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Relationship between personality traits, reading tendencies, and empathy

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Literature suggests that reading fiction, more than reading nonfiction, correlates positively with the reader's social cognition, chiefly cognitive empathy. Earlier studies also indicate that individual differences, especially personality traits, are relevant predictors of reading tendencies that should be considered while studying the relationship between empathy and reading. Hence, in this study we examined whether personality traits, gender, and the students' fiction and nonfiction reading tendencies predict affective and cognitive empathy. University students (N = 429) participated in this study using the following questionnaires: The Emotional Empathy and Fantasy Scale (Raboteg-Šarić, 2002), the IPIP-50 Big-Five markers (Mlačić & Goldberg, 2007), and a newly constructed reading tendencies questionnaire. The results of multiple regression analyses indicate that Big Five Intellect and Big Five Emotional stability positively predicted nonfiction-reading tendency. Moreover, Intellect, Agreeableness, and gender (female) positively predicted fiction-reading tendency, while Extraversion was a negative predictor. Also, Intellect, Agreeableness, gender (female) and fiction-reading tendency positively predicted cognitive empathy. Agreeableness and gender (female) were positive, while Emotional stability and Extraversion were negative predictors of affective empathy.

Keywords: personality traits, reading tendencies, empathy

Research indicates that reading is not just an enjoyable activity that only certain readers benefit from, but that it is also advantageous for people in general (Mumper & Gerrig, 2017). Reading is a process in which people actively engage with a text to give meaning to it (Oatley, 2016). In public discourse, reading is considered a desirable activity because of the positive effects on vocabulary and on general knowledge. Moreover, recent literature indicates that reading contributes not only to educational and intellectual outcomes but to socio-cognitive skills as well (Dodell-Feder & Tamir, 2018). Hence, reading is much more than an idle activity – it is a path towards a better understanding of our social surroundings. In this research, we examine how well reading tendencies, as measured by a newly designed questionnaire, are explained by personality and whether they predict empathy towards other people.

Fiction versus nonfiction reading tendencies

iction and nonfiction are usually differentiated as two broad literature genres, the former including imaginary elements, and the latter focusing on factual matter (Fong et al., 2013). However, new research focuses on subtler differences between them. A first difference pertains to the subject matter – while fiction primarily focuses on selves and their interactions in the social world (Oatley, 2016), nonfiction is usually formatted as scientific, philosophical, political, or business literature (Mar et al., 2009). A second difference is that fiction often uses a narrative, a distinctive mode of thinking and writing about agents, their intentions, and behaviours. Nonfiction is commonly written in a paradigmatic mode, which explains how mechanisms and processes work (Bruner, 1986). A third difference between fiction and nonfiction can be observed in the readers' identification with characters and in the emotions evoked in readers (Djikic et al., 2013). While reading about fictional social worlds and interactions, people often identify with characters and take on their perspectives, their feelings, and their thoughts (Kaufman & Libby, 2012). In contrast, nonfiction is primarily informational and usually does not engage the reader in the same extent that fiction does (Mar et al., 2009).

People differ in how much they read both fiction and nonfiction. The Author Recognition Test (ART; Stanovich & West, 1989) is a commonly used measure of reading tendencies that evaluates the exposure to literature rather than the direct amount of reading. This measure, based on the signal detection logic, allows an objective assessment of the reading tendencies. Participants are given a list of names and asked to mark the authors they recognize on the list. This measure is strongly associated with diaries, questionnaires, and behavioural measures that show how much people read (Oatley, 2016). Until now, the ART was not validated in Croatia. As part of the present study, we sought to develop a new Croatian measure that would assess reading tendencies.

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Reading tendencies, gender, and personality

Some studies show that *gender* is related to reading tendencies: women seem to show a greater inclination towards fiction reading (Summers, 2013; Mar et al., 2009), whereas men exhibit a preference for non-fiction (Mar et al., 2009) or have no pronounced reading preferences (Kotrla Topić et al., 2017; Summers, 2013).

Research thus far also suggests that individual differences in reading tendencies are linked to *personality traits*, albeit with inconsistent findings (Mar et al., 2009; Kotrla Topić et al., 2017). Of the Big Five personality factors, Extraversion, Conscientiousness, and Emotional Stability have not shown consistent associations with reading tendencies (Kotrla Topić et al., 2017; Kraaykamp & Van Eijck, 2005), whereas Agreeableness and Intellect have.

