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## The More Competent, the More Critical?

### On the Influence of News Media Literacy on the Perception of Errors in News

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#### Abstract

*In the context of misinformation and inaccuracies in reporting, the knowledge and understanding of news production processes and conditions are crucial for news users' perceptions of news content. However, research on the users' perception of errors in news and the influence of corrections and individual factors is scarce. In two online experiments, we investigated the influence of corrections, newspaper type, and news media literacy on users' perceptions of error severity and frequency. Corrections decreased the perceived severity of errors in both studies. News media literacy increased the perceived severity of errors in political news (Study 1) but not in sports news (Study 2). Further, news-literate users perceived errors in political news as more frequent. Newspaper type did not influence user perceptions. These results support the need for transparency and the importance of user characteristics – especially news media literacy – when studying perceptions of journalistic products.*



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## **Je kompetenter desto kritischer? Zum Einfluss von Nachrichtenkompetenz auf die Wahrnehmung von Fehlern in Nachrichten**

### **Zusammenfassung**

*Im Kontext von Falschnachrichten und der Qualität von Nachrichten ist das Wissen und Verstehen der Rezipient:innen von Prozessen der Nachrichtenproduktion und -bedingungen von entscheidender Bedeutung für deren Wahrnehmung und Bewertung von Nachrichteninhalten. Forschungsarbeiten über die Wahrnehmung von Fehlern durch die Rezipient:innen und den Einfluss von Korrekturen als auch von individuellen Faktoren sind jedoch kaum vorhanden. In zwei Online-Experimenten untersuchen wir daher den Einfluss von Korrekturen, Zeitungsart und Nachrichtenkompetenz auf die Wahrnehmung der Rezipient:innen von Fehlerstärke und -häufigkeit. Korrekturen verringern die wahrgenommene Fehlerstärke in beiden Studien. Nachrichtenkompetenz erhöht die wahrgenommene Stärke von Fehlern in politischen (Studie 1), jedoch nicht in Sportnachrichten (Studie 2). Zudem nehmen nachrichtenkompetente Nutzer:innen Fehler in politischen Nachrichten häufiger wahr. Die Art der Zeitung hat keinen Einfluss auf die Wahrnehmung von Fehlern. Die Ergebnisse unterstützen die Forderung nach Transparenz im Journalismus und bestätigen die Bedeutung des Einflusses von Merkmalen der Rezipient:innen – insbesondere von Nachrichtenkompetenz – wenn die Wahrnehmung und Bewertung von Nachrichten untersucht wird.*

### **1. Introduction**

News media play an important role in public discourse and societal cohesion. Two of their most important functions are providing information and fostering integration, which in turn empower users to act in a democratic and self-determined way (Hasebrink et al. 2020). For news media to be able to fulfill these functions, there are two prerequisites: first, reliable reporting by the media, and second, competence in self-determined and democratic news use by users. To support the prerequisite of reliable reporting and counteract potential negative effects of errors in reporting – particularly at a time when global concerns about misinformation are rising and

news errors are becoming more likely due to increasing time pressure to publish – newsrooms have begun providing corrections (e.g., Wilner et al. 2021). Although there is a long history of research on news accuracy (e.g., Charnley 1936), empirical research on audience perceptions of errors and corrections is scarce (Karlsson et al. 2017; Wilner et al. 2021). Furthermore, only a few studies to date have investigated how the content of corrections affects user perceptions (Hettinga and Appelman 2016).

One possible means of fulfilling the latter prerequisite of self-determined and democratic news use is to promote news media literacy. News media literacy refers to knowledge about news production processes, conditions, and dissemination, and requires skills that allow users not only to understand these processes but also to think critically about or engage with news media. Studies show that news media literacy influences users' perceptions of news content (e.g., Ashley et al. 2010; Vraga and Tully 2015) and can help to increase media trust and credibility and improve the recognition of misinformation (e.g., Guess et al. 2020; Vraga et al. 2012), which is especially important in the context of social media (e.g., Allcott et al. 2019; Wu et al. 2019). Although there is substantial research about the effects of (news) media literacy, this individual factor has not been investigated in the context of news errors up to now.

To make a first step toward examining the influences of corrections and user characteristics on error perceptions, we investigated the impact of different forms of corrections and news media literacy on users' perceptions of errors in the news. Instead of focusing on credibility or trust perceptions (e.g., Wilner et al. 2021), we focused on two dependent variables that are directly related to errors: the perceived severity and frequency of errors.

After reviewing the literature about the perceptions of errors and corrections in journalism as well as the empirical research about the effects of news media literacy in the context of news, we present results from two online experiments about the perception of errors in political news (Study 1) and sports news (Study 2).

