The Relationship Between Lifetime Book Reading and Empathy in Adolescents: Examining Transportability as a Moderator

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Abstract

Reading narrative literature is discussed as an influencing factor on the development of social-cognitive skills. Transportability, which is the tendency to immerse into narrative worlds, has been proposed as a moderator within this relationship, with high-transportable individuals being assumed to profit more from narratives. The current study examines (1) whether a relationship exists between different dimensions of empathy and narrative reading in an adolescent sample, (2) whether this relationship remains intact when gender, age, IQ, trait openness to experiences, and real-life social network are statistically controlled, and (3) whether transportability moderates the relationship between narrative reading and empathy. The sample included 282 German adolescents (Grades 9-10, age 13-18 years) who completed questionnaires and IQ test. Results revealed significant relationships between different dimensions of empathy (empathic concern, perspective taking, personal distress, and fantasy) and narrative reading. However, after including the control variables in the model, the relationships—except for fantasy—were no longer significant. Only for empathic concern, transportability emerged as a moderator but in an unexpected direction, showing a closer relationship between reading and empathic concern for low-transportable students. Finally, our results indicated that transportability might be better conceptualized as a mediator between narrative reading and empathy.

Keywords: narrative, literature, reading habits, social cognition, empathy

Introduction

Books are omnipresent in Western societies where readers spend numerous hours in a lifetime reading novels, novellas, and short stories. Even before children can read, parents and grandparents tell stories or read books to them. Benefits of engaging with narratives, including these early forms, have been demonstrated reliably for a wide range of abilities such as oral language skills, reading comprehension, spelling, and academic achievement (Flack, Field, & Horst, 2018; Mol & Bus, 2011; Wasik, Hindman, & Snell, 2016). Although the influence of these narrative experiences on social-cognitive skills has aroused a growing interest during the last two decades (e.g., Kidd & Castano, 2013), research has almost exclusively focused on young children's early theory-of-mind development (e.g., Symons, Peterson, Slaughter, Roche, and Doyle, 2005) or on the relationship between lifetime reading and social-cognitive skills in adults (see Mumper & Gerrig, 2017, for a recent meta-analysis). In contrast, we know relatively little about this relationship in adolescence.

In the present work, the term social-cognitive skills is used synonymously with social cognition and refers to knowledge about social situations and the competence to act appropriately (Mar 2018a, 2018b). The term subsumes constructs such as theory of mind, emotion recognition, social attention, and empathy (Happé, Cook, & Bird, 2017), of which the role and development of theory of mind and empathy have been mainly targeted by research. Theory of mind refers to the understanding that we and others possess mental states, which may not always be accurate and may not necessarily correspond to the mental states of others (Doherty, 2009; Happé et al., 2017; Wellman & Liu, 2004). Empathy, in contrast, is defined as the ability to recognize and match others' emotions (Mar, 2018a).

Although real-life interactions serve undoubtedly as the primary means of social-cognitive development, scholars within the domain of literary arts and psychology have proposed that reading literature may foster those skills (e.g., Mar, 2018a,b; Oatley, 2014; Zunshine, 2006). Most narratives, which represent a series of causally linked events (Graesser, Hauft-Smith, Cohen, & Pyles, 1980), are about the vicissitudes of human life and display interpersonal relationships (Oatley, 1999). For example, a large review of narrative literature across the world showed that the two most common narrative themes are love and conflict (Hogan, 2003). Thus, literature allows readers or listeners to participate in a wide range of social topics that include guessing the desires, beliefs, intentions, or emotions of characters, as well as observing different kinds of misunderstandings, disappointments, delusion, and deception. Literature, therefore, provides a rich playground of social situations that, on the one hand, might never be encountered in real-life and on the other hand, offers safe places to experiences difficult social situations without negative real-life consequences (Mar & Oatley, 2008). According to Oatley (2008, 2016), these situations represent simulations akin to a pilot spending time on a flight simulator, in which s/he can safely train skills and crashes don't have any negative consequences. Consequently, through these vicarious experiences, readers may experience different emotions and hone their social-cognitive skills (Mar, 2018; Oatley, 1999).

The SPaCEN-Framework: Fostering Social Cognition Through Narratives

Most recently, Mar (2018a) proposed the Social Processes and Content Entrained by Narrative research framework (SPaCEN), which integrates previous theoretical propositions on how engagement with narrative literature might promote social-cognitive abilities. The framework posits that stories could hone social-cognitive

abilities either through the presentation of explicit content about social relations or through frequent evocation of social-cognitive processes. Following the distinction between content and processes, stories may contain social information that can be learned directly from reading or listening. Children, for example, might acquire the knowledge that the appearance of an object might not necessarily correspond to its real function (i.e., appearance-reality distinction, e.g., when a pistol is used as a lighter), or they might learn that using some words, such as "pansy" for homosexuals, are insulting and will likely cause negative emotions. Frequent engagement with stories should therefore increase the breadth and depth of social knowledge, which in turn might lead to prosocial attitudes and behavior (Mar, 2018a). Moreover, the SPaCEN framework assumes that honing social-cognitive processes depends on the frequency of exposure to stories (Mar, 2018a). For this honing to occur, stories must elicit social processes that require the reader to construct a rich mental simulation of others' mental states (Mar & Oatley, 2008). In this context, the SPaCEN framework seizes on Oatley's (1999, 2014) suggestion that the narrative is a simulation that runs on minds by which the reader is required to simulate simultaneously the mental states of multiple characters within a story. Frequent evocation of social-cognitive processes should therefore improve these processes, that is, developing them to be more accurate, less effortful, and more rapid (Mar, 2018a).

Empirical Evidence on the Relation between Reading and Social-Cognitive Skills

As underlined in the previous paragraph, the SPaCEN framework assumes that frequent exposure to narratives is necessary if they are to improve social cognition (Mar, 2018a). This particularly applies to the honing of social-cognitive processes and to a lesser degree to social content knowledge.

In line with this assumption, several studies have examined the relationship between lifetime reading and social-cognitive skills (e.g., Fong, Mullin, & Mar, 2013; Mar, Oatley, Hirsh, dela Paz, & Peterson, 2006; Mar, Oatley, & Peterson, 2009; van Schooten, Oostdam, De Glopper, 2001; Waytz, Hershfield, & Tamir, 2015; for an overview, see the recent meta-analysis published by Mumper & Gerrig, 2017). Mumper and Gerrig (2017) reported significant correlations of reading narrative fiction with dispositional empathy (r = .07), empathic concern (r = .07), perspective taking (r = .08), fantasy (r = .18), and theory of mind (r = .21), whereas the relation to personal distress was not significant (r = -.04, p = .222). For reading nonfiction, significant correlations were reported for dispositional empathy (r = .05), perspective taking (r = .06), fantasy (r = .05), theory of mind (r = .09), and personal distress (r = -.10) but not for empathic concern (r = .04, p = .146). Thus, fairly stable but small relationships exist between lifetime reading and social-cognitive skills, which tend to be slightly higher for fiction than for nonfiction.

