

Exploring the link between reading fiction and empathy: Ruling out individual differences and examining outcomes

RAYMOND A. MAR, KEITH OATLEY and JORDAN B. PETERSON

E-mails: mar@yorku.ca; keith.oatley@utoronto.ca; jordanbpeterson@yahoo.com.

Abstract

Readers of fiction tend to have better abilities of empathy and theory of mind (Mar et al., 2006). We present a study designed to replicate this finding, rule out one possible explanation, and extend the assessment of social outcomes. In order to rule out the role of personality, we first identified Openness as the most consistent correlate. This trait was then statistically controlled for, along with two other important individual differences: the tendency to be drawn into stories and gender. Even after accounting for these variables, fiction exposure still predicted performance on an empathy task. Extending these results, we also found that exposure to fiction was positively correlated with social support. Exposure to nonfiction, in contrast, was associated with loneliness, and negatively related to social support.

Keywords: empathy, reading, narrative, depression, big five personality, social support

Introduction

We spend an enormous amount of our leisure time engaged with fictional narratives. Our free time revolves around fictional stories, whether it be the morning comic strip, the novel we read on the subway on the way to work, the television show we watch after dinner, or the book that waits for us on our nightstand. Despite the prominent role that these experiences play in our lives surprisingly little psychological research has been devoted to this topic. The necessity of mending this situation, however, is gradually gaining attention (Miall, 2000; Mar and Oatley, 2008). Our engagement with fictional narratives is interesting not just for the prominent place these stories appear to have in our lives, but also because the experience we undergo while engaging with them is unique. When reading a novel or watching a film we become immersed in the world presented to us (Nell, 1988), transported to new places with new people (Gerrig, 1993). In these narrative worlds we experience a simu-

lated reality and feel real emotions in response to the conflicts and relationships of story characters (Oatley, 1994). Stories thus appear to offer us a deeply-felt simulation of social experience (Oatley, 1999) that may hold real consequences for our actual social world (Mar and Oatley, 2008; Mar, Oatley, and Djikic, 2008). Specifically, engaging with narrative fiction and mentally simulating the social experiences represented may improve or maintain social skills, especially skills of empathy and social understanding. Consistent with this idea, our group has shown that frequent readers of narrative fiction perform better on two different empathy tasks, whereas frequent readers of expository non-fiction perform worse (Mar et al., 2006).

There are, of course, several possible explanations for this observed relation between reading fiction and empathy (Mar et al., 2006). While reading fiction, the simulation of social experience that occurs might engage the same social-cognitive processes employed during real-world social comprehension (e. g., mental inference, tracking of goals, emotion recognition). Repeated simulation of this kind, then, could lead to a honing of these social and empathic processes, which in turn could be applied to other contexts outside of reading. Another possibility is that readers of fiction learn concrete social information from books, acquiring knowledge about human psychology. In contrast with the first proposal, here we make a content versus process distinction. Lastly, the relation between fiction and empathy might be explained by individual differences. That is, certain traits may predict greater enjoyment of fiction, and also better empathic accuracy. This last hypothesis seems to be the least interesting possible explanation, and it is this explanation that we seek to rule out in the current study.

The somewhat surprising nature of our finding that reading fiction predicts empathic accuracy, and the fact that it is based on correlation, necessitates a more detailed investigation of this effect. First, the possibility that individual differences can account for the association between exposure to narrative fiction and empathy needs to be ruled out. Second, examining the potential real-world social correlates of narrative fiction is necessary if we are to increase our confidence that the validity of this relation extends beyond our original measures.

Individual differences

Our previous study demonstrated that exposure to narrative fiction was linearly and positively related to social ability, after controlling for age, experience with English, general intelligence (*g*) and exposure to expository nonfiction. However, there are several other potential individual

difference variables that need to be ruled out before pursuing the possibility of a causal association. Key among these is trait personality.

The Big Five Model is the most widely used and extensively validated model of personality. It is composed of Extraversion, Agreeableness, Conscientiousness, Neuroticism (reversed, Emotional Stability), and Openness to experience (Costa and Macrae, 1992; John and Srivastava, 1999). Recent publications have highlighted the importance of demonstrating discriminant validity with respect to these personality dimensions. There is growing evidence, for example, that the Emotional Intelligence construct, clearly related to social ability, can be largely accounted for by measures of trait Agreeableness, in conjunction with gender and *g* (corrected multiple $r = .81$, Schulte, Ree, and Carretta, 2004; see also Nettelbeck, Bastian, and Burns, 2007). Demonstrating that Emotional Intelligence can achieve incremental validity beyond personality and cognitive ability has thus become a fundamental issue for those interested in this construct (e.g., Petrides, Pérez-González, and Furnham, 2007). As another example, Locus of Control, Self-esteem, and Self-efficacy may all represent the same core construct: trait Neuroticism (Judge, Erez, Bono, and Thoresen, 2002; cf. Mar, DeYoung, Higgins, and Peterson, 2006). Thus, it appears increasingly necessary to ensure (1) that hypothetical variables are not merely variants of known personality traits, regardless of their name and (2) to demonstrate that identified relationships between such variables cannot be attributed to well-established measures of personality. In the context of the current study, it is important to demonstrate that our measure of exposure to narrative fiction isn't simply tapping some other individual difference variable.

With regard to the observed relation between fiction exposure and empathy, a number of Big Five traits could theoretically account for this association. Extraversion, for example, represents attraction toward and facility with social interactions (e.g., Jensen-Campbell et al., 2002). Highly outgoing individuals, who crave social contact, might also be interested in immersing themselves in fictional social worlds (despite the apparent decrease in real-world social contact such pursuits might entail).

Agreeableness, a tendency toward empathic and prosocial responses (e.g., Koole et al., 2001), is also a likely candidate. Individuals high on this trait are likely to manifest the empathy required to understand fictional characters making narrative engagement more real and perhaps more pleasurable or interesting. Agreeable individuals are also likely to perform better on measures of social ability.

