018; Tamir et al., 2016) lines of research suggesting transportation and reading flow would partially mediate the relationship between time spent reading and empathy. This finding is particularly surprising given the high levels of reading reported during the study. Reading group participants reported reading, on average, for a total of 16.4 hours during the 27-day period (SD = 10 hrs, minimum = 0 min, maximum = 47.5 hrs). Their time spent reading was also spread across multiple books, as they reported reading each book, on average, for 5.5 hours (SD = 4.25 hours, minimum = 30 minutes, maximum = 35

hours). Overall, the lack of significant findings does not disconfirm the theories and empirical findings that guided this study, but they do warrant further explanation, which I offer below.

Reading and Theory of Mind

One possible explanation for the lack of findings could be that reading does *not* enhance empathy, as defined here (Cuff et al., 2016; Segal et al., 2017), but rather reading enhances *theory of mind* (ToM), or the recognition that others have their own internal thoughts and feelings (also called emotion recognition), instead. Indeed, findings from the present study suggest that lifelong reading predicted greater emotion recognition, which would be consistent with ToM (Mar, 2018; Mumper & Gerrig, 2017). Suggesting reading does not enhance empathy might seem counterintuitive, but confusion around empathy and ToM likely stems from the numerous ways scholars describe the way reading influences facets of empathy. Like the myriad measures used in this field, authors have used many terms to describe the relationship between reading and facets of empathy, including "empathy" (Burke et al., 2016; Johnson, 2012; Koopman, 2016), "theory of mind" (Kidd & Castano, 2013; van Kuijk et al., 2018), and "social cognition" (Black & Barnes, 2015; Dodell-Feder & Tamir, 2018; Mar, 2018; Mumper & Gerrig, 2017). Careful examination reveals scholars (Black & Barnes, 2015; Kidd & Castano, 2019; Mar, 2018; Mar et al., 2006; Panero et al., 2016; van Kuijk et al., 2018) often use ToM, social cognition, and emotion recognition interchangably—a problematic practice (e.g., Burke et al., 2016)—but present results suggest, to choose one, ToM should be the preferred term over the term "empathy" when describing how reading enhances facets of empathy.

Another reason to believe that fiction reading might enhance ToM more than empathy has to do with the complex nature of empathy and the comparatively more straightforward nature of ToM. ToM is a simpler skill than empathy. It does not necessarily draw on the same cognitive

and affective skills required to fully evoke empathy (Decety, 2011). ToM requires individuals to recognize that others have a point of view and their own emotions, and the present study found that lifelong reading was positively associated with scores on the Geneva Emotion Recognition Test-Short (Schlegel et al., 2016), which is conceptually a measure of affective theory of mind (Walter, 2012). This test requires respondents to decipher emotional cues without the need to consider contextual or interpersonal cues. Empathy, however, requires individuals to engage in high level cognitive and affective processing (e.g., perspective taking, affective mentalizing; Decety, 2005), which can be mentally challenging (Eyal et al., 2018; Cameron et al., 2019). Empathy requires not only recognizing that others have a point of view and emotions (e.g., I see that a person is sad), but also sharing and understanding the other person's perspective (e.g., I share my friend's sadness because I know what it is like to have my feelings hurt by someone I care for). Stories often, though not always (e.g., Barnes, 2018), provide the contextual and interpersonal cues required to understand characters' emotions and reactions, so reading may not exercise the full breadth of abilities underlying empathy, at least not to the same extent that it exercises ToM abilities.

Further support for suggesting reading enhances ToM comes from the reading comprehension literature. ToM is regarded as an essential underlying ability in many theories of reading comprehension (Atkinson et al., 2017; Dore et al., 2018; Paris & Paris, 2003). Studies of reading have found readers generate mental images of characters (Speer et al., 2009), track emotionally laden storylines (Altmann et al., 2012; Mouw et al., 2019), and connect with diverse characters (Mar et al., 2006; Tamir et al., 2016), all of which require the ability to recognize others have their own internal thoughts and feelings. Other studies suggest reading comprehension is not possible without at least rudimentary ToM abilities (Neuman et al., 2014).

Present findings and theoretical insights from reading comprehension literature point to an inextricable link between reading and ToM that serves to strengthen the conclusion that reading enhances ToM, specifically, more than it enhances empathy.

Different Measures of Facets of Empathy

Another explanation for the lack of a relationship between reading and empathy may have to do with the measures I employed in the present study. I used the Empathy Assessment Index (Segal et al., 2017) to measure empathy, the Geneva Emotion Recognition Test-Short (GERT-S; Schlegel & Scherer, 2016) to measure ToM, and the most up to date version of the Author Recognition Test (Moore & Gordon, 2015) to measure lifelong reading. I chose these measures because they have more sound psychometric properties than measures used in previous studies.