Agreeableness tends to be positively associated with motivation to read (Medford & McGeown, 2012) and a tendency to read socially themed literature (Kraaykamp & Van Eijck, 2005). The inherent interest of highly agreeable people in others may facilitate understanding and identification with fictional characters and events, and thus make them more inclined towards reading fiction as compared to non-fiction (Mar et al., 2009).

Intellect entails imagination, which aids narrative comprehension, and perspective-taking, thus allowing readers to place themselves in the protagonists' shoes (Michelson, 2014). Imagination also spurs intellectual engagement that can be achieved through reading nonfiction, in a way that people learn information on scientific, empirical, and real-world topics. It has been shown that Intellect is positively associated with reading measures (Mar et al., 2009). It seems that people high in intellect are not only more likely to read more both fiction and nonfiction but also tend to engage in reading in a more immersive way (Kotrla Topić et al., 2017; Michelson, 2014).

Reading tendencies and empathy

Literature usually differentiates between *cognitive* and *affective* empathy (Koopman, 2015). The affective aspect refers to having the same or similar feelings as another person and it refers to responding to them, while the cognitive aspect involves understanding the others' state of consciousness or involves being aware of how something happening to another person can affect them (Koopman, 2015).

It has been shown that reading fiction, more than reading nonfiction, is positively related to socio-cognitive abilities, especially cognitive empathy (Mar et al., 2009). Experimental research also suggests that reading fiction improves social cognition, i.e., that the participants performed better on different socio-cognitive tasks after reading fiction in experimental conditions, compared to either the control group or to themselves in a within-subject design (Kidd & Castano, 2013; Kid et al., 2016; Pino & Mazza, 2016). Although several replications of those studies (i.e., Samur et al., 2016) call into question the consistency of these cognition-related findings, the robustness of the relationship between reading tendencies and cognitive empathy is also supported by the results of meta-analyses of both correlational (Mumper & Gerrig, 2017) and experimental (Tamir & Dodell-Feder, 2018) studies.

Compared to the relatively extensively studied relationship between reading and cognitive empathy, only a few studies addressed its affective component (Pino & Mazza, 2016; Stansfield & Bunce, 2014). Findings from these latter two studies suggest that neither reading nor life exposure to fiction or non-fiction predict affective empathy.

One explanation for the observed association between *fiction* reading and cognitive empathy may be that fiction serves as a simulation of social and emotional experiences relevant to everyday life, meaning that fictional stories represent models of real-life social worlds (Mar et al., 2009). By reading fiction, people have the opportunity to learn about what characters think, feel, and intend, and they learn to anticipate their reactions (Bal & Veltkamp, 2013). As for affective empathy, it may be more difficult to change people's actual emotions than to change their cognitive insights into others'. In contrast, *nonfiction* often uses an explanatory and paradigmatic style that does not provide insight into the complex interactions between characters (Oatley, 2016). As models of social interactions with different actors, works of fiction allow the readers to think about similar social situations in their life from different perspectives, thus honing their social skills for settings beyond reading. Another possible explanation for the association between fiction reading and cognitive empathy is that fiction readers learn social information and acquire knowledge about human psychology, different cultures, and countries in a specific and engaging way (Mar et al., 2009). Therefore, fiction reading may be a tool for increasing the social knowledge of readers, which would enable them to react more adequately in everyday interactions.

The present study

The present study consists of two parts. In a pilot study, we report on the development of a reading tendencies questionnaire. In the main study, using that newly designed measure of reading tendencies, we aim to investigate a) how well the Big-Five personality traits explain individual differences in reading tendencies, b) how well the Big Five explain gender differences in reading tendencies, and c) whether reading tendencies predict empathy.

Based on previous research, we expect that

H1: Intellect and Agreeableness are positively associated with fiction-reading tendency, whereas only Intellect is positively associated with nonfiction-reading tendency.

H2: Women have greater fiction-reading tendency, and lower nonfiction-reading tendency than men.

H3a: Fiction-reading tendency is positively associated with cognitive empathy, but not with affective empathy.

H3b: Nonfiction-reading tendency is not associated with either cognitive or affective empathy.

