Transportation into a story increases empathy, prosocial behavior, and perceptual bias toward fearful expressions

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ABSTRACT

Theorists from diverse disciplines purport narrative fiction serves to foster empathic development and growth. In two studies, participants' subjective, behavioral, and perceptual responses were observed after reading a short fictional story. In study 1, participants who were more transported into the story exhibited higher affective empathy and were more likely to engage in prosocial behavior. In study 2, reading-induced affective empathy was related to greater bias toward subtle, fearful facial expressions, decreased perceptual accuracy of fearful expressions, and a higher likelihood of engaging in prosocial behavior. These effects persisted after controlling for an individual's dispositional empathy and general tendency to become absorbed in a story. This study provides an important initial step in empirically demonstrating the influence of reading fiction on empathy, emotional perception, and prosocial behavior.

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1. Introduction

Theorists from various disciplines propose positive functions of reading fiction including educational and moral development (Alexander, Miller, & Hengst, 2001; Vitz, 1990) and empathy development (Keen, 2007; Mar & Oatley, 2008). Yet, these theoretical assumptions have recently been questioned and have only rarely undergone empirical scrutiny (Keen, 2007). In two studies, the often hypothesized link between reading fiction and empathy was tested.

Mar and Oatley's (2008) recent comprehensive theory proposes the primary function of narrative fiction is to allow the reader to simulate and learn from fictional social experience. According to Mar and Oatley, when reading fiction an individual simulates, that is, feels emotions and experiences thoughts congruent with the story's characters. Readers also learn about the complex social world by abstracting meaning, drawing inferences, and making predictions about plot development and the interpersonal relationships in the story. By indirectly experiencing the same subtleties of social interaction and travails of fictional story characters, Mar and Oatley propose readers experience empathic growth – the focus of the current study.

It is generally agreed that empathy consists of affective and cognitive components (Davis, 1983; Decety & Jackson, 2006; Vingemont & Singer, 2006). The components of empathy include, affective empathy, meaning feeling concern or compassion for

another, emotional contagion, or experiencing identical emotions as another, and perspective-taking, or a basic understanding of another's thoughts and emotions. The component predicted by Mar and Oatley to be most affected by reading fiction is affective empathy. They point out that the process of identifying with a character in a story does not necessarily mean the reader feels identical emotions with the character, but rather feels emotion for the character, like warmth toward a character who accomplishes a goal. While feeling for a character may also involve cognitive perspective-taking, this is considered a relatively independent component that is less "feeling-focused" than affective empathy.

While reading fiction may foster empathic growth, it is also important to determine whether these empathic feelings translate into real-world behaviors. The close relationship between empathy and prosocial behavior is well established (Eisenberg & Miller, 1987). Therefore, it is predicted reading fiction should also increase prosocial behavior. Many fictional narratives include characters that exhibit prosocial behavior. According to social learning theory, the more an individual simulates and learns from the characters exhibiting prosocial behavior, the more likely the individual will perform prosocial behavior as a consequence (Greitemeyer, Osswald, & Brauer, 2010).

To this author's knowledge, the link between reading fiction and empathy in adults has been empirically tested in only one study (Mar, Oatley, Hirsh, Paz, & Peterson, 2006). However, the study did not examine direct and immediate responses to reading a fictional story and instead focused on individuals with a history of reading fiction. It remains unclear whether reading fiction can induce affective empathy and whether this translates into

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prosocial behavior. In addition, while the study revealed fiction readers were better at a global measure of emotional perception, the precise nature of the perceptual consequences of reading fiction also needs elucidating.