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## 2. Accuracy, Corrections, and Audience Perceptions

In recent years, concerns about disinformation and misinformation have increased (Newman et al. 2020). While the former refers to goal-directed untruthfulness (Tandoc et al. 2018), the latter describes the circumstance of unintentional errors (Vraga and Bode 2020). Both concepts are related to different kinds of incorrect message content communicated by communicators, journalists, and/or newsrooms and have different impacts on audience perceptions (Hameleers et al. 2021). While disinformation may result in an overall negative assessment of the media by users and ultimately in rejection or avoidance (Hameleers et al. 2021), misinformation may be associated with a variety of different media and democratic outcomes (e.g., Hooghe et al. 2017). Consequently, in this study, we were interested in perceptions of errors that are not goal-directed but that may occur accidentally and do not result in an overall negative assessment of the media. Therefore, the term *errors* in the following describes unintentional false information, not including disinformation.

In the journalistic profession, there is a consensus that unintentional errors are sometimes inevitable – especially with the changing news production conditions and processes that have emerged with new media (Baker 2018). News errors are not a new phenomenon, however. They have been studied extensively in the field of news accuracy studies, which is primarily interested in investigating what kinds of errors occur in news articles and how often they occur (e.g., Blankenburg 1970; Charnley 1936). The most commonly used method to examine the information quality of news in these studies has been to ask the sources who were cited in articles about the accuracy of different information. Since many researchers have followed this approach, different errors have been identified over the time and differentiated into objective errors, defined as the «deviation from objective fact» (Blankenburg 1970, 376), and subjective errors, referring to omissions or underemphasis of relevant information and overemphasis of irrelevant information (Maier 2005). Although Charnley developed this approach in 1936, more recent research has continued to utilize it with similar results: Only around one-half of news stories have been found to be free from errors (e.g., Maier 2005).

Building on methods and results from news accuracy studies, some researchers have started to examine perceptions of errors in the news (e.g., Maier 2005; Porlezza and Russ-Mohl 2012). On the one hand, researchers have investigated error effects on directly related variables such as sources' perceived error severity and frequency. On the other hand, they have examined the influence errors have on credibility or trust judgments (Maier 2005; Porlezza and Russ-Mohl 2012). Results have shown that sources' perceptions of error severity and frequency depend on the type of error (e.g., subjective vs. objective error). Maier (2005) showed that the perceived severity and frequency of errors influenced sources' credibility judgments. Porlezza and Russ-Mohl (2012) came to similar conclusions: Inaccuracy of news has a significant negative effect on the perceived credibility of sources and on their willingness to contribute again in future news stories.

While the methodological approach of asking cited sources in news about their error perceptions has the advantage that the sources are aware of errors and therefore able to clearly detect them, it does not allow any conclusions about how news users perceive errors. The average news user does not necessarily have neither detailed knowledge about the information and topics of the news they consume nor the expertise and knowledge of journalists and the sources they interview and cite. It is therefore conceivable that news users perceive errors differently than news sources. Most studies to date have relied on Charnley's (1936) approach of investigating sources' perceptions, and the few researchers who have investigated news users' error perceptions have focused on the effects of errors on credibility or trust judgments. While Appelman and Bolls (2011) focused on the effects of spelling and grammatical errors and found that these reduced news users' credibility judgments and increased reading difficulty, Wilner (2021) reported similar results for the effect of the frequency of subjective errors, which reduced general trust in the media. Appelman and Schmierbach (2018) studied the effects of the frequency of grammatical errors and found that a relatively large number of errors are necessary to affect the quality and credibility judgments of news users.

We argue that studying the effect of errors on directly related variables – such as perceived error severity or frequency – is beneficial for understanding the relationship between errors and credibility and trust

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judgments made by users because perceived error severity and frequency influence these judgments (e.g., Wilner et al. 2021). Scales that measure message credibility (e.g., Appelman and Sundar 2016), trust (e.g., Kohring and Matthes 2007) or even the perception of misinformation (Hameleers et al. 2021) often include at least one item or dimension that captures accuracy or bias. Nevertheless, they do not measure news users' perceptions of errors that occurred in an article, but rather a subjective perception of inaccuracy not related to a specific error. Furthermore, most studies that have investigated the perceived severity and frequency of errors in news only included sources' perspectives (e.g., Maier 2005) and disregarded the general news user. Therefore, the investigation of how the audience perceives the severity and frequency of errors is crucial for understanding error perceptions. Consequently, in this study, we examined the impact of specific objective errors on news users' severity and frequency perceptions.

One important reason why journalists or newsrooms make errors is the high time pressure they are under to publish information before their competition (Porlezza and Russ-Mohl 2012). To counteract potential negative effects of errors, professional ethics guidelines in journalism recommend correcting errors (e.g., for the USA, see Society of Professional Journalists 2021; for Germany, see Deutscher Presserat 2021). Although these formal policies exist and corrections are considered an important tool for transparency (Karlsson et al. 2017), only a few studies have examined the influence of corrections. Similar to the research on the effects of errors, most studies have focused on how corrections affect users' trust or credibility assessments (e.g., Appelman and Hettinga 2020; Karlsson and Clerwall 2018). Karlsson and Clerwall (2018) found that news users rated corrections as positive and as a relevant tool for transparency and credibility. Appelman and Hettinga (2020) found that the placement of corrections affected importance and credibility perceptions: Articles in which the correction was above the main text were rated as more credible and important than articles with corrections below the text. Hettinga and Appelman (2016) found that users did not judge all corrections to be important – especially those containing a description of the error before or while correcting it – and attributed the blame to the source. Karlsson et al. (2017) found that users' general tolerance of errors was relatively low and that corrections

of large errors did not affect tolerance. Although no study to date has examined the effect of corrections on the severity and frequency of users' perceptions, the studies described above show that corrections – if presented in the right way – have a positive influence on error perceptions. We therefore assumed the following effect of corrections on news users' perceptions of error severity:

H1a: News users perceive errors as less severe if the newspaper contains a correction of the error.

