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# News for life: improving the quality of journalistic news reporting to prevent suicides

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## Abstract

Despite much theorizing on the quality of journalism, there is limited actual empirical evidence for the effects of improved news quality on societal outcomes. This study provides such evidence for suicide reporting. News quality especially matters in this domain, as low-quality reporting can elicit “copycat” suicides (Werther effect). We developed and disseminated a web-based campaign promoting high-quality suicide reporting, targeting newsrooms in Germany. Twenty-two newsrooms participated. A content analysis ( $N = 4,015$  articles) provided supporting evidence for an increase in high-quality reporting (Study 1). Interrupted time series analyses offered tentative evidence for a reduction in actual suicides (Study 2). Acknowledging limitations in terms of causal interpretations, the findings support the claim that high-quality news can save lives. Similar newsroom interventions run elsewhere may contribute to preventing suicides globally. We discuss the implications, including those of a theoretically meaningful discovery related to the suicide-protective effect’s underlying mechanism, termed the dampening-the-spikes hypothesis.

**Keywords:** quality in journalism, Werther and Papageno effects, suicide, media guidelines, awareness campaign

Quality in journalism has been the topic of heated debates from the 17th century (Stieler, 1695) throughout the 19th century (Wilke, 2003) up until today (McNair, 2012). Although it appears that “good journalism” lies somewhat in the eye of the beholder, scholars have identified several quality criteria based on a broader theorizing of journalism’s role in society (e.g., Hanitzsch et al., 2019; Kunelius, 2006). For example, one avenue of research focuses on the idea that low-quality news may lead to media cynicism—a threat to democracy (Cappella & Jamieson, 1997). Similarly, avoiding the reproduction of stereotypes as a criterion for high-quality news is widely agreed upon (McQuail, 1992). Despite much available theorizing, there is limited actual empirical evidence for any beneficial effects of improved news quality at a societal level (see Meier, 2019). Would increasing the quality of journalistic news have beneficial effects on societal outcomes?

The present study contributes to this line of research and provides rare, empirical evidence for the beneficial effects of improved news quality in an important thematic context: suicide—a threat to global public health (World Health Organization [WHO], 2019). Debates about the quality of journalistic suicide reporting have long emphasized that low-quality suicide reporting—that is, sensationalist suicide reporting providing specific details about the suicide such as the method and the location—can be associated with subsequent increases in “copycat” suicides (Niederkröthaler et al., 2020; Stack, 2005), a phenomenon termed the *Werther effect* (Phillips, 1974). However, the news media can also elicit suicide-protective effects, termed the *Papageno effect* (Niederkröthaler et al., 2010). In fact, stories about hope and recovery are assumed to be associated with a decrease in actual suicides (Niederkröthaler et al., 2022).

Consequently, high-quality reporting media guidelines have been developed (see Pirkis et al., 2006) and promoted by organizations such as the WHO (WHO, 2019). In some countries, suicide reporting aspects are even emphasized in national press codices as a distinct journalistic quality dimension (e.g., Deutscher Presserat [German Press Council], 2021; Österreichischer Presserat [Austrian Press Council], 2019).

Against this background, it seems reasonable to promote the quality of suicide news reporting for the greater societal good. Unfortunately, knowledge is lacking on effective ways to do so. In the present article, we report on a *newsroom intervention* in Germany that we conducted in mid-2019. We offered web-based training on high-quality reporting—aiming to raise awareness about how to reduce detrimental Werther effects and increase beneficial Papageno effects through responsible, high-quality suicide reporting. We invited newsrooms to participate and investigated whether there was (1) a change in the quality of the suicide news and (2) an impact from the newsroom intervention on actual suicide numbers. Study 1 used a large-scale content analysis of suicide reporting, and Study 2 tested the consequences of the newsroom intervention on actual suicide numbers using an interrupted time series analysis.

