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Do Fictions Impact People's Beliefs? A Critical View

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Abstract

The idea that fictions influence beliefs is well established in philosophy, literary theory, behavioral science, public policy, and among laypeople. But is it true? In this chapter, we review the available studies that test the hypothesis that fiction affects beliefs. Overall, the empirical evidence suggests that there is no direct causal effect of fiction on beliefs. We propose an explanation for why the idea that fiction affects beliefs is widespread and seemingly intuitive, even if it is false.

The idea that fictions impact beliefs is as old as literary theory. In *The Republic* (Book 2, section 357) for instance, Socrates already argued that the City should control the content of poetry. It is during youth that the most lasting opinions are formed, and in order to educate the future citizens who will participate in the life of the city, it appears necessary to control the stories on which society's moral principles are based. Thus, Socrates argued, stories by poets Homer and Hesiod should depict the gods and heroes as role models. Conversely, the episodes of the *Iliad* exposing the lamentations of Achilles should be censored because they depict the heroes in postures that are unworthy of the courageous man the City must create. Around the same time, in China, Confucius compiled writings about strikingly similar concerns in the *Classic of Poetry* (*Shijing*), tackling the dire consequences of *poetic misrepresentations* (i.e., fiction) on people's moral beliefs and, ultimately, on socio-political institutions (see Cai, 1999; for a parallel between Plato's and Confucius' visions of fiction, see Schaeffer, 2010, Chapter 1).

This opinion is not limited to Plato and Confucius. Many philosophers and politicians have expressed similar concerns regarding literary characters. Two thousand years after Plato, Rousseau criticized theater for making people laugh at good and virtuous characters in the *Letter to M. D'Alembert on Spectacles* (1758). Later on, the idea that fictional content influences people's beliefs gave rise to a wide range of rather similar concepts, such as (1) the concept of "bovarysm," coined by French philosopher Jules de Gauthier in 1857, and accounting for the way real people supposedly try to imitate the fantasized life of fictional heroes and heroines (Gaultier and Buvik, 2006); (2) the concept of 'external mediation' in René Girard's theory of human mimetic desire (Girard, 1992); (3) the concept of anti-mimesis, stating that artistic and fiction experiences

influence real life, and captured by Oscar Wilde's famous statement that "Life imitates Art far more than Art imitates Life" (Wilde, 1891); or again (4) the idea of fiction as a "moral laboratory" or as a "teaching instrument" (Hakemulder and Hakemulder, 2000; Scalise Sugiyama, 2021a).

The idea that fictions can change people's beliefs is also widespread outside academic circles (see Shirley, 1969, for a study about people's belief that fictions change their beliefs). This is manifest in how people have long dreaded the potential negative consequences of fictions on beliefs for society. From the moral panics about the harmful effects of fictional romantic novels in eighteenth-century England to the moral condemnation of video games in most societies today (Markey and Ferguson, 2017; Vogrincic, 2008), many have socially condemned the consumption of fiction, for fear that people would adopt inaccurate or dangerous beliefs. People do seem to take fictional narratives as opportunities for learning, teaching, and social control. The use of fiction takes multiple forms in modern humans' life. For instance, reaching adulthood, people might read fictional stories to their children for educational purposes, and keep on reading literary fictions because they feel that it makes them smarter or more insightful.

The magnitude of this belief is observable in its concrete and serious consequences on fiction-making: we could enumerate a great number of ways fiction producers are constrained because of it (e.g., censorship). 'Bowdlerisation' is one example: this term was created after Thomas Bowdler censored Shakespeare's thirty-seven plays, by omitting or transforming parts considered immoral. This expurgated edition of Shakespeare was more in line with Victorian values and became, on average, more popular than before. Similarly, in today's China, the China Film Administration has been exercising its power to ban or edit many foreign movies, according to the alleged impact of their content on Chinese citizens' beliefs. For instance, very recently, *Lord of War* (2022) was shortened by 30 minutes: the final scenes, when the rather immoral character comes through with no punishment, were cut and replaced by text screen summary stating that he confessed to all his crimes and was sentenced to life in prison.

Such efforts of control and sometimes censorship are made precisely because fiction is considered a powerful tool to impact people, notably through education. The association between entertainment and education has been coined 'edutainment' by recent research (Anikina and Yakimenko, 2015; Singhal, 2004) and is currently being investigated by policymakers. For instance, a TV series tackling HIV and the problems raised by risky sexual behaviors was used to inform Nigerians about the disease and its treatment. At first sight, it seems that such interventions are effective: one study finds strong effects of the exposure to this fictional TV series on people's knowledge about the treatment and about the sources of transmission of HIV (Banerjee et al., 2019). Considering, for instance, the urgency of the ecological transition, and if such effects are generalized, policymakers could use climate fictions in educational programs to

raise awareness and prompt sustainable behaviors. However, for policymakers to invest in such programs, they need to be sure that the intervention is effective, and more so than an alternative.