The Ethics committee approval was obtained from the Department of Psychology of Catholic University of Croatia for conducting this research as a part of first authors' master thesis.

Table 1. Correlations between reading tendencies factors and enjoyment of reading compared to peers. number of books read. and reading frequency

Reading related measures	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Fiction reading tendency	**.23****	**.56$_{rs}$****	**.16$_{rs}$****	**.36$_{rs}$****	**.28****	**.33****	**.18****	**.17$_{rs}$****	**.56$_{rs}$****
2. Nonfiction reading tendency		**.14$_{rs}$****	**.39$_{rs}$****	**.34$_{rs}$****	**.29****	**.21****	**.30****	**.42$_{rs}$****	**.17$_{rs}$****
3. Reading fiction in comparison to peers			.13$_{rs}$**	.52$_{rs}$**	.42**	.62**	.20**	.15$_{rs}$**	.58$_{rs}$**
4. Reading nonfiction in comparison to peers				.38$_{rs}$**	.36**	.20**	.39**	.34$_{rs}$**	.22$_{rs}$**
5. Reading enjoyment in comparison to peers					.66**	.54**	.51**	.38$_{rs}$**	.53$_{rs}$**
6. Books read per year						.69**	.81**	.53$_{rs}$**	.59$_{rs}$**
7. Fiction works read per year							.34**	.27$_{rs}$**	.81$_{rs}$**
8. Nonfiction works read per year								.65$_{rs}$**	.32$_{rs}$**
9. Frequency of nonfiction reading									.29$_{rs}$**
10. Frequency of fiction reading									

Note: * $p < .05$; ** $p < .01$; *rs* = Spearman's correlation coefficient; significant correlations with fiction and non-fiction reading tendencies are bolded.

Pilot study

In the pilot study we aimed to develop a reading tendencies questionnaire in Croatian language. Although most previous research used the ART (Author Recognition Test; Stanovich & West, 1989), we wanted to develop a questionnaire that would measure the reading tendencies more directly through self-report rather than just measuring life exposure to literature.

METHOD

Participants and procedure

A total of 141 (93 female, 58 male) students from the social sciences, humanities, arts, biomedical, and technical sciences participated, in the age of 19 to 26 years (M = 22.75, SD = 2.76). Participants were contacted via e-mail and social networks (Facebook and WhatsApp) and they received a link to the online study. The online form included a 19-item version of a newly developed reading tendencies questionnaire, a demographic questionnaire, self-reports of enjoyment in reading fiction and nonfiction in comparison to peers (other students), and items about the frequency of reading fiction, nonfiction, and reading in general. All the instruments are described in more detail below.

Measures

Demographics

The demographic questionnaire included questions about age, gender, year, and field of study.

Self-reports on reading

Items regarding self-reports of enjoyment in reading fiction and nonfiction relative to other students, and items about the frequency of reading fiction, nonfiction, and reading in general were included.

Reading tendencies

For the purposes of the present research, the authors developed the Reading Tendencies Questionnaire (RTQ), which measures the propensity to read fiction and nonfiction. In this pilot study, the initial version of the questionnaire consisted of 19 items. The RTQ was inspired by and based on (i) studies that measured exposure to fiction and nonfiction (i.e., the genre classification from ART; Mar et al., 2009; Stanovich and West, 1989) and (ii) the genre classification in the Croatian literature (Solar, 2005). Thus, the fiction genre included historical, romance, fantasy, sci-fi, socially themed works, and thrillers, whereas the nonfiction genre included self-help books, works on philosophical topics, biographies, news, scientific literature, and works on political or social topics.

We discarded three items due to low internal consistency and the final version of the questionnaire included 16 items, with 6 items comprising a nonfiction-reading tendency subscale and 10 items comprising a fiction-reading tendency subscale. Participants rated items of both subscales on a 5-point Likert scale (1 = does not apply to me at all, 5 = applies to me completely). Scores on each item are added to create indexes for each subscale. Both subscales had satisfactory reliabilities ($\alpha_{Fiction}$ = .80; $\alpha_{Nonfiction}$ = .79).

RESULTS

In order to determine the underlying structure of the Reading Tendency Questionnaire (RTQ), a preliminary factor analysis was conducted. Employing the Promax rotation method, the analysis revealed a concise two-factor structure, distinguishing between fiction reading tendency and nonfiction reading tendency (see Appendix A). The cumulative variance accounted for by this 16-item two-factor solution, was computed at 41.06%.

