


Cumulative Reading Engagement Predicts Individual Sensitivity to Moral Judgment: The Mediating Role of Social Processing Tendencies



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Previous research has suggested that one-time literary fiction exposure facilitates the ability to infer the other's emotions/intentions, but the effect has a relatively low statistical power, and the mechanism remains poorly understood. To obtain greater statistical power and understand the mechanism, the index of cumulative reading engagement (CRE) with fiction is being proposed in the present research. College students ($N = 408$) described their reading engagement by completing questionnaires about reading interest, reading time, diversity of reading materials, and fiction exposure. Next, participants assessed the moral judgment of actions and interpersonal reactivity scales. We analyzed the data using the structural equation technique to study the three-path mediation model. The results indicated that 1) CRE was related to social processing tendencies; 2) CRE contributed to moral intentions toward moral dilemma; 3) the effect of CRE on moral judgment was mediated by empathic concern, but not by perspective-taking and imaginary engagement. This study suggests that CRE is a reliable indicator of fiction exposure. Alternatively, reading fiction may involve exploring and expressing complex emotions, which in turn helps individuals increase their ability to infer and prioritize actors' moral intentions.

Key words: moral judgment, social processing, cumulative reading engagement (CRE), theory of mind, literary fiction

Introduction

Everywhere in the world, children at an early age are encouraged to read a lot of moral

stories and fiction, which serve as a tool for acquiring social values and moral domestication (Kim, Green, & Klein, 2006; Fong, Mullin, & Mar, 2015; Fürholzer & Salloch, 2016; Kidd, Ongis, & Castano, 2016). The

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main reason is that literary fiction provides children with demonstrable social benefits, including social processing tendencies (Kidd & Castano, 2013; Mumper & Gerrig, 2016; Dodell-Feder & Tamir, 2018). Although many theorists have suggested that fiction exposure facilitates the ability to infer others' mental states, there is considerable debate about whether it improves children's moral reasoning (Xu, Fang, & Wang, 2020). A growing body of theoretical research exists in separate topics, but the relationship between moral judgment and fiction exposure has seldom caused the researchers concern. Here, we present a preliminary study exploring how participants' fiction exposure might predict moral judgment.

Reading Fiction and Moral Judgment

Literary fiction is generally defined as a genre of fiction, and its main character is aesthetic qualities and character development (Koopman, 2016; Kidd & Castano, 2017). It enables aesthetic experiences and creatively engages readers in the subjective worlds of others (Eden et al., 2014; Schnell & Bilandzic, 2017; Black, Capps, & Barnes, 2018). Reading fiction could influence readers' real-world beliefs, inspire them to challenge traditional patterns, and increase the tendency to form quick and straightforward conclusions (Green & Brock, 2000; Strange & Leung, 1999; Djikic & Oatley, 2014). For instance, Zunshine (2006) has maintained that literary fiction was a medium for delving into others' thoughts and intentions. Fong, Mullin, and Mar (2015) also proposed that fiction exposure changed readers' attitudes and beliefs towards gender (e.g., gender role egalitarianism and gender role stereotyping). Hence, exposure to literary fiction might affect participants' performance on the moral judgment task, which is too surprising for researchers to ignore.

It is common knowledge that the unspoken purpose of literary fiction is to foster people's moral judgment (Nussbaum, 1985). According to declinist Honig's perspective (1987), literary fiction may create empathy and profoundly affect moral behavior. Based on the theory, reading literary fiction has been regarded as the pillar of moral education, especially reading classical literary fiction. For example, Bennett (1993) and Nash (1997) contend that literary fiction has a formative impact on moral character because the fiction's author integrates the protagonist's motivations and aspirations in the story, thus making the reader take moral conflicts in a new light. It is not uncommon for young children to learn traditional moral values and imitate the protagonist's behavior through reading. The psychologist Hakemulder (2000), for instance, claimed literary fiction was like a moral laboratory for reshaping moral ideas. The term "fiction exposure" refers to the experience of reading literary fiction over one's lifetime (Stanovich & West, 1989). Indeed, fiction exposure is an important trigger factor for accurately perceiving the other's moral intention (Black et al., 2018). According to the intuitive morality model, cumulative exposure to specific content (e.g., TV, movie, cartoon, magazine, game, fiction) can increase the subsequent accessibility of moral intention (Tamborini, 2011). For example, exposure to relevant movies and music influences sexual morality (Pardun, L'Engle, & Brown, 2005). Another study showed that adolescents who enjoy reading science fiction might consider taboo or immoral acts permissible (Black & Barnes, 2021). Given the results of the literature outlined above, we hypothesize that exposure to literary fiction would be associated with an increased likelihood of perceiving the moral intention of others. Moreover, searching for mechanisms mediating the effects of reading experience on readers' moral judgments is still