## On the relevance of high-quality suicide reporting

Many studies on the quality of journalism have focused on journalism’s role in democracy: Based on distinctive *normative* models of democracy, scholars derived quality criteria for journalism, such as acting as a watchdog or stimulating public discourse by providing a forum (Strömbäck, 2005). The

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domain of suicide reporting is somewhat different: *Empirical evidence* on the Werther and Papageno effects, rather than normative theorizing, guides the demands placed on the media. Indeed, numerous studies have investigated what makes for high-quality reporting from the perspective of suicide prevention. This research shows that specific content elements represent risk factors associated with the Werther effect, and others represent protective factors associated with the Papageno effect. We focus on the following content elements (for a detailed discussion of content elements, see Pirkis et al., 2006).

Reporting on the specific *method* can inform and prime audiences for specific suicide methods. For example, Chan et al. (2005) found that nearly all survivors of the so-called charcoal-burning suicide attempts had learned about the then-popular method from the news. The method, vividly described by the media, painted a picture of an easy, painless, and effective means of ending one's life. Similarly, Cheng et al. (2007) provided evidence for an increase in suicides by hanging after a famous TV actor died by hanging. Recent meta-analytic evidence is consistent with these findings (Niederkröthaler et al., 2020). Relatedly, *location*-related information can increase the popularity of specific suicide locations, contributing to the establishment of the so-called suicide hotspots (Pirkis et al., 2015). Note that, in many cases, there is an implicit connection between the suicide location and method (e.g., a cliff is related to jumping from a height). In support of suicide prevention, journalists should abstain from reporting on such "Werther stories" that include information on the method and/or location, since avoiding these elements can arguably reduce the risk for suicide-facilitative Werther effects.

Conversely, a specific form of hope-inspiring suicide reporting is assumed to act protectively: Stories of hope and recovery have been associated with decreasing suicide numbers (i.e., Papageno effect; Niederkröthaler et al., 2010, 2022). This suicide news reports on those in suicidal crises who successfully coped. Individuals in such "Papageno stories" seemingly can act as positive role models for others to learn how to cope with life stressors or suicidal thoughts. In order to prevent suicides, frequent reporting on "Papageno stories" of hope and recovery is considered desirable, as it is assumed to contribute to suicide-protective Papageno effects.

### Impact of promoting media guidelines about suicide reporting

National and international organizations have been aiming at increasing journalists' awareness of media guidelines to foster high-quality suicide reporting in order to reduce harmful Werther effects and to promote helpful Papageno effects. Previous research indicates that the communication of media guidelines can lead to an increase in high-quality reporting (Bohanna & Wang, 2012). For example, in a European study, Michel et al. (2000) found that, thanks to such guidelines, the number of front-page suicide reports decreased significantly, as did sensationalist headlines and visual illustrations. However, the analysis could not show changes with regard to the naming of details on the suicide method or the suicide location. Over a period of 6 years, Pirkis et al. (2009) found, in an Australian study, that the naming of details about suicides could be reduced through the implementation of media guidelines. Jamieson et al. (2003) provided evidence for beneficial

changes in the United States. However, changes appeared to be unstable in the long run and the use of sensationalist headlines or speculation about the causes of suicide returned to the original level of reporting over time after desirable changes had leveled off. Scherr et al. (2019) investigated the impact of a workshop intervention on suicide reporting on reporting-relevant attitudes among media professionals. The workshop increased the awareness that high-quality reporting can save lives and reduce misperceptions that there were no clear recommendations about high-quality reporting. Taken together, these findings suggest that the communication of media guidelines can change suicide reporting in a desirable manner.

However, a related important question is whether adherence to guidelines can reduce actual suicides. In a seminal study, Etzersdorfer and Sonneck (1998) investigated the effects of adherence to media guidelines: Several decades ago, the Viennese subway system became a suicide hotspot. The news media provided sensational coverage about multiple subway suicides. Scholars informed journalists about media guidelines on high-quality reporting in mid-1987. Despite lacking a systematic content analysis of the news, Etzersdorfer and Sonneck (1998) argued, based on their own (unsystematic) observations, that the news reporting improved substantially. Importantly, subway suicides and suicide attempts dropped significantly from the first to second half of 1987. The researchers posited that this drop had been elicited by an increase in high-quality suicide news (see also Bohanna & Wang, 2012).