In further validation of the RTQ, the two-factor solutions were subjected to correlation analyses with various reading-related measures (Table 1). Between the two reading tendency factors (measures 1 and 2 in Table 1) and other measures, significant correlations were observed with the frequency of fiction reading ($rs_{Fiction}$ = .56, $p < .01$) and nonfiction ($rs_{Nonfiction}$ =.42, $p < .01$) reading activities, as well as the annual volume of books read ($rs_{Fiction}$ = .28; $rs_{Nonfiction}$ = .29, $p <$'.01) and self-reported levels of reading enjoyment ($rs_{Fiction}$ = .36; $rs_{Nonfiction}$ = .34, $p < .01$). These analyses provided initial insights into the construct validity of the RTQ.

Table 2. Descriptive statistics and bivariate correlations

Measured variables	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Gender	-.07$_{rs}$	.33$_{rs}^{**}$	.03$_{rs}$	-.29$_{rs}^{**}$	-.01$_{rs}$	-.15$_{rs}^{**}$	.17$_{rs}^{**}$	.44$_{rs}^{**}$	.33$_{rs}^{**}$
2. Extraversion		.18**	.19**	.22**	.28**	.13**	.01	-.01	.07
3. Agreeableness			.17**	-.13**	.27**	-.01	.24**	.61**	.36**
4. Conscientiousness				.22**	.14**	.08	.12*	.08	-.01
5. Emotional stability					.06	.19**	.03	-.26**	-.14**
6. Intellect						.44**	.28**	.19**	.30**
7. Nonfiction reading tendency							.22**	.03	.13**
8. Fiction reading tendency								.23**	.42**
9. Emotional empathy scale									.55**
10. Fantasy scale									
M	33.46	40.71	37.65	30.05	39.27	32.28	18.94	61.73	17.01
SD	7.46	5.55	6.23	8.23	5.63	8.44	5.60	10.78	5.15

Note: *p <.05; **p < .01; *rs* = Spearman correlation; Gender: 0 = male, 1 = female

Main study

METHOD

Participants and procedure

The sample of participants consisted of 418 (328 female, 90 male) students from the social sciences, humanities, art, biomedical, and technical sciences aging 17 to 30 years (M = 21.96, SD = 2.32).

The procedure for the main study was similar to that of the pilot study, but it included personality and empathy measures along with the newly designed reading tendencies questionnaire and a sociodemographic questionnaire, with the aim to explore the relationship between personality traits, reading tendencies and empathy.

Measures

Demographics

The demographic questionnaire included questions about age, gender, year, and field of study.

Reading tendencies

The 16-item Reading Tendencies Questionnaire (RTQ), described in the pilot study, was used to measure fiction and nonfiction reading tendencies.

Affective and cognitive empathy

We used the Emotional Empathy and Fantasy Scale (Raboteg-Šarić, 2002), consisting of two subscales. The 19-item Emotional Empathy subscale (α = .89) measures the emotional response to the states of other people. The 6-item Fantasy subcale (α = .82) measures an aspect of cognitive empathy that includes the tendency to empathize with the feelings and activities of imaginary characters from stories, novels, and movies. The alphas are based on the present data. Items on both scales were rated on a 5-point Likert scale (0 = does not apply to me at all, 4 = applies to me completely). Scores on each item were added to create indexes for each subscale.

Personality

The International Personality Item Pool (IPIP-50; Mlačić & Goldberg, 2007) was used to measure the Big-Five personality dimensions. Participants rated themselves on each item on a five-point Likert scale (1 = extremely inaccurate, 5 = extremely accurate). Scores on each item (10 per dimension) created indexes of the five personality dimensions (Extraversion: α = .87; Agreeableness: α = .80; Conscientiousness: α = .80; Emotional Stability: α = .89; Intellect: α = .80; the reported alpha coefficients are from the present study).

RESULTS

Descriptive statistics and bivariate correlations of the measured variables are shown in Table 2. The nonfiction-reading tendency was positively related to Intellect (r = .44), Emotional Stability (r = .19), and Extraversion (r = .13). Fiction-reading tendency was positively correlated with Intellect (r = .28), Agreeableness (r = .24), and Conscientiousness (r = .12). Cognitive empathy was positively related with the fiction-reading tendency (r = .42), Agreeableness (r = .36), Intellect (r = .30) and the nonfiction-reading tendency (r = .12) and negatively associated with Emotional stability (r = -.14). The fiction-reading tendency was positively correlated to the nonfiction-reading tendency (r = .22).