These results, however, neglect to control for the shared variance between reading narrative fiction and nonfiction. Fiction and nonfiction reading habits tend to be highly correlated (Mar et al., 2006), indicating that frequent fiction readers also consume larger amounts of nonfiction (and vice versa). When controlling for the respective other type of reading, only fiction uniquely predicted theory of mind and empathy (Mar et al., 2006). Moreover, the correlation between narrative fiction and social-cognitive skills remained significant when individual differences in gender, age, language proficiency, trait openness to experience, trait extraversion, fantasy (used as a trait measure for immersion or transportation into stories), and intelligence were statistically controlled (Fong et al., 2013; Mar et al., 2006, 2009).

Additionally, some brief experimental studies found positive short-term effects of exposure to narrative texts (Black & Barnes, 2015a), literary vs. non-literary narrative texts (Kidd & Castano, 2013) or films (Black & Barnes, 2015b) on different measures of social-cognitive skills. There are, however, also many non-replications of these findings (e.g., Dijikic, Oatley, & Moldoveanu, 2013; Panero et al., 2016; Samur, Tops, & Koole, 2017). Dodell-Feder and Tamir (2018) conducted a meta-analysis of studies comparing fiction reading to non-fiction reading or no reading and found a small overall effect of narrative fiction (g = .15-.16) on social-cognitive skills. In addition, studies with young children showed that the frequency of shared-book reading and parents' use of mental state talk was correlated with children's theory-of-mind development both concurrently (Adrián, Clemente, Villanueva, & Rieffe 2005; Symons et al., 2005) and longitudinally (Adrián, Clemente, & Villanueva, 2007; Ensor, Devine, Marks, & Hughes, 2014). Finally, Goldstein and Winner (2012) showed that acting training (compared to other types of arts training) improved children and adolescents' empathy scores.

In sum, correlational studies and results from experimental research that have shown small short-term effects of brief narrative interventions on measures of social cognition support the idea proposed in the SPaCEN-framework (Mar 2018a) that exposure to narratives might foster readers' social-cognitive abilities. Conceptually, however, brief narrative interventions deviate from the theoretical underpinnings of the SPaCEN-framework, which emphasizes the role of lifelong or at least frequent engagement with narratives. Increases in performance reported in these short-term studies do not necessarily reflect improvement in social-cognitive skills but may just be situational sensitizations to social cues. In contrast, correlational studies offer the

advantage to capture a longer time span of the relationship between reading narratives and social-cognitive skills, which is conceptually more in line with the SPaCEN-framework.

Moreover, previous research on the relationship between lifetime reading and social cognition has used samples that predominantly consisted of female participants who were older than 18 years (see Mumper & Gerrig, 2017, p. 112, Table 1). Real-life social experiences, which are surely the most important means of social-cognitive skill development, were not statistically controlled in these studies. Consequently, whether narratives have an enduring influence on social-cognitive skills for adolescents and whether such influences are independent of real-world experiences is still unclear.

The Role of Transportation and Transportability

Effects of narratives depend on numerous personality and situational factors. As indicated by an increasing number of studies, in many instances the persuasive effects of narratives depend on the extent to which the reader is transported into a story (e.g., Appel & Richter, 2007, 2010; Green & Brock, 2000, 2002), including effects on personality (Isberner, Richter, Schreiner, Eisenbach, Sommer, & Appel, 2019; Richter, Appel, & Calio, 2014). The same might apply to influences of narratives on social-cognitive skills (Mar 2018a, b). This transportation into narrative worlds is defined as "a convergent process, where all of the person's mental systems and capacities become focused on the events occurring in the narrative" (Green & Brock, 2002, p. 324). Thus, transportation describes a psychological state that represents a single experience in relation to a specific narrative (Bilandzic & Busselle, 2008).

Bal and Veltkamp (2013), for example, examined the impact of narrative and non-narrative texts on empathy. They measured emotional transportation after reading

the different texts and found that only readers who were emotionally transported into the narratives displayed positive changes in empathy. Moreover, Johnson (2012) showed that transportation into stories in which compassionate feelings for the characters were induced and prosocial behavior was modelled led to higher affective empathy and more actual helping behavior. Finally, Stansfield and Bunce (2014) found a positive relationship between transportation and story-induced affective but not cognitive empathy.

Although these and other findings clearly underline the importance of transportation (as a state) for effects of specific narrative experiences, a single transportation experience is difficult to relate to the idea that a lifetime or at least repeated exposures to narratives might hone social-cognitive skills. Following this line of thought, Bilandzic and Busselle (2008) emphasized the need for "a way to assess average transportation experiences" (p. 512). The personality trait transportability, which refers to individual differences regarding how readily and deeply persons are generally transported by narratives, might serve as such a proxy (Dal Cin, Zanna, & Fong, 2004). Transportability is highly related to experiences of situational transportation, indicating also the influence of situational effects related to different stories (Bilandzic & Busselle, 2008, 2011; Dal Cin et al., 2004; Gnamps, Appel, Schreiner, Richter, & Isberner, 2014).

To our knowledge, no studies have examined the role of transportability in the acquisition of social-cognitive skills through narratives. However, Mar et al. (2006) showed that the correlation between reading fiction and empathy was not mediated by fantasy, which they used as a trait measure for immersion into stories. In addition, studies have shown that transportability is related to media enjoyment (Bilandzic &

Busselle, 2011), leisure reading and reading ability (Jensen, Christy, Krakow, John, & Martins, 2016), attitude change through narratives (Mazzocco, Green, Sasota, & Jones, 2010), and helping tendencies after reading a fictional story (Stansfield & Bunce, 2014). Moreover, given that transportability is linked to transportation, we assume that the findings linking narratives, social-cognitive skills, and transportation for specific narrative experiences (Bal & Veltkamp, 2013, Johnson, 2012) might also apply to the general relationship between lifetime reading, social-cognitive skills, and transportability.