an important task in understanding the function of literary fiction. The present research examines whether individual differences in some social processing tendencies mediated the relationship between literary fiction exposure and readers' moral judgments.

The Mediator Variables between Reading Fiction and Moral Judgment

Although fiction exposure predicts more changes in moral intention, it may play an indirect role through some mediators. For example, the theoretical-empirical framework advocated that literary reading could hone social processing tendencies (Koopman & Hakemulder, 2015). Social processing tendencies are fundamental and essential abilities used to identify and understand others, including perspective-taking, empathic concern, and imaginary engagement. Individual abilities in social processing tendencies may relate systematically to reading experiences. According to previous studies, these three possible mechanisms proposed by psychologists underlie the indirect relationships between fiction exposure and moral intention (Bal & Veltkamp, 2013; Barnes, 2018; Johnson et al., 2013).

Perspective-taking is generally regarded as a cognitive ability that involves understanding others' mental states (e.g., their intentions, desires, knowledge, beliefs). The presence of perspective-taking may facilitate the perception of moral intention (Batson, 1991, 1998), and its absence can devastate moral intention (Richardson et al., 1994). For instance, after reading about anti-stereotype exemplars and Arab/Muslim culture, participants were more likely to decrease the implicit prejudice of people when they see magazine photographs of Arab faces (Johnson et al., 2013; Johnson et al., 2014). The main idea of projection theory is that people carefully consider others' thoughts when they exhaustively capture

others' moral intentions (Mata, 2019). Specifically, moral intention largely depends on the extent to which people try to read the minds of others. Thus, readers exposed to literary fiction are more likely to take others' perspectives, which in turn allows them to exercise their ability to interpret the characteristics of moral events.

Empathic concern is conceptually similar to sympathy, but it is mainly characterized by the feeling of warmth or compassion for the emotional state of the people around you (Spreng et al., 2009). On the one hand, empathic concern is motivated by engaging in fictional characters' inner worlds (e.g., Oatley, 1999; Mar, Oatley, & Peterson, 2009; Koopman, 2018). For example, two notable studies found a significant correlation between empathic concern and fiction exposure, which is typically measured through the author recognition test (ART: Mar et al., 2006; Mar et al., 2009). On the other hand, empathic concern is likely to influence how readers think about life, thinking socially, thinking about reality (Oatley, 1995; Mar et al., 2011). As a component of empathy, empathic concern alerts the individual to the moral salience by bringing emotion and thus can serve as an antecedent to moral judgment. That means empathic concern guides moral judgment (Decety, Michalska, & Kinzler, 2012; Decety & Cowell, 2014). This study examines whether empathic concern mediates the relationship between fiction exposure and moral judgment.

A common experience is that a very interesting story allows the reader to fill the gap, enliven the characters, search for answers, flesh out the fictitious scenario, or input meaning onto the plot that is not explicitly written (Barnes, 2018). This process is known as imaginative engagement. It can be evoked not only by enjoying great artworks but also by reading about literary fiction. In line with the conclusion, Nussbaum (1995) asserted

that imaginative engagement was an inevitable reaction when readers try to enjoy reading, which helps them make inferences about the characters' complex internal lives. Recently, Fong, Mullin, and Mar (2013) also proposed that readers unconsciously imagined characters in a story and imitated the protagonists' behavior, mentally adopting moral judgment. Specifically, imagination allows the reader to construct a possible solution to moral dilemmas and moral conflicts (Mar & Oatley, 2008). For instance, those readers who like to read science fiction imagine alternatives to the real world, allowing for moral or physical violations (Black et al., 2018). Individuals with higher fiction exposure seem to imagine others richly and mentally adopt novel perspectives. This study also examines whether imagination mediates the relationship between fiction exposure and moral judgment.

