When are Fact-Checks Effective? An Experimental Study on the Inclusion of the Misinformation Source and the Source of Fact-Checks in 16 European Countries

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ABSTRACT

Despite increasing academic attention, several questions about fact-checking remain unanswered. First, it remains unclear to what extent fact-checks are effective across different political and media contexts. Second, we know little on whether features of the fact-check itself influence its success. Conducting an experiment in 16 European countries, this study aims to fill these gaps by examining two features of fact-checks that may affect their success: whether fact-checks include the political source of the misinformation, and the source of the fact-check itself. We find that fact-checks are successful in debunking misperceptions. Moreover, this debunking effect is consistent across countries. Looking at features of fact-checks, we find no indication that it matters whether fact-checks include the political source of the misinformation claim. Comparing fact-checks from independent organizations with those from public broadcasters, we do find, however, that who the fact-

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checker is matters, especially in combination with trust in this source.

Scholars and pundits alike increasingly point toward misinformation as one of the key threats to democratic societies (Lewandowsky et al., 2012). Though misinformation is not a new phenomenon (Allport & Lepkin, 1945), recent years have seen a strong surge of it. Social media have made it much easier to spread misinformation (Gruzd & Mai, 2020), and in the current post-truth information environment, we see also political elites espousing opinions or falsehoods as facts (Van Aelst et al., 2017; Walter & Murphy, 2018). This has only been further exacerbated by recent crises, such as the COVID-19 health crisis and the Russian invasion in Ukraine.

One tool that is commonly employed to battle misinformation are fact-checks: journalistic instruments that scrutinize (mis)information and indicate to what extent a specific piece of information is factual and accurate. Recent years have seen a vast growth of fact-checking organizations (Graves & Cherubini, 2016). It is, therefore, not surprising that fact-checks, and the extent to which they are effective, have, across subdisciplines, been studied extensively. The general consensus that emerges from these studies is that fact-checks are effective tools and that they can contribute to debunking misinformation (Hameleers & van der Meer, 2020; Porter & Wood, 2021; see; Walter & Murphy, 2018 for an overview).

Despite scholarly interest, several questions about fact-checks remain unresolved. For instance, while studies have started investigating how the effectiveness of fact-checks are moderated by individual factors of the receiver (Walter et al., 2020), the influence of features of the fact-check itself remain mostly unexplored (but see Pillai et al., 2021). In this study, we are particularly interested in two such features of fact-checks. The first concerns whether to include the political source of the misinformation in fact-checks. Recently, some discussion has started on whether fact-checks should mention, or even call out, the source of the misinformation claim, particularly in situations where these are political actors. On the one hand, it may be beneficial to have fact-checks point out which political actor made the claim. Previous research has shown that when political actors are called out for spreading misinformation, they are less likely to do so in the future (Nyhan & Reifler, 2015). Moreover, it may make citizens more careful in believing false claims from these politicians in the future. On the other hand, it has been argued that pointing out the political actor or group spreading misinformation, may actually be counter-effective (Nyhan, 2021). Doing so may prime partisan or political identities, thereby enforcing motivated political reasoning (Taber & Lodge, 2006), which could result in the fact-check becoming less effective. So far, it has remained empirically untested whether mentioning the political source of the misinformation claim in fact-checks indeed results in such a mechanism.

Second, we are interested in the source of the fact-check itself. In recent years many fact-checking organizations have popped up and mainstream news outlets across the globe have started publishing fact-checks to test contested claims. While there are quite a few studies that have investigated how the source *of* misinformation impacts its acceptance (e.g., Nyhan et al., 2020), there is not much research yet on whether the source of the fact-check impacts on the effectiveness of the debunking message as well (but see Nekmat (2020) and Zhang et al. (2021)).

We test both features by means of an experiment. More concretely, we compare fact-checks that include the political source of misinformation (political elite references) with those that do not. In addition, we manipulate the source of the fact-check and investigate whether it matters if the fact-check is published by an independent fact-checking organization or a mainstream news organization —specifically state-owned or -subsidized public broadcasters—and how trust in the source of the fact-check moderates its effectiveness.

Finally, we also examine the extent to which the effectiveness of fact-checks in debunking misinformation holds across different countries and media contexts. So far, most experimental studies on the effectiveness of fact-checks are single-country studies, although recently some comparative studies have emerged (Porter & Wood, 2021; Porter et al., 2023). Yet, due to limited comparative evidence, it remains unclear whether fact-checks work across different contexts, such as different media systems. For instance, trust in legacy media outlets varies substantially across countries and could impact the success of fact-checks, especially from legacy media (Newman et al., 2022). In this study, we conducted an experiment in 16 different European countries simultaneously. Those countries have different political and media systems and report a wide variety of levels of trust in legacy media outlets.

This study makes an important contribution to the literature on fact-checks by studying their effects on three levels: the source of the misinformation, the source of the fact-check, and the media context.

Misinformation, misperceptions, and fact-checks

Misinformation can be defined as all information that is considered false based on relevant expert data and/or empirical evidence (Vraga & Bode, 2020). Often this information is spread without the intention to deceive people, but, in those instances, actors spread false information with the deliberate purpose to manipulate the public we rather speak of disinformation (Wardle, 2017). The spread of mis- and disinformation impacts society, as numerous studies show that it affects the beliefs and opinions of citizens, and that these effects are persistent over time as well (Thorson, 2016).

Mis- and disinformation are especially likely to resonate in instances where a false message is congruent with one's prior opinions (Hameleers &

van der Meer, 2020). This can be explained by motivated reasoning, which assumes that people are biased information processors who want to remain consistent and avoid cognitive dissonance (Zaller, 1992). Indeed, many studies have shown that citizens, sometimes falsely, evaluate information that is congruent with their beliefs as more credible than incongruent information (e.g., Jerit & Barabas, 2012). This mechanism also explains why, similarly, citizens are more likely to believe misinformation when it comes from political actors they support (Nyhan et al., 2020; Vegetti & Mancosu, 2020).