The Current Study

The current study is theoretically based on the SPaCEN framework proposed by Mar (2018a), which assumes an incremental honing of social-cognitive skills, such as empathy or theory-of-mind, through frequent exposure to narratives. The aims of the current study were threefold, building on previous studies that reported small but stable relationships between social-cognitive skills and reading (Mumper & Gerrig, 2017). The first aim was to replicate with a German sample of adolescents the finding from Mar and colleagues (Mar et al., 2006, 2009) that reading narratives and social-cognitive skills are correlated (Hypothesis 1). Second, we aimed to extend the list of control variables (i.e., gender, age, intelligence, trait openness to experience) by adding detailed information about students' real-life social networks that include family, friends, teachers, and classmates. The purpose of this extension was to examine whether reading narratives has an effect on social-cognitive skills that is incremental to real-life social experiences (Hypothesis 2). Finally, we examined transportability as a potential moderator within the relationship between reading narratives and social-cognitive skills. As proposed by research on the role of transportation (Bal & Veltkamp, 2013; Johnson,

2012) and transportability (Mazzocco et al., 2000), we assumed that the effects of reading narratives might depend on an individual's transportability, with the effects increasing with increasing transportability scores (Hypothesis 3).

Methods

Participants

Participants were 282 ninth and tenth graders attending 16 different classes in four different secondary schools in Germany. One school (n = 114) was a high school that represents the middle track in the German secondary school system (Realschule), and the other three high schools (n = 168) represent the highest track (Gymnasium), which qualifies students for studying at the university. The mean age of the students was 14.82 years (SD = 0.82 years; 13-18 years of age), and gender was almost equally distributed in the sample (55% girls). Approximately 94% of the students, 73% of their mothers, and 72% of their fathers were born in Germany, which mirrors largely the German population. Less than 1% of the mothers and fathers left school without graduation, and approximately 50% of the fathers and 43% of the mothers received a university entrance certificate, which is similar to but somewhat higher than the distribution of maternal and paternal educational levels in the German population (reference groups: 35- 50 year-olds; Statistisches Bundesamt, 2018).

Design and Procedure

We employed a cross-section correlational design. Students and their parents received informed consent forms prior to the study. Students participated voluntarily and were included in the study only if they obtained written permission from their parents. Data were collected in the classrooms, and the procedure took approximately 30-35 min. Students received a small gift for their participation, and 20 Euros were

awarded for the class fund of each participating class (irrespective of the number of participants per class) after the completion of the study.

Measures

All materials were presented in German.

Demographics. Students completed a questionnaire that required demographic information such as their age, gender, number of siblings, their and their parents' country of birth, languages spoken at home, and their parents' highest educational level.

Empathy. To assess different facets of empathy, we used the Saarbrücker Persönlichkeitsfragebogen (SPF, version 6.2; Paulus, 2009, 2016), a German adaption of the commonly used Interpersonal Reactivity Index (IRI; Davis, 1980, 1983). Comparable to the IRI, the SPF is multidimensional and comprises four subscales (perspective taking, personal distress, empathic concern, fantasy) that represent different facets of empathy. The SPF consists of 16 items that are answered on a 5-point Likert scale. Cronbach's α for the present study was .62 for empathic concern scores, .72 for fantasy scores, .71 for personal distress scores, and .74 for perspective taking scores.

Intelligence. To obtain an indicator for intelligence as a control variable, we used the Mini-Q (Baudson & Preckel, 2016), which is a standardized and economic screening procedure. Theoretically, it is based on Baddeley's (1968) verbal reasoning test, which is based on grammatical transformations. The Mini-Q is administered as a speed test and consists of 64 items, resulting in scores ranging from 0-64 points. Split-half-reliability (odd-even) was .96 for the Mini-Q scores.

Openness to experiences. We used the subscale openness to experience from the Big Five Inventory (BFI; Rammstedt, 1997, as cited in Rammstedt & John, 2005) as a control variable. The scale consists of 10 items that are answered on a 5-point Likert

scale, resulting in scores ranging from 10-50. Cronbach's α was .67 for the openness to experience scores.

Reading habits. Reading habits were assessed by a title-recognition test (TRT) and an author-recognition test (ART), which were constructed for German adolescents (Dangel & Lenhart, 2017). Authors and book titles were selected from Amazon (2014-2016) and Spiegel bestseller lists for juvenile literature (Buchreport, 2014-2016). The selection was completed by nominations for the German Children's Literature Award (category: juvenile literature) (Arbeitskreis Jugendliteratur, 2015, 2016), the most frequently read books of the JIM study 2015, the KIM study 2016 (Medienpädagogischer Forschungsverbund Südwest, 2015, 2016), and the 57. read aloud competition 2015/2016 of the German Publishers and Booksellers Association, as well as from the loan statistics from two German federal capitals' libraries. The resulting list consisted of 72 authors and 78 book titles and 60 distractor book titles or author names. Distractor names for the ART were generated by randomly combining given names and family names that were derived from medical registers. Distractor book titles were generated by combining parts of existing book titles. To ensure that distractor items did not exist, the catalogues of the German National Library and the US Library of Congress were checked for matches. The author and book title lists were piloted with 437 secondary school students, resulting in 30 book titles and 10 distractors for the TRT and 30 author names and 10 distractors for the ART (Dangel & Lenhart, 2017; see Appendices A and B), comprising titles and authors of narrative juvenile literature. The ART and the TRT differentiate between primary and secondary exposure to books (Martin-Chang & Gould, 2008) by asking the students to check the boxes (a) if they know an author or a title or (b) if they have already read the book or a work that

was written by the author (primary exposure reading). The tests also include separate scales for primary exposure in terms of audiobooks and screen adaptions of the listed books and authors. Given our interest in the relationship between actual reading behavior and social cognition, we used only the primary exposure scales for reading. Both tests consist of 30 items and 10 distractors each. The distractors were not included in the calculation of the reading behavior score (0-30) but used instead to screen for students that simply checked all the boxes or just guessed. The title and the author-recognition test highly correlate with the number of books in the household and with different indicators of literacy and school grades (Dangel & Lenhart, 2017). In the current sample, the correlation between TRT and ART was .59 for primary exposure reading. Cronbach's α were .76 (TRT) and .74 (ART) for the scores reflecting primary exposure reading.

Social network. The first and second author translated the Social Support Scales for Children and Adolescents (SSSCA; Harter, 2012) to assess the nature of the students' social network. The SSSCA consists of 24 items on a 4-point scale, which are assigned to one of four subscales (Parent Support Scale, Classmate Support Scale, Teacher Support Scale, Close Friend Scale). Cronbach's α was .83 for the Parent Support Scale scores, .75 for the Classmate Support Scale scores, .86 for the Teacher Support Scale score, and .89 for the Close Friend Scale scores.