The Current Study

Most researchers contend that fiction exposure is a more sensitive and reliable predictor of reading engagement (Fong et al., 2013, 2015; Mar et al., 2006). However, the effect may be fragile (Mumper & Gerrig, 2016). The reason for it is that one-time fiction exposure for social cognition is unconvincing. First, the measurement for fiction exposure was frequently criticized for its lack of rationale. Fiction exposure is typically measured through the Author Recognition Test (ART, e.g., Stanovich & West, 1989). More specifically, participants were presented with a list of authors' names and required to select the real author's name, including half of the foil names to avoid guessing. The scores of fiction exposure are calculated by subtracting the number of foil names selected from the number of real authors' names chosen. The score is taken as a proxy index of fiction exposure. Although the index is generally adopted by

many researchers (Stanovich & Cunningham, 1993; West et al., 1993; Acheson et al., 2008), it does not directly measure fiction exposure. People may know the given authors' names but do not read the author's novels. Second, it also comes out that the correlation coefficient between the scores and theory of mind was small, and the power was low (ToM, Mar, et al., 2006). For example, a meta-analytical study found that one-time fiction exposure improves social cognitive ability significantly, but the effect size was only 0.15 (Dodell-Feder & Tamir, 2018). Third, the other question worth considering is whether the test is suitable for Chinese students. Although many Chinese students have not read this fiction, they achieve good scores. The most obvious reason is that they only need to recite authors' names for exams.

To resolve failure detection, we used the well-known parameter of the cumulative reading engagement index. The cumulative model posited that outcome variables could be better predicted by combinations of factors, rather than by a single factor (Sameroff et al., 1993). According to the engagement model of reading comprehension development, reading engagement is gathered together by motivational processes and reading behavior during reading comprehension (Guthrie & Wigfield, 2000). From this perspective, reading engagement includes behavioral, emotional, and cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004). Behavioral engagement includes spontaneous participating in or absorbing in a very interesting story (e.g., reading time); Emotional engagement refers to emotional activation that occurs when the reader considers reading potentially exciting or interesting (e.g., reading interest); Cognitive engagement refers to the implementation of several strategies for selecting literary fiction that reflect their students' cognitive level and offer them windows into the diverse lived experiences of

others (e.g., reading diversity and fiction exposure). The *Program for International Student Assessment* (PISA) also assessed that reading engagement included three behavioral indicators: reading time, fiction exposure, and reading diversity (OECD, 2010a). Based on the PISA indicators, cumulative reading engagement (CRE) was constructed. To achieve maximal reliability, we evaluated CRE using four aspects: fiction exposure, reading time, reading interest, and reading diversity (Maslej, Oatley, & Mar, 2017). Concretely speaking, CRE was calculated by summing these factors, with higher scores indicating that the reader was exposed more to literary fiction. Therefore, we make a methodological contribution to CRE measurement in the present study. The critical hypothesis of the cumulative model is that exposure to multiple factors does have some effect over and above a single factor (Evans, Li, & Whipple, 2013). The study explored the association between cumulative exposure to literary fiction and the capacity to infer moral intention. We expected to find associations between the CRE and ratings of moral judgment, with higher levels of CRE in participants being associated with the more positive intention of their moral judgments. Based on previous literature, we also predicted that social processing tendencies, namely perspective-taking, imaginary engagement, and empathic concern from Davis's (1983) IRI, could account for any observed relationships between CRE and judgments of moral judgment. To explore the idea, we examine whether individual differences in social processing tendencies mediate the relationship between CRE and moral judgment. Theoretically, we expected three variables to matter, but disagreements exist on the mediating effect size. Specifically, if CRE serves as a way to understand other's mental state in the real world, the association between CRE and moral judgment is mediated by perspective-taking; If the effect of CRE stems from the

emotional reaction, its association is mediated by empathic concern; If the effect stems from becoming immersed in a story, its association is mediated by imaginary engagement.