The fact that misperceptions resulting from false information are so persistent, makes it difficult to debunk incorrect beliefs. Therefore, scholars have investigated whether instruments such as fact-checks can be effective tools in countering misperceptions. Fact-checks assess the extent to which pieces of information are factual and accurate. In the case of misinformation, these instruments indicate to readers that the information is false and present them with a corrective. In that sense, they are a posteriori tools that aim at correcting beliefs stemming from misinformation after they are already accepted and that try to counter any misbeliefs with facts.

Since fact-checks have to override existing incorrect beliefs, doubts have been raised about their effectiveness, especially when it comes to political misinformation and misbeliefs which are often more persistent (Walter & Murphy, 2018). Still, there is strong evidence that fact-checks are generally successful in countering misinformation (Hameleers & van der Meer, 2020; Hameleers et al., 2020; Nyhan et al., 2020). However, there is less consensus on whether motivated political reasoning also plays a role here. In 2010, Nyhan and Reifler introduced the idea of a backfire effect. Conducting several experiments, they found in some of these experiments that respondents who are congruent with misinformation believed more strongly in this misinformation after being exposed to a corrective message (Nyhan & Reifler, 2010). Later studies, however, were unable to replicate these backfire effects, including Nyhan (2021) himself. While there is not much evidence for a backfire effect, many of studies do find evidence of a differential effect, indicating that fact-checks may be less successful in debunking misinformation which is congruent with one's opinion or which is spread by a political actor with whom we identify (Hameleers & van der Meer, 2020; Nyhan et al., 2020). This differential effect suggests that not only in the acceptance of misinformation, but also in the effectiveness of corrective message from fact-checks, motivated political reasoning plays a role.

In sum, based on previous studies on fact-checking, we expect that fact-checks are effective in correcting misbeliefs and in discrediting misinformation. However, we also expect that this will be moderated by the extent to which one supports the actor making the false claim, and that there will be

a weaker differential effect among supports of political actors making the false claim. This results in our first two hypotheses:

H1: After being exposed to a fact-check, citizens will be less likely to accept a misinformation claim.

H2: The effect of being exposed to a fact-check on being less likely to accept a misinformation claim (H1) will be weaker for respondents who support the political actor making the misinformation claim.

The effectiveness of fact-checks across contexts

So far, most studies examining the effectiveness of fact-checks have been single-country studies (for an exception, see Porter & Wood, 2021). They are also still predominantly conducted in Western democracies (Nieminen & Rapeli, 2019). In recent years though, an increasing number of studies have appeared outside this context, which show that fact-checks are also effective in Latin America (e.g., Mare & Munoriyarwa, 2022) and Africa (e.g., Bowles et al., 2023; Montana-Nino et al., 2022; Offer-Westort et al., 2023). That said, comparative studies that go beyond single country experiments are still scarce, raising the question as to whether fact-checks are equally effective across different political and media systems. Only recently, two studies, by Porter and Wood (2021) and Porter et al. (2023), have employed a comparative approach. Using experiments, Porter and Wood (2021) study the effectiveness of fact-checks in four countries—Argentina, Nigeria, South-Africa and the UK—whereas Porter et al. (2023) expanded this to 10 countries. Those studies provide first evidence that fact-checks seem to work across different national contexts.

In another comparative study on fact-checking, although not on its effectiveness, but rather on attitudes of the public toward them, Lyons et al. (2020) find strong differences between European countries in the extent to which citizens are familiar with and acceptive of fact-checks. They show that in Northern European countries, such as Sweden and Germany, people are generally familiar with fact-checks. Additionally, fact-checking is generally seen as something positive, compared to other European countries, such as France, Spain, Italy, and Poland, where citizens are often unfamiliar with fact-checking and more skeptical about it. Those geographical differences, Lyons et al. (2020) explain, stem from the prevalence of fact-checks in Northern and Western Europe along with broader institutional trust and trust in the public media is generally higher and more robust.

Given that there are strong differences in the extent to which people are familiar with and favorable toward fact-checks within Europe (Lyons et al., 2020), it could be that there are also differences in their effectiveness across these contexts. However, due to the lack of empirical evidence for some of these countries, and the scarcity of comparative studies on fact-checking in general, this question remains unanswered. We will, therefore, investigate this possibility by testing the effectiveness of fact-checks across a wide arrange of European countries. Since we are mostly interested in whether there are any country differences in the effectiveness of fact-checks, we formulate a general research question rather than specific hypotheses.

RQ1:   To what extent are fact-checks successful in debunking misbeliefs resulting from misinformation across different European countries with different political and media systems?

The role of the political source

As discussed earlier, motivated political reasoning (Taber & Lodge, 2006) plays a strong role in the acceptance and persistence of misinformation (Nyhan & Reifler, 2010). Earlier research has shown that people's prior beliefs, ideology, and knowledge could lower the effectiveness of corrective tools, such as fact-checks (Walter et al., 2020). Thus, one potential explanation for why some researchers find traces of a differential effect, whereas others do not, could be the extent to which the content of the fact-check further exacerbates such motivated political reasoning. What may matter especially in this regard, is whether fact-checks mention the political source of the misinformation and include elite references or not. Fact-checks can either explicitly mention, or even call out, the political actor making the misinformation claim, or they can rather leave this in the middle and focus solely on the claim itself.

We expect that fact-checks that include the political source of the misinformation may induce motivated political reasoning, and, therefore, be less effective in debunking misbeliefs stemming from misinformation. This will particularly be the case among supporters of the political actor being called out for spreading misinformation. The reasoning behind this expectation is that when interpreting messages such as fact-checks, there is a trade-off between accuracy and directional goals (Kunda, 1990). On the one hand, people want to hold correct opinions and are thus motivated to interpret information in a correct way, on the other hand, they also want to be consistent in their beliefs, and therefore interpret information in such a way that it fits with their prior beliefs. The trade-off between these two goals becomes particularly clear when the misinformation claim is

congruent with one's prior opinion and made by an actor one supports, as in this situation the accuracy and directional goal do not align. In those instances, the directional goal may win over the accuracy goal, making fact-checks not or less effective (Nyhan et al., 2020; Wood & Porter, 2019). By explicitly calling out elite actors, fact-checks may tip the scale in favor of the directional goal even further, and at the cost of the accuracy goal. The mentioning of the political actor is likely to prime and enhance people's political and party identification, making people more inclined to use motivated reasoning. Ultimately, we expect that this priming results in supporters of a political actor—citizens who are already more likely to accept the misinformation claim in the first place—digging their heels in the sand and be less likely to accept the debunking information of the fact-check. This will be less the case for fact-checks that do not mention the political source of the misinformation claim, as they do not prime party identification and may therefore rather lessen motivated political reasoning, promoting accuracy goals instead.