Although the seminal work by Etzersdorfer and Sonneck (1998) clearly contributes to our knowledge, the lack of a systematic content analysis, the strong local focus on the city of Vienna, and the specific context of subway suicides in the late 1980s calls for a large-scale update. In addition, back then, the Papageno effect was not explicitly recognized as such.

### Interventional approach and formal hypotheses

Supplementarily to the seminal work by Etzersdorfer and Sonneck (1998), the present project provides a large-scale web-based newsroom intervention, including an online training session targeted at journalists in numerous German newsrooms. Thus, we follow the Etzersdorfer and Sonneck's (1998) interventional approach and provide a 21st-century update for it. We systematically tested the effects of a web-based newsroom intervention on changes in news content (higher quality reporting?) and actual suicides (reduced numbers?). Furthermore, we focused on reporting elements related to both harmful Werther and helpful Papageno effects.

Although some preliminary findings indicate that awareness material can alter Werther and Papageno effects, evidence is rather scarce. For example, in one experiment with journalism students (Scherr et al., 2017), whether exposure to awareness material promoting high-quality reporting influenced their actual news writing was tested. This controlled study allowed for confident causal interpretations. As a supplement to the widely used text-based material (as used by Etzersdorfer & Sonneck, 1998), the effects of a video, in which a suicide expert presented the guidelines, were tested as well. Analyses indicate that the exposure to awareness material increased high-quality reporting in general, but especially when presented as a video. We therefore also used a video intervention.

There was one additional aim for our interventional approach: Assuming there were beneficial effects from our web-based newsroom intervention, then running similar interventions elsewhere in the world could substantially contribute to preventing suicides. With this possibility in mind, we developed awareness materials that can be easily reproduced at low production costs. And, in contrast to Etzersdorfer and Sonneck's days, our intervention can be scaled more easily using modern, digital media technologies, and the Internet.

Based on the previous research outlined above, the following formal hypotheses guided the empirical work: We hypothesized a beneficial effect of the newsroom intervention in the form of a reduction in the number of "Werther stories" (Hypothesis 1), that is, less harmful suicide reporting (i.e., on the method and/or location). We also hypothesized an increase in the number of "Papageno stories" of hope and recovery (Hypothesis 2). Finally, we asked whether the intervention would have a beneficial impact on actual suicides (Research Question 1 [RQ 1]).

## Overview of the empirical work

In mid-2019, we launched a campaign in Germany in which we provided a web-based training session. At the heart of the online intervention was a self-produced short video that included an expert explaining responsible suicide reporting, how journalists can reduce detrimental Werther effects, and how they can stimulate preventive Papageno effects. As a first step, we produced a video and asked professional journalists to evaluate it, using qualitative formative research. This was an important step, as research has shown that there are important barriers to adoption (Markiewicz et al., 2020). Consistent with their suggestions, as a second step, we produced a new, improved video. As a third step, we invited newsrooms across Germany using a diverse set of methods (emails, letters, telephone calls) to participate in our awareness campaign. We contacted the editors-in-chiefs (as disseminators for each newsroom) and journalists with experience in suicide reporting. A total of 63 German newsrooms—for all of which we had access to their entire news coverage via digital news archives—were invited to participate in the training session. Of these, 22 newsrooms participated (see [Supplementary Table S1](#) for details). Journalists in each newsroom were asked individually to participate in individual online training and to disseminate this information to their colleagues. Materials including a printer-friendly summary of media guidelines were also provided to help journalists to spread the word about the intervention in their newsrooms.

Of note, we focused our available resources on two "dissemination periods." The focus on such periods was necessary given that contacting newsrooms and persuading them to participate was time-consuming. In these periods, we intensively contacted newsrooms and tried to convince them to participate. The first period took place between April 9 and May 22, 2019, during which a total of  $N = 11$  newsrooms participated; all were local newspapers. Given that we wanted to evoke effects observable at the societal macro level, we followed up with a second dissemination period. Here, we aimed at increasing the general number of participating newsrooms (to push observable changes in the entire message system of the German press theorized to be necessary for suicide-protective effects observable at the societal level). The second period took place between October 7 and December 3, 2019.