Transportability. To assess transportability, the first and the second author translated the Transportability Scale (Dal et al., 2004). The scale measures trait transportation (i.e., the general tendency of a person to immerse into narratives) and was designed as an adaption and extension of Green and Brock's (2000) Transportation Scale. It consists of 20 items (e.g., "I can easily envision the events in the story", "I find

myself thinking what the characters may be thinking, and "I find myself feeling what the characters may feel.") answered on a 9-point Likert scale. Cronbach's α was .92 for transportability scores.

Results

Data Preparation and Analysis

Power analyses with G*Power (α = .05; 1-β = .80; one-tailed tests; version 3.1.9.2; Faul, Erdfelder, Buchner, & Lang, 2009) indicated that a sample size of 282 students was sufficient to detect bivariate correlations larger than .147 and single regression coefficients in multiple regression analysis with effect sizes larger than $f^2 >$ .022 (11 predictors). All hypothesis were directional and were thus tested one-tailed with the significance level being set at $p < .05$.

Data preparation and analysis were conducted with IBM SPSS 25. Although the amount of missing data was small and missing data were unsystematic (< 1%; range = 0 to 5% per item), we used multiple imputation to avoid a reduction of cases and power (Enders, 2010). Following the guidelines for small effects proposed by Graham, Olchowksi, and Gilreath (2007), we conducted 20 imputations. Given that the estimation of R^2, ΔR^2, and their significance tests for multiple regression analyses are currently not implemented in SPSS for imputed data sets, we followed the procedures proposed by van Ginkel (2019). R^2 and ΔR^2 were derived by averaging the respective values of the twenty imputed data sets. For performing the significance tests, we used the SPSS macro by van Ginkel (2010). To assess the effect sizes of single predictors, we calculated f^2 for each significant predictor (Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012). Finally, for interpretability and the reduction of non-essential

multicollinearity in moderated regression analyses, all continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female).

Relationships between Lifetime Reading and Social Cognition

Table 1 provides on overview of the bivariate correlations between lifetime reading habits, different facets of empathy, transportation, and the control variables that were included in the current study. Supporting Hypothesis 1a, both measures of lifetime reading showed small to moderate correlations with indicators of empathy. The relationship with fantasy was largest (ART: $r = .33$, $p < .001$; TRT: $r = .29$, $p < .001$) and with perspective taking the smallest (ART: $r = .11$, $p = .031$; TRT: $r = .14$, $p = .009$). Unexpectedly, however, both indicators of lifetime reading also correlated positively with personal distress (ART: $r = .165$, $p < .001$; TRT: $r = .145$, $p = .007$).

[Insert Table 1 around here]

Relationships Between Lifetime Reading and Social Cognition While Controlling for Potential Effects of Other Individual Differences

Both indicators of lifetime reading habits were highly correlated ($r = .59$, $p < .001$) and displayed very similar bivariate correlation patterns to empathy subscales, transportation, and control variables. Consequently, we performed all subsequent analyses with a compound variable for reading habits (i.e., the mean of the two *z*-standardized variables) to reduce the problem of multicollinearity in multiple regression analysis.

Table 2 summarizes the results for empathic concern as the outcome variable. Although the relationship between reading habits and empathic concern was significant (Model 1), it was no longer significant after including individual differences in IQ, age, gender, openness to experience, and the real-life social network in the model (Model 2).

Significant effects of participants' gender and openness for experience suggest that the variance previously explained by reading habits was now absorbed by these two variables. In particular, girls scored higher on empathic concern than boys and openness to experience was positively associated with empathic concern. Thus, Hypothesis 2 was not supported for empathic concern as the outcome variable. Reading habits had no incremental effect on empathic concern after the individual differences were included as control variables, particularly participants' openness to experience and gender.

Table 3 summarizes the results for perspective taking as the outcome variable. Although the bivariate relationship between reading habits and perspective taking was significant (Model 1), it did not remain significant after controlling for individual differences in IQ, age, gender, and openness to experience, and the real-life social network also did not remain significant (Model 2). Again, participants' gender and openness to experience but also their real-life social experiences seemed to absorb the variance in empathy previously explained by reading habits. Thus, Hypothesis 2 was not supported for perspective taking as the outcome variable. Reading habits had no incremental effect on perspective taking after the individual differences were statistically controlled, particularly participants' gender, openness to experience, and real-life social experiences.

Table 4 summarizes the results for personal distress as the outcome variable. Although the bivariate relationship between reading habits and personal distress was significant (Model 1), it again vanished when controlling for individual differences in IQ, age, gender, openness to experience, and the real-life social network (Model 2). As in the previous models, participants' gender was a significant predictor, with girls reporting more personal distress than boys. Moreover, real-life social experiences,

especially the perceived parental support and support by classmates, were significant predictors in this model. Thus, Hypothesis 2 was not supported. Reading habits had no incremental effect on personal distress beyond the effect of participants' gender and their real-life social experiences.

Table 5 summarizes the results for fantasy as the outcome variable. In line with results for the other empathy subscales, the bivariate relationship between reading habits and fantasy was significant (Model 1). However, in contrast to the other subscales, the partial correlation controlling for individual differences in IQ, age, gender, openness to experience, and the real-life social network remained significant (Model 2). Thus, supporting Hypothesis 2, reading habits had an incremental effect on fantasy, particularly after controlling for real-life social experiences.

[Insert Tables 2-5 around here]

Transportability as a Moderator of the Effects of Reading Habits

The hypothesis that transportability would moderate the effects of reading habits on different facets of empathy was examined in Model 3 for each of the empathy subscales (see Tables 2 to 5). Although transportability had a positive, unique effect on each of the empathy subscales, no support for a moderating role of transportability was found for the outcome variables fantasy, perspective taking, and personal distress. Thus, for these facets of empathy, Hypothesis 3 was not supported. For empathic concern, transportability moderated the relation to reading habits, but the interaction was not positive as assumed by Hypothesis 3. To explore this complex pattern of results, we calculated simple slopes at specific values of transportability (-1 *SD*, +1 *SD*). As Figure 1 shows, only for low-transportable students (-1 *SD*) more reading of narratives was associated with greater empathic concern ($B = 0.170$, $SE = 0.068$, $t = 2.507$, $p = .012$),

whereas for high-transportable students (+1 *SD*) no such relationship existed (*B* = -0.047, *SE* = 0.045, *t* = -1.046, *p* = .296).