In sum, these expectations result in the following hypotheses.

H3: Citizens exposed to a fact-check that does not mention the political source of the misinformation claim will be less likely to accept the claim than citizens exposed to a fact-check that does mention the political source.

H4: This expected effect (H3) will be stronger for citizens who more strongly support the political actor making the misinformation claim.

The role of the source of the fact-check

Another characteristic that may determine whether fact-checks are successful is the source publishing the fact-check. The practice of fact-checking started in the United States, but has also become common practice in democracies worldwide, with a mix of more independent fact-check organizations and fact-checks coming from legacy media (Graves & Amazeen, 2019). Established media outlets such as *Le Monde* and *Der Spiegel*, and also public broadcasters such as the BBC in the United Kingdom or ARD in Germany, publish fact-checks on a regular base (Lyons et al., 2020).

Whether a fact-check is published by an independent fact-checking organization, or a mainstream media outlet, may impact its effectiveness. As Guillory and Geraci (2013) have shown, the likelihood that people accept a corrective claim increases when they deem the source of this claim as trustworthy, a finding that has been confirmed by others (Kraft et al., 2022). Based on this, we could expect that fact-checks coming from legacy media, such as public broadcasters, are more successful in correcting

misinformation. In most European countries, public broadcasters still belong to the most used and trusted news sources (Newman et al., 2022). In addition, they are seen by most people as high-quality news sources, and as we know from literature on source cues, messages are seen as more credible when the perceived expertise of their source is higher (Go et al., 2014; Kang et al., 2011). This knowledge of and trust in, the expertise of, public broadcasters, might stand in contrast to independent fact-check organizations that may not always be widely known by the public, and who may therefore be less effective. In the same vein, Nekmat (2020) and Zhang et al. (2021) found evidence in the United States that fact-checks published by known media sources are more effective than fact-checks from unknown media sources. Against this backdrop, we formulate the following hypothesis:

H5:　Citizens exposed to a fact-check from a public broadcaster will be less likely to accept a misinformation claim than citizens exposed to an independent fact-checker.

The effect stated in H5 may not be an across-the-board effect, though. In many countries trust in the public broadcaster has been declining over time and in certain countries this trust has been quite polarized (Newman et al., 2022). While fact-checks published by the public broadcaster may be more successful than those coming from independent organizations among citizens who find this source trustworthy, the effect may be reversed among that part of the population that no longer trusts the public broadcaster. Thus, given the moderating role trust in the source could play, we would expect that for those citizens fact-checks from independent organizations are more effective.

H6:　The expected effect (H5) will be stronger for citizens that have more trust in the public broadcaster.

The moderating role of trust in the source of the fact-check may not just work at the individual level but could also result in differences between the effectiveness of fact-checks coming from independent organizations versus those coming from the public broadcaster across media contexts. As the likelihood that people accept a corrective claim increases, when they consider the source of this claim to be more trustworthy, we would expect that fact-checks published by public broadcasters are more effective in media contexts where trust in the public broadcaster is also high. Higher trust in the public broadcaster at the aggregate level can be considered as a proxy for a less polarized information environment, where the role of public broadcaster as a news provider or fact-checker is less often disputed.

Conversely, in media contexts where the average trust in public broadcasters is low, citizens may rather turn away from traditional media and more easily opt for more independent sources. As a result, we would expect that in these countries fact-checks from independent organizations are more successful in debunking misinformation. This results in our final hypothesis about the moderating role of the media context:

H7: The expected effect (H5) will be stronger in countries with higher average trust in the public broadcaster.

Data and method

To test our hypotheses, we conducted a survey experiment. The survey experiment was fielded simultaneously in 16 European countries: Austria, Belgium (Flanders), Czech Republic, Denmark, France, Germany, Greece, Italy, Norway, Poland, Romania, Spain, Sweden, Switzerland, the Netherlands, and the United Kingdom.[1] The country selection was motivated by the diversity in these countries' political and, media systems, with varying levels of, for instance, political parallelism and journalistic professionalism (Humprecht et al., 2022), media trust levels, as well as variation in how common fact-checks are. This variation between countries enables us to investigate the effectiveness of fact-checks across an arrange of political and media contexts. Appendix A in the online supplemental materials provides an overview of the countries and their features.

The survey experiment was fielded between April 26 and June 3, 2022, via the online panel of Kantar Lightspeed. As we work with an online panel, several data quality checks were made. First, the survey started with an attention check. Respondents were instructed to ignore the following question and click "none of the above" and then were asked about their feelings from a list of options, including the option "none of the above." Respondents failing this attention check—i.e. not clicking "none of the above"—could not continue with the survey. Second, speeders—defined as those completing the survey within 40% of the median time—were also removed from the dataset. Respondents who failed those quality checks were replaced with other respondents by the survey company to reach a response of 1,000 respondents per country.[2] To improve the representativeness of the sample, we also used soft quota on gender, age, and

[1]In Belgium we only included the Dutch-speaking region and in Switzerland the German-speaking region. Both are the largest regions in their respective country.
[2]About 26% of the initial respondents failed the attention check and were replaced by respondents who passed this check. About 1,3% of the respondents was a speeder.

education. Appendix B in the online supplemental materials provides an overview of the descriptives for all key variables. The experiment was preregistered via aspredicted.com and ethical permission was granted by the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp on March 29, 2022.[3] Since the survey was fielded in multiple languages the questionnaire was translated by professional translators and checked by members of the research teach who were also native speakers of each country.