In all, this view that fiction can be used to change others' beliefs has been institutionalized for so long and is so well anchored in our daily lives that one might not easily realize that it is merely a hypothesis. In recent years, scientific theories, grounded in evolutionary and cognitive research, have proposed multiple explanatory models. Notably, it has been argued that people selectively retain relevant and accurate information from fictional stories (Nakawake and Sato, 2019; Scalise Sugiyama, 2021b; Schniter et al., 2018, 2022; D. Smith et al., 2017; Sugiyama, 2001) or that fictional stories allow us to simulate and, therefore, "experience" new situations, notably by taking the perspective of a fictional protagonist (Bloom, 2010; Gottschall, 2012; Mar and Oatley, 2008; Scalise Sugiyama, 2005; van Mulukom and Clasen, 2021; see Dubourg and Baumard, 2022, for a review of the evolutionary literature; see Best, 2021, for a review of the psychological literature). Both hypotheses, therefore, make the prediction that fictions can effectively change people's beliefs, and even that this effect is precisely why fiction emerged in human cultures.

The idea that fictions impact beliefs is thus strongly entrenched in philosophy, in literary theory, in public policy, in behavioral science, as well as among the lay people. But is it true? Here, we will argue against such a view. First, we will review empirical studies testing the hypothesis that fictions impact beliefs: such recent empirical evidence challenges the hypothesis that fictions do impact beliefs. Then, we will propose an explanation as to why this idea that fictions impact beliefs can be widespread and seemingly intuitive even if it is wrong.

A Critical Review of the Empirical Evidence

Mixed Empirical Findings Do Not Clearly Support the Main Hypothesis

A large number of studies have tried to empirically test the hypothesis that fiction consumption causally impacts beliefs, some relying on correlational evidence, others aiming at estimating the causal effects through pretest-posttest designs (e.g., Green and Brock, 2000; E. J. Marsh et al., 2003; Mulligan and Habel, 2013).

In correlational studies, researchers survey people about their beliefs and their preferred kinds or genres of fiction. Then, they test whether people holding more such or such beliefs also consume more such or such fictional genres. In statistical terms, they test whether both measures significantly correlate. For instance, Hefner and Wilson (2013) find that people who report watching romantic comedies more also report having more romantic ideal beliefs.

In pretest-posttest studies, researchers study the differences in beliefs of people before and after they are exposed to a specific piece of fiction. For instance, Howell (2011) studied how people's beliefs about climate change were impacted by the movie *The Age of Stupid*, by statistically comparing participants' beliefs before and after they had watched it. The film had an impact on people's concern about climate change and viewers' agency, for instance. However, such effects did not persist after ten to fourteen weeks (see Section 'Testing the Stability of the Effects').

In some of them, but not all, they adopt a quasi-experimental design, assigning participants either to a test group (i.e., participants read or watch the fiction that is supposed to change people's belief) or to a control group (i.e., participants read or watch something unrelated, or some fiction that does not include aspects hypothesized to change people's beliefs). Then, they compare the difference between before and after the experimental conditions (difference in difference). In Riley's study (2017), students from Uganda were assigned to two conditions: in the test condition, they watched an aspirational movie featuring a role model, while in the control group, they watched a placebo movie (i.e., a movie that is not relevant to the test). The treatment significantly increased students' math performance at an exam, compared with the control. However, there was no effect on any other subjects than math.

In all, there seems to be mixed evidence to support the main hypothesis that fictions impact beliefs. Some studies find significant effects (e.g., Butler et al., 1995, on the impact of the movie *JFK* on conspiracy beliefs; Prentice et al., 1997; Wheeler et al., 1999, on the impact of short stories on beliefs; Diekman et al., 2000, on the impact of romance stories on beliefs about safe sex; Mutz and Nir, 2010, on the impact of crime drama on the belief that the justice system is functional; Mulligan and Habel, 2013, on the impact of the movie *Wag the Dog* on the belief that president has launched a fake war; Kretz, 2019, on the impact of romance movies on the belief in soulmates). However, some do not find significant effects (e.g. Schofield and Pavelchak, 1989, on the impact of the movie *The Day After* on the belief that a nuclear war will occur; Green and Brock, 2000, on the impact of the short story "Murder at the Mall" on the belief in a just world; Hefner and Wilson, 2013, on the impact of romance comedy movies on romantic ideal beliefs; Nera et al., 2018, on the impact of a TV show episode on conspiracy beliefs; Petterson et al., 2022, on the effect of fictions with animals on concern for animal welfare).

Other kinds of analyses in media studies focused on the effect of fiction exposure on the *salience* of beliefs. Maybe fictions don't impact beliefs but put some of them high "on the agenda." Chances are that some become hot discussion topics when they are represented in a very popular fiction. For instance, a movie about a nuclear war had a great impact on the salience of and information about nuclear war (but not on people's belief—see Feldman and Sigelman, 1985). However, in another study, the impact of political fiction series (i.e., *Borgen*) on the public agenda was very small: the hypothesis that there was a causal relation between the topic of an episode

and the saliency of the topic after its release was dismissed by the authors (Boukes et al., 2022). In all, there is also mixed evidence for this agenda-setting effect of fictions on beliefs.