It is possible measures used in past studies have resulted in spurious associations between time spent reading and empathy. Past studies (e.g., Oliver et al., 2012) have used relatively simplistic measures of empathy, focusing on only one or two components of empathy (e.g., empathic concern or perspective taking, as measured by the Interpersonal Reactivity Index; Dodell-Feder & Tamir, 2018; Mumper & Gerrig, 2017) and labeling it as "empathy." However, these measures are often too narrow in scope (e.g., focusing on shared emotions; Jordan et al., 2016) to validly assess empathy or conflate constructs related to but distinct from empathy (e.g., sympathy, compassion; Johnson, 2013). It is possible the conceptual narrowness of these measures made it easier to detect relationships that were not observed in the present study. Studies have also used different ToM measures like the Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001) or the Diagnostic Analysis of Nonverbal Accuracy (DANVA; Booth et al., 2019; Nowicki & Carton, 1993), both of which require one to recognize

emotions from static photos of faces. These measures are limited by their simplistic nature (i.e.,

static photo; Schlegel et al., 2014) and strong association with intelligence (Baker et al., 2014)

rather than emotion recognition ability (Black, 2019; Oakley et al., 2016). Because of this, past

studies might have been more clearly detecting a relationship between reading and intelligence,

which are strongly, positively associated (Peng et al., 2019), rather than between reading and

ToM. Further, studies (Kidd & Castano, 2013, 2019; van Kuijk et al., 2018) have used older

versions of the Author Recognition Test (ART; Acheson et al., 2008; West et al., 1993), but

there is a need to continually update the ART to reflect readers' preferences and cultural shifts

among readers (Moore & Gordon, 2015). Overall, these older measures still have a degree of

validity (Acheson et al., 2008; Booth et al., 2019), but pressing issues like measurement validity

of the Interpersonal Reactivity Index (Chrysikou & Thompson, 2016) and the need to

synchronize measures used in this field (Burke et al., 2016) substantiate recommendations to use

the newer and more psychometrically sound measures.

Using different measures of facets of empathy also highlights the potential explanation

that self-report measures of empathy are less likely to detect change associated with time spent

reading compared to objective ToM measures. This conclusion is supported by finding that

empathy scores were positively associated with socially desirable responding. Participants may

have inflated their self-perceived empathy skills, as past research has shown (Israelashvili et al.,

2019), but present results show this problem can be attenuated by using objective measures.

Though present results do not support research showing time spent reading can enhance self-

reported empathy (Bal & Veltkamp, 2013; Johnson et al., 2013), those studies did not account

for socially desirability and its potential impact on participants' responses, which lowers the

confidence those findings could be replicated. On the contrary, present results do support

research showing time spent reading can enhance ToM abilities (Black & Barnes, 2015; Kidd & Castano, 2013). Finding lifelong reading was positively associated with the GERT-S, which has enhanced ecological validity over measures like the RMET or DANVA (Schlegel & Scherer, 2016), not only highlights the potential importance of using objective ToM measures to assess the impact of time spent reading on facets of empathy but increases the confidence that reading enhances ToM abilities.

In sum, the myriad measures used by researchers in this field perpetuate difficulties with comparing results across studies (Valkenburg, 2015) and determining whether researchers are assessing the same concepts in their investigations (Burke et al., 2016). The lack of agreement about the most appropriate measures of the facets of empathy is not unique to reading studies (Batson, 2009), but findings do suggest that use of up to date measures likely produces different results than older measures. Determining why these differences were observed (e.g., reading did not influence empathic concern; Bal & Veltkamp, 2013) will require replication with these newer measures.

Developmental Effects on Reading and Empathy

Developmental insights also highlight potential explanations for the lack of a relationship between reading and empathy specifically. The study sample consisted of adult readers. I included adults because I expected they were the most likely to infer social information from stories (Altmann et al., 2012; Mouw et al., 2019; Narvaez et al., 2010), and I expected them to have more well-developed cognitive and affective abilities (Hay & Diehl, 2011; Labouvie-Vief, 2015) than child or adolescent readers. These factors were expected to facilitate the growth of adult readers' empathy through reading fiction. Adults' well-developed inferential and cognitive and affective abilities contribute to adults reading more varied stories than younger readers