Recent work demonstrates that individuals higher in dispositional empathy have enhanced perception of emotional facial expressions, particularly fearful expressions (Besel & Yuille, 2010; Clark, Winkielman, & McIntosh, 2008). However, it is not yet clear whether reading-induced affective empathy also influences emotional perception. In addition, previous studies did not allow the separation of perceptual accuracy and perceptual bias. A novel prediction is that an empathic state could bias an individual toward perceiving an emotion, even when it is not present. In the real world, emotional expressions are often subtle and fleeting, so under these conditions of uncertainty, it is possible an empathic person is biased toward emotion. This bias should be particularly evident when a facial expression conveys a need for help, like a fearful expression (Besel & Yuille, 2010). Recent studies investigating emotional perception and all basic emotions suggest a strong link between empathy and fear perception, over and above perception of sad expressions and others (Clark et al., 2008; Marsh, Kozak, & Ambady, 2007). By favoring fearful expressions, the individual high in affective empathy may sacrifice perceptual accuracy. Consequently, the predictions are that individuals higher in reading-induced affective empathy will demonstrate higher bias toward subtle fearful emotional expressions and lower perceptual accuracy.

2. Study 1

The purpose of the first study was to determine if reading a fictional story can induce affective empathy and increase prosocial behavior. The literature lacks a way to assess the degree to which a particular sample of fiction elicits the simulation of social experience. However, Green and Brock (2000) posit that *transportation* into a story occurs when an individual is fully engaged, experiences high imagery, and is emotionally impacted by the story. Supporting the idea that transported individuals are simulating and learning from the fictional social world, participants in the study modified their attitudes in a story-consistent manner. Therefore, it appears the degree to which an individual reports being transported into the story can serve as a proxy for how much they simulated and learned social information from the story.

3. Method

3.1. Participants

Participants volunteered to participate by responding to an announcement in their class or a publically posted flyer. The sample consisted of 62 students and community members (30 men, 32 women). The mean age was 21.37 (range 18–53, 3% above age 29) and all participants had normal or corrected-to-normal vision.

3.2. Materials

3.2.1. Fictional story

The story was written specifically for this study, took approximately 15 min to read, and was written at a 14-year old reading level. The story was designed to induce compassionate feelings for the characters and model prosocial behavior.[1]

[1] Full story is available upon request from the author.

3.2.2. Affective empathy

Batson, Early, & Salvarni's (1997) measure of affective empathy was used where participants rated how much (1 = very little, 5 = extremely) they experienced six emotions while reading the story including, compassionate, sympathetic, soft-hearted, tender, moved, and warm. This scale demonstrated good reliability for this sample (Cronbach's α = .863) and has shown sensitivity to manipulations of empathy (e.g., Batson et al., 1997).

3.2.3. Mood assessment

The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) was used to assess positive and negative mood dimensions, where participants rated how much (1 = very little, 5 = extremely) they felt specific emotions during the story.

3.2.4. Transportation

Green and Brock's (2000) transportation scale provides an assessment of the degree to which an individual is fully engaged in the story, has vivid imagery, and is emotionally impacted by the story. Example items include "I had a vivid mental picture of Eric" and "After finishing the story, I wanted to learn more about Eric and Mr. Howard." On a Likert scale, participants rated how much (1 = very little, 5 = extremely) they experienced these items. It has been validated and shown sensitivity to changes in the quality and persuasiveness of a story (Green & Brock, 2000). This scale demonstrated good reliability for this sample (Cronbach's α = .745).

3.2.5. Prosocial behavior

Helping behavior was assessed using a validated measure, where the experimenter "accidently" drops pens within sight of the participant and then records whether or not the participant helps to pick up the pens (van Baaren, Holland, Kawakami, & van Knippenberg, 2004).

3.2.6. Control measures, demand questions

Given the close relationship between empathy and prosocial behavior (Eisenberg & Miller, 1987), dispositional empathy could provide an alternative explanation of any relationship with reading-induced affective empathy. In addition, one's general tendency to get involved in fiction could also provide an alternative explanation of the results (Mar et al., 2006). Consequently, two subscales from the Interpersonal Reactivity Index (IRI; Davis, 1983) were used for control. The Empathic Concern dimension is the dispositional version of affective empathy. Example items include "I often have tender, concerned feelings for people less fortunate than me" and "I am often quite touched by things that I see happen." The Fantasy dimension is the dispositional version of transportation. Example items include, "I really get involved with the feelings of the characters in a novel" and "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." Both scales employ a 1 (does not describe me well) to 5 (describes me very well) Likert scale and demonstrated good reliability in this sample (Cronbach's α = .815, .706, respectively).