Regarding the experiment, respondents first read a fictional online news article published by the fictional news.org. This article contained misinformation, claiming that the number of asylum requests in Europe increased dramatically in 2020 as shown in Appendix C in the online supplemental materials (we multiplied the real number of asylum requests by five). This claim is false as, in reality, the number of asylum requests in Europe, influenced by the COVID-19 pandemic, saw a slight decrease in 2020. We created a general story about immigration to Europe because this way we could use the same story across the 16 countries. This approach increased the equivalence of the experiment. It is important to note that in Norway and Switzerland, we talked about the Schengen zone rather than the European Union. Moreover, we selected the topic of immigration, because research has shown that this is a common topic of misinformation within Europe (Humprecht, 2019). Within the article, the false claim was made by a populist radical right party (PRR party). For each country, we selected the most radical right party that had at least one seat in parliament, to make it as comparable as possible between countries. However, we admit that equivalence could not be fully reached on this aspect, as in some countries these PRR parties are in government including Italy, whereas in other countries they are or have become marginal players such as in Greece and the United Kingdom. Appendix A in the online supplemental materials presents a list of the PRR parties used for each country.

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[3]The preregistered information is available at https://aspredicted.org/nk2s2.pdf. We deviate somewhat from the preregistration in the final study. First, one hypothesis on polarization that we preregistered will not be tested in this paper but will be kept for a later study. Second, H2 was officially not preregistered, but is added as an important building stone for H3 and H4. Third, the analyses using credibility rather than acceptance (e.g., H1a to H1d) of misinformation were moved to Appendix F in the online supplemental materials due to a lack of word space. Finally, we slightly changed the wording of some of the hypotheses to make them clearer. This is most noticeable for H3 and H4 which originally explored politized versus depoliticized fact-checks. Based on comments from anonymous reviewers, we changed this into fact-checks that mention the political source of the misinformation claim (politicized) and fact-checks that do not mention the political source of the misinformation claim (depoliticized).

After reading the news article containing misinformation, respondents assigned to one of the experimental groups read a fact-check debunking the claim. This fact-check explained that the claim made in the news article was false and that in reality the number of asylum requests decreased in 2020, backing this up with evidence from Eurostat. The fact-check varied in two dimensions. First, we manipulated whether the fact-check mentioned the political source of the misinformation or not. The fact-check, including the political source, repeated that the false claim was made by the PRR party throughout the article. The fact-check excluding the political source of the misinformation claim made no reference to the PRR party at all, focusing solely on the claim itself. Second, we manipulated the source of the fact-check. The fact-check was either published by the news website of the public broadcaster of the country or by an independent fact-checking organization. Fact-checks from public broadcasters are quite common in some European countries, such as for instance the United Kingdom, Germany, and Belgium. Yet, this is not the case for all countries. Still, we opted for the public broadcaster to ensure that the experiment was equivalent across countries. For the independent fact-check organization we used the fictional EuroFacts.org. Appendix C in the online supplemental materials shows the different fact-check conditions.

Summarizing, we employ a between-subject design with five condition groups; one control group alongside 2 (political source included versus political source excluded) x 2 (public broadcaster versus EuroFacts) experimental groups that were exposed to a fact-check. It should be noted that we also added an additional control group. Like the initial control group, this group only read the misinformation article. In this article the claim that the number of asylum requests from refugees in Europe increased dramatically in 2020 was not made by the PRR party, however, but was just a general claim. This group will not be included in the main analyses but serves as a robustness check to make sure that our test of the inclusion or exclusion of the political source of the misinformation claim is not affected by the fact that we may already prime partisan identity somewhat with the news article. Table 1 provides an overview of the different groups. Afterward, all respondents received a debriefing indicating that the news article was false and created by the researchers.

After the stimuli, we measured to what extent respondents accepted the misinformation claim, to use as our dependent variable. Respondents were asked to "give an estimation to what extent the number of asylum requests increased or decreased in the EU in 2020." They could answer that it *strongly decreased* (1), *slightly decreased* (2)*, remained the same* (3), *slightly increased* (4), or *strongly increased* (5) ($M = 3.43$, $SD = 1.24$). If fact-checks are effective, we should see that respondents being exposed to a fact-check will be less likely to believe that it strongly increased.

Table 1. Overview of the different experimental conditions.

Group	Misinformation article	Political source included vs excluded	Independent organization vs public broadcaster
Control 1 (Robustness only)	General claim	X	X
Control 2	Claim by PRR party	X	X
Experimental group 1	Claim by PRR party	Included	Eurofacts
Experimental group 2	Claim by PRR party	Included	Public broadcaster
Experimental group 3	Claim by PRR party	Excluded	Eurofacts
Experimental group 4	Claim by PRR party	Excluded	Public broadcaster

We also asked questions to measure the most important moderating variables. First, to measure support for the party making the misinformation claim, a PRR party, we use a propensity to vote (PTV) question. Concretely, respondents were asked to indicate for the most important parties in their country, up to nine parties, how likely it is that they would ever vote for them, ranging from 0 = *not at all probable* to 10 = *very probable*. Here we used the PTV score for the PRR party ($M = 2.99$, $SD = 3.32$). Second, we measured trust in the public broadcaster. Respondents had to indicate how much they trust the public broadcast on a scale from 0 = *no trust at all* to 10 = *full trust* ($M = 6.12$, $SD = 2.89$). We also used this variable to measure trust in the public broadcaster at the country level, by aggregating the scores.

We included several manipulation checks at the end of the survey. First, we checked whether respondents recognized the false claim made in the news article. We found that 78.4% correctly recalled that the news article stated that the number of asylum requests increased strongly. A similar percentage also correctly answered our second manipulation check, with 72.6% of the respondents correctly identifying the political actor making this claim. We also had two checks for the fact-check: 63.9% of the respondents correctly recalled the source of the fact-check (EuroFacts or the public broadcaster), and, most importantly, 78.7% correctly recalled that the fact-check concluded that the claim on asylum requests was false.[4]

Regarding the analyses, we use OLS regression analyses as some hypotheses contain moderation. As our respondents are nested in countries, we add fixed effects via country dummies. The final models, where we include

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[4]Overall, the scores for the manipulation checks were similar between experimental groups. Those exposed to a fact-check from the public broadcast scored similar to those exposed to an independent fact-check. The only exception is the first manipulation check where the control group was more likely to recall the false claim than the experimental group (10% points difference).

aggregate media trust at the country level form an exception. For those models we opt for a multilevel model, with respondents nested in countries, rather than including fixed effects.