A total of  $N = 13$  newsrooms participated in this second period. Note that there was an overlap in newsrooms between both dissemination periods, as two newsrooms participated twice (see [Supplementary Table S1](#), for details). A total of  $N = 22$  different newsrooms participated in our newsroom intervention.

## Awareness intervention material

Given the existing evidence for its effectiveness (Scherr et al., 2017), we produced a short awareness video, in which an expert explains media guidelines on responsible suicide reporting and provides recommendations on how to avoid Werther effects and promote Papageno effects. The video depicts the current scientific consensus on the role of news media in suicide prevention. Importantly, the video emphasizes avoiding method- and location-related information and highlights the relevance of reporting on stories of hope and recovery. An English transcript of the video and the German-language video can be found in [Supplementary Table S2](#).

## Study 1: Change in the quality of reporting?

We hypothesized that a newsroom intervention would reduce the number of "Werther stories" (H1) and would increase the number of "Papageno stories" (H2). Study 1 aimed to test these two hypotheses. We coded  $N = 4015$  suicide-related articles from December 2018 to March 2020 and counted the number of Werther and Papageno stories that were published in the German press for each day of the observation period. The observation period therefore included a sufficiently long period before and after the newsroom intervention. The inclusion criterion was that the article had to report on suicide (i.e., suicide, suicide attempt, or suicidal ideation). We identified suicide-related articles via keyword searches in news archives (see [Supplementary Table S1](#)). However, we excluded articles on murder and homicide, articles containing metaphors such as "political suicide," and articles exclusively focusing on policy-level discussions about assisted suicide.

With societal effects on actual suicides in mind (see RQ 1 and Study 2), we applied a *macro-level, societal perspective* on the German news environment as a whole when analyzing the content-analysis data. We do not focus on changes in individual newspapers here.

## Method

We conducted a content analysis of  $N = 4,015$  articles selected from databases using a search string that included different German expressions for suicide. We focused on newsrooms, for which we had access to their news coverage through online databases (i.e., LexisNexis, APA, and online archives of newspapers), which led to a list of  $n = 63$  German newsrooms. Although having contacted all of them,  $n = 22$  newsrooms took part in our intervention and  $n = 41$  declined. After extensive coder training and three pretests followed by separate sessions during which challenging coding decisions were discussed, three coders coded the entire material. Inter-coder reliabilities, assessed with Krippendorff's  $\alpha$ , indicated a reliable measurement (see below).



## Outcomes

### Number of Werther stories

Coders assessed the presence (0 = not present, 1 = present) of content elements for each article: They coded whether the article (1) reported on the method (35% of all suicide articles included the method,  $\alpha = 0.93$ ) and (2) included the location (40% of all suicide articles included the location,  $\alpha = 0.87$ ). *Werther stories* were defined as suicide articles that reported about the method and/or the location. About half of all suicide articles were Werther stories (51%). We aggregated this measure and assessed the number of Werther stories that were published for each day of the observation period in the German press ( $M = 4.20$  Werther stories per day,  $SD = 5.59$ ,  $Mdn = 3.00$ ,  $Min = 0$ ,  $Max = 63$ , *skewness* = 4.39, *kurtosis* = 31.47).

### Number of Papageno stories

As a second outcome, we counted the number of *Papageno stories* of hope and recovery. Coders assessed each suicide article as to whether it reported on a narrative about people who were in a suicidal crisis but successfully overcame it ( $\alpha = 0.74$ ). A very low number of all suicide articles were Papageno stories (3%). Consistent with the procedure related to Werther stories, we aggregated this measure and counted the number of Papageno stories that were published on a given day in the German press ( $M = 0.28$  Papageno stories per day,  $SD = 0.69$ ,  $Mdn = 0$ ,  $Min = 0$ ,  $Max = 5$ , *skewness* = 3.25, *kurtosis* = 12.75).