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(Botzakis, 2009; Schutte & Malouff, 2007) that bring them into simulated contact with a wide range of social experiences (Hakemulder, 2000; Willems & Jacobs, 2016). Indeed, readers in this study reported reading approximately 386 books (with some overlap among titles), including classics like *The Brothers Karamzov* by Fyodor Dostoyevsky and newer ones like *The Underground Railroad* by Colson Whitehead. However, it is possible the books they chose to read served to reinforce social schemas they already had firmly in place (e.g., slavery is bad; Labouvie-Vief, 2015) rather than spur accommodative thinking (Narvaez, 2002). This is because with increasing age social schemas become more firmly established (Narvaez, 2005), and reading stories, even profound classics like *The Brothers Karamzov* or Orwell's *1984*, might only contribute incrementally to changing social schemas.

Another developmental insight that could help explain why time spent reading did not influence empathy takes into account the relatively brief duration of the study. Avid adult readers' lifelong reading likely spans years and potentially hundreds of books. Reading up to five books in one month's time then, by comparison, is likely to have a much smaller effect, pointing to the possibility that the influence of reading on empathy and ToM attenuates with age. Participants' free responses about how reading influenced their levels of empathy also support this reasoning. One noted, "I read a lot, all the time, so not sure this period made much difference," and another stated, "reading . . . in the last month was [not] any more impactful than an average month, [but] I do hope that by continuously reading and gaining new perspective, I'm able to become more empathetic and interact more positively with others." The choice to complete diary surveys across one month's time seemed reasonable at the outset of this study, as only one other study has come close to investigating reading across this length of time (Pino & Mazza, 2016). However, in the end, it seems a month may have been too short a period to

capture significant changes in any facet of empathy, at least among adults. A longitudinal study that follows adults over years might be better suited to capturing changes in empathy or ToM that result from reading fiction.

Participants' Perspectives on Their Changing Empathy

The qualitative responses offer some insight into the impact of reading on facets of empathy. For example, participants' responses provided limited but clear support for the theoretical expectations guiding this investigation. Reading seemed to have a unique influence on readers' empathy that was not mirrored in leisure group participants' descriptions of changes in their empathy. As well, the richness of respondents' descriptions regarding how reading impacted their thinking about and understanding of others suggests reading can shape facets of empathy, even if this impact is limited to a few readers. That is, most themes that emerged were based on responses from eight respondents or fewer. Still, finding that these experiences were limited to a few readers aligns with the Different Susceptibility to Media Effects Theory predictions (Valkenburg & Peter, 2013), in highlighting the uniqueness of individuals' reading experiences. The uniqueness of readers' experiences also helps explain why the qualitative analyses showed support for the theoretical expectations guiding this study and seemingly contradict the quantitative findings—on average, readers did not experience changes in empathy during the study; however, some did, and this nuance was captured in the qualitative analyses because they allowed for examining participants' unique perspectives. Also of note, no respondents mentioned how reading impacted their emotion regulation or self-other awareness—fundamental components of empathy—which could help explain why reading did not enhance empathy, as conceptualized here.

Reading, Empathy, and Donating

Another unexpected finding from this study was the lack of a relationship between reading and prosocial behavior (i.e., donating). I expected this study would provide empirical evidence supporting long-held beliefs about how reading functions as a moral laboratory (Hakemulder, 2000) and influences prosocial behavior (Keen, 2007; Vitz, 1990), but it did not. Neither time reading nor lifelong reading predicted donation behavior. This finding fails to support past research (Johnson, 2012; Koopman, 2015). One reason for this could be related to the story content. Studies that have found links between reading and prosocial behavior tend to feature morally elevating stories with prosocial themes (Aquino et al., 2011; Coyne et al., 2018; Freeman et al., 2009; Johnson, 2012). This study left the decision of what to read up to participants, to assess readers' everyday reading material. As a result, it is possible, even likely, that few readers read stories with this kind of content (Willems & Jacobs, 2016). Another reason could be because reading primarily enhances ToM, and ToM (emotion recognition) had the weakest association with donation behavior of any facet of empathy.

The lack of a relationship between reading and donating could also be attributable to the costly nature of the donation behavior (e.g., FeldmanHall et al., 2015). Participants were not aware they would have the option to donate until the end of the posttest. This was partly to avoid moral licensing effects (Blanken et al., 2015). I did not want participants to be aware of the donation option beforehand and decide to engage in other prosocial activities in lieu of donating. Instructions at the end of posttest read as follows: "Based on number of surveys you completed (X), you will be receiving $(X) in compensation. If you would like, you may donate some or all of your compensation to a book-related charity (Book Aid International). I will make the donation on your behalf, and you will receive any amount you choose not to donate." These

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instructions were followed by a blank text box, which allowed participants to indicate how much they wanted to donate. There was no imperative to donate, but roughly half (49%) of participants did, with most who donated (65%) giving all their compensation to charity. Individual donations ranged from $0.50 to $10.50, and participants donated $703.50 in total. This represented a real sacrifice from participants in that many responded to approximately 11 surveys (in total) across one month's time without accepting any compensation.