While journalists recommend correcting and apologizing for an error (Baker 2018), research about the influence of different correction types is scarce (Hettinga and Appelman 2016). Considering that errors can be understood as a violation of audiences' accuracy expectations (Fawzi and Mothes 2020), we argue that a correction that contains an apology by the journalist or the newsroom instead of an attribution of blame (Hettinga and Appelman 2016) can have a positive influence on user perceptions. Therefore, we further assumed:

H1b: News users perceive errors as less severe if the newspaper contains a correction with an apology.

Some studies have shown that the perceived frequency of error varies, which could influence sources' credibility judgments (Maier 2005) or users' trust in the news (e.g., Wilner et al. 2021). Wilner et al. (2021) pointed out that this relationship depends at least partly on the type of error (i.e., subjective or objective). Since there is a lack of research on whether and how the presence and type of a correction influences perceived error frequency, we asked:

RQ1: Does perceived error frequency vary depending on the presence of (a) a correction or (b) an apology?

Whereas the research in accuracy studies described above focused mainly on errors in local newspapers, research on users' perceptions of errors has often investigated errors in national news or without a specific frame and shown rather small or medium effects (Appelman and Hettinga 2020; Wilner et al. 2021). With regard to trust perceptions, local newspapers

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are perceived as relatively trustworthy (Guess et al. 2018; Newman et al. 2020), although studies on accuracy have shown that they contain many errors (e.g., Maier 2005). It is therefore unclear whether and how the type of newspaper affects news users' perceptions of error severity and frequency. We therefore asked:

RQ2: Do users' perceptions of (a) error severity and (b) frequency vary between local and national newspapers?

### **3. News Media Literacy and its Influence on Accuracy Perceptions**

Research on media effects, credibility, and trust has identified several variables that influence error perceptions. One factor that may be crucial in counteracting negative perceptions of news content is (news) media literacy (e.g., Vraga et al. 2012; Vraga und Tully 2015).

News media literacy has been shown to be one of the key competencies for using and evaluating news content (Buckingham 2015). Literacy concepts that are closely related to news media literacy are digital literacy, information literacy, and especially media literacy (e.g., Lee and So 2014). While all three concepts share the same general goal of increasing knowledge and skills related to a specific field, the main difference between them is their reference object. Whereas media literacy is more related to media content and the media industry, information literacy is more closely tied to library science (Lee and So 2014), and digital literacy refers to information from digital sources (Koltay 2011). The three concepts further adopt different analytical approaches and differ in terms of academic origin and scope (Lee and So 2014). The literacy concept that is closest to news media literacy is media literacy.

In the research literature, there are several definitions of media literacy that vary in their scope and aim. According to the National Association of Media Literacy Education (2020) media literacy can be generally defined as «the ability to access, analyze, evaluate, create, and act using all forms of communication». Going beyond this rather broad understanding of media literacy, Christian (2020) defines it as «the development of knowledge, skills and attitude to provide users with an essential framework for effective

lifelong engagement with media messages» (p. 7). Whereas some authors define news media literacy as a specific form of media literacy (Ashley et al. 2013), other researchers distinguish news (media) literacy from the concepts of media or digital literacy by referring to different aspects of the media. Concerning the latter definition, Maksl et al. (2015) acknowledge that news media literacy refers to news users' knowledge of how to identify news and their motivation to engage with it. According to Tully and Vraga (2018), news media literacy is focused on «elements of news stories (e.g., sources, attribution), news processes (e.g., verification), and the role of news as a purveyor of information in a democracy» (p. 768). In our understanding, news media literacy therefore refers to specific knowledge about news production processes, conditions, and dissemination and requires skills that allow users not only to understand these processes but also to think critically about or engage with news media. The verification of information by media users and accuracy perceptions play an important role in the context of news media literacy, especially when it comes to knowledge about news production processes and conditions (Tully and Vraga 2018). Although research on accuracy perceptions and the verification of information is not new (e.g., Charnley 1936; Maier 2005), it has gained in importance with the rise of the Internet, and especially with the emergence of social media. In these contexts, anyone can publish information – regardless of whether that information is correct. As a result, the dissemination of misinformation and disinformation has increased in recent years (Allcott et al. 2019) and the ability to verify information has taken on even greater importance. Therefore, studying the relation and effect news media literacy has on error perceptions, such as the perceived severity and frequency of errors, is crucial to counteracting negative evaluations of media content.