### Statistical analysis

We used segmented regression analysis, a powerful statistical method for estimating intervention effects in interrupted time series designs (Jebb et al., 2015; Lopez-Bernal et al., 2017; Wagner, et al., 2002). The method allowed us to test if the newsroom intervention was temporarily associated with a change in suicide reporting. We used aggregated daily scores of the outcomes. Given that we used two dissemination periods, we specified two intervention-related time points that corresponded to the two dissemination (intervention) periods (see Wagner et al., 2002):  $\text{outcome} = \beta_0 + \beta_1 \cdot \text{time} + \beta_2 \cdot \text{intervention}_1 + \beta_3 \cdot \text{time after intervention}_1 + \beta_4 \cdot \text{intervention}_2 + \beta_5 \cdot \text{time after intervention}_2 + e_t$ . The variable “time” is a continuous variable indicating time in days from the start of the observation period. Note that the intervention variables are dummy variables for time occurring before (intervention = 0) or after (intervention = 1) the intervention. Intervention 1 was defined as May 23, 2019, and intervention 2 was defined as December 4, 2019 (i.e., end of the dissemination periods, as outlined above). In this model (see Wagner et al., 2002, for details),  $\beta_1$  estimates the change in the news quality that occurs with each day *before* the intervention (i.e., the baseline trend);  $\beta_2$  provides an estimate of the level change in the news quality immediately after the first intervention; and  $\beta_3$  estimates the change in the (longer term) trend after the first intervention, compared to the daily trend before the first intervention. Similarly,  $\beta_4$  provides an estimate of the level change in the news quality immediately after the second intervention and  $\beta_5$  estimates the change in the trend after the second intervention.

## Results

### Fewer Werther stories?

H1 predicted a reduction in the number of Werther stories during the observation period. In a first step, we assessed the

descriptive statistics (i.e., whether the mean [ $M$ ] and variance [ $SD^2$ ] are equal) and ran a Kolmogorov–Smirnov test to check if the count measure of Werther stories followed a Poisson distribution. However, this was not the case ( $M = 4.20$ ,  $SD^2 = 31.26$ ,  $p_{K-S} < .001$ ). In order to account for the observed overdispersion, we used a negative binomial model for the segmented regression analysis. This model allowed us to also estimate a dispersion parameter. Note that we report the incidence rate ratio (IRR) as a measure of effect size.

### Macro-level perspective on the message system of the press

We applied a macro-level, bird’s eye view of the German press, as this is the relevant level of analysis for the study of macro-level effects of suicide reporting on suicide rates (see Study 2). Figure 1 visualizes the time series.

The segmented regression analysis showed a harmful baseline trend,  $\beta_1 = 0.005$ ,  $SE = 0.002$ ,  $IRR = 1.005$ , Wald  $\chi^2 = 11.557$ ,  $p < .001$ . This indicated that for each additional day during the baseline period, the log of the number of Werther stories was estimated to increase by 0.005 points and the incidence rate of Werther articles increased by a factor of 1.005. Put differently, for every additional day during the baseline period, the incidence rate of the number of published Werther stories increased by 0.5%. Conversely, the first intervention was related to a significant, immediate decrease in the number of Werther stories (i.e., an abrupt level change),  $\beta_2 = -0.667$ ,  $SE = 0.221$ ,  $IRR = 0.513$ , Wald  $\chi^2 = 9.076$ ,  $p = .003$ . However, the first intervention was not significantly related to a significant change in the trend,  $\beta_3 = -0.002$ ,  $SE = 0.002$ ,  $IRR = 0.998$ , Wald  $\chi^2 = 1.225$ ,  $p = .268$ .