Table 3. Results of multiple regression analyses

	Reading tendencies	
	Nonfiction	Fiction
	ß	ß
Gender	-.09	.13*
Extraversion	-.03	-.11*
Agreeableness	-.06	.16*
Conscientiousness	.01	.04
Emotional Stability	.13*	.10
Intellect	.47**	.24**
R^2; $F(R^2)$	.24; 21.979**	.13; 10.274**

Note: *p < .05. **p < .01; Gender: 0 = male. 1 = female; ß = beta coefficient; R^2= coefficient of determination; $F(R^2)$ = F-statistic for overall model significance

Table 4. Results of multiple regression analyses

Predictors	Cognitive empathy ß	Affective empathy ß
Gender	.21**	.20**
Extraversion	.00	-.10*
Agreeableness	.17**	.57**
Conscientiousness	-.06	.00
Emotional Stability	-.08	-.13**
Intellect	.20**	.08
Nonfiction reading tendency	.03	.06
Fiction reading tendency	.32**	.04
R^2; $F(R^2)$	.35; 26.79**	.54; 58.70**

Note: *$p < .05$. **$p < .01$; Gender: 0 = male. 1 = female; ß = beta coefficient; R^2= coefficient of determination; $F(R^2)$ = F-statistic for overall model significance

To determine whether personality and gender predict reading tendencies, two multiple regression analyses were performed (Table 3). Intellect (ß = .47, $p < .01$) and Emotional Stability (ß = .13, $p < .05$) positively predicted nonfiction reading tendency, explaining 24.3% of its variance. Furthermore, Intellect (ß = .24, $p < .01$), Agreeableness (ß = .16, $p < .05$), Extraversion (ß = −.13, $p < .05$) and gender (ß = .13, $p < .05$), were positive predictors of the fiction reading tendency, accounting for 13% of its variance.

To examine the association between reading tendencies and cognitive and affective empathy, while controlling for personality and gender, we conducted two multiple regression analyses (Table 4).

Multiple regression results show that significant positive predictors of cognitive empathy were gender (ß = .21, $p < .01$), Intellect (ß = .20, $p < .01$), Agreeableness (ß = .17, $p < .01$), and fiction reading tendency (ß = .32 $p < .01$), accounting for 34,5% of its variance.

Regarding the second model, Agreeableness (ß = .57, $p < .01$) and gender (ß = .20, $p < .01$) were positive predictors, while Emotional Stability (ß = -.13, $p < .01$) and Extraversion (ß = -.10, $p < .05$) were negative predictors of affective empathy, explaining 53,6% of the variance. Fiction and nonfiction reading tendencies did not predict affective empathy.

DISCUSSION

Nonfiction reading tendencies, personality, and gender

In this study we investigated how gender and personality predict reading tendencies, and how reading tendencies are related to cognitive and affective empathy. Consistent with results of previous research (Kotrla Topić et al., 2017; Mar et al., 2009), Intellect, encompassing interest and enjoyment in intellectual activities (Mlačić & Goldberg, 2007), was found to be the strongest predictor of the nonfiction-reading tendency, which is about reading encyclopaedias and scientific articles and such enabling acquiring knowledge on a variety of topics. Hence, for people high in Intellect, reading nonfiction can satisfy the need for the inherently appealing intellectual engagement. Contrary to the previous research (Mar et al., 2009), Emotional Stability was a significant predictor of the nonfiction-reading tendency. This small effect may have been discovered because the newly constructed measure of reading tendencies used in this study provides a more direct insight into readers' preferences in comparison to the ART which measures literature exposure (Mar et al., 2009). One explanation for the observed relationship between Emotional Stability and nonfiction- reading tendency might be that a higher Emotional Stability level helps in maintaining focus while reading nonfiction, which is usually more demanding than reading fiction. Furthermore, emotionally stable individuals tend to read nonfiction works that enable self-improvement (Annalyn et al., 2018). Therefore, individuals who cope relatively well with different life situations may be able to utilize part of their capacities for additional learning and personal growth. This effect is, however, small and should thus be interpreted with caution.