Research on the influence of (news) media literacy on audience perceptions has focused mainly on trust and credibility judgments. This research has shown, on the one hand, that news media literacy positively affects credibility and trust judgments (Vraga et al. 2012) and reduces user's perceptions that media are hostile or biased (Vraga and Tully 2015). On the other hand, according to Ashley et al. (2010), news media literacy can lead to a decrease in perceived credibility and accuracy since it stimulates critical thinking by increasing users' knowledge about media ownership. Vraga

and Tully (2019) also studied the effect of news media literacy on information quality perceptions. They confirmed the results of Ashley et al. (2010) in the context of social media usage by revealing that more literate news users are more skeptical of information quality and share less news content on social media. Although there are at least a few studies that have investigated the effect of news media literacy and perceptions of accuracy (Ashley et al. 2010) or information quality (Vraga and Tully 2019), they did not test users' perceptions of concrete errors but rather subjective perceptions of information quality not directly related to errors. Since the relationship between news media literacy and error perceptions is not clear, we asked:

RQ3: How does news media literacy influence news users' perceptions of the (a) severity and (b) frequency of errors?

#### **4. Method**

To investigate the influence of news media literacy and corrections on news users' perceptions of errors, we conducted two online survey experiments. One experiment contained vignettes in the context of political news and the other in the context of sports news. We conducted experiments on both topics to analyze whether our results were generalizable to different contexts. The vignettes consisted of newspaper articles that contained errors or otherwise objective false information. We further manipulated the form in which the described errors were corrected: The newspaper either did not correct the error, provided a correction the following day, or included an apology with the correction. In addition, we manipulated the type of newspaper in which the error occurred: a local or national newspaper. The experiments had a 3x2 mixed design.<sup>1</sup>

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<sup>1</sup> The data are available in the folder «Data and Measures for Paper 'The more competent, the more critical?'» at: <https://osf.io/m3rky>.

## 4.1 Vignettes

In our vignettes, we manipulated the type of correction (no correction/correction/correction and apology) and the newspaper type (local/national). In writing the vignettes for our studies, we used real errors that occurred in German newspapers or on TV programs.<sup>2</sup> Whereas Study 1 contained errors in political news that were small (e.g., a typo in a link to a website), medium (e.g., wrong professions ascribed to rival politicians or wrong teams ascribed to rival head coaches), and large (e.g., a false notification of the death of politician or athlete), Study 2 contained similar errors in sports news. In sum, we created nine vignettes with 54 variations (translated versions of the vignettes in Study 1 are provided in the OSF project, see footnote 1).

## 4.2 Measures

We used the following scales to measure our central dependent and independent variables:

*News Media Literacy.* To measure users' news media literacy, we created a scale oriented toward the instrument developed by Ashley et al. (2013). In line with our definition and interest in literacy about news production conditions and processes, we excluded items from Ashley et al. (2013) that do not refer to news production and dissemination and added two items that are related to production conditions and error-making in the news («News items are often produced under high time pressure» and «It is important for newsrooms to publish information before their competitors.») (Karlsson et al. 2017). Consequently, our scale contained six items. Participants were asked to rate these items on a five-point scale (1 = «do not agree at all» to 5 = «fully agree»). The scale showed high internal consistency (Study 1:  $\alpha = .803$ ; Study 2:  $\alpha = .781$ ) and the ratings were relatively high (Study 1:  $M = 3.80$ ;  $SD = .81$ ; Study 2:  $M = 3.87$ ;  $SD = .66$ ) in both studies.

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<sup>2</sup> For example, we looked at the errors news outlets (e.g., Die ZEIT or ZDF heute) documented and corrected on their websites. We further read summaries of how German newsrooms handle errors (e.g., <https://uebermedien.de/dokumentation-fehlerkorrektur-regeln-in-deutschen-redaktionen/>)

*Perceived Error Severity.* To measure perceived error severity, we used two single items. The first one asked about the severity and the second about the importance of the described error. Both items were rated on a five-point scale. In further analysis, the items were used independently as dependent variables.

*Perceived Error Frequency.* To measure perceived error frequency, we asked the following question: «What do you think: How often do errors, like the one in the example you have just read, happen?». Including a scale ranging from 1 = «never» to 5 = «very often». This item was also used as a dependent variable in further analyses.<sup>3</sup>

### **4.3 Pretest**

To test whether our vignettes indeed described different severities of errors (small, medium, and large), we conducted an online survey experiment with journalism students at a German university ( $N = 53$ ;  $M_{Age} = 23.53$ ;  $SD_{Age} = 3.85$ ; 36 female). After each participant was randomly assigned to one of three experimental conditions (no correction/correction/correction and apology), they were asked to indicate the perceived severity and frequency of the described error in nine different vignettes. Consequently, we tested 27 vignettes of which each participant read nine. According to the results of the pretest, we modified the wording of 12 vignettes for better fitting. After receiving some comments from participants, we also included the newspaper type (local/national) in the vignettes.