Finally, trait Openness may play an explanatory role. Openness is associated with imaginative tendencies, curiosity, intellectual endeavors, and creativity. Imagination is essential for narrative comprehension, al-

lowing us to vividly render the surroundings and situations being presented to us in literary fiction. This capacity may also aid perspective-taking, allowing us to place ourselves in the shoes of story protagonists and better understand other people (Taylor and Carlson, 1997).

The first step in testing whether reading predicts social ability beyond Big Five personality is to examine the trait correlates of reading fiction and non-fiction. Few previous studies have examined this question, with previous work focusing on engagement with media such as television or film (e. g., Weaver, 1991; Hall, 2005). What research does exist on reading is somewhat mixed, with most studies reporting positive associations between reading fiction and Openness (Finn, 1997; McManus and Furnham, 2006; Tirre and Dixit, 1995), with inconsistent relations to Extraversion and Agreeableness (Finn, 1997; Tirre and Dixit, 1995). Three studies from our own lab found that Openness was indeed the only consistent correlate of exposure to narrative fiction¹. It appears that this trait is the most important factor of personality to rule out as accounting for the relation between reading fiction and social abilities.

Another important individual difference variable to control for is the tendency to be drawn into fictional narratives (Gerrig, 1993). Those more prone to these immersive and simulative experiences are logically more likely to seek them out. At the same time, this same capacity to be drawn into the representation of fictional characters could help us to improve our understanding of real others – and to perform better on tasks that measure social abilities. Controlling for this construct in our analyses will allow us to rule out the possibility that this tendency toward narrative engagement can explain the relation between reading fiction and empathic ability.

The last individual difference to take into account is gender. Women are more likely to be readers (Statistics Canada, 1998), and are also more empathic (Baron-Cohen and Wheelwright, 2004; Davis, 1980). To ensure that the observed relation between reading and empathy is not simply a function of gender, this variable needs to be controlled for in the statistical analyses.

Potential outcomes

Another useful extension of the previous finding is an examination of whether exposure to narrative fiction has any real-world social correlates, apart from improved performance on laboratory empathy tasks. If the greater social ability of frequent readers observed previously can be generalized to the real world, we would expect that readers might have a larger social network, less loneliness, and less depression. It is worth noting that this hypothesis is in direct contradiction of the stereo-

type of a bookworm (England and Petro, 1998). Bookworms are often seen as turning to literature and fictional characters in order to compensate for the absence of real-world peers, immersing themselves in an imaginary social world due to the lack of an actual social network. Along with social awkwardness, frequent readers are often seen as having fewer friends, being socially isolated, and experiencing more depression, loneliness, and stress as a result. Our own conception of readers, however, predicts just the opposite.

Current studies

In this paper we further examine the nature of the association between exposure to narrative fiction and empathy, from two perspectives. First, we statistically control for three important individual difference variables, in order to rule out the possibility that the effects observed are merely a function of Openness, narrative engagement, or gender. Secondly, we turn from ruling out alternative accounts to the further investigation of social outcomes. Specifically, we investigate correlates pertaining to social network size, social support, loneliness, and depression.

Method

Participants

A total of 252 participants completed the study. Individuals were removed from the analysis because they were missing data due to computer error ($N = 18$, 7.1% of the sample population) or human error ($N = 4$, 1.6%) during testing. Individuals with less than 9 years of English fluency ($N = 5$, 2.0%) were also removed, resulting in a final sample of 225 persons (175 females), ranging in age from 17 to 38 years, $M = 18.9$, $SD = 2.8$. The majority had learned English as their first language, $N = 203$, 90.2%. Participants gave consent after learning the aim of the study. After completing all the measures (order randomized for each person), participants were debriefed and compensated for their time.

Materials and procedure

Author Recognition Test (ART). Because erudition is so closely tied to intelligence and sophistication in our culture, self-report assessments of reading are vulnerable to biased responding (West, Stanovich, and Mitchell, 1993). The original ART, developed by Stanovich and West (1989), overcame this issue by employing a task-based approach that

relies upon a signal detection logic, allowing for a more objective rather than subjective assessment. Respondents are asked to check off from a list of names those that they recognize as authors. They are explicitly told, however, that a number of the items are fake or foils (i. e., names that are not those of authors), so guessing (or indiscriminate checking) can easily be detected. While this does not provide a direct measure of the amount of reading a person has done, it is a measure of how much exposure to print an individual has had, which has been found to correlate strongly with book-reading and related behaviours (West et al., 1993). Even if participants have not read a specific author, they are likely to have learned about the person by reading reviews, discussing authors they like, or browsing in bookstores and libraries – all behaviors highly associated with reading itself. Checklist measures of print-exposure have been extensively validated. Scores on the ART are predicted by early reading ability (Cunningham and Stanovich, 1997), and predict actual observed reading behavior (West et al., 1993), reading skills (Stanovich and West, 1989), and acquisition of knowledge controlling for cognitive ability (Stanovich and Cunningham, 1993; West et al., 1993). Versions of the ART checklist have demonstrated better predictive validity than more conventional self-report questionnaires (Allen, Cipielewski and Stanovich, 1992, Sénéchal, LeFevre, Hudson, and Lawson, 1996), and validity equal to daily diary approaches (Allen et al., 1992).

Mar and colleagues (2006) revised the ART, creating the two subscales used in the present study: (1) an assessment of exposure to narrative fiction (50 names, divided into 5 genres, such as thrillers, romance novels, and science fiction), and (2) a measure of exposure to non-narrative expository nonfiction (50 names across 5 genres, including philosophy, business, and science). We also included 40 foils. This version of the ART has been validated, demonstrating better prediction of vocabulary than self-report measures of reading (Mar, Oatley and Peterson, 2008).

Big Five Inventory (BFI). Personality was measured using the Big Five Inventory (BFI; John and Srivastava, 1999), a well-validated 44-item measure of personality based on the Big Five model.