We have summarized this literature, stating that there is mixed evidence to support the main hypothesis that fictions impact beliefs. However, there *are* some significant results. But do these results really tell us anything about the *causal* impact of fictions? As it is well known, "correlation does not imply causation" (this fallacy is also known by the phrase *cum hoc ergo propter hoc*: "with this, therefore because of this"). In the following section, we discuss several statistical and experimental flaws. That is, we point to reasons why some studies find that fictions do impact beliefs, even if such effects don't actually exist.

Methodological Problems Cast Doubt on the Robustness of the Significant Effects

The "Third Variable" and "Self-Selection" Problems in Correlational Studies: Differences between People Explain Both What They Believe and What They Like

A wealth of studies tested correlations between fiction exposure and beliefs (e.g., Buttrick et al., 2022, on the correlation between the consumption of literary fiction and complex beliefs about the world; Kretz, 2019, on the correlation between the consumption of romance movies and the belief in soulmates; Hefner and Wilson, 2013, on the correlation between the consumption of romantic comedy movies and romantic ideal beliefs; Scrivner et al., 2021, on the correlation between the consumption of horror movies and the belief that one is prepared to face a pandemic; Mumper and Gerrig, 2017, for a meta-analysis of the numerous studies studying the correlation between fiction reading and level of Theory of Mind). Such correlational studies had the objective to support the hypothesis that fiction consumption causally impacts beliefs.

However, it is not legitimate to deduce a cause-and-effect relationship between two events or variables solely on the basis of an observed association between them. Such correlations between fiction consumption and beliefs would be indicative of a plausible causal process only if they hold after accounting for *all* other factors that cause both beliefs and fiction consumption. The correlational studies presented here often control for standard demographic variables: we then know that the correlations they find are not due to differences between people's age, gender, education, or social status. But that is obviously not an exhaustive list of how people differ from each other. What if another variable could explain both what people overall believe and what fictions they consume?

This is known as the "third-variable" or "omitted variable" problem. For instance, childhood socio-economic status might have a causal impact both on what people believe *and* what fictions they prefer. Or maybe personality traits are great causal forces on both dimensions. Then, the

correlations can be explained in such terms: some people resemble each other in what they believe and in what they like *because an unspecified causal factor accounts for how both dimensions vary*.

This is also sometimes referred to as a selection bias, but here it underlies the same idea: in such correlational studies, the participants in the treatment group, that is, those who decided to watch or read some kind of fictions, *selected* this activity by themselves and therefore somehow chose to be included in the "test group." In econometrics, the umbrella term for this is "endogeneity bias," because the correlations one finds are *endogenous* to the tested population (i.e., in statistical terms, the explanatory variable is correlated with the error term capturing all the variance that has *not* been specified in the model, hence also the omitted variable). Again, the problem is the same: the characteristics of the people which caused them to read or watch some specific kinds of fictions might cause them to hold some specific beliefs.

For instance, people vary in the extent to which they are open to new experiences and overall curious. This is captured by a personality trait called "Openness-to-experience" by personality psychologists. Researchers developed a questionnaire to compute a "score" which approximates people's level of Openness-to-experience (Costa and McCrae, 1992; McCrae and John, 1992). There is robust empirical evidence that this score correlates with (1) the extent to which people hold the belief that humans hold diverse values (DeYoung, 2015; Feist and Brady, 2004; Matz, 2021; McCrae, 1993), and with (2) what fictions they prefer consuming (e.g., fantasy and science fiction; Dubourg et al., 2022; Nave et al., 2020). Therefore, both variables are correlated, making it seem like fantasy fiction *causes* changes in people's belief, whereas such correlation might be explained by personality differences between people causing variation in both variables.

The "Trust-Calibration" Problem in the Self-Reporting of Beliefs: Participants Intuitively Trust Scientific Experimenters to Tell Them Accurate Information

Most of the studies used self-reporting to measure people's beliefs, that is, they directly asked people what they believed. In pretest-posttest studies, such questions were asked while participants took part in a scientific experiment, sometimes online, sometimes in the lab. Such questionnaires have recently been contested in many scientific fields, because they are considered as *not ecologically valid*: participants in experimental settings are known to respond to them in ways that are sometimes inconsistent with what they believe or how they behave in real-world settings (Osborne-Crowley, 2020).

Notably, the setting of a scientific experiment is likely to influence what beliefs people report holding, because of the presence of an experimenter: we expect participants to believe more easily conveyed pieces of information in this specific setting because it was delivered by a trustworthy

and competent source (i.e., a scientist). It makes it hard to be confident about such measurements of changes in people's actual beliefs after an experimental intervention, in ways that would be externally valid (i.e., that would still be valid outside of the experiment; Andrade, 2018). For instance, Prentice and her colleagues (1997) asked participants to read a fictional text in which they included blatantly false information (e.g., "Most forms of mental illness are contagious"). Then, in a trivia quiz taking place just after the reading, participants were likely to answer consistently, even when the answers were obviously inaccurate. Chances are that participants took the content of this text at face value because it was presented by a scientific experimenter, even if it was presented as fictional.