### **4.4 Main Studies**

*Procedure.* At first, to fill quotas and filter participants who did not meet our quota requirements, participants were asked sociodemographic questions. Afterwards, they were asked to indicate their news media literacy and were then randomly assigned to one of our six experimental conditions. Each participant either read vignettes without a correction, with a correction, or with a correction and an apology that was published in

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<sup>3</sup> Descriptive statistics for perceived error severity and frequency sorted by vignettes and studies are presented in the appendix.

either a local or national newspaper. In sum, each participant read five vignettes and rated the severity and frequency of the error described in each vignette. News media literacy, error severity, and frequency were measured with the scales described above.

*Sample.* We recruited quota-representative samples via respondi for both studies ( $N_1 = 856$ ;  $N_2 = 839$ ). Our quotas for age, gender, and education were based on information from the German Federal Statistical Office (Statistisches Bundesamt 2019). Both samples had satisfactory distributions for gender (Study 1: 49% female; Study 2: 51% female), education (Study 1: 34% highly educated; Study 2: 35% highly educated), and age (Study 1:  $M = 51.07$ ;  $SD = 17.86$ ; Study 2:  $M = 52.12$ ;  $SD = 17.9$ ).

## 5. Results

Since we wanted to analyze the variance between both vignettes and participants with regard to our variables, we used linear mixed-effects models. With these models, we were also able to investigate the effects of our experimental factors as well as participants' news media literacy on error severity and frequency in both studies. All models were estimated with restricted maximum likelihood estimation; all p-values are based on Kenward-Roger estimated degrees of freedom, as it is recommended when modeling data with a relatively low number of clusters (i.e., nine vignettes; Elff et al. 2020; McNeish und Stapleton 2014). The results of our two studies are presented separately below; the subsequent discussion references both.

### 5.1 Study 1 – Errors in political news

First, we fitted null models, which only included random intercepts for participants and vignettes, to estimate the variance each factor contributes to our dependent variables (Table 1). For perceived strength and importance, the variance between vignettes was larger than the variance between participants (indicated by  $\tau_{00}$ ). This shows that perceptions of errors in the news depend more on the errors themselves than on the characteristics of the news user. Further, the intra-class correlation coefficient

(ICC) was higher for vignettes than for participants. This shows that perceived strength and importance correlate more strongly within individual vignettes than within individual participants. The contrary was true for perceived error frequency: Perceptions of errors in the news depend more on the characteristics of the news user than on those of the error itself.

Predictors	Perceived Strength		Perceived Importance		Perceived Frequency	
	B (SE)	p	B (SE)	p	B (SE)	p
(Intercept)	3.17 (.22)	< .001	3.04 (.22)	< .001	2.97 (.05)	< .001
<b>Random Effects</b>						
$\sigma^2$	.94		.88		.37	
$\tau_{00}$	.32 <sub>Participant</sub>		.33 <sub>Participant</sub>		.28 <sub>Participant</sub>	
	.44 <sub>Vignette</sub>		.44 <sub>Vignette</sub>		.02 <sub>Vignette</sub>	
ICC	.25 <sub>Participant</sub>		.27 <sub>Participant</sub>		.43 <sub>Participant</sub>	
	.32 <sub>Vignette</sub>		.33 <sub>Vignette</sub>		.05 <sub>Vignette</sub>	
N	856 <sub>Participant</sub>		856 <sub>Participant</sub>		856 <sub>Participant</sub>	
	9 <sub>Vignette</sub>		9 <sub>Vignette</sub>		9 <sub>Vignette</sub>	
Marginal R2 / Conditional R2	.000 / .448		.000 / .464		.000 / .444	

**Tab. 1:** Null Models for perceived strength, importance, and frequency of errors in Study 1.

Next, we fitted the full models containing our experimental factors and our other predictors as fixed effects. Overall, our results (Table 2) were relatively stable across perceived strength and importance. But our fixed effects only explained 1.7% of the variance. For perceived frequency, we could only explain 1% of the variance and did not find the same effects.

	Perc. Strength		Perc. Importance		Perc. Frequency	
	<i>B</i> (SE)	$\beta$ (std. SE)	<i>B</i> (SE)	$\beta$ (std. SE)	<i>B</i> (SE)	$\beta$ (std. SE)
<i>Predictors</i>						
Intercept	3.17 (.22)**		3.04 (.22)**		2.97 (.05)**	
Correction	-.28 (.06)**		-.25 (.06)**		-.09 (.05)	
Correction & Apology	-.28 (.06)**		-.28 (.06)**		-.06 (.05)	
National Paper	.06 (.05)		.08 (.05)		-.04 (.04)	
News Media Literacy	.14 (.03)**	<b>.08 (.02)</b>	.14 (.03)**	<b>.08 (.02)</b>	.10 (.03)**	<b>.09 (.03)</b>
<b>Random Effects</b>						
$\sigma^2$	.94		.88		.37	
$\tau_{00}$ <sub>Participant</sub>	.29		.30		.27	
$\tau_{00}$ <sub>Vignette</sub>	.44		.54		.02	
<i>N</i> <sub>Participant</sub>	856		856		856	
<i>N</i> <sub>Vignette</sub>	9		9		9	
Observations	4280		4280		4280	
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	<b>.017 / .449</b>		.017 / .465		.010 / .446	
Notes: Model fitted with REML estimation; p-values based on Kenward-Roger approximation of degrees of freedom; standardized coefficients are only reported for continuous predictors; ** p < .001						