Method

Participants

We used the Cochran formula (Cochran, 1977) to compute the sample size: $N = Z^2 \times [P(1-P)] / E^2$, where N is the sample size, Z is z-score, P is the proportion of reading literary fiction, and E is the relative desired precision. In this study, parameters are as follows: $Z = 1.96$ (95% confidence), $E = 5\%$. Because modern Chinese undergraduate students' incidence of reading literary fiction is 40.5% (Wang et al., 2019), $P = 0.405$ is required. Therefore, it can be calculated that the required sample size should not be less than 372. Before the investigation, ten trained graduate students voluntarily introduced the research purpose, questionnaire's content, basic procedures, confidentiality principle, and attention points during the survey period. We used convenience sampling to recruit 408 students from Chinese universities, of which 62.7% were female, and 37.3% were male. The sample's Mean age is 20.12 (range = 18.42–22.32), and the standard deviation is 1.85.

Measures

Reading Interest Questionnaire of PISA. To measure students' interest in reading, we used the reading interest revision of PISA. The scale was developed to assess the Chinese version, which has 11 items (OECD, 2010b). The participants were asked to indicate the degree to which they agree or disagree with the following statements about whether they enjoyed reading and whether they like to read. The items were rated on a 5-point Likert scale

(1 = strongly disagree, 5 = strongly agree). The Cronbach's alpha was 0.82 in the current study.

Self-reported diversity of reading materials and time spent reading. We also measured the participants' reading habits using the Chinese version of self-reported measurement, consisting of three sections: reading time, reading diversity, and diversity of online reading (OECD, 2010b). For example, reading time was rated on an 8-point scale ranging from 1 (never) to 8 (roughly every day). We also assessed the frequency of reading different types of literary fiction in the same way: "I read fiction/poetry/nonfiction." The Cronbach's alpha was 0.64 in the current study.

Fiction exposure. Fiction exposure was rated indirectly using Author Recognition Test (ART; Stanovich & West, 1989). Given the cultural differences, the original version of ART was modified for the Chinese version. Hence, we adopted 60 authors' names from the National Center for School Curriculum and Textbook Development (Ministry of Education of the People's Republic of China). This Chinese version of the ART contained 60 names of authors of fiction and 40 foil names. Participants are asked to identify those that were real authors' names. The scores of fiction exposure were calculated by subtracting the number of foil names selected from the number of real authors' names. The final score is taken as a proxy index of fiction exposure.

The Moral Judgment Test (MJT). We assessed moral judgments using Lind's Moral Judgment Test (MJT) (Lind, 1998, 2000). The test was developed to assess Chinese adolescents and includes two stories of moral dilemmas. One story tells of workers who illegally enter a company's administrative offices to find reliable proof. The other story is about a physician who seriously considers taking a patient's lives at the dying patient's request. Participants were required to rate the moral permissibility of actions according to the ac-

tion result and the actor's intention about the possible outcome. The response items varied from -4 (disagree) to +4 (agree). The C index, which ranges from 1 to 100, indicates the degree of given arguments or behavior. Numerous studies propose to use the C index as the extent to which people consider and infer actors' moral intentions (Kidd, & Castano, 2019; Young et al., 2010; Young & Saxe, 2008).

The Interpersonal Reactivity Index – Chinese (IRT-C). This scale was developed to assess Chinese empathic functioning and has 28 items and four subscales: fantasy, perspective-taking, empathic concern, and personal distress (Davis, 1980, 1983; Rong et al., 2010). The scale has shown cross-cultural validity in the Chinese context (Zhang, Dong, & Wang, 2010). Our primary focus was on three subscales: empathic concern, perspective-taking, and fantasy. Each item adopts a 5-point scale from 0 (doesn't describe me) to 4 (describes me completely). The subscale of perspective-taking assesses people's ability to take others' perspectives. One representative item is "I try to look at everybody's side of a disagreement before I make a decision." The Cronbach's alpha was 0.85. The subscale of fantasy, consisting of seven items, determines one's ability to imagine experiencing oneself as a character in a book. The Cronbach's alpha was 0.82. The subscale of empathic concern assesses feelings of the degree of sympathy or concern for others. One item is, for example, "I am often quite touched by things that I see happening." The Cronbach's alpha was 0.87.