Self-report measure of fantasy. The Fantasy subscale of the Interpersonal Reactivity Index (IRI; Davis, 1980) was employed to measure participants' trait tendency to be transported into a narrative. Although the scale author originally conceptualized this subscale as an aspect of empathy, examination of the items reveals that this measure can be more accurately described as an assessment of one's tendency to become immersed in narrative (see Table 1). This measure includes a total of 7 items, and only one item does not directly refer to immersion in narrative

Table 1. *Items of the IRI Fantasy subscale.*

Number	Item
1	I daydream and fantasize, with some regularity, about things that might happen to me. [^]
2	I really get involved with the feelings of the characters in a novel.
3	I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.*
4	Becoming extremely involved in a good book or movie is somewhat rare for me.*
5	After seeing a play or movie, I have felt as though I were one of the characters.
6	When I watch a good movie, I can very easily put myself in the place of a leading character.
7	When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.

* Reverse-coded. [^] Item 1 was removed from all analyses in this study.

media (item 1). This is also the only item whose removal increases the scale's internal reliability (Chronbach's alpha). Thus, for theoretical and empirical reasons, this item was not included in the current analyses, improving face validity and scale reliability. (The two versions of this subscale are highly correlated, however, $r = .98, p < .05$.) Respondents rated the degree to which the statements were self-descriptive using a five-point Likert scale. As a trait measure, this scale is distinct from more common state measures of narrative transportation (e.g., Green and Brock, 2000). While another trait measure of transportation exists (Dal Cin, Zanna, and Fong, 2004), the authors were not aware of it at the time of this data collection. Subsequent data from our lab has shown these two scales to be highly correlated, $r = .62, p < .05; N = 260$ (unpublished data).

Mind-in-the-Eyes task (MIE). Self-reported social acumen suffers from a variety of limitations. Most notably, respondents are expected to have access to accurate meta-cognitive evaluations of their own social ability. Reporting these assessments without bias motivated by social desirability is a second hurdle to accurate measurement. We thus relied on an objective task-based measure of empathy (an adult measure of theory of mind) for our study. The MIE requires respondents to examine still pictures of actors' eye-regions and choose which of four possible mental states is being represented (Baron-Cohen, Wheelwright, Hill, Raste, and Plumb, 2001). Prior to the task all participants are familiarized with a list of the mental state terms that will be presented, controlling for differ-

ences in vocabulary. This list remains accessible to the individual during testing for their reference. Individuals with autism or Asperger syndrome, who are often characterized by severe social deficits, perform worse on this measure than IQ-matched controls (Baron-Cohen et al., 2001), demonstrating that performance is independent of intelligence. Along parallel lines, in a normal population, performance on this task is negatively correlated with scores on a measure of autism-spectrum disorder symptomatology (Baron-Cohen et al., 2001). Using an earlier version of this test (Baron-Cohen, Jolliffe, Mortimore, and Robertson, 1997), patients with frontal lobe dementia were found to perform worse than both normal controls and patients with Alzheimer's; this dementia group also underperformed on other theory-of-mind tests (Gregory et al., 2002). Lastly, a brain imaging study found that regions previously associated with numerous other mental-inference tasks are activated when normally developing individuals attempt to infer the mental states of the persons depicted in the MIE materials (Platek, Keenan, Gallup Jr., and Mohamed, 2004).

Social isolation and loneliness. In order to investigate the social outcomes associated with reading narrative fiction, measures of social network and social support were administered. If readers have better social abilities, we would also expect them perhaps to have a larger social network and perceive more social support. The measures employed to assess these variables included: (1) the Social Network Index (SNI; Cohen, Doyle, Skoner, Rabin, and Gwaltney, 1997) which yields a score for the number of high contact roles a person possesses (of 12 possible), along with a score for the number of people within his or her social network; and (2) the Interpersonal Support Evaluation List—College Version (ISEL; Cohen and Hoberman, 1983), which requires respondents to indicate whether the items are either “Probably True” or “Probably False” in relation to their selves for four subscales: (i) Tangible (perceived availability of material aid), (ii) Appraisal (perceived availability of someone to talk to), (iii) Belonging (perceived availability of people to engage in activities with), and (iv) Self-Esteem (perceived positive sense of self in comparison to others).

Measures of loneliness, stress and depression were also included, to see if readers experience less social isolation. These variables were measured using: (1) the UCLA Loneliness Inventory (UCLA-LI; Russell, 1996), which taps the degree to which someone feels connected to those around him or her, as indicated by their self-reported frequency of certain thoughts or feelings, using a four-point Likert scale; (2) the Perceived Stress Scale (PSS; Cohen, Karmark, and Mermelstein, 1983), which examines stress and coping responses by requiring respondents to

indicate the frequency of certain thoughts and emotions using a five-point Likert scale; and (3) the Beck Depression Inventory (BDI; Beck, 1988), a widely-used measure of clinical depression, in which each item requires respondents to indicate which of four statements is self-applicable. Because these social outcomes are somewhat distal from social abilities and empathy, the effects involving these variables are expected to be smaller and may even be absent.

Results

Scale scores and gender differences

Participants checked very few of the foil items on the ART ($M = 1.1$, $SD = 1.9$), 91.6% of the sample checked three or fewer foils. The reliability for Fiction (Cronbach's $\alpha = .90$) and Non-Fiction (Cronbach's $\alpha = .82$) in this sample was high. Reliability for the slightly revised Fantasy measure was also high, Cronbach's $\alpha = .81$. Reliabilities for the other measures are reported in source articles. For all analyses reported, all $ps < .05$ (two-tailed) unless stated otherwise.

No statistically significant differences in personality were found between the sexes in this sample, all $ps > .05$; Openness: $M = 3.6$, $SD = .31$; Extraversion: $M = 3.3$, $SD = .73$; Agreeableness: $M = 3.8$, $SD = .57$; Conscientiousness: $M = 3.5$, $SD = .64$; Emotional Stability: $M = 2.9$, $SD = .69$. However, gender differences were observed on a number of the other variables measured. Males scored lower on fiction print-exposure ($d = 0.54$; $t = -4.40$; $M_{males} = 4.5$, $M_{females} = 8.2$), the social ability task (MIE: $d = 0.65$; $t = -4.04$; $M_{males} = 25.5$, $M_{females} = 27.8$), and rated themselves lower on the measure of narrative engagement, IRI Fantasy: $d = 0.40$; $t = -2.47$; $M_{males} = 3.5$, $M_{females} = 3.8$. With respect to self-reported stress and social support, males scored lower on only one measure, seeing themselves as less likely than females to have someone to talk to, ISE Appraisal: $d = 0.58$; $t = -3.14$; $M_{males} = 8.2$, $M_{females} = 9.8$. Gender was thus covaried out for all of the following analyses, except in those cases where separate analyses were conducted for males and females.