To ensure participants carefully read the story, they were asked content-related questions at the end of the session. In addition, a funneled debriefing procedure was used to determine if the participants were aware that the pen drop was a part of the study.

3.3. Procedure

Participants first took the PANAS as an assessment of baseline mood. Next, they read the story, followed by another assessment of PANAS with affective empathy items interleaved throughout the scale. After the transportation scale was administered, the experimenter stood up and told the participants they needed to

Table 1
For study 1, linear and logistic regressions demonstrating the positive relationships between transportation, affective empathy, and helping behavior.

Regression #	Predictors	Criterion	b	SE	b^*	p-Value
Study 1						
1	Transportation	Affective empathy	.23	.08	**.35**	**.007**
	Empathic Concern		.20	.12	.21	.096
	Fantasy		−.06	.12	−.07	.602
2	Affective empathy	Helping behavior	.13	.06	**.34**	**.042**
	Empathic Concern		.06	.06	.16	.338
	Fantasy		.05	.06	.14	.376
3	Transportation	Helping behavior	.13	.05	**.51**	**.010**
	Empathic Concern		.07	.06	.18	.289
	Fantasy		.10	.06	.27	.125

Note: Logistic regression was used when Helping Behavior was the categorical dependent variable (0 = did not help pick up pens, 1 = helped pick up pens), otherwise multiple linear regression was used. The significant standardized regression weights and *p*-values are bolded.

retrieve the debriefing forms. On their way back, the experimenter dropped six pens within view of the participants and recorded whether or not the participants helped. The session concluded with the manipulation check, demand questions, and debriefing.

3.4. Statistical analysis

In order to determine the unique contributions of transportation to affective empathy, linear, simultaneous multiple regression was used. Given the dichotomous nature of the prosocial behavior dependent variable, simultaneous logistic regression was used in all analyses involving this variable. Also, a mediation model was used to test whether reading-induced affective empathy can explain any changes in prosocial behavior after reading.

4. Results and discussion

Participants appeared to comprehend the story (accuracy = 99.50%). In addition, no participants reported being aware that the pen drop was a part of the study.

In all following regressions, both Empathic Concern and Fantasy were controlled for by serving as predictors along with the predictor of interest (see Table 1). Supporting Mar and Oatley's (2008) theory, individuals who were more transported into the story reported significantly higher affective empathy for the characters (regression 1). The hypotheses that transportation and affective empathy would translate into real-world behavior were also supported as individuals who experienced higher transportation and affective empathy were significantly more likely to help the experimenter pick up the pens (regressions 2, 3).[2]

Finally, to determine whether the influence of reading fiction on prosocial behavior is fully explained by the affective empathy it induces, a statistical mediation model was performed.[3] As the top panel of Fig. 1a demonstrates, affective empathy did not fully mediate the influence of transportation on helping behavior. This indicates there was something above and beyond affective empathy that led to helping behavior after being transported into the story. Given that a main character in the story modeled prosocial behavior, it is possible that this modeling also had an effect on helping behavior, independent of affective empathy. This supports social learning theory and a recent study on the influence of mod-

Fig. 1. (a) A mediational model where all regression weights are adjusted by controlling for Empathic Concern and Fantasy. The path leading to affective empathy represents multiple linear regression, whereas the other paths represent multiple logistic regression. $^*p < .05$, $^{**}p < .01$. (b) Using a median split on bias for fearful faces presented slowly, the high perceptual fear bias group helped the experimenter pick up the pens significantly more than the low perceptual fear bias group. Standard error bars are included.

eling prosocial behavior on affective empathy (Greitemeyer et al., 2010).