Procedure and Data Analyses

All scales were measured by a self-report method. We carried out this investigation in three steps. The first step involved systematically gathering data (including students' reading time, reading interest, diversity of reading materials, and fiction exposure). Subsequently,

participants were requested to read and complete the MJT. Finally, participants completed the IRT-C. At the beginning of the test, participants were given task instructions. It took approximately 45 min for the participants to complete the surveys.

We applied the cumulative technique to compute the index of CRE of reading engagement that was calculated for each person. More precisely, we dichotomized the index score according to the cumulative index technique, as follows: Scored the variables as 1 if the raw score fell within the higher than 25% of the distribution while the rest was scored 0 (Gerard & Buehler, 2004; Wade et al., 2015; Evans et al., 2013). Thus, we summed the dichotomized variables to compute the index of CRE (range: 0-4). Further, we used Pearson correlations analysis based on the survey to study the relationships between variables and adopted the structural equation model to examine whether participants' social processing tendencies mediate the associations between their CRE and moral judgment.

Results

Descriptive Analysis of the Variables

The summary descriptive statistics of all the variables (Mean, Standard deviation, Maximum, and Minimum) involved in the study are shown in Table 1.

Table 1 *Descriptive statistics of all the variables*

Variable	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Reading interest	33.04	5.07	19.00	44.00
Reading time	1.96	0.97	0.00	4.00
Reading diversity	15.77	4.54	6.00	30.00
Fiction exposure	20.85	6.45	1.00	41.00
Moral judgment C index	17.10	10.54	0.45	62.29
Fantasy	22.60	4.21	9.00	30.00
Perspective-taking	17.62	3.68	6.00	25.00
Empathic concern	21.39	6.77	6.00	41.00

The Cumulative Reading Engagement Index

The distribution of the CRE index was as follows: 39.5% of students ($n = 161$) had an index score of 0; 31.9% ($n = 130$) had an index score of 1; 13.7% ($n = 56$) had an index score of 2; 11.3% ($n = 46$) had an index score of 3; and only 3.7% ($n = 15$) belong to index score of 4. We combined scores for 3 and 4 because the participants with a score of 4 were fewer.

Correlations among these Dimensions

Table 2 showed that fiction exposure (ART) was significantly associated with moral judgment, $r(407) = 0.11$, $p < 0.05$; CRE was also positively associated with moral judgment, $r(407) = 0.32$, $p < 0.001$; Empathic concern was significantly and positively correlated with moral judgment; CRE had a significant correlation with perspective-taking, empathic concern, and fantasy. However, the coefficient between perspective-taking and moral judgment failed to meet the threshold for statistical significance, as did fantasy (Table 2; bootstrapped 95% confidence intervals in parentheses).

Comparative Analysis of Reading Engagement and Moral Judgment

To establish whether CRE contributes to one's moral judgment, we conducted one-way

Table 2 Correlations between CRE and social processing tendencies and moral judgment, r (95% CI)

Variables	1	2	3	4	5	6
1. Cumulative reading engagement (CRE)	1					
2. Perspective-taking (PT)	0.17* (0.09, 0.24)	1				
3. Fantasy (FT)	0.20** (0.11, 0.29)	0.36*** (0.27, 0.44)	1			
4. Empathic concern (EC)	0.56*** (0.49, 0.61)	0.18** (0.08, 0.27)	0.28** (0.18, 0.36)	1		
5. Moral judgment (MJ)	0.32*** (0.23, 0.42)	0.06 (-0.03, 0.16)	0.09 (-0.01, 0.18)	0.39*** (0.30, 0.47)	0.14* (0.04, 0.23)	
6. Fiction exposure (ART)	0.45*** (0.36, 0.52)	0.02 (-0.08, 0.12)	0.10* (0.01, 0.19)	0.17* (0.09, 0.26)	0.03 (-0.06, 0.11)	0.11* (0.01, 0.19)

Note. 95% bootstrapped confidence intervals appear in parentheses. $p < 0.05$.