Raw correlations between print-exposure and social ability

The number of foils checked by each participant was subtracted from the number of valid names recognized on the ART, to form corrected indices of exposure to narrative fiction and expository non-fiction. Pearson correlations were then calculated between these scores and the social ability measure, for the total sample and for each gender (see Table 2).

Table 2. *Inter-scale correlations for measures of print-exposure and social ability by gender.*

	ART-NF	MIE	IRI-FS	BFI-O	BFI-C	BFI-E	BFI-A	BFI-ES
ART-FC	.60* .64* (.50*)	.21* .16*	.17* .09 (.42*)	.22* .24*	.09 .06 (.09)	-.04 -.07 (-.14)	-.07 -.06 (-.22)	.02 .05 (.01)
ART-NF		.08 .09 (.05)	.04 .01 (.20)	.20* .24*	.09 .11 (.01)	-.02 -.02 (-.05)	-.05 -.02 (-.14)	-.01 .01 (-.06)
MIE			.21* .17* (.20)	.15* .17*	-.02 -.01 (-.14)	-.03 -.02 (-.22)	-.04 -.03 (-.13)	-.14* -.10 (-.17)
IRI-FS				.26* .27* (.24)	-.04 -.04 (-.08)	.09 .07 (.13)	.06 .08 (-.05)	-.07 -.03 (-.10)
BFI-O					.10 .08 (.16)	.16* .17* (.10)	.01 .01 (.02)	.13 .13 (.11)
BFI-C						.17* .13 (.31*)	.28* .26* (.34*)	.27* .19* (.62*)
BFI-E							.08 .10 (-.03)	.31* .32* (.38*)
BFI-A								.34* .34* (.37*)

Notes: * $p < .05$. ART-FC = ART Fiction, ART-NF = ART Nonfiction, IRI-FS = IRI Fantasy, BFI-O = Openness, BFI-C = Conscientiousness, BFI-E = Extraversion, BFI-A = Agreeableness, BFI-ES = Emotional Stability. Numbers in bold represent the entire sample. Coefficients not in bold are for females only (N = 175). Coefficients for males reported in parentheses (N = 50).

Full sample. Although exposure to narrative fiction and expository nonfiction were highly correlated, Fiction was associated with the empathy task (the MIE), whereas Nonfiction was not. This difference in association was statistically significant, $t(222) = 2.22$. Moreover, the magnitude of this association was not trivial, falling as it does within the middle third of all effect-sizes observed in psychology, for measures that employ different methods (Hemphill, 2003).

In line with the findings of our pilot work¹, trait Openness was the only personality factor associated with fiction print-exposure. Performance on the MIE task was also correlated with Openness, making this trait the most important personality factor to control for statistically, in order to rule out the possibility that trait personality is responsible for the association observed between exposure to narrative fiction and social ability.

IRI Fantasy was also correlated with the empathy task, indicating that individuals who find themselves more easily drawn into narratives perform better than others when asked to infer the mental states of target individuals. Since Fantasy was also related to exposure to narrative fiction, it also appears to be an important individual difference variable to control for.

Gender differences. Correlation magnitudes between males and females in this sample were tested for statistically significant differences (Steiger, 1980). A tendency toward narrative engagement predicted exposure to narrative fiction to a greater degree in males relative to females, $r_{\text{diff}} = .33$, $Z = -2.17$. It thus appears that an ability to see oneself in a story and simulate the experiences described is more important for predicting the reading behavior of men than women. This may explain the gender difference in reading behavior between the sexes (Statistics Canada, 1998), or it may simply be a reflection of cultural expectations. Perhaps young children are acculturated with the idea that reading is an appropriate activity for females but less so for males, and only a strong natural imaginative tendency can overcome these implicit messages for males.

Association between print-exposure and empathy: Ruling out the role of individual differences

In order to rule out the possibility that the association between exposure to narrative fiction and empathy can be explained by individual differences, we conducted a hierarchical linear regression predicting MIE scores, with control variables entered in the first block and exposure to narrative fiction entered in the second block. First, a composite variable averaging age and years of English fluency was created, due to their high correlation ($r = .86$) and concerns regarding multicollinearity. This variable, along with gender, Openness, and IRI Fantasy scores were entered in the first block, and ART–Fiction entered in the second block. The results of this analysis are presented in Table 3.

In the first block, gender and Fantasy scores were both unique predictors of performance on the MIE task. When fiction print-exposure was entered into the second block, it was identified as a unique predictor, and the addition of this variable yielded a statistically significant increase in variance accounted for by the model, $F(1, 219) = 3.94$. In this model, gender remained a unique predictor, with Fantasy just failing to attain statistical significance ($p = .06$). Thus, exposure to narrative fiction predicts performance on an empathy task, controlling for age, gender, English fluency, trait Openness, and tendency to become immersed in fiction.

Table 3. *Regression showing prediction of MIE scores by fiction print-exposure, controlling for gender, age, years of English fluency, trait Openness, and tendency to become immersed in fiction.*

	Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>
Model 1	Gender	2.08	.57	.24	3.67*
$R^2 = .11$	Fantasy	.64	.30	.14	2.10*
$F(4, 220) = 6.82^*$	Openness	.69	.41	.11	1.71
	AgeFluency	-.08	.08	-.06	-.97
Model 2	Fiction	.07	.04	.14	1.99*
$R^2 = .13$	Gender	1.8	.58	.21	3.11*
$F(5, 219) = 6.31^*$	Fantasy	.58	.30	.13	1.93
	Openness	.56	.41	.09	1.37
	AgeFluency	-.11	.08	-.09	-1.39

* $p < .05$ *Exposure to fiction or nonfiction, social support, loneliness, and stress*

In order to examine whether individuals who read more see themselves as having a larger social network and experiencing less negative affect as a result, correlations between lifetime exposure to fiction or nonfiction texts and the various measures of support and stress were calculated. Because some of these variables violated the normality assumption required for the calculation of a Pearson correlation coefficient (i. e., ISE Tangible, ISE Appraisal, and the BDI), a nonparametric statistic (Spearman's rho) was employed to examine these associations. Table 4 presents the results of this analysis for both the total sample, and for the two genders.