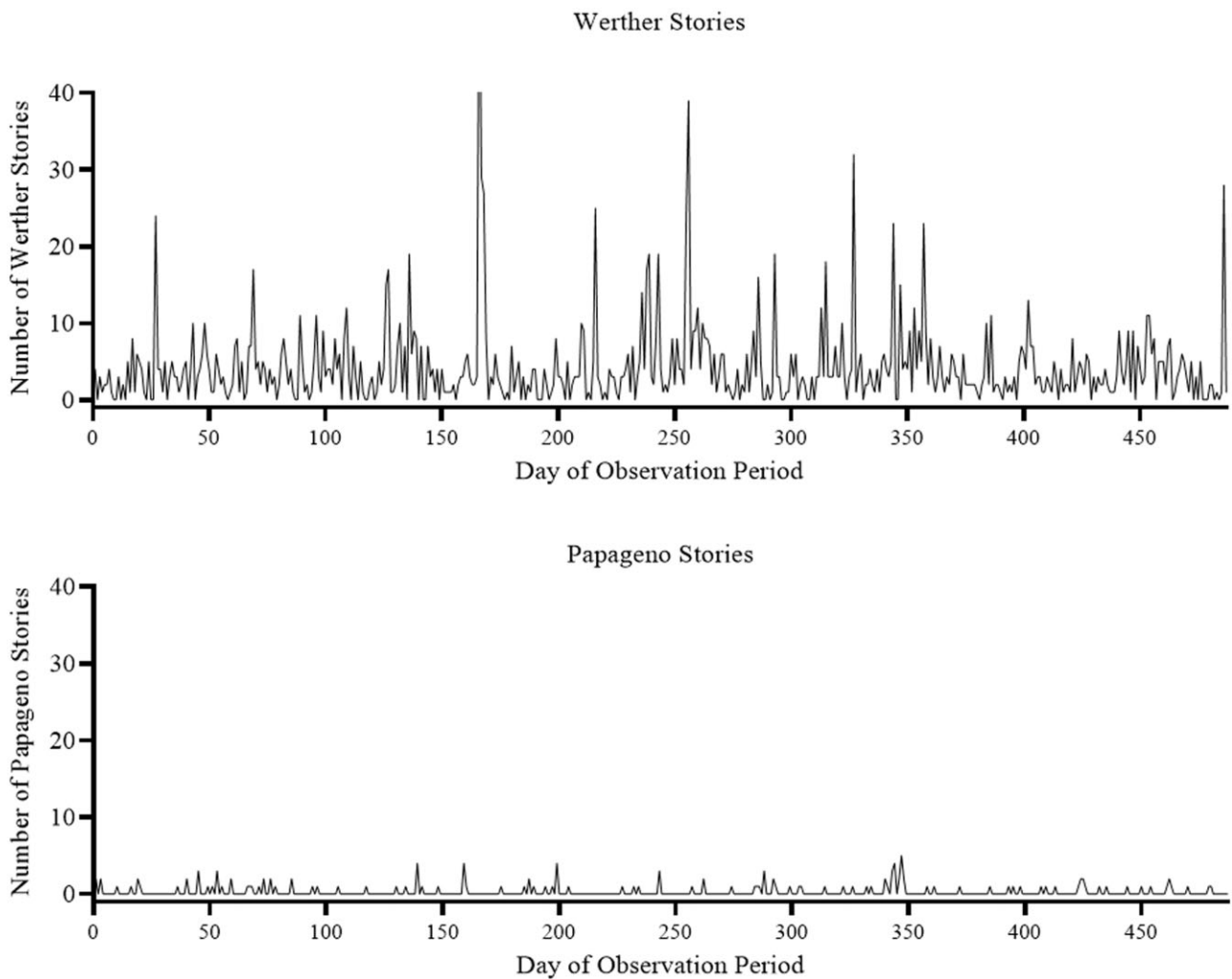
A similar picture was obtained for intervention 2: The second intervention was also related to a significant, abrupt level change, that is, a decrease in the number of Werther stories,  $\beta_4 = -0.687$ ,  $SE = 0.254$ ,  $IRR = 0.503$ , Wald  $\chi^2 = 0.503$ ,  $p = .007$ , and there was also no significant change in the trend,  $\beta_5 = -0.001$ ,  $SE = 0.003$ ,  $IRR = 0.999$ , Wald  $\chi^2 = 0.078$ ,  $p = .780$ .

Taken together, our newsroom intervention was temporarily associated with a reduction in the number of published Werther stories across the entire German press.

### Comparison of the control and intervention newsrooms

We now investigate differences in the reporting quality of newsrooms that did (i.e., “intervention newsrooms”) and those that did not (i.e., “control newsrooms”) receive our intervention. Following a quasi-experimental logic, this analysis allowed us to assess the causal impact that our newsroom intervention might have had on actual suicide reporting. As a first step, we assessed the number of Werther stories separately for both groups of newsrooms. Our time series analysis approach requires one time series as the outcome, which is why we calculated a difference score between the daily numbers of Werther stories published by “control newspapers” and “intervention newspapers.” A larger difference is indicative of more Werther stories being published by control newsrooms relative to intervention newsrooms.