ANOVA to compare participants' moral intentions at different levels of CRE. There were CRE differences observed in moral intention, $F(3, 404) = 19.89, p < 0.001, \eta^2 p = 0.469$. Thus, we then conducted Post hoc tests using Tukey HSD, which we used for pairwise comparisons between every two groups. The results showed that the index score of 3 had higher scores in moral intention than index scores of 1 and 0 (all $p < 0.001$). Likewise, the participants with an index score of 2 achieved higher moral intention than participants with an index score of 0 ($p < 0.001$). Participants with an index score of 1 also had significantly higher moral intention than those with an index score of 0 ($p = 0.027$). The results revealed that participants with an index score of 2 had significantly higher scores in moral intention than an index score of 1 ($p = 0.052$). However, the mean difference of the C index between the score of 2 and 3 showed no statistical difference ($p = 0.285$).

Mediation Analyses

The second goal was to examine whether social processing tendencies mediate the

effect of literary fiction exposure on moral judgment. Specifically, the aim is to test whether empathic concern, fantasy, and perspective-taking acted as mediators of the association between CRE on moral intention. Based on the result of correlation analysis (Table 1), the study demonstrated significant correlations between moral judgment and all variables (e.g., CRE, perspective-taking, empathic concern, fantasy), which meets the assumptions for conducting mediation analysis. Hence, we conducted the structural model analysis with CRE being elected as the predictor variable and moral judgment (C score) serving as the outcome variable. Meanwhile, empathic concern, fantasy, and perspective-taking were mediator variables. The parallel multiple mediator models were constructed to simultaneously compare the indirect effects of each mediator (empathic concern, fantasy, and perspective-taking) in the relationship between CRE and moral judgment. We adopted bootstrapped mediation analyses to explore indirect effects based on 5000 resamples (Preacher & Hayes, 2008). The result indicated that empathic concern

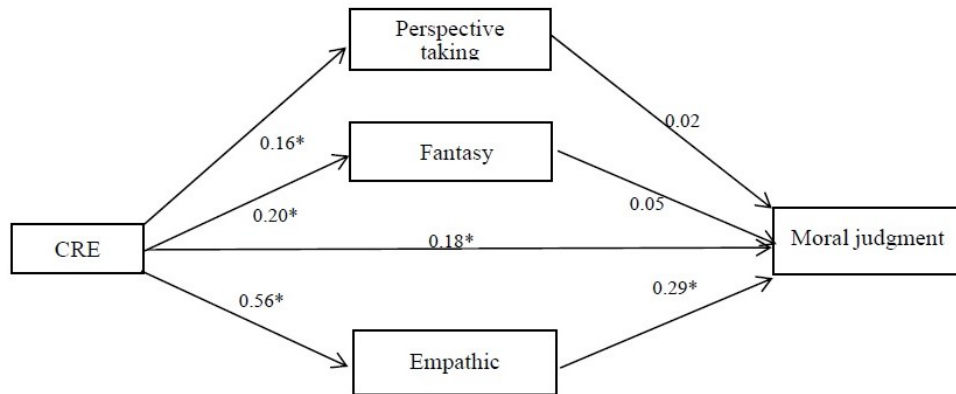


Figure 1 Standardized path coefficient for parallel model which shows the relationship between CRE and moral judgment.

was a mediator of this relationship ($ab = 0.16$, $SE = 0.02$, 95% CI [0.004, 0.08]). However, the confidence interval for the indirect effect of perspective-taking contained 0 ($ab = 0.003$, $SE = 0.008$, 95% CI [-0.109, 0.083]). Similarly, the confidence interval for the indirect effect of fantasy also did not confirm this mediation ($ab = 0.011$, $SE = 0.010$, 95% CI [-0.114, 0.076]). The reason is that both $a*b$ path values range from 0 to 0.011, and the 95% confidence intervals included 0. Thus, we did not find evidence that perspective-taking and fantasy mediated associations between CRE and moral judgment.