5. Study 2

The purpose of the second study was to determine the perceptual consequences of reading-induced affective empathy. The design was identical to study 1 except an emotional perception task was added. This allowed an internal replication of study 1 results. To make the task sensitive to individual differences in empathy, subtle emotional expressions were used. The task required participants to detect subtle expressions of positive and negative emotion that were presented both slowly and quickly. A signal detection framework was applied so that perceptual accuracy could be disentangled from perceptual bias (Macmillan & Creelman, 2005). It is predicted that individuals experiencing greater reading-induced affective empathy will exhibit a perceptual bias toward emotion, particularly for fearful expressions (Besel & Yuille, 2010). In addition, due to this bias, individuals experiencing higher levels of affective empathy may also exhibit decreased perceptual accuracy.

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[2] All analyses were also performed controlling for baseline mood and mood response to the story. The patterns and significance of the results persisted, but due to potential multicollinearity effects on estimates, these were not included in the regressions reported.

[3] The bootstrapping method described by Preacher and Hayes (2008) was used to test this mediation model because it's shown to have the greatest power and lowest probability of a type one error.
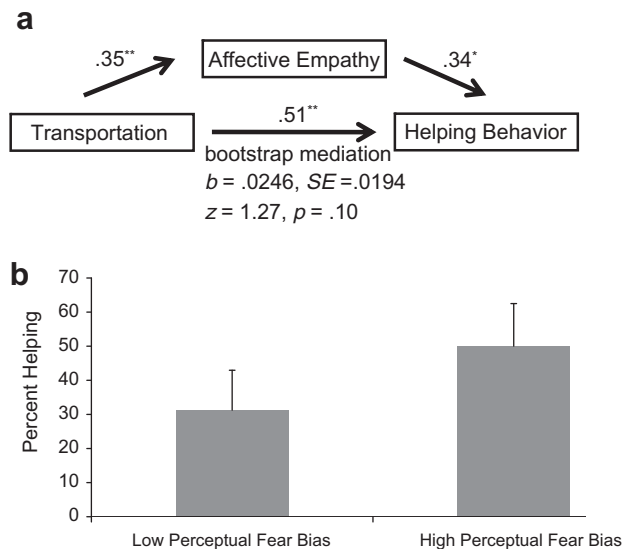
6. Method

6.1. Participants

Participants volunteered to participate by responding to an announcement in their class or a publically posted flyer. This second sample consisted of 31 students and community members (20 men, 11 women). The mean age was 22.76 (range 19–53, 6% above age 29) and all participants had normal or corrected-to-normal vision.

6.2. Materials

6.2.1. Emotional perception task

Participants were presented with a series of happy, fearful, and neutral faces. On each trial, participants indicated with a key press whether or not they thought an emotion was present on the face. The facial expressions were taken from a validated emotional expression database (Tottenham et al., 2009) and stimuli were created using the morphing software, FantaMorph (Abrosoft). The same person's neutral and happy facial expressions were morphed together to reflect 20% happy:80% neutral and 40% happy:60% neutral expressions. These two intensities were chosen to represent subtle expressions of emotion. The same procedure was used for fearful expressions. Using Adobe Photoshop (Adobe, CS4), all faces were converted to black and white and matched on potential confounding dimensions, like resolution, contrast, and brightness. The 3 male faces and 1 female face used in the study were carefully chosen to represent those that appeared the most realistic after morphing.

The task consisted of four blocks of trials. The first block consisted of 16 happy faces at 20% intensity, 16 happy faces at 40% intensity, and 32 neutral faces. This created a 50:50 ratio of emotional to neutral faces. Each trial began with a crosshair followed by the face that was presented very quickly, for 50 ms, followed by a mask composed of gray-black static for 500 ms. Then, the participant had 5 s to indicate whether they thought an emotion was present or absent and the next trial began. The faces were presented quickly to assess more automatic processing and represent realistic, subtle and fleeting emotions. The next block was identical to the first block except the faces were presented for 2 s, to assess more controlled, deliberative judgments. The third and fourth blocks were identical to blocks one and two, except fearful faces were used. The order of fearful and happy face-blocks was counterbalanced. The task was given just before the helping behavior assessment.