Full sample. More frequent readers did not report fewer or more individuals in their social network, nor did they report fewer or more high-contact social roles. Exposure to nonfiction, however, was negatively related to the measure of self-perceived belongingness (ISE Belonging) whereas exposure to fiction was unrelated, and this difference was almost statistically significant (Steiger, 1980), $t(222) = 1.92$, $p = .06$. Nonfiction was also positively related to self-reported loneliness (UCLA), whereas fiction was not related, and this difference was statistically significant, $t(222) = 2.54^2$. In contrast, those who were exposed to more narrative fiction saw themselves as having more people available to talk to (higher scores on ISE Appraisal), and those exposed to more nonfiction exhibited no such relation, $t(222) = 2.22$. The general picture, then, is that there is no evidence that frequent reading has any substantial impact on social support and associated loneliness or depression. Tentatively, it

Table 4. Inter-scale correlations (*Spearman's rho*) for measures of print-exposure, social support, loneliness and stress.

	Print Exposure		Social support				Loneliness		Stress		
	ART-FC	ART-NF	SNI role	SNI number	ISE tangible	ISE belonging	ISE appraisal	ISE SE	UCLA	BDI	PSS
ART-FC	.48* (.51*)		.05	.13	.00	-.01	.13*	.02	.04	-.08	-.10
			.03 (.01)	.13 (.13)	-.04 (.02)	-.01 (-.13)	.06 (.19)	.07 (-.02)	.06 (.08)	-.12 (-.02)	-.16* (-.06)
ART-NF			-.02	.04	-.04	-.14*	-.02	-.10	.21*	.09	-.03
			.04 (-.23)	.05 (-.02)	-.07 (.06)	-.11* (-.23)	-.01 (-.05)	-.01 (-.24)	.19* (.27)	.04 (.27)	-.06 (.10)
SNI role				.59*	.14*	.24*	.15*	.21*	-.22*	-.04	-.11
				.57* (.66*)	.17* (.08)	.25* (.21)	.12 (.27)	.26* (.30)	-.21* (-.29*)	-.02 (-.13)	-.09 (-.24)
SNI number					.30*	.46*	.28*	.30*	-.31*	-.21*	-.21*
					.33* (.20)	.51* (.26)	.28* (.32*)	.35* (.12)	-.34* (-.19)	-.18* (-.28*)	-.19* (-.29*)
ISE tangible						.50*	.30*	.22*	-.33*	-.20*	-.17*
						.49* (.51*)	.27* (.35*)	.19* (.36*)	-.29* (-.47*)	-.17* (-.35*)	-.18* (-.23*)
ISE belonging							.42*	.42*	-.58*	-.37*	-.44*
							.39* (.49*)	.42* (.47*)	-.58* (-.59*)	-.35* (-.50*)	-.44* (-.50*)
ISE appraisal								.23*	-.47*	-.27*	-.25*
								.28* (.13)	-.44* (-.55*)	-.28* (-.53*)	-.28* (-.45*)
ISE Self-esteem									-.52*	-.49*	-.44*
									-.52* (-.54*)	-.47* (-.45*)	-.43* (-.51*)
UCLA											.51*
											.49* (.62*)
BDI											.69*
											.68* (.67*)

Notes: * $p < .05$. ART-FC = ART Fiction, ART-NF = ART Nonfiction. Numbers in bold represent the entire sample. Coefficients not in bold are for females only (N = 175). Coefficients for males reported in parentheses (N = 50).

might be said that there appears to be some positive association between exposure to narrative fiction and more social support, and a negative association for exposure to nonfiction. In light of the social measures for which no association was found, however, this interpretation should be viewed with caution.

Gender differences. As before, differences between males and females for these associations were examined for statistical significance (Steiger, 1980). For males, exposure to nonfiction was negatively correlated with the number of high contact roles. This was not the case for females, $|\rho_{\text{diff}}| = .27$, $Z = 1.67$, $p = .05$. Nonfiction was also more negatively associated with self-esteem and more positively correlated with depression for males relative to females, although these differences just failed to reach threshold for statistical significance, ISE Self-esteem: $|\rho_{\text{diff}}| = .23$, $Z = 1.43$, $p = .08$; BDI: $|\rho_{\text{diff}}| = .23$, $Z = 1.44$, $p = .08$.

Exposure to expository nonfiction thus appears to be a stronger predictor of negative social outcomes for males relative to females. The causal direction of this association, of course, cannot be determined. Males who feel depressed, have low self-esteem, and have fewer friends whom they see often, may seek solace in nonfiction texts or their avid interest in nonfiction may exclude them socially, resulting in negative affect and lower self-esteem.

Discussion

The previous finding by Mar and colleagues (2006), of an association between reading fiction and levels of empathy, might be explained by a number of possible theories. One possibility is that fiction readers simply have particular personality traits that also make them more empathetic. In order to rule out the possibility that trait personality could be responsible for the association between narrative fiction and social ability, we set out to find the individual differences most highly correlated with fiction reading. In pilot studies and the extant literature we found that narrative fiction reading is related to the Big Five trait of Openness to Experience, but not consistently with any other trait¹. In this study we attempted to rule out the possibility that this trait can explain the relation between fiction reading and empathy. We also set out to account for a more specific individual difference, the tendency to feel transported into the world of a narrative, as well as gender. Hierarchical linear regressions demonstrated that fiction print-exposure predicts performance on an empathy task, even after gender, age, English fluency, trait Openness, and trait Fantasy are statistically controlled. This finding helps to rule out the possibility that mere individual differences are responsible

for the observed association between fiction exposure and empathy. Our confidence in this assertion has increased further in light of our previous work, which ruled out the potential role of intelligence and non-fiction reading (Mar et al., 2006). Also in this study, the social life of frequent readers was explored, moving beyond empathy to other social variables such as loneliness and social network size. Nonfiction was positively associated with loneliness and negatively related to belongingness, whereas fiction was related to self-perceived availability of confidants. Moreover, the association between exposure to nonfiction and loneliness should not be considered trivial, as it is equivalent to the median effect-size for studies in personality (Fraley and Marks, 2007). Overall, however, there were no consistent associations with social network, depression, and perceived stress.