Results

First, we look at the general effect of fact-checks in debunking misinformation about the number of asylum requests. Model 1 in Table 2 provides evidence that they are effective. The model compares respondents exposed to one of the four fact-check conditions with respondents in the control group and finds a significant negative effect, indicating that those exposed to a fact-check are less likely to accept the misinformation claim that the number of asylum requests strongly increased: $b = -1.29$, 95%CI [-1.34, -1.24], $p < .001$. This coefficient and the plotted conditional means in Figure 1 show that the debunking effect of fact-checks are strong, with respondents exposed to the fact-check scoring about 1.3 points lower on the five-point misinformation acceptance scale than those not exposed to a fact-check. In sum, we find strong evidence for our first hypothesis that after being exposed to a fact-check citizens are less likely to accept the false claim.

The question is to what extent this effect is universal and holds across the different countries in this study. To examine this, we ran Model 1 for each country separately. The full models are displayed in Appendix D in the online supplemental materials, but in Figure 2 we plot the effects (b-coefficients) of being exposed to a fact-check on misinformation acceptance per country, including the 95% confidence interval. First, and most importantly, the figure shows that fact-checks are effective in all countries. In all countries do we find a negative effect, indicating that people are less likely to accept the misinformation claim after being exposed to a fact-check. Second, it shows that this debunking effect of the fact-check is relatively consistent across countries. We do find some differences—with fact-checks being significantly less effective in Belgium, France, Germany,

Table 2. The general effect of fact-checks.

Misinformation acceptance	Model 1 b(SE)	Model 2 b(SE)
Fact-check (Ref = control)	−1.292(.023)**	−1.398(.031)**
Support PRR	.064(.003)**	.035(.006)**
Fact-check*Support PRR		.036(.007)**
Constant	3.987(.042)**	4.073(.045)**
N	13347	13347
R2	.222	.223

Country fixed effects included
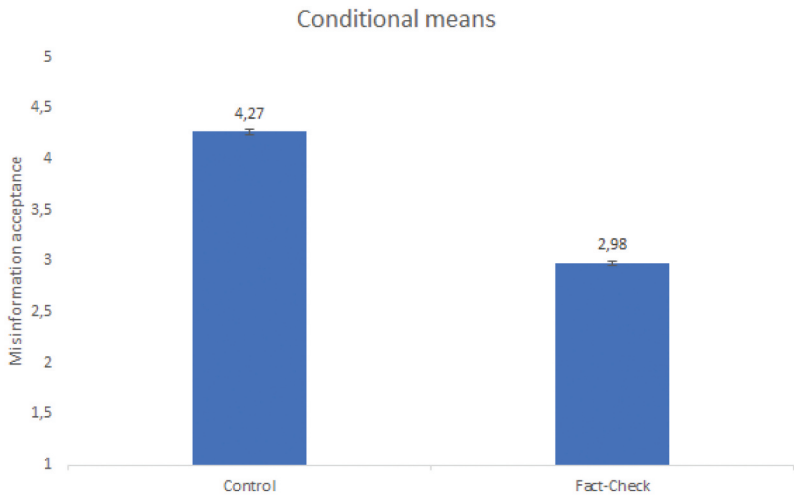**$p < .01$,*$p < .05$

Figure 1. Conditional means of effectiveness fact-check. The figure compares the conditional mean score on the dependent variable (misinformation acceptance) for the control group with the experimental groups that were exposed to a fact-check. 95% confidence interval is included.
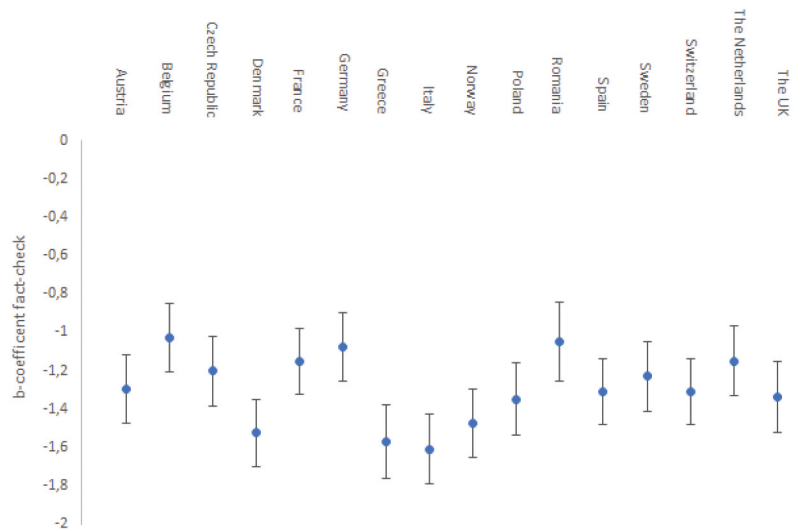

Figure 2. Effect of the fact-checks depicted per country. This figure depicts the b-coefficient of the effect of being exposed to a fact-check on the acceptance of misinformation by country. The 95% confidence interval of the effect is included.

and Romania, compared to Denmark, Greece, Italy, and Norway—but in most instances the confidence intervals overlap, with differences being only moderate. While there are some variations in effect sizes, this indicates that the effects of fact-checks are quite universal across a wide range of political and media systems with different levels of familiarity with this tool. Most importantly, it shows that fact-checks have a substantial debunking effect everywhere, at least within Europe.

Next, in Model 2 in Table 2, we examined if effects are different depending on whether respondents support the PRR party making the false claim, testing H2. We find that this is indeed the case. The significant interaction term—$b = .04$, 95%CI(.02, .05), $p < .001$—between being exposed to the fact-check and the PTV score for the PRR party, indicates that PRR supporters are more likely to still accept the misinformation claim after being exposed to a fact-check, than those not supporting the PRR party. In other words, the debunking effect of reading a fact-check is less strong when support for the PRR party is higher. This supports earlier findings of a differential effect between those who support the actor making the misinformation claim and those who do not.