6.2.2. Questionnaires

All the same questionnaires from study 1 were used and demonstrated adequate reliability (Empathic Concern, α = .779; Fantasy, α = .640; affective empathy, α = .909; transportation, α = .788).

6.2.3. Statistical analysis

In order to determine the unique contributions of transportation and affective empathy to emotional perception, linear, simultaneous multiple regression was used. Given the dichotomous nature of the prosocial behavior dependent variable, simultaneous logistic regression was used in all analyses involving this variable.

7. Results and discussion

Table 2 presents regressions 4–6 that indicate the results of study 1 were replicated. To determine the influence of reading-induced affective empathy on perceptual bias and accuracy, a signal detection theory framework was utilized. Two main parameters were computed including d'; which indexes perceptual accuracy, and c; which indexes perceptual bias (Macmillan & Creelman,

Table 2
For study 2, linear and logistic regressions demonstrating the positive relationships between transportation, affective empathy, perceptual bias and accuracy, and helping behavior.

Regression #	Predictors	Criterion	b	SE	b^*	p-Value
Study 2						
4	Transportation	Affective empathy	.33	.12	**.47**	**.011**
	Empathic Concern		.33	.22	.28	.144
	Fantasy		.29	.23	.22	.217
5	Affective empathy	Helping behavior	.23	.10	**.74**	**.022**
	Empathic Concern		.14	.11	.39	.195
	Fantasy		.17	.13	.41	.193
6	Transportation	Helping behavior	.13	.06	**.65**	**.029**
	Empathic Concern		.10	.10	.27	.327
	Fantasy		.04	.11	.11	.683
7	Affective empathy	Perceptual fear bias	.08	.03	**.50**	**.010**
	Empathic Concern		.10	.04	**.53**	**.013**
	Fantasy		.03	.04	.17	.378
8	Affective Empathy	Perceptual fear accuracy	.10	.04	**−.49**	**.016**
	Empathic Concern		.03	.05	.15	.475
	Fantasy		.00	.05	.00	.988
9	Perceptual fear bias	Helping behavior	1.12	.62	**.61**	**.050**
	Empathic Concern		.04	.09	.10	.703
	Fantasy		.09	.11	.22	.421
10	Affective empathy	Perceptual happy bias	.01	.03	.05	.819
	Empathic Concern		.03	.04	.18	.436
	Fantasy		.02	.04	.12	.577
11	Affective empathy	Perceptual happy accuracy	.03	.05	.12	.565
	Empathic Concern		.03	.07	.09	.708
	Fantasy		.03	.07	.08	.703

Note: Logistic regression was used when Helping Behavior was the categorical dependent variable (0 = did not help pick up pens, 1 = helped pick up pens), otherwise multiple linear regression was used. The significant standardized regression weights and *p*-values are bolded.

2005). All following analyses control for Empathic Concern and Fantasy by including them as predictors in the regressions.

As Table 2 indicates, predictions were confirmed as individuals higher in reading-induced affective empathy were significantly more biased toward fearful expressions than individuals lower in affective empathy (regression 7). This means individuals higher in affective empathy were more likely to say a fearful face was present, even when it was not, compared to individuals lower in affective empathy. This relationship emerged only for fearful expressions that were presented slowly, indicating the bias was less automatic and requires some deliberation. In addition, given the non-significant effects for happy expressions, it appears this bias is limited to facial expressions conveying a need for help, rather than emotional expressions in general (regressions 10, 11).