Ruling out Big Five personality

The data from this study show that it is not merely the case that individuals who are more open to experience tend to enjoy fiction more and also perform better on tests of empathy. Examining the role of trait personality is an important step in any research program, and in doing so, we have ruled out one major possible explanation for the positive relation between narrative fiction and empathy. Across the previous study (Mar et al., 2006) and the current one, we have taken a conservative approach, by looking at the incremental prediction of exposure to narrative fiction beyond numerous individual difference variables, increasing our confidence in the reliability and robustness of this association.

Narrative transportation and empathy

The self-reported tendency to become highly absorbed in fictional products such as literature and movies is related to both empathy and narrative fiction print-exposure. In our hierarchical regression, trait Fantasy was an independent predictor of empathy ability, controlling for a variety of individual difference variables including one's exposure to narrative fiction.

It seems that a ready capacity to project oneself into a story may assist in projecting oneself into another's mind in order to infer their mental states. It has recently been observed that a very similar pattern of brain activity underlies such diverse cognitive processes as autobiographical memory, future-thinking, spatial navigation and mental inferencing, and that this network may represent self-projection (Buckner and Carroll, 2007; Spreng, Mar, and Kim, 2009). This network also appears to be

important for story comprehension (Mar, 2004; Ferstl, Neumann, Bogler, and von Cramon, 2008), indicating that a single process, perhaps self-projection, could support both mental inferencing and story comprehension. In children, imaginative abilities are related to the development of social comprehension (Taylor and Carlson, 1997), and in adults this capacity to really empathize with fiction appears to explain, in part, why fiction-reading habits relate to social skills.

Of course, the precise role of this individual difference variable has yet to be determined. Reading could improve our tendency to “get into” stories, and also understand others. Or, those who are naturally more inclined to feel transported by fiction, may read more and thus become better at understanding others. The fact that this prediction was demonstrated in a multiple regression model that included Openness is particularly interesting, as it demonstrates that the construct of narrative transportation or fantasy is something unique from what is captured by this trait.

The social world of readers

The stereotype of a bookworm as socially awkward and lonely was further challenged by the data in this study, which provided convergent evidence to bolster our findings regarding empathic abilities. Frequent readers do not report smaller social networks or more loneliness and stress. What we observed was another separation between exposure to narrative fiction and expository nonfiction. Reading narrative fiction was associated with more social support and reading expository nonfiction was related to less social support and more stress. This finding must be interpreted cautiously, however, in light of the fact that these relations were not consistent across measures of social support. An interesting gender difference also emerged, in that exposure to expository nonfiction was more associated with negative outcomes (less social support, lower self-esteem and more depression) in males than in females.

Because we measured perceived social support rather than objective social support, some interesting possibilities emerge for explaining why individuals exposed to more narrative fiction feel they have more people available to speak to. Perhaps these individuals are drawing support from the fictional characters that they encounter in novels, engaging in a form of parasocial relationship. A desire for social contact may motivate anthropomorphization, or the tendency to see fictional characters as possessing agency and personality (Epley, Waytz and Cacciopo, 2007). Research has demonstrated that favourite television characters can influence us in a manner similar to real peers, particularly if they are seen as “real” (Gardner and Knowles, 2008). Findings that people who are feel-

ing lonely may be more likely to watch television are also consistent with this idea (Derrick, Gabriel, and Hugenberg, 2009; Jonason, Webster, and Lindsey, 2008). Exploring whether these same effects hold for the reading of narrative fiction would seem to be an interesting possibility for future research.

It must be noted that one result from the previous work by Mar and colleagues (2006) was not directly replicated in the current study. We did not find a negative association between exposure to expository nonfiction and empathy (cf. Mar et al., 2006). In this sample, the partial correlation between exposure to nonfiction and the MIE, similar to that employed by Mar and colleagues (2006), reveals no statistically significant association, $pr = -.03$, $p > .05$. It is unclear why this effect was not found in this sample, and this is something that certainly deserves careful attention. It is worth noting, however, that in this sample exposure to expository nonfiction was associated with loneliness and a low sense of belonging, symptoms consistent with poor social abilities. Moreover, the social ability task that was most negatively associated with exposure to nonfiction in the previous study (Mar et al., 2006), the Interpersonal Perception Task-15 (Costanzo and Archer, 1993), was not included here.

Limitations

Future studies should experimentally investigate the causal direction of the observed association between exposure to narrative fiction and social ability, since such inferences cannot be derived from correlational studies. One potential approach might involve participants being assigned a diet of fiction over some weeks along with pre- and post-manipulation assessments of social skills. More direct examinations of the two remaining hypothesized mechanisms (i. e., direct transfer of social knowledge and honing of social cognitive processes) are necessary.

Subsequent studies should also incorporate a more diverse sample, since most research to date has employed undergraduate students. The restricted range of this group may mean that the current findings are underestimates of any effect in the general population. A university student population is more likely to contain frequent readers than the general population at large. Our pilot work, however, did confirm that the personality correlates of reading are largely identical for undergraduate and older populations¹.

There may be some concern with how to interpret the association between IRI Fantasy and the MIE. One might argue that since both are measures of empathy, the positive correlation between the two is completely unsurprising and therefore uninteresting. However, examination of both of these measures reveals that they are quite dissimilar and

likely should not be considered equivalent measures of the same latent construct. The MIE involves pairing mental-state terms to pictures of a person's eye-region, whereas the IRI Fantasy scale asks respondents to self-report their own tendency to become deeply involved in books and film (see Table 1). That these two measures are correlated is interesting, and congruent with various theories put forward relating empathy to fiction (e. g., Keen, 2006; Mar and Oatley, 2008; Zillmann, 1994). From the perspective of this study, which controlled for IRI Fantasy in order to rule out trait differences, even if Fantasy is interpreted as a form of empathy directly related to narrative experience, controlling for this construct makes the continued prediction of empathy by reading even more compelling.