**Tab. 2:** LME Models for perceived strength, importance, and frequency of errors in Study 1.

In H1, we hypothesized that (a) a correction and (b) an apology would reduce perceived error severity. Here, the results support the hypotheses by revealing that a correction and an apology reduced participants' perceptions of the strength and importance of the error.

RQ1 asked about the influence of (a) error corrections and (b) apologies on the perceived frequency of errors. Here we found no significant effect of the presence of a correction or an apology on perceived frequency.

In RQ2, we were interested in differences in error perceptions between local and national newspapers. We found that this factor did not affect any of our three dependent variables. The descriptive statistics also showed minor differences in favor of national papers for (a) perceived strength and importance as well as marginal higher values for local newspapers for (b) perceived frequency (Table 3).

	No correction	Correction	Correction & Apology	Overall
<b>Perceived Strength</b>				
Local	3.33 (1.27)	3.04 (1.29)	3.03 (1.34)	3.13 (1.31)
National	3.35 (1.30)	3.09 (1.19)	3.11 (1.20)	3.18 (1.24)
<b>Overall</b>	3.34 (1.29)	3.06 (1.24)	3.07 (1.27)	3.16 (1.27)
<b>Perceived Importance</b>				
Local	3.18 (1.25)	2.93 (1.24)	2.86 (1.29)	2.99 (1.27)
National	3.22 (1.31)	2.98 (1.17)	2.99 (1.21)	3.06 (1.23)
<b>Overall</b>	3.20 (1.28)	2.96 (1.21)	2.93 (1.25)	3.03 (1.25)
<b>Perceived Frequency</b>				
Local	3.01 (0.87)	2.96 (0.83)	2.99 (0.84)	2.99 (0.85)
National	3.04 (0.85)	2.90 (0.76)	2.92 (0.74)	2.95 (0.79)
<b>Overall</b>	3.03 (0.86)	2.93 (0.80)	2.96 (0.79)	2.97 (0.82)

**Tab. 3:** Means (SDs) of our experimental groups for each dependent variable in Study 1.

In RQ3, we asked about the influence of news media literacy on error perceptions. Results showed that news media literacy led to higher (a) perceived strength and importance and (b) perceived frequency of errors in the news. However, these effects were small.

### 5.2 Study 2 – Errors in sports news

In Study 2, we repeated our analysis strategy from Study 1. First, we looked at the null models for our dependent variables (Table 4). Overall, a similar pattern emerged. Again, there was more variance between vignettes than between participants for perceived strength and importance, but the contrary for perceived frequency. Compared to Study 1, however, there was slightly more variance between vignettes and participants for perceived strength and importance. Moreover, error severity perceptions correlated more strongly within individual vignettes than within individual participants. But, as with the between-vignettes variance, the within-variance for vignettes was slightly larger than in Study 1. The variance explained by our random effects was slightly larger than in Study 1.

Predictors	Perceived Strength		Perceived Importance		Perceived Frequency	
	<i>B (SE)</i>	<i>p</i>	<i>B (SE)</i>	<i>p</i>	<i>B (SE)</i>	<i>p</i>
(Intercept)	3.00 (.24)	< .001	2.87 (.24)	< .001	2.95 (.05)	< .001
<b>Random Effects</b>						
$\sigma^2$	.92		.83		.37	
$\tau_{00}$	.43 <sub>Participant</sub>		.42 <sub>Participant</sub>		.26 <sub>Participant</sub>	
	.52 <sub>Vignette</sub>		.50 <sub>Vignette</sub>		.02 <sub>Vignette</sub>	
ICC	.32 <sub>Participant</sub>		.34 <sub>Participant</sub>		.41 <sub>Participant</sub>	
	.36 <sub>Vignette</sub>		.38 <sub>Vignette</sub>		.05 <sub>Vignette</sub>	
N	839 <sub>Participant</sub>		839 <sub>Participant</sub>		839 <sub>Participant</sub>	
	9 <sub>Vignette</sub>		9 <sub>Vignette</sub>		9 <sub>Vignette</sub>	
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	.000 / .507		.000 / .524		.000 / .430	

**Tab. 1:** Null Models for perceived strength, importance, and frequency of errors in Study 2.

Next, we fitted the full models (Table 5). Again, our fixed effects had low explanatory value and explained between 2.3% (perceived strength) and 2.7% (perceived importance) of variance. For perceived frequency, the explanatory value was under 1%.