It seems as if the evaluation that a scientist is a good source to revise one's beliefs was more powerful than the identification of the fictional status of the text. This interpretation of such results is consistent with a cognitive approach to information-sharing in humans, whereby people intuitively, unconsciously, and yet carefully calibrate their trust to the source of the information before adopting a new belief (Mercier, 2017, 2020).

The "Social-Desirability" and "Hypothesis-Guessing" Biases in Experimental Settings: Participants Want to Please the Experimenters and Report Beliefs That Fulfill This Goal

In the latter case, participants follow what they (wrongly) take as an expert's opinion: fiction loses its fictional status because it is presented by a scientist. There is another case where the reporting of belief is biased: when such beliefs are thought of to be socially evaluated: then, participants likely succumb to the *social-desirability bias* (i.e., when participants orient their responses to be viewed favorably by others, notably by the experimenters; Krumpal, 2013, for a review). For instance, when experimenters ask if their participants intend to engage in anti-nuclear behavior (after a movie about a nuclear war), they globally report that they do, and more so after the movie (Schofield and Pavelchak, 1989). We argue that they report such a belief because they understand that this response would be judged positively, and the fiction exposure simply makes this idea more salient. If this is true, it is as if the movie was saying: 'The appropriate belief to report is that everybody should engage in anti-nuclear behavior'. The same could be said about the finding that students who read passages of Harry Potter related to the issue of prejudice (*versus* any other passages) reported being more tolerant about immigrants (Vezzali et al., 2015).

Sometimes, to be judged positively by someone, we don't report beliefs that are objectively socially desirable, but we report beliefs that we think our interlocutor expects. Experimental participants might do just that: this is called the *hypothesis-guessing bias*. It happens when the participants guess what the experimenters want to test: then, they are likely to respond accordingly. This is arguably the case in all pretest-posttest studies analyzing the effect of fictions on beliefs: experimenters show some topic-specific fictional content and then ask participants

questions about this very topic. Participants can easily guess what would please the experimenter and unconsciously respond accordingly.

The Problem of Accuracy in Identifying the Source of One's Beliefs: Participants Do Not Always Know or Remember Where Their Beliefs Come From

Some studies explicitly ask participants whether they believe they learn new information or change their worldviews because of fiction consumption: in general, they do believe that fictions impact their own beliefs. However, it does not necessarily mean that it is accurate: people can be wrong about the origin of their own beliefs.

For instance, some people explicitly report that they read romance with the objective to learn new things about love from fiction (Hefner and Wilson, 2013). The hypothesis that romance is primarily thought of as a way of learning leads to the prediction that people unhappy about their relationship or relationship status should enjoy more and read more romance fiction (to learn how to fare better). In a recent paper, van Monsjou and Mar (2019) tested just this very prediction. Their results from their empirical study show that it is actually the other way around: people who already fare better in romantic relationships enjoy reading romance fiction more. This result supports the hypothesis that some people are just more psychologically prone to having romantic relationships, which makes them both more successful at romantic relationships and more likely to consume romance fiction.

The Problem of Direct versus Substitution Effect: People Consuming Fictions Change Their Behaviors without Changing Any Belief

Some recent studies in economics have tried to overcome such methodological problems by using more ecologically valid paradigms. In so-called natural experiments, researchers use the fact that some external arbitrary factor leads to differences in exposure to fiction in some close areas. This resembles random assignments in intervention studies (see DellaVigna and La Ferrara, 2015, for a review). It overcomes all the previous problems because (1) nobody is asked to report anything (so that there is no more social desirability or trust calibration biases) and (2) the *availability* of a fiction in a given location is exogenous (so that there is no self-selection or endogeneity bias).

To take a concrete example, La Ferrara and her colleagues (2012) wanted to estimate the causal effect of consuming fiction on women's fertility choices. Their hypothesis was that exposure to emancipated female characters would inspire women to delay pregnancy. To test this causal hypothesis, the researchers needed to find a context where the availability of a fiction appears as an "exogenous" variable, so that it does not depend on people's individual choice to be exposed to them. They used the fact that access to the television network that hosted the TV show took

time, and people in some parts of the country had access to it before others. Which regions came first was argued to have no link whatsoever with women's fertility and can thus be seen as a random treatment allocation process with regard to it. The researchers could then compare fertility measures in regions where people could watch soap operas with regions where they couldn't (yet), because the network provider had not yet established access. In other words, the variation in delay of network distribution served as a randomization process that split the population into a treatment and control group. To measure fertility choices, they used administrative data from the government census. This strategy allowed them not to use self-reporting questionnaires and directly measure people's behaviors. Their evidence suggests that coverage by the television network which airs soap operas has a causal impact on the decrease in the probability of giving birth.

With this robust paradigm, some studies found significant effects of fictions on beliefs. For instance, Jensen and Oster (2009) show that, in rural India, exposure to television shows (in regions where it was possible to be exposed to them because of the availability of cable TV) alters people's beliefs about women's autonomy. The timing of changes in people's beliefs is aligned with the introduction of cable, so it seems not likely that they are due to a third variable. In this case, changes in beliefs and behaviors after exposure to fictional content are likely caused by the acquisition of consequential real-life information (e.g., women who work and are financially independent *actually exist* in the real world) that either change people's perception of social norms or make people more optimistic and raise their agency, that is, their willingness to act and have an impact on their life.