Conclusion

There is growing evidence that reading narratives, even those explicitly labeled as fiction, is far from a meaningless leisure activity that ends when one closes the cover of a book (Green, Strange, and Brock, 2002). Several researchers have demonstrated that exposure to narrative fiction can influence our attitudes toward various issues (Green, 2004; Green and Brock, 2000; Prentice, Gerrig, and Bailis, 1997; Strange and Leung, 1999). From these findings as well as those reported here and previously (Mar et al., 2006), evidence is accumulating that the reading of narrative fiction can have important consequences, whose quality and underlying mechanisms require closer study.

Bionotes

Raymond A. Mar is an Assistant Professor in the Department of Psychology at York University, 4700 Keele St., Toronto, ON, Canada M3J 1P3.

Keith Oatley is a Professor Emeritus in the Department of Human Development and Applied Psychology at the University of Toronto, 252 Bloor Street W., Toronto, ON, Canada M5S 1V6.

Jordan Peterson is a Professor in the Department of Psychology at the University of Toronto, 100 St. George St., Toronto, ON, Canada M5S 3G3.

Notes

1. Pilot work examining three separate samples ($N = 188$; $N = 636$; $N = 158$) from both University undergraduate and community samples (ESCS dataset; Goldberg, 1999) found that Openness was the most consistent unique predictor of exposure

to narrative fiction. Analyses conducted using the NEO PI-R facets (Costa and McCrae, 1992) were congruent with factor-level associations. For more details, please see supplementary material at: <http://www.yorku.ca/mar/papers/>

2. Because the nonfiction print-exposure measure included self-help as a genre, it is possible that exposure to this particular form of nonfiction was driving the observed associations for loneliness and lack of social support. However, when this category of book was removed from the calculation of Nonfiction, the new variable correlated highly with the total Nonfiction score ($r = .94$) and the pattern of results remained unchanged.

References

- Allen, L., Cipielewski, J., & Stanovich, K. E. (1992). Multiple indicators of children's reading habits and attitudes: Construct validity and cognitive correlates. *Journal of Educational Psychology, 84*, 489–503.
- Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another advanced test of theory-of-mind: Evidence from very high functioning adults with autism or Asperger syndrome. *Journal of Child Psychology and Psychiatry, 38*, 813–822.
- Baron-Cohen, S. & Wheelwright, S. (2004). The Empathy Quotient: An investigation of adults with Asperger syndrome or high-functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders, 34*, 163–175.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, 42*, 241–251.
- Beck, A. T. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77–100.
- Buckner, R. L. & Carroll, D. C. (2007). Self-projection and the brain. *Trends in Cognitive Sciences, 11*, 49–57.
- Cohen, S., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. M. Jr. (1997). Social ties and susceptibility to the common cold. *Journal of the American Medical Association, 277*, 1940–1944.
- Cohen, S. & Hoberman, H. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13*, 99–125.
- Cohen, S., Kamarck & T., Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396.
- Costa, P. T. & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Cunningham, A. E. & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology, 33*, 934–945.
- Dal Cin, S., Zanna, M. P., & Fong, G. T. (2004). Narrative persuasion and overcoming resistance. In E. S. Knowles & J. A. Linn (Eds.), *Resistance and persuasion* (pp. 175–191). Mahwah, NJ: Erlbaum.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalogue of Selected Documents in Psychology, 10*, 85.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology, 44*, 113–126.

- England, E. M. & Petro, K. D. (1998). Middle school students' perceptions of peer groups: Relative judgments about group characteristics. *The Journal of Early Adolescence*, 18, 349–373.
- Epley, N., Waytz, A., & Cacioppo, J. T. (2007). On seeing human: A three-factor theory of anthropomorphism. *Psychological Review*, 114, 864–886.
- Ferstl, E. C., Neumann, J., Bogler, C., & von Cramon, D. Y. (2008). The extended language network: A meta-analysis of neuroimaging studies on text comprehension. *Human Brain Mapping*, 29, 581–593.
- Finn, S. (1997). The origins of media exposure. *Communication Research*, 24, 507–529.
- Derrick, J. L., Gabriel, S., & Hugenberg, K. J. (2009). Social surrogacy: How favored television programs provide the experience of belonging. *Journal of Experimental Social Psychology*, 45, 352–362.
- Fraley, R. C. & Marks, M. J. (2007). The null hypothesis significance testing debate and its implications for personality research. In R. W. Robins, R. C. Fraley, & R. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 149–169). New York: Guilford Press.
- Gardner, W. L. & Knowles, M. L. (2008). Love makes you real: Favorite television characters are perceived as “real” in a social facilitation paradigm. *Social Cognition*, 26, 156–168.
- Gerrig, R. J. (1993). *Experiencing narrative worlds*. New Haven: Yale University Press.
- Goldberg, L. R. (1999). A broad-bandwidth, public-domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe*, vol. 7. (pp. 7–28). Tilburg: Tilburg University Press.
- Green, M. C., Strange, J. J., & Brock, T. C. (Eds.). (2002). *Narrative Impact*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Green, M. C. (2004). Transportation into narrative worlds: The role of prior knowledge and perceived realism. *Discourse Processes*, 38, 247–266.
- Green, M. C. & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79, 701–721.
- Gregory, C., Lough, S., Stone, V., Erzinclioglu, S., Martin, L., Baron-Cohen, S., & Hodges, R. (2002). Theory of mind in patients with frontal variant frontotemporal dementia and Alzheimer's disease: theoretical and practical implications. *Brain*, 125, 751–764.
- Hall, A. (2005). Audience personality and the selection of media and media genres. *Media Psychology*, 7, 377–398.
- Jensen-Campbell, L. A., Adams, R., Perry, D. G., Workman, K. A., Furdella, J. Q., & Egan, S. K. (2002). Agreeableness, extraversion, and peer relations in early adolescence: Winning friends and deflecting aggression. *Journal of Research in Personality*, 36, 224–251.
- John, O. P. & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research*, 2nd ed. (pp. 102–138). New York, NY: Guilford Press.
- Jonason, P. K., Webster, G. D., & Lindsey, A. E. (2008). Solutions to the problem of diminished social interaction. *Evolutionary Psychology*, 6, 637–651.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, self-control, and generalized self-efficacy indicators of a single core construct? *Journal of Personality and Social Psychology*, 83, 693–710.
- Keen, S. (2006). A theory of narrative empathy. *Narrative*, 14, 207–236.
- Koole, S. L., Jager, W., van den Berg, A. E., Vlek, C. A. J., & Hofstee, W. K. B. (2001). On the social nature of personality: Effects of extraversion, agreeableness,