Although reading did not predict donation behavior, empathic concern and empathy, to a small degree, did. This is in line with much research highlighting positive outcomes associated with empathy (Davis et al., 1999; Freeman et al., 2009; Van der Graaff et al., 2018). One surprising aspect of these findings is that reading group participants consistently had greater empathic concern than leisure group participants, but empathic concern was not predicted by time spent reading in either group or participants' background characteristics (i.e., age, gender, education, ethnicity; *B* estimates ranged from -0.05-0.12, *SD* ranged from 0.05-0.07). In light of this, it is unclear why empathic concern differed between the groups. Still, in sum, results support the positive impact of empathy on prosocial behavior but do not provide evidence for a link between reading and prosocial behaviors.

Complex Relations Between Facets of Empathy

Findings also highlight the complex relations between different facets of empathy. In this way, they support the continued need to incorporate multiple measures of facets of empathy (i.e., empathy, empathic concern, ToM) into investigations of how reading enhances empathy or ToM. It was reasonable at the outset of this study to expect reading would exert different effects on unique facets of empathy (e.g., empathy, emotion recognition; Black & Barnes, 2015; Kidd & Castano, 2013; Koopman, 2016), as the facets are inextricably related (Segal et al., 2017; Walter,

2012). However, results make clear that different facets of empathy contribute to empathic feelings and outcomes in different ways. For example, empathy and empathic concern were positively correlated (see Table 9), but empathic concern predicted donating behavior more strongly than empathy. This makes sense as empathic concern is a response evoked by feeling empathy first and then feeling concern for others (Batson et al., 2015). Indeed, some people purposefully attenuate empathic feelings to avoid the ensuing guilt associated with not acting on empathic concern (Cameron & Payne, 2011; Hoffman, 2008). The present results add to the growing body of evidence suggesting empathic concern differs from empathy (Cuff et al., 2016; Segal et al., 2017), and, therefore, it should not be used as a proxy for empathy, as it has been in some studies (e.g., Bal & Veltkamp, 2013; Djikic et al., 2013; Koopman, 2016). Overall, these findings support the need for researchers to use clearly defined terms and measures for describing the facets of empathy they are investigating and explaining how reading influences those facets (Burke et al., 2016).

Another example of the complex relations among facets of empathy stems from the finding that empathy and empathic concern were not associated with objective measures of ToM (emotion recognition). It was an open question as to whether the Empathy Assessment Index (Segal et al., 2017) would be associated with ToM when other empathy measures, like the Interpersonal Reactivity Index, have not been (Murphy & Lilienfeld, 2019). These results help move the field of empathy studies forward by providing more support for the distinction between objective ToM and self-report empathy. Present data do not explain why objective ToM diverged from other facets of empathy, but research suggests people overestimate their empathic skills (Israelashvili et al., 2019). Findings also suggest socially desirable responding may have inflated participants' empathy scores (see Table 2). I expected social desirability would pose a threat to

candid responding and tried to attenuate it by not referring to "empathy" in the survey, but this may not have been enough to wholly eliminate the issue. More candid responding might reveal a stronger connection between empathy and ToM. Still, though the effects of socially desirable responding appear to have been appreciable, findings are in line with past research (Israelashvili et al., 2019; Murphy & Lilienfeld, 2019), suggesting current results are a good approximation of the relationship between empathy and objective ToM. Further, finding that socially desirable responding influenced empathy scores, even in a survey designed to attenuate such responding, suggests social desirability should be taken into account in future studies of empathy.

Impacts of COVID on Participants' Behavior

COVID-related lockdowns undoubtedly impacted all participants' lives in some way (Mata et al., 2021), but I did not expect lockdowns to have much impact on participants' reading behavior. Based on how they described the impact of lockdowns in their lives, it does not appear to have done so. For instance, reading group participants generally had more time to read. Some turned to reading as an escape, a cheap and effective form of entertainment, and though some noted how the emotional toll of the pandemic discouraged them from reading, they still spent time reading. The avid readers in this sample dedicated time to reading before lockdown, and many of them continued reading during the lockdown. Notably, dedicating time to one's hobbies like this appears to have been a successful strategy for many to deal with COVID stressors (Fullana et al., 2020), further supporting expectations that readers continued reading during lockdown. Likewise, leisure group participants reported having fewer activities available to them, but they still sought out leisure activities. It is possible the study procedure even had a positive impact on their well-being, by bringing leisure time into focus for them. This is because leisure time was a strong, positive predictor of resilience during lockdown (Killgore et al., 2020).