However, this literature in economics has recently been aware of and vigilant about a crucial bias in such natural experiments. It could be the case that the effect of fictions on behaviors is not caused by a direct effect on people's beliefs or even on people's cognition, but by a substitution (indirect) effect, captured by the intuitive idea that while people are consuming fictions, they are not doing anything else (DellaVigna and La Ferrara, 2015). To take one example from DellaVigna and La Ferrara's article, if soap opera becomes more culturally successful, then the effect of soap opera must be considered "with respect to the activities that it substitutes, like meeting with friends in a social context." Therefore, an effect of fictions on any life outcome, if significant, might not be the consequence of a change in belief at all.

Dahl and DellaVigna's study (2008) show a concrete example. They investigated the question of the impact of movies with violence on violent crimes in the United-States. To do so, they exploited the day-by-day variation of the release of movies with violence, and their popularity, in movie theaters, from 1995 to 2004: it shows a strong exogenous variation of violent movie exposure over time. They also retrieved the number of reported assaults and intimidation for a given day from the National Incident-Based Reporting System (NIBRS). After controlling for

some potentially confounding variables (e.g., seasonality, rainy weather), they find that, over the nine years covered by this study, the "amount" of exposure to violent movies significantly *decreases* the number of assaults the very same day. Is this due to a decrease in one's violent beliefs after having been exposed to fictions with violence, that is, to some sort of catharsis? The study shows that this is not the case. First, there was no delayed effect of fictions on violent behaviors: researchers observed no effect of exposure to violent movies on the number of assaults or intimidation in the days after exposure. Second, and more importantly, the decrease of violent crimes caused by exposure to violent movies was significant within a specific time frame during the day, between 6 pm and 12 am, that is, when people go to the movies. The most likely interpretation is, therefore, that violent movies *attract* people that could otherwise be violent in the real world. That is, "violent movies lower violent crime because they reduce the allocation of time to even more pernicious activities," such as drinking at bars or wandering around at night (DellaVigna and La Ferrara, 2015). The net effect of violent movies can be computed: they lead to a decrease of 1,000 assaults per weekend, on average. However, this is not due to any cognitive changes in people's beliefs, but to the effect of voluntary incapacitation: the only explanation that fits the statistical observations is that people who have a more violent temper self-select into movies with violence (more so than other movies) and are, therefore, incapacitated from committing crimes.

More generally, to understand the impact of fiction consumption on beliefs, such findings urge us to consider the activity it is likely to be substituted for, what economists call the "next-best alternative activity." The question, therefore, should not be "Do fictions impact our beliefs?" but "Do fictions impact our beliefs *more than the alternative activity*?"

What Can Be Done to Overcome These Problems?

Testing the Stability of the Effects

To overcome the problems we have just reviewed, some researchers implement new methodologies. Notably, experimenters started to measure the *temporal stability* of what they assumed was an actual change in belief, by asking again the same questions to the same participants a few weeks later (i.e., test-retest design).

To our knowledge, the handful of studies that tested the stability of the effects with such a test-retest design were inconclusive. They typically find significant results when comparing people's beliefs before and directly after the exposure to the fiction. However, and crucially, this statistical significance always disappeared when comparing people's belief before and some weeks after fiction exposure (Brodie et al., 2001; Howell, 2011; Schneider-Mayerson et al., 2020; Strange and Leung, 1999).

Such results support the hypothesis that people didn't actually change their beliefs after having read or watched a fictional story, but rather *reported* beliefs that were consistent with what they had *just* read or watched (for the reasons we listed in the previous section). After a time (in the aforementioned experiments, between three weeks and two months), they return to reporting their actual beliefs from before the exposure to the fiction.

Comparing Effect Sizes

The effect size is the measure of the magnitude of the effect. While a *p*-value (i.e., a number calculated with a statistical test that describes the likelihood of observing such results under the assumption that the null hypothesis is true) indicates whether an intervention works, an effect size indicates *how much* it works. Moreover, an effect size is independent of the sample size, whereas a *p*-value can reach significance with enough individuals even if the effect is very, very small.

It is paramount to report effect sizes when studying the effect of fictions on beliefs, notably because one needs to compare the impact of fictions on beliefs with the impact of the activity it substitutes on beliefs. For instance, to argue that horror movies make people less prosocial, one would need to prove that it makes people even less prosocial than the activity it substitutes, which is likely to be meeting with friends: are people less prosocial because they watched horror movies, or because while doing so they didn't talk with their friends and benefited from this effect? Reporting effect sizes is also important to compare the size of effects of different variables, and inferring which variable contributes 'more' to the observed effect. In Smith and Apicella's article (2022), Hadza hunter-gatherers were given the dictator game (i.e., after having received money, participants decide whether and how much money they want to give to another participant). The control group heard a control story before the game, while the test group heard a prosocial story. People from the test group did give more in the dictator game. However, the effect was small, and the amount of money transferred was more strongly correlated with other variables, such as marital status or region of residence.