- and feedback about collective resource use on cooperation in a resource dilemma. *Personality and Social Psychology Bulletin*, 27, 289–301.
- Mar, R. A. (2004). The neuropsychology of narrative: Story comprehension, story production and their interrelation. *Neuropsychologia*, 42, 1414–1434.
- Mar, R. A., DeYoung, C. G., Higgins, D. M., & Peterson, J. B. (2006). Self-liking and self-competence separate self-evaluation from self-deception: Associations with personality, ability, and achievement. *Journal of Personality*, 74, 1047–1078
- Mar, R. A. & Oatley, K. (2008). The function of fiction is the abstraction and simulation of social experience. *Perspectives on Psychological Science*, 3, 173–192.
- Mar, R. A., Oatley, K., & Djikic, M. (2008). Effects of reading on knowledge, social abilities, and selfhood: Theory and empirical studies. In S. Zyngier, M. Bortolussi, A. Chesnokova, & J. Auracher (Eds.), *Directions in Empirical Literary Studies: Essays in honor of Willie van Peer* (pp. 127–137). Amsterdam: John Benjamins.
- Mar, R. A., Oatley, K., Hirsh, J., dela Paz, J., & Peterson, J. B. (2006). Bookworms versus nerds: Exposure to fiction versus non-fiction, divergent associations with social ability, and the simulation of fictional social worlds. *Journal of Research in Personality*, 40, 694–712.
- Mar, R. A., Oatley, K., & Peterson, J. B. (2008). The relation between vocabulary and lifetime exposure to narrative fiction versus expository nonfiction. Poster presented at the 9th Annual Conference of the Society for Personality and Social Psychology, Albuquerque, NM, USA.
- McManus, I. C. & Furnham, A. (2006). Aesthetic activities and aesthetic attitudes: Influence of education, background and personality on interest and involvement in the arts. *British Journal of Psychology*, 97, 555–587.
- Miall, D. S. (2000). On the necessity of empirical studies of literary reading. *Frame: Utrecht Journal of Literary Theory*, 14, 43–59.
- Nell, V. (1988). *Lost in a book: The psychology of reading for pleasure*. New Haven, CT: Yale University Press.
- Nettelbeck, T., Basian, V., & Burns, N. (2007). Is Emotional Intelligence distinct from personality and cognitive ability? In Emotional Intelligence (P. Qualter, P. Rogers, Chairs). Paper presented at the 13th Biennial Meeting of the International Society for the Study of Individual Differences. Giessen, Germany.
- Oatley K. (1994). A taxonomy of the emotions of literary response and a theory of identification in fictional narrative. *Poetics*, 23, 53–74.
- Oatley, K. (1999). Why fiction may be twice as true as fact: Fiction as cognitive and emotional simulation. *Review of General Psychology*, 3, 101–117.
- Petrides, K. V., Pérez-González, J. C., & Furnham, A. (2007). On the criterion and incremental validity of trait emotional intelligence. *Cognition and Emotion*, 21, 26–55.
- Platek, S. M., Keenan, J. P., Gallup Jr., G. G., & Mohamed, F. B. (2004). Where am I? The neurological correlates of self and other. *Cognitive Brain Research*, 19, 114–122.
- Preacher, K. J. & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717–731.
- Preacher, K. J. & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879–891
- Prentice, D. A., Gerrig, R. J., & Bailis, D. S. (1997). What readers bring to the processing of fictional texts. *Psychonomic Bulletin Review*, 4, 416–420.
- Russell, D. W. (1996). UCLA Loneliness Scale (version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment*, 66, 20–40.

- Schulte, M. J., Ree, M. J., & Carretta, T. R. (2004). Emotional intelligence: Not much more than *g* and personality. *Personality and Individual Differences*, *37*, 1059–1068.
- Sénéchal, M., LeFevre, J., Hudson, E., & Lawson, E. P. (1996). Knowledge of story-books as a predictor of young children's vocabulary. *Journal of Educational Psychology*, *88*, 520–536.
- Spreng, R. N., Mar, R. A., & Kim, A. S. N. (2009). The common neural basis of autobiographical memory, prospection, navigation, theory of mind and the default mode: a quantitative meta-analysis. *Journal of Cognitive Neuroscience*, *21*, 489–510.
- Stanovich, K. E. & Cunningham, A. E. (1993). Where does knowledge come from? Specific associations between print exposure and information acquisition. *Journal of Educational Psychology*, *85*, 211–229.
- Stanovich, K. E. & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly*, *24*, 402–433.
- Strange, J. J. & Leung, C. C. (1999). How anecdotal accounts in news and fiction can influence judgments of a social problem's urgency, causes, and cures. *Personality and Social Psychology Bulletin*, *25*, 436–449.
- Taylor, M. & Carlson, S. M. (1997). The relationship between individual differences in fantasy and theory of mind. *Child Development*, *68*, 436–455.
- Tirre, W. C. & Dixit, S. (1995). Reading interests: Their dimensionality and correlation with personality and cognitive factors. *Personality and Individual Differences*, *18*, 731–738.
- Weaver, J. B., III (1991). Exploring the links between personality and media preferences. *Personality and Individual Differences*, *12*, 1293–1299.
- West, R. F., Stanovich, K. E., & Mitchell, H. R. (1993). Reading in the real world and its correlates. *Reading Research Quarterly*, *28*, 34–50.
- Zillmann, D. (1994). Mechanisms of emotional involvement with drama. *Poetics*, *23*, 33–51.