We then ran the same segmented regression analysis as reported before, but additionally included two covariates: As we had more newspapers published by control newsrooms than newspapers published by intervention newsrooms, the number of suicide articles within both groups was different. Therefore, our difference score could be inflated. Thus, we included the daily number of suicide articles for the control newspapers and the intervention newspapers, respectively. As



**Figure 1.** Number of Harmful Werther and Helpful Papageno Stories during the Observation Period.

Note. This figure shows the number of Werther and Papageno stories that appeared on each day of the observation period, focusing on the entire news environment of the German press.

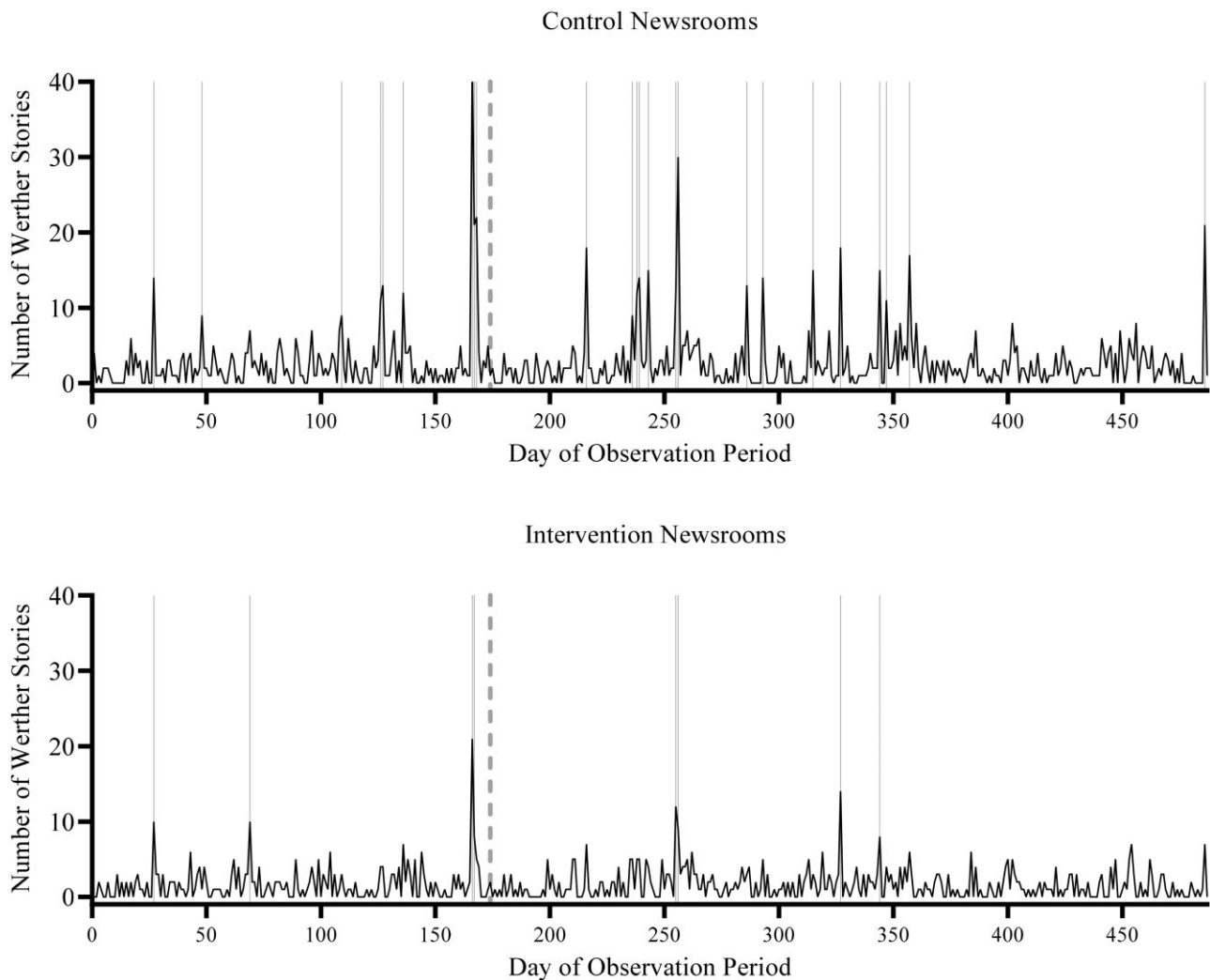
expected, both covariates elicited a significant effect on the difference score: the number of suicide articles for control newspapers,  $\beta = 0.079$ ,  $SE = 0.005$ ,  $IRR = 1.082$ ,  $\text{Wald } \chi^2 = 316.301$ ,  $p < .001$ , and the number of suicide articles for intervention newspapers,  $\beta = -0.084$ ,  $SE = 0.008$ ,  $IRR = 0.920$ ,  $\text{Wald } \chi^2 = 99.169$ ,  $p < .001$ . Importantly, none of the five conceptual variables in the segmented regression analysis elicited a significant effect: baseline trend,  $\beta_1 = 0.000$ ,  $SE = 0.001$ ,  $IRR = 1.000$ ,  $\text{Wald } \chi^2 = 0.408$ ,  $p = .523$ , level change of intervention 1,  $\beta_2 = -0.015$ ,  $SE = 0.085$ ,  $IRR = 0.985$ ,  $\text{Wald } \chi^2 = 0.030$ ,  $p = .862$ , change in trend after intervention 1,  $\beta_3 = 0.000$ ,  $SE = 0.001$ ,  $IRR = 1.000$ ,  $\text{Wald } \chi^2 = 0.310$ ,  $p = .578$ , level change of intervention 2,  $\beta_4 = -0.107$ ,  $SE = 0.097$ ,  $IRR = 0.898$ ,  $\text{Wald } \chi^2 = 1.217$ ,  $p = .270$ , and change in trend after intervention 2,  $\beta_5 = 0.001$ ,  $SE = 0.001$ ,  $IRR = 1.001$ ,  $\text{Wald } \chi^2 = 1.277$ ,  $p = .258$ . This was an unexpected finding, inconsistent with H1.