	Perc. Strength		Perc. Importance		Perc. Frequency	
	$3.00$ (.24)**	$\beta$ (std. SE)	$B$ (SE)	$\beta$ (std. SE)	$B$ (SE)	$\beta$ (std. SE)
Intercept	-.40 (.06)**		2.87 (.24)**		2.93 (.05)**	
Correction	-.48 (.06)**		-.43 (.06)**		-.09 (.05)	
Correction & Apology	.05 (.05)		-.48 (.06)**		-.01 (.05)	
National Paper	.02 (.04)		.02 (.05)		-.04 (.04)	
News Media Literacy	.14 (.03)**	.01 (.02)	-.02 (.04)	-.01 (.02)	.02 (.03)	.02 (.03)
<b>Random Effects</b>						
$\sigma^2$	.92		.83		.37	
$\tau_{00}$ Participant	.39		.38		.26	
$\tau_{00}$ Vignette	.52		.50		.02	
$N$ Participant	839		839		839	
$N$ Vignette	9		9		9	
Observations	4195		4195		4195	
Marginal R <sup>2</sup> / Condi- tional R <sup>2</sup>	.023 / .507		.027 / .525		.004 / .431	
Notes: Model fitted with REML estimation; p-values based on Kenward-Roger approximation of degrees of freedom; standardized coefficients are only reported for continuous predictors; ** p < .001						

**Tab. 2:** LME Models for perceived strength, importance, and frequency of errors in Study 2.

For errors in sports news, the results for H1a and H1b remained similar to those in Study 1. The only difference was in the strength of the effects: While we found small effects for political news, the effects for perceived error severity in sports news were medium.

For RQ1, we found the same effects for sports news. The presence of (a) a correction or (b) an apology did not influence perceived error frequency.

For RQ2, there were also no effects of the newspaper type on error perceptions. The descriptive statistics also reveal that (a) error severity perceptions were slightly higher for national news, while for (b) perceived frequency, the difference was slightly in favor of local news (Table 6). The results of Study 1 are therefore confirmed.

	No correction	Correction	Correction & Apology	Overall
<b>Perceived Strength</b>				
Local	3.26 (1.24)	2.86 (1.33)	2.80 (1.31)	2.96 (1.31)
National	3.32 (1.34)	2.92 (1.37)	2.85 (1.31)	3.04 (1.36)
<b>Overall</b>	3.29 (1.29)	2.89 (1.35)	2.82 (1.31)	3.00 (1.33)
<b>Perceived Importance</b>				
Local	3.16 (1.19)	2.71 (1.27)	2.69 (1.27)	2.85 (1.26)
National	3.20 (1.28)	2.76 (1.36)	2.71 (1.28)	2.89 (1.32)
<b>Overall</b>	3.18 (1.24)	2.73 (1.31)	2.70 (1.27)	2.87 (1.29)
<b>Perceived Frequency</b>				
Local	2.99 (0.75)	2.97 (0.83)	2.96 (0.84)	2.98 (0.81)
National	2.98 (0.79)	2.82 (0.79)	2.99 (0.81)	2.93 (0.80)
<b>Overall</b>	2.99 (0.77)	2.90 (0.81)	2.98 (0.82)	2.95 (0.80)

**Tab. 3:** Means (SDs) of our experimental groups for each dependent variable in Study 2.

In Study 2, in contrast to Study 1, we found no significant influences of news media literacy (RQ3) on our three dependent variables. Whereas in Study 1, news media literacy increased (a) perceived error severity, in Study 2, it did not. The results for (b) error frequency remained the same as in Study 1.

## 6. Discussion

The aim of our study was to investigate the influence of different types of corrections and news media literacy on news users' perceptions of error severity and frequency. Results of two studies reveal that corrections – especially those with an apology – reduced the perceived severity of errors but did not affect the perceived frequency. The presence of a correction positively influenced news users' perceptions of error severity but were not related to perceptions of error frequency. Perceived error frequency was more or less independent of the presence of corrections. Interestingly, the effects of apologies were slightly higher in magnitude than the effects of simple corrections: A correction that included an apology improved users' error perceptions. In light of this finding, journalists and newsrooms could benefit from including corrections and apologies when errors occur since they can reduce the perceived severity of errors and counteract violations of the principle of reliable reporting.

We also have to note that the effect sizes of corrections and apologies vary between our two studies. Corrections and apologies in the context of errors in sports news have a stronger influence on perceived error severity than errors in political news. One possible explanation for these results could be that political news is more important to most news users since it has a greater relevance and impact on people's lives. Therefore, errors in political news are generally judged to be more severe. Corrections of errors also have a smaller impact on perceived error severity in political news than in sports news. We must therefore acknowledge that our results are not generalizable across different topics or contexts. Future studies would be well advised to investigate whether and how users' error perceptions vary across contexts. The same is true for specific types of journalism: Especially in data journalism, news users are theoretically able to identify errors themselves, since most data are public. This may influence user perceptions of errors and corrections.