To better grasp this interaction, we plot it in Figure 3. The plot shows that, even among those who fully support the PRR party and give it a PTV score of
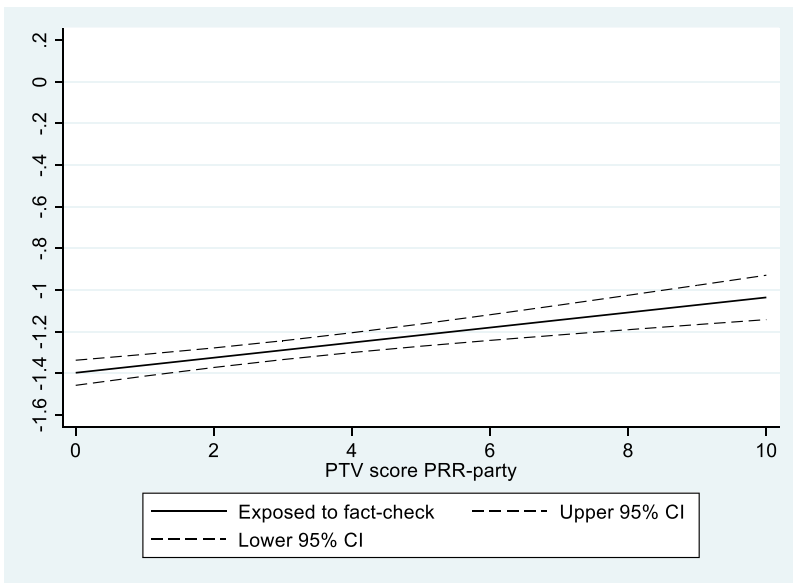

Figure 3. Interaction plot between effect of fact-check and PTV-score PRR-party. This figure depicts the b-coefficient of the effect of being exposed to a fact-check on the acceptance of misinformation (y-axis) for each value on the moderating variable "PTV-score for the PRR party" (x-axis).

10, the debunking effect of reading a fact-check is still significant and substantial: $b = -1.04$, 95%CI $[-1.14, -.93]$, $p < .001$. Moreover, it should be noted that while the differential effect exists, it should not be overstated. Among those who do not support the PRR party (PTV-score = 0), the effect is only somewhat stronger: $b = -1.40$, 95%CI $[-1.46, -1.34]$, $p < .001$). That shows that while there is a difference between those who fully support the PRR party and those who do not support it at all, this difference is only moderate. In sum, we do find a differential effect, depending on whether you support the political actor making the misinformation claim, thereby supporting H2. However, this effect is not that pronounced.

So far, we have examined the general effectiveness of fact-checks. Next, we compare the different types. Table 3 shows the inclusion of the source of the misinformation and compares fact-checks that include the political source of the misinformation claim with fact-checks that do not. The fact-checks with the political source included are used as reference category here. Model 3 presents the main comparison between fact-checks with or without the political source of the misinformation claim. The model indicates that there is no significant difference between fact-checks that in- or exclude the political source: $b = -.01$, 95%CI $[-.05, .03]$, $p = .667$. Both types of fact-checks are equally successful in debunking the misinformation claim —with respondents being less likely to accept the misinformation claim after exposure to either type. We therefore reject H3.

However, as we posited in the fourth hypothesis, there may be a difference depending on whether the political source making the misinformation claim is included or not for supporters of the PRR party making the misinformation claim. The inclusion of the political source in the fact-check may trigger motivated political reasoning amongst this group and result in them rejecting the corrective information. This is what we test with Model 4 shown in Table 3 by adding an interaction term between the experimental conditions and the PTV score for citizens fully supporting the

Table 3. Fact-checks with political source included versus political source excluded.

Misinformation acceptance	Model 3 b(SE)	Model 4 b(SE)
Ref=Political source included		
− Control	1.288(.025)**	1.384(.034)**
− Political source excluded	−.009(.021)	−.027(.028)
Support PRR	.064(.003)**	.068(.004)**
Control* Support PRR		−.033(.008)**
Political source excluded* Support PRR		.006(.006)
Constant	2.699(.04)**	2.689(.041)**
N	13347	13347
R2	.222	.223

Country fixed effects included
**$p < .01$,*$p < .05$

PRR party, with this interaction also being plotted in Figure 4. The insignificant interaction term—$b = .01$, 95%CI [−.01, .02], $p = .308$—and the interaction plot shows that even for those respondents fully supporting the PRR party, fact-checks that explicitly mention the political source, are just as effective as the fact-check conditions that do not mention the political source of the misinformation. H4 therefore is rejected.[5]

Next, in Table 4, we focus on the role of the source of the fact-check itself. In the models in this table, we use the fact-checks coming from the fictional independent organization EuroFacts as reference category. Model 5 first presents the main effect. Unlike what we expected, the table shows that the fact-check published by the public broadcaster was just as effective as the fact-check from the independent organization (EuroFacts). There is
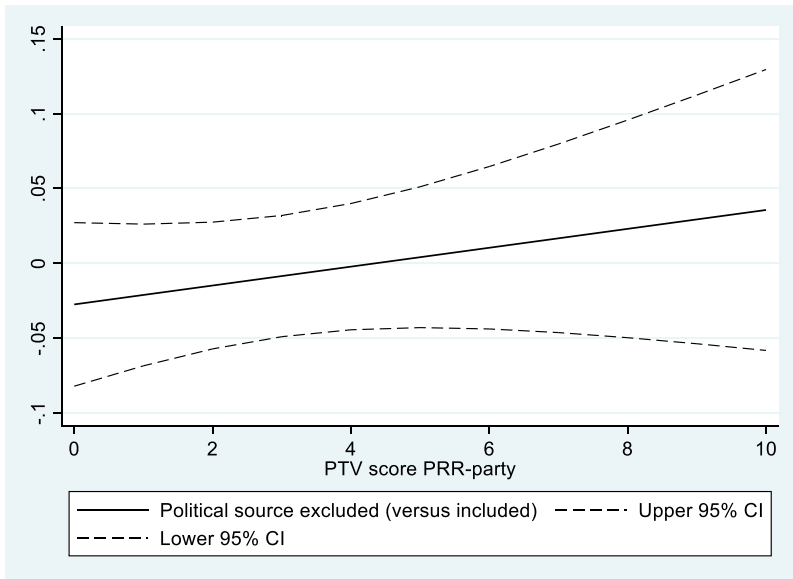

Figure 4. Interaction plot between political source of the fact-check in-or excluded and PTV-score PRR-party. This figure depicts the b-coefficient of the effect of including or excluding the political source in the fact-check on the acceptance of misinformation (y-axis) for each value on the moderating variable "PTV-score for the PRR party" (x-axis).