Replicating the Findings

Reproducibility is a major principle in science according to which the results from scientific studies should be achieved again to be verified, using the same methodological paradigm, but usually performed by other researchers. The replicability crisis is an ongoing methodological crisis in many scientific fields, and notably in medicine and psychology: results of many studies are impossible to reproduce (Ioannidis, 2005; Open Science Collaboration, 2015).

The most well-known example in the matter at hand is the question of the impact of literary fiction on Theory of Mind, that is, the cognitive capacity to understand others' mind (Zunshine, 2006). First, Mar and his colleagues (2006) found correlational evidence of an association between fiction exposure (compared with non-fiction exposure) and social ability. To measure people's lifetime exposure to literary fiction, they used the Author Recognition Test (ART), which asks people to recognize classical authors' names in a list.

Then, Kidd and Castano (2013) found significant (yet small) effects of literary fiction (compared to popular fiction) on advanced tests of Theory of Mind (e.g., RMET; Baron-Cohen et al., 2001), in pretest-posttest experiments with control conditions, and controlling for the participants' previous exposure to fiction (using ART as a control variable). Black and Barnes (2015) also found a significant yet small effect of literary fiction using a within-participant design (again, compared to popular fiction), but using different controls (e.g., narrative transportation). In another study, they also looked at the effects of TV drama (compared to documentary) on Theory of Mind and found significant results (Black and Barnes, 2015). In 2016, Kidd and Castano replicated their own findings from 2013, with success. Such results would suggest that a one-time and brief exposure to literary fiction could immediately enhance social cognitive skills.

However, this is not the full story. Researchers tried to reproduce and extend such results. Djikic and her colleagues (2013) failed to find an effect of literary fiction (compared to essays) on Theory of Mind. An important article from 2016 was the first close replication attempt of Kidd and Castano's original findings. It was performed by three different research groups. They failed to find that reading literary fiction improves Theory of Mind (Panero et al., 2016; see Kidd and Castano, 2017; Panero et al., 2017 for a discussion). Another close replication again failed to replicate Kidd and Castano's results (Samur et al., 2018). Other conceptual replications did not find any association between lifetime exposure to literary fiction and social cognitive skills (Wimmer et al., 2021), nor between single short exposure to literary fictiona and social cognitive skills (Lenhart and Richter, 2022). A meta-analysis reported significant but small effects comparing exposure to fiction and exposure to non-fiction (Mumper and Gerrig, 2017). And a recent study performed a *p*-curve analysis (i.e., a statistical test aimed at looking for publication biases) and partially explains why apparently so many studies find significant effect: because papers with significant effects are more likely to be published (Quinlan et al., 2022). Finally, a recent study used for the first time a randomized control methodology, randomly assigning participants to a test group (where they had to read fiction 45 minutes a day for four weeks) or two control groups (where they had to read non-fiction 45 minutes a day for four weeks, and where they had to not engage in any reading for pleasure). Fiction readers did not outperform non-fiction readers or participants who did not read on any social outcome (Dodell-Feder et al., 2022).

The debate is not over, but most importantly, it highlights the necessity to wait for close replications before making any causal claim following single experiments. It seems more parsimonious, in light of the reviewed empirical evidence, to conclude that there is no specific immediate effect of fiction exposure on Theory of Mind. Future research should replicate such findings with other media (see Rathje et al., 2021 for theater; Castano, 2021 for movies) but also carefully design studies to test predictions that are theoretically grounded. As we have seen, some studies compared highbrow fiction exposure with lowbrow fiction exposure (e.g., Castano, 2021; Kidd and Castano, 2013), while other studies compared fiction exposure with non-fiction exposure (e.g., Black and Barnes, 2015; Mumper and Gerrig, 2017). The theoretical assumptions behind such tests are not at all similar. Besides, the former design has been criticized because of the lack of strong demarcation between literary and popular fiction. We argue that the latter suffers from the same flaw: fictionality is a continuum, as evidenced by literary naturalism, the recent emergence of hybrid genres such as autofiction or docufiction, or the success of realistic "inspired-from-real-facts" movies.

Using Behavioral Measures

Another way to work around the methodological problems we reviewed would be to actually measure, neither beliefs, nor intention to behave, but actual behaviors. The main cognitive function of beliefs is to orient future action. We assume that, when they ask whether people change their beliefs about, for instance, nuclear wars, safe sex, justice, or climate change, after some fiction exposure, what researchers really want to know is whether people actually engage in anti-nuclear behaviors, use more condoms, act more morally, or dedicate more effort to fight climate change. That is, the main question is not "Do people hold different beliefs?" but "Do people behave differently?"