[Insert Figure 1 around here]

Discussion

In the present study, we examined the relationship between reading of narrative literature and empathy in adolescents. First, we investigated the bivariate correlations between reading habits and several dimensions of empathy (empathic concern, fantasy, perspective taking, personal distress), then the same relations when controlling for age, gender, IQ, trait openness to experiences, and real-life social network. Finally, we examined transportability, which represents a person's overall tendency to immerse into narratives, as a moderator of the relationship between empathy and reading habits.

Bivariate Correlations Between Reading Habits and Empathy Dimensions

In line with Hypothesis 1 and previous studies (e.g., Mar et al., 2006, 2009; van Schooten et al., 2001), we found small- to medium-sized bivariate correlations between the different dimensions of empathy and reading. Although the correlations were somewhat higher than mean correlations reported in Mumper and Gerrig's (2017) meta-analysis, the sizes were similar to the values reported in the only study (van Schooten et al., 2001) that targeted a similar age group (*r* = .28/.32 between empathy and the frequency of reading/time spent on reading).

Turning to the individual dimensions of empathy, we found that the fantasy subscale, which represents empathy for fictitious characters, showed the highest correlations with our reading habit measures. Empirically, this finding is in line with Mumper and Gerrig's (2017) meta-analysis showing that fantasy had the closest relation to fiction consumption. From a theoretical perspective, it makes sense that if there are

positive effects of reading narratives on social-cognitive abilities, these effects should be particularly strong for the (self-reported) ability to picture oneself as a character of these narratives and to get involved with the characters and their feelings. This ability in turn might then also transfer to social-cognitive skills in real-world social situations. These real-life skills might be better reflected in the empathy dimensions empathic concern and perspective taking, which showed smaller but still significant correlations with the measures of reading habits.

Somewhat unexpected, however, personal distress, which reflects the tendency to feel uneasy in difficult emotional social situations (Davis, 1983), was positively related to reading habits, indicating that feeling uneasy in emotionally difficult situations was associated with higher amounts of narrative reading. This finding was at odds with our hypothesis that narrative reading would be associated with slightly less personal distress (e.g., Mar et al., 2006; Mumper & Gerrig, 2017). From a theoretical point of view, however, personal distress differs from the other empathy dimensions of the IRI. Empathic concern, perspective taking, and fantasy capture other-oriented feelings and thoughts, whereas personal distress predominantly reflects self-oriented feelings in difficult social situations (Davis, 1983). The extent to which personal distress reflects empathy has been debated (e.g., Batson, Fultz, & Schoenrade, 1987; Eisenberg & Eggum, 2009). Several factor-analytic studies based on the IRI have shown that empathic concern, perspective taking, and fantasy substantially load on a common factor, whereas personal distress does not (Cliffordson, 2002; Pulos, Elison, & Lennon, 2004), which even led to its exclusion from the personal distress scale in the recently published revised German adaption of the IRI (Paulus, 2019; SPF-R; version 1.0). Thus, whether personal distress should be seen as an indicator of empathy remains

unclear. It could reflect another construct, for example, emotion regulation (e.g., Pulos et al., 2004).

Reading-Empathy Relationships Controlling for Gender, Age, Trait Openness to Experiences, IQ, and Real-Life Social Network

Following the possibility that the relationships between reading narrative literature and self-reported empathy might be influenced by relevant third variables, we estimated the relationships again after controlling for gender, age, IQ, and trait openness to experiences, which had been proposed in the literature (e.g., Mar et al., 2009), as well as controlling for real-life social network.

After controlling for these variables, reading habits did not predict empathic concern, perspective taking, or personal distress. Thus, Hypothesis 2 was not supported for those outcome variables. However, in addition to providing opportunity for social learning to occur, the real-life social network might also be seen as a consequence of social-cognitive skills (Mar et al., 2009, e.g., used the social network as a distal outcome variable in their analyses). Thus, including the social network could have resulted in too much control. We therefore reran the hierarchical regression analyses without the social network (see Appendix C). However, even without the social network as control, we found no significant relations between reading habits and empathic concern, perspective taking, or personal distress, indicating that gender and trait openness to experiences explained much of the bivariate relationship between the three empathic skills and narrative reading.

Yet, in line with Hypothesis 2, reading habits and fantasy were still significantly related even after entering the control variables. Together with the finding that reading of narratives had the closest bivariate relationship with the fantasy scale, this lends

further support to the notion that if reading narratives fosters social-cognitive skills the effect might be particularly strong in the (self-reported) ability to picture oneself as a character in the narratives and to get involved with the characters and their feelings. This effect in turn might then also transfer to real-life social situations and improve real-life social-cognitive skills.

Transportability as a Moderator of the Relationships of Narrative Reading and Empathy Dimensions

Finally, we examined transportability, which represents stable individual differences in the tendency to immerse in narratives, as a moderator of the relationships between narrative reading and empathy. Contrary to the assumption stated in Hypothesis 3 that the effects of reading increase with transportability (e.g., Mar 2018a, 2018b), we found no significant interaction between reading habits and transportability for perspective taking, fantasy, or personal distress. Moreover, we even found the opposite effect for empathic concern, that is, reading and affective concern for others were more closely related when students' transportability scores were low.

Interestingly, transportability showed a significant positive relation to all the empathy dimensions – even incremental to reading habits and the other control variables. Thus, our data indicate that transportability might be conceptualized as a mediator for the relationship between lifetime reading habits and empathy. Reading large amounts of narratives might train a reader's ability to immerse into narrative worlds and to empathize with the thoughts and feelings of fictional characters, which seems to be highly related. Both, in turn, might then also improve real-life social-cognitive skills.

Features of Literature that May Influence Empathy

Our study and the design of the reading habits assessment were theoretically based on the SPaCEN framework (Mar, 2018a), and therefore focused on the relation between narrative book exposure and social-cognitive skills. The SPaCEN framework emphasizes the role of narrativity and assumes that particularly the simultaneous mental simulation of multiple characters' intentions, thoughts, beliefs, and emotions hone social-cognitive processes (Mar, 2018a; Mar & Oatley, 2008).

Other theories, however, propose that not narrativity but literariness might be the crucial aspect for the development of social-cognitive skills (e.g., Kidd & Castano, 2013). Miall and Kuiken (1994, 1999, 2002), for instance, propose that foregrounding, which refers to textual features that depart from ordinary language use, is typical for literary texts. They assume that foregrounding causes readers to become unsettled (i.e., defamiliarization), which in turn should elicit more narrative and aesthetic feelings, which might then lead to self-reflection and thus to higher empathy (Koopman, 2015, 2016). Moreover, some theories have argued that fictionality represents an important aspect as" reading a text one knows to be fictional allows one to postpone judgments, to suspend disbelief, follow the (implied) author in his/her representations" (Koopman & Hakemulder, 2015, p. 101). Thus, fictional texts might provide the environment and space for deeper reflections. Finally, as pointed out by Koopman and Hakemulder (2015) narrativity, literariness, and fictionality might complement each other but also interactively influence social cognition through different processes.