[5]The lack of effect is not driven by the fact that we may have already primed respondents' party identity beforehand by including the PRR party in the misinformation article. If we run a similar analysis with the alternative control group—who were exposed to the same misinformation article, but where the PRR party is not mentioned-we obtain similar results.

Table 4. Independent fact-check versus PBS.

Misinformation acceptance	Model 5 b(SE)	Model 6 b(SE)
Ref=Independent organization		
– Control	1.305(.025)**	1.207(.06)**
PBS	.026(.021)	.178(.048)**
Trust PBS		−.026(.005)**
Control* Trust PBS		.017(.009)
PBS* Trust PBS		−.026(.007)**
Support PRR	.064(.003)**	.061(.003)**
Constant	2.682(.04)**	2.833(.05)**
N	13347	13126
R2	.222	.232

Country fixed effects included
**$p < .01$,*$p < .05$

no significant difference between the two so we can reject H5: $b = .03$, 95% CI [−.01, .07], $p = .212$.

However, as theorized with H6, the difference between the two may be moderated by trust in the public broadcaster at the individual level. The interaction term between a fact-check published by the public broadcaster and trust in the public broadcaster indicates that there is indeed a significant moderation as shown in Model 6 in Table 4: $b = −.03$, 95% CI [−.04, −.01], $p < .001$. The interaction plot in Figure 5 delves deeper into this interaction effect and shows that when citizens are lacking trust in the public broadcaster with a trust score below five, they are more likely to still believe the misinformation claim after being exposed to a fact-check from the public broadcast than after being exposed to an independent fact-check. In other words, for citizens with low media trust independent fact-checks are more successful. For citizens with a trust score between six and nine, we find no differences between fact-checks from the public broadcast and independent fact-checks, whereas for citizens with full trust in the public broadcast—a score of 10, about 11% of our sample—fact-checks from the public broadcaster are more effective, although only slightly. Taken together these findings support H6 and show that fact-checks from the public broadcaster are somewhat more effective for those with high trust in the public broadcaster, whereas independent fact-checks are more effective for those with low trust in the public broadcast.

Finally, in Table 5, we consider the moderating role of the media context with multilevel models. In Model 7, we first examine whether the general effectiveness of fact-checks depends on the aggregate level of trust in a public broadcaster in a country. The model shows that this is not the case, as the interaction term between being exposed to a fact-check and the aggregate level of trust in the public broadcaster is insignificant: $b = .02$, 95% CI [−.03, .06], $p = .390$. This again provides evidence that the effectiveness of fact-checks is universal across the different media contexts
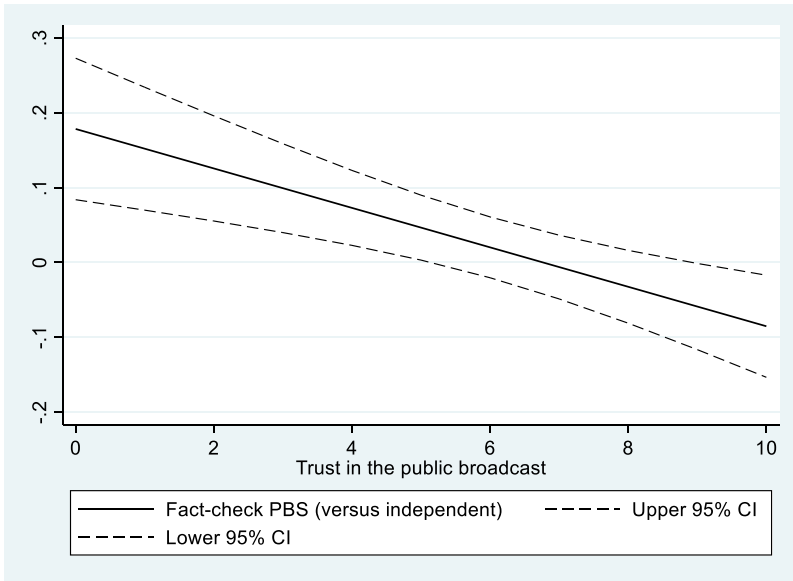
Figure 5. Interaction plot between fact-check PBS and trust PBS. This figure depicts the b-coefficient of the effect of a fact-check from the PBS versus an independent fact-check on the acceptance of misinformation (y-axis) for each value on the moderating variable "Trust in the public broadcast"(x-axis).

Table 5. Moderation by trust (country-level).

Misinformation acceptance	Model 7 b(SE)	Model 8 b(SE)
Fact-check	−1.412(.141)**	
Fact-check* Trust PBS (country)	.020(.023)	
Ref=Independent organization		
Control		1.504(.155)**
PBS		.184(.126)
Control* Trust PBS (country)		−.032(.025)
PBS* Trust PBS (country)		−.026(.02)
Trust PBS (country)	−.114(.03)**	−.081(.026)**
Support PRR	.064(.003)**	.064(.003)**
Constant	4.774(.184)**	3.270(.161)**
σcountry	.088**	.088**
σresidual	1.067**	1.067**
N	13347	13347

**p < .01,*p < .05

included in this study. The same holds when we look at the difference between fact-checks published by the independent organization versus fact-checks published by the public broadcaster. Although we expected the latter to be more effective in systems with high trust in the public broadcaster and the former in systems with low trust in the public broadcaster (H7), Model 8 in Table 5 shows that this is not the case. All interaction terms in Model 8

are insignificant. Taken together, the models in Tables 4 and 5 indicate that trust in the source publishing the fact-check has an influence on its effectiveness, but only at the individual level.