Applications

There are a few useful insights from this study that could be applied in real-world settings. First, the findings support expectations that the effects of reading on empathy are slow to build (Djikic et al., 2013; Mumper & Gerrig, 2017). One does not simply pick up a book, read 300 pages, and become a more empathic person. That is, reading cannot be considered a magic bullet for improving society, even if the diversity of social learning experiences that can be found in the pages of books seem promising for contributing to a more empathic and moral society (Hakemulder, 2000; Willems & Jacobs, 2016; Wolk, 2009).

Another practical application of this study is the likely need to update the Author Recognition Test. The most recent update was six years ago now (Moore & Gordon, 2015), and Moore and Gordon noted the measure needs to be updated roughly every 10 years to remain current with readers' changing preferences and cultural shifts. In support of this, reading is likely similar to other forms of media use in that it is becoming more individualized (Valkenburg et al., 2021), and though no single measure can fully capture individuals' lifelong reading, the Author Recognition Test is a creative and useful measure for approximating it that can continue being useful in future studies. Still, any updates to the Author Recognition Test will need to undergo rigorous item response theory analysis to make sure it discriminates well between avid and less avid lifelong readers, as the latest iteration did (Moore & Gordon, 2015).

Limitations

Three notable limitations temper the interpretation of present findings. One limitation concerns the composition of the two samples in this study. Neither sample was randomly drawn from a larger population. Leisure group participants seem reasonably typical of many WEIRD samples—well-educated, young adults, largely White (Cheon et al., 2020)—and they were

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different from reading group participants in ways I intended in this study (e.g., lower lifelong reading, everyday reading). However, reading group participants are likely not representative of populations other than book club members (Sedo, 2003). They were very highly educated, mostly female, and mostly White. This was not a significant issue, as the study was largely exploratory in nature, but these considerations make clear that the study's findings are limited in their generalizability. Moreover, I tried to recruit a diverse population of participants. I reached out to internet book club leaders on sites such as Meetup, Goodreads, Facebook, Reddit, and Discord, but no group moderators responded to me. I reached out to local librarians for permission to post recruitment flyers, but I was not granted permission. Also, I reached out to more than a dozen college literature professors, but only three agreed to share my study with their students. In sum, group composition is a limitation, but it is one common to many psychology studies (Cheon et al., 2020), and it is quite difficult to overcome.

Another notable limitation concerns the degree of measurement reactivity. Measurement reactivity poses a threat to validity in diary studies because it introduces unexplainable random error. That is, if participants stop responding during a study, it is typically impossible to know why (Barta et al., 2012). As an example, did they get bored with the study? Did they encounter an adverse life event? Measurement reactivity was apparent in this study because the assumption of stationarity was violated (McNeish & Hamaker, 2020); that is, amount of time reading slightly decreased across the study but feelings of transportation and reading flow increased. This is possibly due to highly motivated readers continuing to report more about their time spent reading across the study compared to less motivated readers. Some participants continued reporting about new books they began reading during the study period, making notes about reading a new book in their diary free response. Still, other participants chose to quit responding about books in

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the survey after finishing those books, with several participants reporting that once they completed a book, they stopped responding to questions about that book. The unintentional pressure to read that some participants felt might have motivated them to finish the books they listed quickly, reading to be able to "say something" in their diary surveys, so then they could stop responding about time spent reading those books. Indeed, some participants seemed to enjoy the external pressure from the study, "it motivated me to keep reading the books I set out to read!", but others disliked it, "I was aware I was reading to do this survey. Which sometimes made it feel like a chore." Overall, this limitation suggests the frequency of reading in this study may have been biased upward, both by sampling avid readers and measurement reactivity, even if time spent reading did slightly decrease across the 27-day period.