Discussion

Researchers confirmed that one-time exposure to fiction might promote abilities of empathy and mentalizing (Mar et al., 2006, 2009). Recent studies, however, have raised a question about the fragility of one-time exposure (Panero et al., 2016; Samur et al., 2018). The results from this study go one step further to demonstrate that the correlation

coefficient between fiction exposure, which was measured by a traditional test of the ART, and moral judgment is incredibly minor at 0.11. The effect size is small and hard to replicate. Given the reason that a single index of literary fiction yielded a slight improvement in social cognitive tasks (Samur et al., 2018; Kuijk et al., 2018), fiction exposure appears to need to aggregate the weight of the reading index (Mumper & Gerrig, 2016; Xu et al., 2020). Therefore, a method combined with the determination results of several indexes should be more reasonable. To confirm the idea, the index of CRE was created in combination with the cumulative index technique, and the new method for calculating reading engagement was proposed. The results confirmed that the relationship from CRE to moral judgment is more prominent than ART. Thus, the difference may be due to methodology. Many studies adopted a single index of reading engagement to measure fiction exposure, whereas the study integrated CRE with several indexes. The traditional method might underestimate the associations between fic-

tion exposure and moral judgment. In contrast, multiple factor exposures can overlap or be independent, and the predicted effect is enhanced by combining the cumulative index in the model (Evans et al., 2013). To further illustrate the advantages of the CRE index, we used one-way ANOVA. The results suggested that each CRE index has a different level of moral intention associated with it. It showed that behavioral performance would be better predicted by combinations of factors than by a single indicator. Consistent with previous research, CRE was associated with fantasy, empathic concern, and perspective-taking (Mar et al., 2006, 2009). According to the transportation imagery model, literary fiction tends to be more persuasive when recipients elicit a state of psychological transportation (Green & Brock, 2000). In other words, individual differences in exposure to literary fiction were found to predict differences in social processing abilities.

This study is unique in simultaneously examining three mediators. The results indicated that cumulative reading engagement (CRE) was positively related to moral judgment, and was partly mediated by empathic concern, but not mediated by perspective-taking and fantasy. Consistent with the hypothesis, CRE was associated with moral intention through empathic concern. Therefore, empathic concern has a unique ability to explain the association between CRE and moral judgment, emphasizing the importance of distinguishing different mediating variables. The above results theorize that empathic concern could account for any observed relationships between cumulative reading engagement and moral judgment. One unexpected result was that perspective-taking and fantasy differed from empathic concern and did not strongly mediate these associations. These results contradicted theoretical perspectives, such as the projection theory and intriguing hypothesis, which wide-

ly argued that the association between CRE and moral judgment was through taking the perspective of others and imaginary engagement in fiction. The reason for such conflicting conclusions is that the moral judgment test resulting from using the MJT only measures the extent to which participants infer and prioritize others' moral intentions when facing moral dilemmas. It means that MJT failed to cover moral judgment exactly. It is difficult to say how it may influence the results. Moral judgment measures such as MJT may be more closely related to empathic concern. The moral intention is also assumed to be automatic and resource-independent (Patil et al., 2020). Similarly, empathic concern is automatically activated and is more susceptible to affective arousal. It showed that they had common features. Our results also align with a recent study of moral judgment in adolescents. Namely, readers may eventually feel that it is easier to empathize with the protagonist of the narrative world, which could ultimately influence the way readers see the world (Mar & Oatley, 2008; Nussbaum, 1995). Empathic concern that was most commonly associated with moral judgment was also theoretically related as aspects of reading engagement to experience. Reading habits may also be associated with positive changes in readers' real-life ability to engage in empathy (Johnson, 2012; Mar & Oatley, 2008). Compared with general entertainment, reading fiction may therefore underlie the capacity to develop empathic ability, related to a motivation to prioritize others' moral intention. However, perspective-taking and imaging require more cognitive resources than empathic concern (Bischoff & Peskin, 2014; Black & Barnes, 2017). Future research should continue exploring the role of perspective-taking and imaging in accounting for this relationship from multiple mediators.

The study was an important step forward in adopting the index of CRE to represent fic-

tion exposure, rather than using only a single indicator. But more importantly, the results have implications for practice. Many practical methods are proposed to increase the possibility of children being exposed to literary fiction and encouraged to read various types of literary fictions. Moreover, fiction exposure is a malleable intervention technique that cultivates one's ability to empathize, which in turn supports the experience of inferring and prioritizing actors' moral intention.

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