This apparent subtlety is actually crucial, because, as we have seen in the previous subsection, people can report holding specific beliefs *even if they do not actually believe in them*, for social reasons (e.g., pleasing the experimenter) or epistemic reasons (e.g., waiting for the belief to be more strongly confirmed to act according to it). (On this point, see also Lisa Zunshine's contribution to the present volume). A cognitive approach to belief explains this oddity: humans can hold beliefs in a cognitive 'meta-representational' format (Sperber, 2008) so that they have no practical consequence whatsoever on behavior or on other beliefs (Mercier, 2020). Again, this is very useful, in order not to act on any belief we might encounter. Crucially, it means that not all beliefs lead to changes in behavior.

For instance, when people answered the trivia quiz after reading a fictional story with inaccurate information (Prentice et al., 1997), some answered (obviously, wrongly) that chocolate leads to losing weight, because this information was included in the story. However, we argue that this

belief is held in a meta-representational format: after the test, participants are not likely to actually eat chocolate with the objective of losing weight.

To take a second example, in a classical study, people were interviewed before and after having seen the movie *JFK*. Immediately after, more people reported believing in the conspiracy hypothesis that multiple agents were involved in the Kennedy assassination and its cover-up (Butler et al., 1995). First, this belief was reported under the direct influence of the broadcast and this study didn't check the stability of this reported belief. As we have seen, it may very well not last much longer. But, even more importantly, it is a self-reported statement of a belief that should not be very consequential in behavioral terms: we argue that participants are not likely to change their future *actions* in accordance with this new reflective belief.

This discrepancy between belief and behavior has been put to light with randomized controlled trials. For instance, one study tested the impact of a fictional movie with relevant information about the national antipoverty program in India (Ravallion et al., 2013). Two months after the movie, participants from the control villages were more likely to believe that employment had increased or that economic opportunities had improved. Yet, it was not objectively the case: an objective measure of employment showed no gain on average between the two conditions. Likewise, in Tanzania, students who were incentivized to watch an edutainment show about business believed more than others that entrepreneurship is interesting. However, the show had in fact a negative effect on actual investment in learning: there was a negative treatment effect on exam performance (Bjorvatn et al., 2020; see Barsoum et al., 2022, for a similar study in Egypt). We hypothesize that such negative effects are not direct consequences of fiction consumption, but indirect *substitution* effect (i.e., people who are watching TV series are not studying). The fact that we can hold beliefs in a format that prevents them from impacting any other belief or behavior urges further research to directly study the *behavioral* consequences of fiction exposure, not just changes in self-reported beliefs.

Conclusion: The Impact of Fictions on Belief Remains to Be Demonstrated

Mixed results and methodological flaws make us more inclined to reject the hypothesis that fictions impact beliefs, because of the lack of sound empirical evidence in favor of it. First, studies testing the impact of fiction on beliefs show no consistency in the significance of the effects. Second, because correlational studies cannot account for everything that differs between participants, they cannot make causal claims, and this is captured by the saying that "correlation does not imply causation." On another note, pretest-posttest studies, because they investigate changes in beliefs and use self-reporting surveys, are particularly subject to some experimental flaws, derived from the fact that people trust the experimenters, want to appear desirable, and are likely to guess (rightly or wrongly) what the experimenters are testing. Such flaws cast doubt on

the external validity of the significant results. The stability of such effects seems to be challenged: when participants are re-tested some time after the test, they show no stability in their response, and instead return to reporting what they believed before the fiction exposure. Finally, some natural experiments in economics find significant, but yet small effects. It could be the case that fictions do impact some beliefs, when people have no strong priors (e.g., information about HIV treatment in a fiction), and in the context of a highly realistic fiction (e.g., soap operas). Therefore, considering such mixed results, we argue that the burden of proof now lies with those who hold that fictions do have an important impact on our beliefs. It seems more probable, in the face of this critical review, that fictions have no effect, or small effect on some specific beliefs under particular circumstances.

If It Is Wrong, Why Is the Idea that Fictions Impact Beliefs So Widespread?

Why do people believe that fictions impact beliefs? The first reason is simply that they confound correlation and causation. People rightly observe that people consuming such or such kinds of fictions are also more likely to hold such or such beliefs, and wrongly infer that there is a causal process happening. For example, meeting a fan of horror movies who holds the belief that real people are overall dangerous and malicious, we would easily conclude that he watched too many horror movies and *therefore* acquired this belief. However, as we have seen, a more parsimonious explanation is that people's broad personality causes both what people believe and what fictions people consume (in the latter example, a high score on the Big Five trait Neuroticism).

Maybe the most consensual findings in personality psychology is that human psychology universally varies along five dimensions, and therefore as many "personality traits" (i.e. the Big Five): (1) Openness-to-experience, basically capturing how tolerant and curious one is, (2) Conscientiousness, measuring how meticulous and farsighted one is, (3) Extraversion, which is about how energetic, enterprising, and positive one is, (4) Agreeableness, capturing how empathetic, cooperative, and warm one is, and (5) Neuroticism, capturing the extent to which one experiences intensively bad feelings such as fear, anxiety, or anger (McCrae and John 1992, for an introduction of the Big Five personality traits; Durkee et al., 2020: a study of this Big Five Model of human personality across 115 nations). Longitudinal studies have consistently shown that personality traits are extremely stable across an individual's lifespan. They vary a little according to people's age, but much of this variation is due to universal patterns (Damian et al., 2019; Fraley and Roberts, 2005; e.g., all humans become lower in Openness-to-experience as they age; Helson et al., 2002; H. W. Marsh et al., 2013; and all humans increase in Agreeableness and Conscientiousness in young adulthood: this is known as the maturity principle of developmental psychology; Bleidorn et al., 2013, 2020). Moreover, the effects of specific life experiences on personality are very small (Bleidorn et al., 2018). Finally, such personality traits are

flexible in response to socio-cultural long-lasting conditions that were relevant in humans' ancestral environments (e.g., the amount of resources; Baumard, 2019; Boon-Falleur et al., 2022).