The third notable limitation concerns statistical power. I did not obtain my desired sample size based on a priori power analysis ($N = 160$ vs. actual $N = 111$). However, I believed $N = 100$ would be sufficient based on simulation power studies using MSEM (Preacher et al., 2011) and taking into account the advantages of Bayesian estimation (Miočević et al., 2017). In light of these caveats, it is unclear to what degree this study was underpowered. The diary response rate was high (95%), but, because of the semi-continuous nature of reading, there were fewer relevant responses (i.e., reports about time participants spent reading) than expected. This issue was beyond my control; participants either did or did not read between diaries. I tried to maximize the likelihood they would by implementing a criterion sampling approach (Creswell & Creswell, 2018), but it is possible the criteria (e.g., self-described avid reader) were not rigorous enough. Ideally, every participant would have reported about a minimum of five reading responses (Preacher et al., 2011), but 21 of them reported four or fewer reading responses, including one participant who reported zero reading responses. I retained this participant's data because they

were an English literature student who noted in every diary that they were reading for class (primarily Shakespeare) rather than their self-selected books from the pretest.

Finally, a relatively minor limitation concerns a technological issue at the beginning of the study, specifically, survey emails going to spam. Several participants reported it required too much effort to constantly check their spam for diary surveys, and they asked me to stop sending them reminders. I estimate around 100 participants did not even begin the pretest, based on the number of responses to the interest survey, because they never opened the pretest email and did not search for it in their spam folders. This behavior, of course, is understandable. Participants had better response rates after I resolved the spam issues, which took approximately 20 days. I tried many avenues to solve the spam issue, with CGU IT finally providing a solution. I might have had more statistical power or a more diverse sample had I not had these technological issues, but many participants made clear they would not rejoin the study, even after I recontacted them to say I had resolved the issue.

Future Directions

Findings from this study point to several future study directions. One useful future direction would be to refine the survey design and make it more flexible, particularly regarding participants' book titles. Participants collectively finished reading more than 100 books over the course of this study, and many began reading and reporting on new books after they finished the five they proposed to read in their pretest. I only became aware of this because of the free response comments in the diary responses. I was unable to capture the fluidity of changing reading preferences, but this could be a focus of future research. To be clear, I did not capture this fluidity because (a) I did not expect it, and (b) the survey design precluded it. Book titles were piped into subsequent surveys as "embedded data" that could not be changed once an

action was triggered. Actions were triggered after completing the pretest, as using automated actions was the only way to ensure all participants received surveys on the correct days and times. Future studies could recruit more "survey stewards" (i.e., researchers to track participants choices and responses) and take a more flexible approach to changing embedded data between survey responses (e.g., adding new book titles, removing completed books). This recommendation is informed by participants' descriptions of their experiences in the study. Participants frequently noted they wanted to change the book titles during the study. They commented on this because some did not finish a particular book, noting, "This book is boring but I managed to get a solid session in…not sure I'll continue." Others picked up new books not mentioned in their original five from the pretest, saying they changed books "because my mood changed," and another aptly noted they "never follow a rational pattern when choosing what to read." A research team of "survey stewards" could reduce response burden by allowing flexibility of diary delivery times and updating book titles to reflect readers' fluid choices throughout the study (Gunthert & Wenze, 2012). This, in turn, could facilitate greater engagement with diary surveys and allow for a longer study time frame since surveys would be updated to reflect participants' changing reading choices.

Another future direction would be to implement a similar study but with different—preferably younger—participants. There are some reasons to expect reading enhances empathy among adolescents in similar ways as it does among adults (Decety et al., 2012; Mouw et al., 2019; Valkenburg & Piotrowski, 2017). Since this study sample consisted of adults, it does not suggest anything specific about adolescents' reading and empathy. However, reading could change adolescents' empathy at a faster pace compared to adults because adolescents have a lesser amount of lifelong reading, and their social schemas are more fluid than adults'

(Labouvie-Vief, 2015). There have been several semester-long studies of reading habits among adolescents in English Language Arts (ELA) classes (Cuevas et al., 2012; Ivey & Johnston, 2013; Smit, 2016), suggesting the ELA context could be a useful one for studying how reading influences empathy among adolescents. One potential way to increase the informativeness and reduce students' response burden would be to have participants complete diaries weekly and over a longer period (i.e., nine weeks) than the current study. Given the possibility for social schemas to become firmer in adulthood and for reading to spur less accommodation in social cognition, adolescent ELA classes may be a particularly valuable context for investigating how reading enhances empathy.

Finally, another future direction could be incorporating a small manipulation into a similarly designed study. For instance, researchers could collaborate with literature professors to select books that seem particularly likely to influence readers' empathy and assign half of the self-described avid readers to incorporate assigned books into their otherwise self-selected reading lists, and the other half to read solely self-selected books. The design could include focus groups or interviews afterward to assess what about the content of the books, if anything, influenced participants' empathy or social cognition, and what participants liked (or disliked) about the assigned books, and how self-selected books compared to assigned books. Assigning some readers books and comparing outcomes with readers who focus only on self-selected books could help researchers home in on factors specific to either books or individuals that have the greatest effect on enhancing empathy.