In correlational studies, these features are difficult to separate. For instance, in the present study reading habits were assessed with an author- and a title-recognition test that focused on narrative juvenile literature, which is read by teenagers in real-life. Empirically, these narratives were also fictional and with regard to aspects of

foregrounding, most of these texts would probably count as non-literary. Thus, the reading habits test gives no indication about differential effects of literariness, fictionality, or narrativity. Given the different theoretical approaches, it is necessary to disentangle the effects of literariness, fictionality, and narrativity in future research. However, as the empirical definition of literariness is already difficult for adult literature (e.g., Kidd & Castano, 2013, used award-winning books as a proxy), it is unclear if it can be applied to children and juvenile stories at all.

Limitations

The current study has some limitations that need to be addressed. A clear limitation is the cross-sectional correlational design. Although this design allows analyzing relationships between variables and capturing the notion of lifetime reading habits, which is better than short-term experiments and is fundamental for the SPaCEN-framework (Mar 2018a), it does not allow drawing conclusions about causal relationships. However, given results from experimental studies (Dodell-Feder & Tamir, 2018), it seems likely that narrative fiction has positive effects on social-cognitive skills. A second limitation is the exclusive use of self-report data for empathy. Although the IRI scale is most commonly used in this research field to measure empathy (see Mumper & Gerrig, 2017), self-reported empathy might not correspond to actual social-cognitive skills and it might not necessary be reflected in actual behavior. Related to this point, a third limitation is that the content of the transportability and the empathy scales overlaps, which might have contributed to the results. A fourth limitation is that the Transportability Scale (Dal Cin et al., 2004) as well as the Social Support Scales for Children and Adolescents (Harter, 2012) were translated by the first and the second author for use in the present study, and the psychometric properties of

the translated scales and their equivalence to the English-speaking scales could not be tested. However, giving some support to the accuracy of our translations, our results indicate that reliabilities of the scales were good to excellent, which corresponds to the original versions of the questionnaires. Finally, a limitation is that the study design does not allow distinguishing different types of proposed mechanisms. Therefore, we cannot say, for example, whether the correlations between reading habits and social-cognitive skills might be driven by narrativity, fictionality, or literariness.

Conclusion

The present study shows that the "socially awkward stereotype attributed to bookworms" (Mar et al., 2006, p. 705) does not correspond to reality. Instead, different dimensions of self-reported empathy (empathic concern, perspective taking, and fantasy) were positively related to the reading of narrative literature. Furthermore, the study also showed an incremental effect of reading habits in addition to the effects of gender, age, IQ, trait openness to experiences, and the real-life social network on students' self-reported ability to picture oneself as a character in the story and get involved with the characters and their feelings (fantasy), which might then also transfer to better empathic understanding in real-world settings. Related to that, our findings show that transportability may serve as an important mediating variable, indicating that the relationship between reading, transportability, and social cognition might be more complex than initially thought (Mar 2018a). However, to gain insight into causal mechanisms, longitudinal studies examining the developmental relationship between social-cognitive skills, transportability, and different types of reading material, as well as long-term experimental studies that provide sufficient narrative input are needed.

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Table 1

Descriptive Statistics and Bivariate Correlations

	M	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 ART	2.72														
2 TRT	6.00	.587**													
3 SPF-EC	3.59	.192**	.228**												
4 SPF-FS	3.52	.331**	.292**	.348**											
5 SPF-PD	2.53	.165**	.145*	.348**	.315**										
6 SPF-PT	3.31	.112	.141*	.410**	.271**	.109									
7 SSSCA-P	3.56	.135*	.004	.067	-.029	-.170**	-.048								
8 SSSCA-C	3.14	.067	.085	.148*	-.045	-.167**	.052	.455**							
9 SSSCA-T	2.77	-.057	-.002	.169**	.018	-.107	.185**	.172**	.229**						
10 SSSCA-F	3.60	.115	.142*	.219**	.100	.011	-.030	.315**	.500**	.127*					
11 TS	5.77	.387**	.385**	.340**	.758**	.253**	.322**	-.019	-.043	.103	.064				
12 BFI-O	3.52	.097	.107	.225**	.273**	.035	.205**	-.057	-.121*	.216**	.001	.361**			
13 Age (years)	14.81	-.212**	-.061	.014	-.037	-.046	.060	-.060	.033	.110	.055	-.069	-.013		
14 Mini-q	25.84	.219**	.165**	.008	.188**	-.019	.078	-.041	.048	-.034	.155**	.219**	.104	-.086	
15 Gender		.346**	.341**	.402**	.263**	.341**	.269**	-.020	.045	.099	.170**	.325**	.046	.031	.072

Note. Gender: 0 = male, 1 = female. Means and correlations were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience, SSSCA-P = Social Support Scales for Children and Adolescents – Parent Support Scale, SSSCA-C = Social Support Scales for Children and Adolescents – Classmate Support Scale, SSSCA-T = Social Support Scales for Children and Adolescents – Teacher Support Scale, SSSCA-F = Social Support Scales for Children and Adolescents – Close Friend Scale.

* $p < .05$, ** $p < .001$ (two-tailed).

Table 2

Hierarchical Multiple Regression Analyses with Empathic Concern as Outcome Variable

	Model 1					Model 2					Model 3				
	B	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2
Intercept	3.589	0.039	93.164	<.001		3.343	0.055	60.723	<.001		3.419	0.057	60.322	<.001	
Reading Habits	0.156	0.039	4.053	<.001	.058	0.050	0.040	1.250	.106		0.061	0.044	1.384	.083	
IQ						-0.050	0.037	-1.348	.089		-0.064	0.036	-1.764	.039	.012
Age						-0.003	0.037	-0.094	.463		-0.005	0.036	-0.150	.440	
Gender						0.451	0.078	5.752	<.001	.124	0.397	0.078	5.106	<.001	.099
BFI-O						0.136	0.037	3.658	<.001	.050	0.092	0.038	2.410	.008	.022
SSSCA-P						-0.006	0.041	-0.152	.440		-0.009	0.040	-0.217	.415	
SSSCA-C						0.059	0.045	1.303	.097		0.058	0.044	1.311	.095	
SSSCA-T						0.039	0.038	1.023	.153		0.018	0.037	0.481	.315	
SSSCA-F						0.075	0.045	1.684	.047	.012	0.084	0.044	1.925	.027	.016
Transportability											0.112	0.042	2.684	.004	.027
Transportability X Reading Habits											-0.108	0.037	-2.952	.002	.032
R^2			.055					.248					.296		
ΔR^2								.192, $p < .001$					.048, $p < .001$		

Note. All continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female). Values were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience, SSSCA-P = Social Support Scales for Children and Adolescents – Parent Support Scale, SSSCA-C = Social Support Scales for Children and Adolescents – Classmate Support Scale, SSSCA-T = Social Support Scales for Children and Adolescents – Teacher Support Scale, SSSCA-F = Social Support Scales for Children and Adolescents – Close Friend Scale.