In addition to the main analysis, we conducted two robustness tests. First, we tested whether results are similar when using ordinal regression. Appendix E in the online supplemental materials shows that this is the case. Second, we verified whether we obtain similar results if we look at perceptions of the misinformation claim, rather than its acceptance, as we also preregistered. Respondents were asked how credible they find this claim, whether they think this claim is correct, and whether they found it convincing, measured on a seven-point scale, running from 1 = *very uncredible/completely incorrect/not convincing* to 7 = *very credible/completely correct/full convincing*. The average of the three items was taken to form one single credibility scale (α = .909, M = 3.82, SD = 1.64). Appendix F shows the same models as our main analyses, but this time using the credibility scale. The results are very similar. Again, we find that fact-checks are effective and are so in all countries. Moreover, we find no differences depending on whether the political source is mentioned or not. Finally, we again find that fact-check from independent fact-check organizations are more effective, but only for citizens with low trust in the public broadcaster.

Conclusion and discussion

This study was designed to further advance the steadily increasing body of knowledge on whether fact-checks can effectively correct misinformation and therefore dampen its spread across countries (Walter & Murphy, 2018). We designed a cross-country experimental study that manipulated the presence of a political source of misinformation as well as the source of the fact-check (i.e., independent fact-check organization vs. public broadcaster). Moreover, we explored how trust in the source of the fact-check moderates its effectiveness both at the individual and country level.

Overall, our findings clearly demonstrate that fact-checks work. More importantly, the debunking effect of fact-checks is relatively stable across a wide range of European countries. Our selection of countries varied regarding their political and media systems, levels of media trust, and strength of the populist political party. Yet, in all countries we found that people were less likely to believe the misinformation claim after being exposed to a fact-check, with this effect being quite strong. We did find some differences between countries with the fact-check being slightly more effective in Denmark, Greece, Italy, and Norway and slightly less effective in Belgium, France, Germany, and Romania, but overall, these differences were moderate, and our findings suggest that fact-checks work everywhere

within Europe. Future research should investigate; however, which context factors can explain these slight differences in effect sizes.

We also show that the corrective power of fact-checks decreases with rising levels of support for the actor making the misinformation claim, in this case the populist radical right (PRR) party. However, it is important to note that even though the debunking effect is somewhat smaller for those supporting the PRR party making the claim, there is still a substantial debunking effect for this group. This indicates that while motivated political reasoning may dampen the success of fact-checks, it cannot fully counter them. This is important as it implies that fact-checks even work for groups who may be more likely to accept the misinformation in the first place.

We found no evidence for the expectation that fact-checks that do not call out the political source behind the misinformation claim are more effective as compared with fact-checks that do. Even for those citizens fully supporting the political source making the false claim, fact-checks were just as effective when they included the political source of the misinformation, as when they did not. Although we need to be cautious when interpreting these findings, it seems safe to say that calling out the political source of the misinformation in a fact-check does not seem to fuel motivated political reasoning. It is the content of the fact-check that matters for its effectiveness, and this content can be persuasive even for those who support the source of the misinformation, independent of whether this source has been mentioned or not. This has important implications. Given that earlier research found that political actors are less likely to spread misinformation when they are called out for spreading it (Nyhan & Reifler, 2015), and since our study shows that such calling out does not result in fact-checks becoming less effective, this suggests that calling out the political source of the misinformation may actually be a good strategy for fact-checks.

Finally, we also found that fact-checks from both independent organizations and the public broadcasters worked. However, fact-checks from independent organizations play an important role as they can convince those citizens who are more skeptical about the traditional media. Given the concerns about the decline of media trust, and findings that exposure to misinformation may also further decrease media trust (Stubenvoll et al., 2021), this finding has important implications. Some citizens may distrust public-service broadcasters and those people may be most susceptible to believe and further spread misinformation. In this situation, based on our findings, fact-checks by independent organizations are deemed more promising. Notably, the moderating role of media trust was only significant when focusing on the individual level of trust in the media and not when focusing on trust in the public broadcast at the country level.

This implies that this mechanism plays much more of a role at the individual level than at the context level.

Several important limitations must be acknowledged. First, we used a single exposure experiment, showing respondents a fact-check to misinformation on a single topic, focusing solely on claims coming from a PRR party, and a fact-check from public broadcasters. Obviously, the findings of our study need to be replicated with other topics, such as health related issues who have been confronted with rising levels of misinformation in recent years (Lee & Ramazan, 2021), and with alternative political actors. Second, the present study did not make any assumptions about which country-level factors may moderate the effectiveness of fact-checks, except for media trust at the aggregate level, which did not result in anything. Instead, we sought to validate claims about the general effectiveness of fact-checks, and the conditions under which fact-checks work, across a wide range of countries. Of course, there may important differences between the countries with respect to PRR parties as well as the topic of the misinformation, among other things. Ideally, macro-level factors need to be used to arrive at a theoretically meaningful list of countries, allowing for theory-driven multi-level analyses. Third, while we demonstrate the corrective power of fact-checks across a wide range of European countries with different political and media systems, we need to be careful to generalize claims outside the European context. We therefore call for further comparative research that also includes the Global South, to investigate whether our findings can be generalized to non-Western countries. Finally, we only examined short-term effects and we employed a forced-exposure experimental design. Moreover, we exposed people to a fact-check directly after reading the misinformation claim, whereas there is often more time in between. Future research needs to design experiments with larger effects timespan or, ideally, panel studies that examine the effectiveness of fact-checks in more natural settings.

These limitations notwithstanding, our study paints a rather positive and encouraging picture about fact-checks. They do work, for everybody and across countries, and even for those who originally support the actor making the misinformation claim. Moreover, when fact-checks come from independent sources, they can persuade those who distrust public service broadcasters. Obviously, in a polarized and fragmented media environment, the key challenge is to get people to read and process the fact-checks in the first place. Therefore, future discussions should not be so much about whether fact-checks work, but rather about how they can be employed and distributed so that people can and will consume them. If that succeeds, fact-checks can make a difference in the fight against misinformation.

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Data availability statement

Data is available upon request.

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