Conclusion

How does reading enhance empathy? In short, it is complicated. It is possible that reading may not enhance empathy, at least as empathy is conceptualized in the current study. Instead, it

may be the case that reading enhances ToM, one facet of empathy. Even so, the effects of reading on ToM are likely slow to build, particularly among a sample of avid, adult readers. Transportation and reading flow, considered the most likely mediators of reading and facets of empathy, had little effect on this relationship. Results do not rule out transportation and reading flow as mediators, but they do suggest the time scale assessed here was too short to understand how reading enhances empathy or even ToM. As well, results paint a complex portrait of the facets of empathy, and more work needs to be done to tease apart how different facets of empathy relate to each other. Reading is not a perfect vehicle for enhancing empathy, or even ToM, but it likely does have utility for improving the way people interact with and understand others (Hakemulder, 2000; Vitz, 1990); however, scholars should be careful not to overstate its utility.

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Appendices

Appendix A

List of Items Used in Different Surveys (Pretest, Posttest, Diary Survey)

Empathy / Empathy Assessment Index (Segal et al., 2017)
1. When I see someone receive a gift that makes them happy, I feel happy myself (AR)
2. Emotional stability describes me well (ER)
3. I am good at understanding other people's emotions (AM)
4. I can consider my point of view and another person's point of view at the same time (PT)
5. When I get angry, I need a lot of time to get over it (ER, R)
6. I can imagine what the character is feeling in a good movie (PT)
7. When I see someone being publicly embarrassed, I cringe a little (AR)
8. When I see another person experiencing a strong emotion, I can accurately assess what that person is feeling (SOA)
9. Friends view me as a moody person (ER, R)
10. When I see someone accidentally hit their thumb with a hammer, I feel a flash of pain myself (AR)
11. When I see a person experiencing a strong emotion, I can describe what the person is feeling to someone else (AM)
12. I can imagine what it's like to be in someone else's shoes (PT)
13. I can tell the difference between my friend's feelings and my own (SOA)
14. I consider other people's points of view in discussions (PT)
15. When I am with someone who gets sad news, I feel sad for a moment too (AR)
16. When I am upset or unhappy, I get over it quickly (ER)
17. I can explain to others how I am feeling (SOA)
18. I can agree to disagree with other people (PT)
19. I am aware of what other people think of me (SOA)
20. Hearing laughter makes me smile (AR)
21. I am aware of other people's emotions (AM)
- *Note.* AR = affective responding, ER = emotion regulation, AM = affective mentalizing, PT = perspective taking, SOA = self-other awareness, R = reverse-coded

Emotional Recognition / Geneva Emotion Recognition Test-Short (GERT-S; Schlegel & Scherer, 2016)
- This test is comprised of a series of short video clips depicting actors conveying one of 14 specific emotions—(1) joy, (2) amusement, (3) pride—high arousal/positive valence; (4) pleasure, (5) relief, (6) interest—low arousal/positive valence; (7) anger, (8) fear, (9) despair—high arousal/negative valence; (10) irritation, (11) anxiety, (12) sadness—low arousal/negative valence; (13) disgust, and (14) surprise
- The test takes about 10 min to complete (Schlegel & Scherer, 2016)

Empathic Concern subscale from Interpersonal Reactivity Index (Davis, 1983)
1. When I see someone being taken advantage of, I feel kind of protective toward them.
2. When I see someone being treated unfairly, I sometimes don't feel very much pity for

them. (R)
3. I often have tender, concerned feelings for people less fortunate than me.
4. I would describe myself as a pretty soft-hearted person.
5. Sometimes I don't feel sorry for other people when they are having problems. (R)
6. Other people's misfortunes do not usually disturb me a great deal. (R)
7. I am often quite touched by things that I see happen.