Table 3

Hierarchical Multiple Regression Analyses with Perspective Taking as Outcome Variable

	Model 1					Model 2					Model 3				
	B	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2
Intercept	3.314	0.043	77.499	<.001		3.121	0.064	49.136	<.001		3.153	0.066	47.631	<.001	
Reading Habits	0.103	0.043	2.400	.008	.020	0.031	0.046	0.684	.247		-0.021	0.052	-0.408	.342	
IQ						0.041	0.042	0.970	.166		0.022	0.042	0.528	.299	
Age						0.038	0.042	0.908	.182		0.041	0.041	0.995	.160	
Gender						0.354	0.090	3.917	<.001	.057	0.293	0.091	3.233	<.001	.039
BFI-O						0.122	0.043	2.821	.003	.030	0.074	0.045	1.656	.049	.010
SSSCA-P						-0.046	0.047	-0.992	.161		-0.046	0.046	-1.002	.158	
SSSCA-C						0.094	0.052	1.809	.035	.012	0.103	0.051	2.025	.022	.015
SSSCA-T						0.089	0.044	2.019	.022	.015	0.080	0.044	1.834	.034	.012
SSSCA-F						-0.108	0.051	-2.138	.017	.019	-0.107	0.050	-2.160	.016	.019
Transportability											0.167	0.049	3.424	<.001	.044
Transportability X Reading Habits											0.002	0.043	0.038	.485	
R^2			.020					.152					.188		
ΔR^2								.132, p <.001					.036, p = .002		

Note. All continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female). Values were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience, SSSCA-P = Social Support Scales for Children and Adolescents – Parent Support Scale, SSSCA-C = Social Support Scales for Children and Adolescents – Classmate Support Scale, SSSCA-T = Social Support Scales for Children and Adolescents – Teacher Support Scale, SSSCA-F = Social Support Scales for Children and Adolescents – Close Friend Scale.

Table 4

Hierarchical Multiple Regression Analyses with Personal Distress as Outcome Variable

	Model 1					Model 2					Model 3				
	B	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2
Intercept	2.527	0.045	55.648	<.001		2.254	0.067	33.783	<.001		2.304	0.070	32.930	<.001	
Reading Habits	0.134	0.045	2.957	.002	.031	0.049	0.048	1.004	.158		0.025	0.055	0.458	.324	
IQ						-0.059	0.045	-1.319	.094		-0.075	0.044	-1.686	.046	.011
Age						-0.038	0.044	-0.863	.194		-0.037	0.044	-0.854	.197	
Gender						0.499	0.095	5.264	<.001	.103	0.443	0.095	4.643	<.001	.081
BFI-O						0.013	0.045	0.278	.391		-0.032	0.047	-0.673	.251	
SSSCA-P						-0.090	0.051	-1.768	.039	.013	-0.091	0.050	-1.809	.036	.014
SSSCA-C						-0.113	0.055	-2.053	.020	.016	-0.108	0.055	-1.987	.024	.015
SSSCA-T						-0.073	0.047	-1.542	.062		-0.087	0.047	-1.831	.034	.013
SSSCA-F						0.065	0.053	1.215	.113		0.069	0.053	1.309	.096	
Transportability											0.137	0.052	2.646	.004	.026
Transportability X Reading Habits											-0.044	0.045	-0.980	.164	
R^2			.030					.182					.208		
ΔR^2								.151, $p < .001$					.026, $p = .010$		

Note. All continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female). Values were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience, SSSCA-P = Social Support Scales for Children and Adolescents – Parent Support Scale, SSSCA-C = Social Support Scales for Children and Adolescents – Classmate Support Scale, SSSCA-T = Social Support Scales for Children and Adolescents – Teacher Support Scale, SSSCA-F = Social Support Scales for Children and Adolescents – Close Friend Scale.

Table 5

Hierarchical Multiple Regression Analyses with Fantasy as Outcome Variable

	Model 1					Model 2					Model 3				
	B	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2	*B*	*SE*	*t*	*p*	f^2
Intercept	3.523	0.048	73.912	<.001		3.389	0.072	47.015	<.001		3.504	0.056	62.835	<.001	
Reading Habits	0.297	0.048	6.242	<.001	.139	0.209	0.052	3.999	<.001	.059	0.000	0.044	0.000	.500	
IQ						0.080	0.048	1.652	.050	.010	0.008	0.036	0.226	.411	
Age						0.006	0.048	0.131	.448		0.018	0.035	0.527	.299	
Gender						0.246	0.102	2.404	.008	.021	0.015	0.076	0.200	.421	
BFI-O						0.191	0.049	3.915	<.001	.057	0.011	0.038	0.294	.385	
SSSCA-P						-0.011	0.054	-0.200	.421		-0.009	0.039	-0.238	.406	
SSSCA-C						-0.063	0.059	-1.067	.143		-0.025	0.043	-0.575	.283	
SSSCA-T						-0.020	0.050	-0.400	.345		-0.050	0.037	-1.369	.086	
SSSCA-F						0.059	0.057	1.038	.150		0.061	0.042	1.446	.074	
Transportability											0.638	0.041	15.476	<.001	.892
Transportability X Reading Habits											0.026	0.036	0.723	.235	
R^2			.122					.213					.585		
ΔR^2								.091, $p < .001$					.373, $p < .001$		

Note. All continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female). Values were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience, SSSCA-P = Social Support Scales for Children and Adolescents – Parent Support Scale, SSSCA-C = Social Support Scales for Children and Adolescents – Classmate Support Scale, SSSCA-T = Social Support Scales for Children and Adolescents – Teacher Support Scale, SSSCA-F = Social Support Scales for Children and Adolescents – Close Friend Scale.