Evolutionary theory posits that personality traits vary between humans and not so much across the lifespan because they are considered as evolutionary behavioral niches that lead to some adaptive benefits (Nettle, 2007; Smaldino et al., 2019). This theory predicts that personality traits are partly genetically inherited. This idea is captured by common observations that children's character resembles their parents or grandparents. From twin studies, adoption studies, and recent advances in genomic studies allowing to map the entire human genome, we know that such personality traits are indeed partly genetically inherited (Penke and Jokela, 2016). We can actually compute the level of influence of genes on personality and personality stability, independently of life-events: it accounts for at least half of the explained variance (Bouchard and Loehlin, 2001; see Briley and Tucker-Drob, 2014, for a meta-analysis of longitudinal behavioral genetic studies of personality development).

On the one hand, such personality traits make some beliefs (and not others) more appealing and more acceptable to people (Langston and Sykes, 1997). For instance, being higher in Openness-to-experience leads one to be more exposed to, and more easily accept, the belief that human cultural thoughts are highly diverse, and therefore be more tolerant of differences (DeYoung, 2011, 2015; Feist and Brady, 2004; McCrae, 1994). Being higher in Agreeability makes one hold more complex beliefs about others' intentions and thoughts (i.e., Agreeability is associated with socio-cognitive Theory of Mind; Nettle and Liddle, 2008). Being higher in Neuroticism makes one more sensitive to frightening beliefs (Kumari et al., 2007). And being low in Neuroticism leads one to be more exposed to or more easily accept the belief in a just world (Golparvar et al., 2014).

On the other hand, scores of personality traits significantly predict what fictions people enjoy to consume (see Michelson, 2014, for a theoretical essay and a review on the links between the Big Five model and fiction consumption). It has been tested with a sample of 3.5 million participants, with their Big Five scores and the movies they liked on Facebook: scores of personality traits are significantly associated with the genres of such movies (Nave et al., 2019). For instance, people who are higher in Openness-to-experience were significantly more likely to "like" fantasy or science fiction movies on Facebook and people higher in Neuroticism were significantly more likely to "like" horror fictions. In a recent study, we have shown that, more specifically, people who enjoy movies with imaginary worlds are higher in Openness-to-experience (Dubourg, Thouzeau, de Dampierre et al., 2022). Many other studies investigate the links between personality traits and fictional content features (see Dubourg, Thouzeau, Beuchot et al., 2022, for a review).
This consistently explains why people believe that fictions impact beliefs: because both variables are associated but for reasons that have nothing to do with a causal process. Beliefs and

preferences for fictional content correlate largely because of people's cognitive predispositions, notably their personality, which appears not to change much during their life.

Conclusion

In this chapter, we first reviewed the empirical literature testing whether fictional narratives, be they movies, novels, or fictional short stories, impact people's beliefs. There is mixed evidence supporting this hypothesis, with some statistically significant and some statistically insignificant results. We consider that this inconsistency greatly challenges the hypothesis. Furthermore, we reviewed methodological problems that could very well account for the significant results such studies find: participants are likely to report beliefs that they don't actually hold, for a variety of reasons that have to do with the experimental setting and the way human cognition works. Studies that try to overcome such problems by implementing a test-retest design found no effects.

Therefore, for the moment, it is more reasonable to conclude that fictions *don't* impact beliefs. This statement has big implications on current hypotheses aiming at explaining the very origin of fiction in human cultures. It actually challenges the dominant hypothesis which posits that fiction emerged by natural selection precisely because of its effect on beliefs. We proposed an alternative: the "entertainment technology" hypothesis (Dubourg and Baumard, 2022). This hypothesis offers an explanation as to why people believe that fictions impact beliefs even though it is not the case: both producers and consumers benefit from this inaccurate but positive belief in many ways. We can easily imagine why people might disagree with such a claim: one might consider that fiction loses some merit or nobility if it has no effect on people's beliefs. However, our framework does not see fiction consumption as some useless or pointless human activity, quite the contrary: it focuses on the wide range of emotions that fictional stories can and do evoke and proposes social advantages that people can derive from their consumption, other than the ones to adopt or update their beliefs. Moreover, this view puts fiction in a different light. Because successful fiction captures our attention by appealing to our preferences, desires, and emotions, fiction is a magnifying glass of the human mind. Through the study of fiction, then, we can gain a richer and deeper insight into the human mind and the human experience.

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