With regard to the impact of the newspaper type, we find that it does not affect error severity or frequency perceptions. Although we have to note that our vignettes just included a general differentiation between local and national newspapers (see appendix), it is conceivable that having a subscription to a specific newspaper or reading one regularly (especially a

local one) influences users' error perceptions. Fawzi et al. (2021) reported that users' trust evaluations could differ between the news in general and the news users consume themselves. The same could be true for error perceptions.

Concerning individual characteristics, we found that participants' news media literacy increased the perceived severity and frequency of errors in political but not in sports news. These results are partly in line with research about credibility and literacy, revealing that the latter is associated with lower credibility and perceived accuracy (Ashley et al. 2010; Vraga und Tully 2019). News media literate users seem to think more critically about information quality, especially in the context of errors in political news. Regarding the differences in results between political and sports news, we can argue that literate news users are only more critical about information quality and accuracy when it is appropriate and necessary in their eyes. While errors in political news seem to have more severe consequences for users' opinion formation and democratic actions, errors in sports news do not have such direct consequences for users' behavior – at least for the large majority of users. The results also could explain why the effectiveness of corrections is not as high for political as for sports news: Since news media literacy does not play a significant role in users' perceptions of errors in sports news, only the presence of corrections matters for perceived error severity and frequency. But in the context of political news, news media literacy significantly increased users' perceptions of the severity and frequency of errors, while corrections reduced the perceived severity and frequency. It is therefore conceivable that news media literacy influences users' perceptions of political news in the opposite direction than corrections.

Despite these results, we want to address some additional limitations. We have to note that our stimuli do not represent all errors that could occur in news, since we only created and tested vignettes containing objective errors and disregarded subjective ones. To achieve more generalizable conclusions, future studies should include different types and a broader spectrum of errors in one study. Further, errors and corrections should be investigated in laboratory and field studies to take advantage of both study types – controlled studies with high internal validity and studies

in realistic contexts with high external validity. Furthermore, our analysis was limited to relatively simple models, since all independent variables simply had a direct effect on perceived error severity and frequency. Future research should include mediation or path models to analyze specific relationships between different constructs. Further, in our design and analysis, we did not include the consumption of or customer loyalty to specific media. Regular consumption of specific media influences news users' trust, which could affect error perceptions insofar as errors in frequently consumed and highly trusted media are generally judged as less severe and frequent than errors in media a participant does not use. Future studies would therefore be well advised to include such variables, instead of or in addition to simply manipulating a single type of media in a generalized form.

In sum, our results reveal that corrections and especially corrections with an apology and news media literacy influence the perceived severity (and frequency) of errors. They support the need for transparency in journalism and reveal that user characteristics and personality traits are crucial to understanding users' perceptions of errors. News media literacy in particular seems to support news users' critical examination of media content and information quality, and is therefore worth promoting through specific programs.

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## Appendix

### Descriptive statistics for error severity and frequency

«How large do you think the error described in the example above was?»  
(1 = «small error» 5 = «large error»)

Vignette	Study 1 - Politics			Study 2 - Sports		
	M	SD	N	M	SD	N
1	2,26	1,12	479	2,07	1,13	463
2	2,88	1,23	468	2,76	1,23	448
3	2,67	1,06	472	2,26	1,15	477
4	2,74	1,19	486	2,63	1,21	461
5	3,07	1,12	501	2,80	1,16	460
6	2,95	1,14	482	2,97	1,24	471
7	4,12	1,05	446	4,11	1,11	464
8	4,00	1,04	480	3,91	1,08	474
9	3,81	1,10	465	3,45	1,12	477

«How serious do you find the error in the example you just read?» (1 = «not severe at all», 5 = «very severe»)

Vignette	Study 1 - Politics			Study 2 - Sports		
	M	SD	N	M	SD	N
1	2,14	1,07	479	2,02	1,07	463
2	2,77	1,18	468	2,65	1,18	448
3	2,60	1,04	472	2,20	1,09	477
4	2,59	1,13	486	2,44	1,11	461
5	2,89	1,12	501	2,68	1,13	460
6	2,80	1,12	483	2,74	1,21	471
7	3,99	1,07	446	4,03	1,09	464
8	3,89	1,03	480	3,77	1,07	474
9	3,67	1,11	464	3,28	1,12	477

«What do you think: How often do errors like the one in the example you just read happen?» (1 = «never», 5 = «very often»)

Vignette	Study 1 – Politics			Study 2 – Sports		
	M	SD	N	M	SD	N
1	2,99	,82	479	3,00	0,78	463
2	3,10	,80	468	3,15	0,78	448
3	3,01	,75	472	3,02	0,79	477
4	2,92	,80	486	2,82	0,72	461
5	3,07	,78	501	2,96	0,75	460
6	2,96	,74	483	2,90	0,83	471
7	2,59	,83	446	2,66	0,83	464
8	3,04	,88	480	3,06	0,81	474
9	3,04	,85	465	3,01	0,82	477