Gender was not a significant predictor of the nonfiction-reading tendency, which could be explained by the fact that all participants were students, a population that differs from the general population in reading characteristics (Summers, 2013). Given that reading nonfictional literature (i.e., textbooks) is important for their professional development, higher education may play a more important role in the propensity to read nonfiction than the gender of the students itself.

Fiction reading tendencies, personality, and gender

Intellect was the strongest predictor of the fiction-reading tendency, congruent with previous research (Kotrla Topić et al., 2017; Mar et al., 2009). Intellect includes imaginative activities, and reading fictional stories enables creative engagement and stimulation. Also, individuals high in this dimension respond more intensely to art and are more easily transported to narrative worlds (Michelson, 2014). Therefore, being high on Intellect is associated with the belief that through art, especially complex fictional experiences, one can reach deeper understandings of the world and of oneself. Agreeableness was also a positive predictor of the fiction-reading tendency, which is consistent with research suggesting that more agreeable individuals are more likely to read literature depicting people's social worlds (Medford & McGeown, 2012). Since more agreeable people tend to be more attentive and caring towards others, reading fiction may give them an insight into other people's social worlds.

In contrast, Extraversion was a negative predictor of fiction-reading tendency. Previous findings about this relationship are inconsistent, with some studies finding a negative association (i.e., McManus & Furnham, 2006), and some suggesting no correlation between the constructs (Mar et al., 2009). One possible explanation is that extraverted individuals may be disinclined to read fiction because it limits the time available for maintaining real-world contacts (Mar et al., 2009). Likewise, extraverted individuals generally seek rewarding activities (Michelson, 2014), and reading works of fiction, although involving social worlds, may not be as rewarding to them as actual interactions and social activities.

We also observed gender differences consistent with earlier findings suggesting that women are more likely to read fiction than men (Mar et al., 2009; Summers, 2013). Literature suggests that those differences may be due to the different reading socialization of boys and girls, as well as

due to the advertisement of publishing houses (Summers, 2013), which portray fiction-reading as a feminine activity. Note, however, that gender, Extraversion, and Agreeableness effects are small and thus warrant more investigation.

Personality, reading tendencies, cognitive and affective empathy

Consistent with previous research (Tamir & Dodell-Feder, 2018; Mumper & Gerrig, 2017) the more people read fiction, the higher they score on measures of cognitive empathy. It seems that fictional stories model real-life interactions and activate socio-cognitive processes similar to those required for understanding the real social world (Oatley, 2016; Tamir & Dodell-Feder, 2018). Specifically, fiction allows readers to practice perspective taking and reasoning about their emotions, thoughts, and intentions. Hence, it is possible that reading fiction promotes cognitive empathy. Another possible explanation for this finding is that, through reading, people gain specific social information about different aspects of human psychology (Bal & Veltkamp, 2013) which may allow one to respond more adequately and to adapt to the emotions and intentions of others.

Interestingly, we also found that Agreeableness and Intellect were associated with cognitive empathy. Because of a predisposed care for other people, more agreeable individuals tend to take on the perspectives of others and understand their feelings and situations. These findings are consistent with research that suggests that Agreeableness is the most important predictor of empathy in different cultural groups (Melchers et al., 2016) and different age groups (Costa et al., 2014). Furthermore, the present results are consistent with studies that have shown a positive correlation between Intellect and empathy (cf. Costa et al., 2014; Mar et al., 2009). Intellect includes both creativity and imagination, which are important for the ability to imagine situations and feelings of others. Finally, the results of the present study also indicate that women are more prone to expressing cognitive empathy, consistent with earlier literature showing that women are on average more inclined to understand others, their mental states, and their circumstances (Christov-Moore et al., 2014).