Prosocial Behavior
- Real-world prosocial behavior will be measured by participants' willingness to donate their compensation to a charity

Reading Behavior
- These questions are intended to give me a sense of what type of literature participants are reading, which is necessary in lieu of assigning them something to read. I recognize that some readers may finish more than one novel during the study period. Having this information will be useful for assessing potential literariness or genre effects (e.g., Kidd & Castano, 2013), and to see if there are any interesting effects related to differences in reading motivations between student and adult participants

Transportation Scale-Short Form (Appel et al., 2015)
1. I could picture myself in the scene of the events described in the narrative
2. I was mentally involved in the narrative while reading it
3. I wanted to learn how the narrative ended
4. The narrative affected me emotionally
5. While reading the narrative, I had a vivid mental image of the characters

Reading Flow Short Scale (Thissen et al., 2018)
1. I felt optimally challenged while reading (AB)
2. I read this text smoothly and fluently (SP)
3. I did not notice time passing during reading (AB)
4. I was completely immersed in what I was reading (AB)
5. Thoughts, emotions, and images emerged spontaneously and automatically, inspired by what I was reading (AB)
6. I knew on every page that I was able to grasp the story (SP)
7. I felt that I understood everything during reading (AB)
8. During reading, I became so oblivious that I became completely unaware of myself (SP)
- *Note.* AB = absorption, SP = smooth processing

Reading Habits (diary survey questions)
- These questions focused on participants' reading habits in between diary surveys with questions like, (a) did you spend time reading since your last survey (yes/no); (b) how long did you spend reading, with 30-min blocks as response options; (c) why were you reading; and (d) an open-ended response to report about particularly meaningful reading experiences or changes in their reading habits (e.g., starting a new book or finishing an old one)

Mood Items (leisure group diary questions)
- Please think about how you feel at the moment and indicate how closely each statement describes you.
- I am feeling happy, stressed, tense, tired, relaxed, energetic

Leisure Activity Items (leisure group diary questions)
- Have you spent any time doing any of these leisure activities since completing the previous survey? Responses are yes/no.
- Using social media; exercising; reading fiction books; watching movies/television; socializing (in-person, Zoom); general internet browsing (e.g., YouTube, Reddit); listening to music; playing board games/video games; gardening; doing creative activities (as defined by you); Other (please specify)
- If they said yes to any of these activities, they indicated how much time they spent (e.g., "Between 1-30 minutes," "More than 30 minutes but less than 1 hour"), and they could describe what they were doing in a free response box

Lifelong Reading / Author Recognition Test (Moore & Gordon, 2015)
- This test was presented in a check-all-that-apply format, and participants selected names they believed to be real authors (i.e., 50 fiction author names) from a list of 100 names (i.e., 50 foil author names)
- The complete list of author names can be found in Acheson et al. (2008), though I am using an adapted, shorter version from Moore and Gordon (2015)

Social Desirability / Balanced Inventory of Desirable Responding (Hart et al., 2015)
1. I have not always been honest with myself (SDE, R)
2. I always know why I like things (SDE)
3. It's hard for me to shut off a disturbing thought (SDE, R)
4. I never regret my decisions
5. I sometimes lost out on things because I can't make up my mind soon enough (SDE, R)
6. I am a completely rational person (SDE)
7. I am very confident about my judgments (SDE)
8. I sometimes tell lies if I have to (IM, R)
9. I never cover up my mistakes (IM)
10. There have been occasions when I have taken advantage of someone (IM, R)
11. I sometimes try to get even rather than forgive and forget (IM, R)
12. I have said something bad about a friend behind their back (IM, R)
13. When I hear people talking privately, I avoid listening (IM)
14. I don't gossip about other people's business (IM)
- *Note.* SDE = self-deceptive enhancement, IM = impression management, R = reverse-coded.

COVID-impact on behavior
- Do you feel that COVID-related measures in your life influenced your reading habits/leisure activities over the past month?

Study impact on behavior
- Do you feel participating in this study influenced your reading habits/leisure activity choices over the past month?

Perspectives on empathy
- Do you feel the time you spent reading recently, particularly during the study, impacted the ways you think about or interact with other people? (Reading group only)
- Do you feel that your outlook toward other people and others' perspectives has changed over the past month? (Leisure group only)

Appendix B

Study Procedure Flow Chart

On-boarding

- Complete the interest survey and provide email
- Watch video describing participation
- Reach out with any questions

Pretest

- Completed online following on-boarding
- Measures: EAI, GERT-S, reading behavior, demographics, and control measures
- Indicate time of day to receive diary survey

Diary survey

- Participants receive first diary survey 3 days after pretest
- Continue receiving diary surveys every 3 days following, on fixed interval
- 9 surveys total

Posttest

- Completed as soon as possible after last diary survey
- Measures: EAI, GERT-S, open-ended questions (e.g., do you feel you gained appreciation for new perspectives through your reading?)
- Donate (part of) compensation to charity

Appendix C

Participant Procedure Overview

Note. Participants viewed this procedure overview during the screener survey.