The hypothesis that individuals favoring emotional expressions over neutral expressions may come at a cost to perceptual accuracy was also confirmed. Individuals higher in affective empathy had significantly lower perceptual accuracy for slowly presented fearful expressions, compared to individuals lower in affective empathy (regression 8). These effects were again limited to fearful expressions, indicating perceptual accuracy for faces conveying need was uniquely impacted, rather than perceptual accuracy for emotion in general.

Importantly, the reading-induced effect on perceptual bias translated into real-world helping behavior in that a logistic regression indicated greater bias toward fearful expressions predicted a higher likelihood of helping behavior (regression 9). Using a median split, Fig. 1b demonstrates that those higher in bias toward fearful expressions were nearly twice as likely to help the experimenter pick up the pens as those lower in bias.

8. General discussion

Philosophers, literary scholars, and psychologists ascribe crucial value to narrative fiction as an outlet for empathic development and growth (Alexander et al., 2001; Keen, 2007; Mar & Oatley, 2008). This is the first study, to this author's knowledge, to show a direct link between reading narrative fiction, affective empathy, and helping behavior.

Supporting Mar and Oatley's (2008) theory, individuals who were more transported into the story experienced greater affective empathy for the story's characters. Extending Mar and Oatley's theory, reading fiction influenced emotional perception. Individuals who experienced higher levels of reading-induced affective empathy were biased toward subtle fearful facial expressions. That is, those experiencing reading-induced affective empathy were more likely to say there was fear depicted on a face even when no emotion was present. This bias appeared to come at a cost as these individuals also had lower perceptual accuracy for fearful expressions. In addition, the effects of reading-induced affective empathy on emotional perception were limited to fearful expressions, rather than to all emotional expressions. These emotional perception findings suggest some boundary conditions for Mar and Oatley's predictions regarding empathic growth in the domain of emotional perception. When participants are still experiencing affective empathy after reading, rather than inducing a generalized increase in emotion perceptual ability, it appears individuals are specifically biased toward interpreting subtle negative facial expressions as fearful. A future study should determine if this perceptual bias is limited to fearful expressions or whether individuals experiencing reading-induced affective empathy may be biased toward other expressions conveying a need for help, such as a sad expression.

The results of this study also suggest that an additional positive consequence of reading fiction should be added to Mar and Oatley's theory, that is, prosocial behavior. In the current study, individuals who experienced high levels of affective empathy while

reading were nearly twice as likely to engage in prosocial behavior as individuals experiencing low levels of affective empathy. A recent study demonstrated that playing prosocial video games leads to empathic growth (Greitemeyer et al., 2010). The current study suggests the reverse causal relationship may also operate, where individuals exposed to prosocial behavior while reading may later be more likely to exhibit the same behavior. This has applied implications for education. For example, if children are encouraged to read fictional stories that include characters that elicit empathy and exhibit prosocial behavior, they may develop the same behavior.

The primary limitation of this study is that both studies were correlational in nature. As a result, it cannot be concluded that the effects of transportation, empathy, and perceptual bias on helping behavior are causal. However, two primary alternative explanations of the results were eliminated by controlling for dispositional empathy and one's general tendency to become absorbed in a story. This control strengthens the argument that the results in the study were due to the immediate effects of reading a fictional story. The design also capitalized on the apparent large individual differences in response to reading a fictional story. Future studies should determine the causal relationships among transportation, empathy, and prosocial behavior.

Another limitation of the study is the small sample size in both studies, particularly in study 2. However, given that both the pattern and significance level of the outcomes in study 1 were replicated in study 2, it is difficult to argue the relationships found in these studies were due to a type one error. In addition, the primary measures exhibited adequate reliability. Nonetheless, the precise magnitude of relationships found in these studies with a small sample size should be interpreted cautiously and await replication in a larger, more comprehensive study.

In conclusion, it appears that "curling up with a good book," may do more than provide relaxation and entertainment. Reading narrative fiction allows one to learn about our social world and as a result fosters empathic growth and prosocial behavior.

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