We found that both fiction and non-fiction reading tendencies were not related with affective empathy. Most of the previous research that addressed the relationship between reading and empathy measured cognitive empathy (Djikic et al., 2015; Kidd & Castano, 2013), while affective empathy was largely neglected. A few studies that addressed the relationship between reading and affective empathy (Pino & Mazza, 2016; Stansfield & Bunce, 2014) suggested that neither fiction nor nonfiction reading were associated with affective empathy. Affective empathy as a trait primarily encompasses emotional reactions underlying the preconscious mechanism of mirroring (Koopman, 2015). Therefore, by reading either fiction or nonfiction, one does not further develop affective empathy because it might be more influenced by personality traits. Cognitive empathy, on the other hand, involves conscious and intentional processing of mentalization which can be practiced, for example, through reading about others' mental states and conditions (Pino & Mazza, 2016). In accordance with that, we observed a positive association between fiction reading and cognitive empathy, but no association between reading and affective empathy.

The results of the present study suggest that Agreeableness is the strongest predictor of affective empathy, consistent with research showing that more agreeable people are inclined to express empathy towards others (Costa et al., 2014). The propensity for altruism and valuable interpersonal relationships, typical for Agreeableness, builds on empathic compassion and care for others. Hence, it is likely that more agreeable students will not only understand others' mental states better but will also be more willing to express compassion for others.

In contrast, Emotional Stability was found to be a negative predictor of affective empathy, which is consistent with several previous studies (Melchers et al., 2016; Mooradian et al., 2011). Jabbi et al. (2007) also found that Neuroticism, the opposite pole of Emotional Stability, was positively associated with the emotional arousal underlying the empathic response. Therefore, lower Emotional Stability could play an important role in empathizing with others, especially when it comes to unpleasant emotions such as sadness, anxiety, or fear.

Our results showed that women are more likely to show compassion to others, consistent with previous research suggesting gender differences in both affective and cognitive empathy (Christov-Moore et al., 2014). Thus, it seems that women have a more pronounced tendency to both understand the mental states and situations of others and to empathize with them.

Limitations and implications

This research has several limitations. In a correlational study, although we might argue that certain personality traits predispose people to nonfiction or fiction reading, the research design does not allow distinguishing whether people tend to develop their cognitive empathy by fiction reading, and whether people who are already empathic have a greater tendency towards reading fiction. Another possibility is that there is an additional unmeasured variable that confounds the observed relationships. However, by modelling the effects of personality and gender, we have adjusted the effect of interest for two very strong and probable confounders.

Furthermore, this study focused on reading tendencies at the general level of fiction and nonfiction. As previous research (Fong et al., 2013) has suggested that distinct genres of fiction predict social cognition differently, future research may further examine which genres of fiction are related to socio-cognitive skills. Also, future studies should consider using a more comprehensive measure of cognitive empathy. Finally, using students in our sample may have biased the effects related to nonfiction reading due to the obligation to read such literature during studying.

This study has important practical implications. Understanding the mental states of others is a key skill that enables functioning in the social world. There is some evidence that reading might have a positive influence on socio-cognitive skills. For example, reading has been used in programs that have sought to promote social welfare, such as programs encouraging empathy in physicians (McLellan & Jones, 1996)

and life skills of prisoners (Billington, 2011). Since this study's findings support the idea that fiction reading is associated with higher levels of cognitive empathy, if future studies demonstrate the causal relationship between reading and empathy, reading fiction may ultimately serve as the basis of cost-effective rehabilitation treatments for different conditions characterized by deficits in cognitive empathy.

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Appendix

The Reading Tendencies Questionnaire

	Fiction	Nonfiction
8. I like reading romance-themed works (novels. short stories).	.73	
9. I like reading socially-themed fictional works (novels. short stories).	.69	
4. I don't like reading romance-themed works (novels. short stories).	-.65	
6. I like reading fantasy-themed works (novels. short stories).	.59	
12. I like reading science-fiction-themed works (novels. short stories).	.58	
16. I don't like reading socially-themed works (novels. short stories). *	-.53	
11. I don't like reading fantasy-themed works (novels. short stories). *	-.53	
15. I like reading historically-themed works (novels. short stories).	.53	
3. I like reading thrillers.	-.51	
2. I don't like reading historically-themed works (novels. short stories).	.51	
5. I don't like reading politically-themed works. *		-.74
13. I like reading socially and politically themed works.		.71
7. I like reading scientific literature (encyclopaedias. textbooks. articles).		.67
10. I like reading philosophical works.		.65
14. I don't like reading scientific literature. *		-.65
1. I don't like reading philosophical works. *		-.59

Note: A principal axis factoring extraction and oblique Promax rotation were applied. Variance explained: 41.057%.
*= inversely scored items.