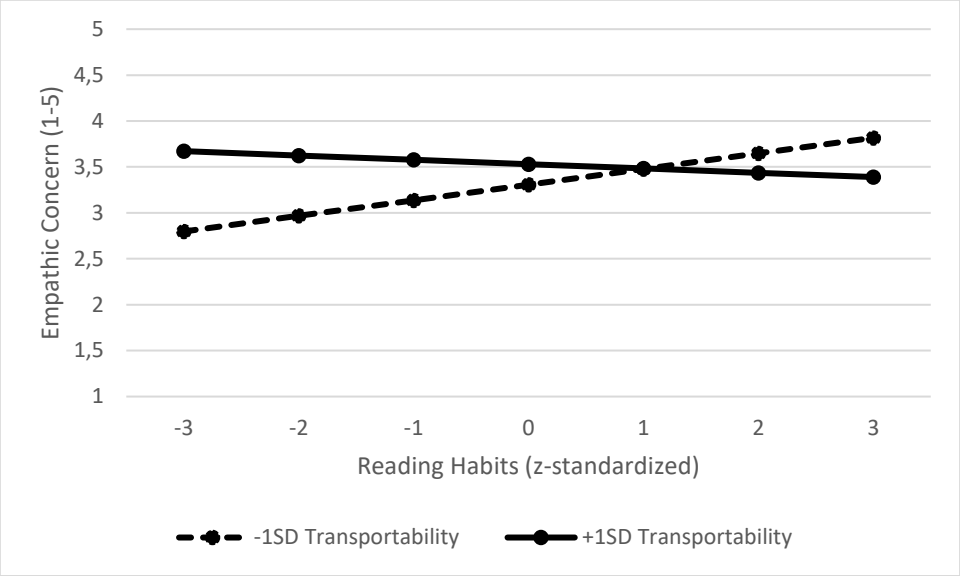

Figure 1. Relationship between reading habits and empathic concern for low-transportable students (-1 *S*D) and high-transportable students (+1 *SD*).

Appendix A

ART Items

Item	Description
Enid Blyton	Real author
Lilli Kiesel	Distractor/Foil item
Makiia Lucier	Real author
Cassandra Clare	Real author
Otfried Preußler	Real author
Erna Sassen	Real author
J.K. Rowling	Real author
Nathalie Jordan	Distractor/Foil item
Kristina Gehrmann	Real author
Alice Pantermüller	Real author
Andreas Steinhöfel	Real author
Barbara Wakely	Distractor/Foil item
Paul Maar	Real author
Negati Yusuf	Distractor/Foil item
Erica Bertelegni	Real author
Marah Woolf	Real author
Dorit Linke	Real author
Kerstin Gier	Real author
Dagmar Hoßfeld	Real author
Albert Thorne	Distractor/Foil item
James Dashner	Real author
Suzanne Collins	Real author
Nele Neuhaus	Real author
Eva Berghöfer	Distractor/Foil item
Cornelia Funke	Real author
Kristina Magdalena Henn	Real author
Adel Ghalavand	Distractor/Foil item
Brigitte Jakobeit	Real author
Paul Vierling	Distractor/Foil item
Samantha Fromberg	Distractor/Foil item
Colleen Hoover	Real author
Erin Jade Lange	Real author
Stephenie Meyer	Real author
Mariko Tamaki	Real author
Susan Kreller	Real author
Kristen Boie	Real author
Louanne Montpelier	Distractor/Foil item
Liz Pichon	Real author
Isabel Abedi	Real author
Sabine Giebken	Real author

Appendix B

TRT Items

Item	Description
DORK Diaries	Real title
Geliebte der Sprache	Distractor/Foil item
Krabat	Real title
Die Bestimmung	Real title
Magnus Chase	Real title
Krieger des Grenzlandes	Distractor/Foil item
Selection	Real title
Erebos	Real title
??? (die drei Fragezeichen)	Real title
Versprechen aus Bernstein	Distractor/Foil item
Letztendlich sind wir dem Universum egal	Real title
Drachenzähmen leicht gemacht	Real title
Chroniken der Unterwelt	Real title
Tom Gates	Real title
Harry Potter	Real title
Das Schicksal ist ein mieser Verräter	Real title
Wunder	Real title
Layers	Real title
Feder der Unendlichkeit	Distractor/Foil item
Ostwind	Real title
Ichnographia	Distractor/Foil item
Echsen des Untergrundes	Distractor/Foil item
Eine wie Alaska	Real title
Night School	Real title
Connii 15	Real title
Endgame	Real title
Die Tribute von Panem	Real title
Tinten-Trilogie	Real title
Der Junge im gestreiften Pyjama	Real title
Rico und Oskar	Real title
Marionette des Nachtfalters	Distractor/Foil item
Never ending riddle	Distractor/Foil item
Die 100	Real title
Verrat in Flammen	Distractor/Foil item
Silber-Trilogie	Real title
Im Land des Feigenbaumes	Distractor/Foil item
Twilight	Real title
Margos Spuren	Real title
Percy Jackson erzählt	Real title
Helden des Olymp	Real title

Appendix C

Multiple Regression Analysis with Empathy Dimensions as Outcome Variables Excluding Real-Life Social Network

	Empathic Concern				Perspective Taking				Personal Distress				Fantasy			
	B	*SE*	*t*	*p*	*B*	*SE*	*t*	*p*	*B*	*SE*	*t*	*p*	*B*	*SE*	*t*	*p*
Intercept	3.326	0.055	60.281	<.001	3.120	0.064	49.07	<.001	2.251	0.068	33.28	<.001	3.383	0.071	47.653	<.001
Reading Habits	0.057	0.040	1.437	.076	0.019	0.046	0.420	.338	0.039	0.049	0.798	.213	0.208	0.051	4.046	<.001
IQ	-0.038	0.037	-1.034	.151	0.029	0.042	0.699	.243	-0.047	0.045	-1.042	.149	0.087	0.047	1.828	.034
Age	0.009	0.037	0.240	.405	0.045	0.042	1.069	.143	-0.041	0.046	-0.901	.184	0.006	0.047	0.133	.447
Gender	0.481	0.078	6.201	<.001	0.355	0.090	3.959	<.001	0.505	0.095	5.318	<.001	0.256	0.100	2.566	.005
BFI-O	0.135	0.036	3.747	<.001	0.135	0.042	3.240	<.001	0.015	0.044	0.345	.365	0.194	0.046	4.189	<.001
R^2	.212				.115				.125				.206			

Note. All continuous predictors were *z*-standardized. Gender was dummy coded (0 = male; 1 = female). Values were pooled based on 20 imputed data sets. BFI-O = Big Five Inventory – Openness to experience.