#### *Dampening of detrimental spikes*

When looking at both time series for the control and intervention newsrooms separately, a visual inspection revealed an interesting pattern: The distribution of spikes that represent days with a high number of Werther stories seemed to be

different. To follow up on this observation, we conducted additional analyses: As a first step (*spike detection*), we used autoregressive integrative moving average (ARIMA) modeling for automatic spike detection using the Expert Modeler function in SPSS. This procedure automatically detects spikes in time series, which was done separately for suicide reporting provided by the control and intervention newsrooms. By using an automatic spike detection algorithm, we aimed at avoiding a possible confirmation bias in spike identification. A total of  $N = 32$  spikes were identified. Figure 2 provides a visualization of both time series, including all identified spikes (vertical lines).

As a second step (*intervention effect analysis*), we used a 2 (reporting from control or intervention newsrooms)  $\times$  2 (before vs. after the intervention) cross-tabulation (one case = one identified spike). We used the first intervention (day of observation period = 174, see above) to define the pre- and post-periods in this analysis. In the period before the intervention (Day < 174), the algorithm automatically detected a total of 13 spikes. Of these,  $n = 9$  (69.2%) were found in the reporting of control newsrooms, and  $n = 4$  (30.8%) were found in the reporting of intervention newsrooms. Given that  $n = 22$  newsrooms took part in our intervention, but



**Figure 2.** Automatic Spike Detection: Number of Werther Stories Published by the Control and Intervention Newsrooms.

*Note.* The solid vertical lines indicate automatically detected spikes. These massive spikes represent days with a high number of Werther stories. The dashed vertical line at Day = 174 indicates the first intervention.

approximately twice as many, that is,  $n = 41$ , declined, this frequency distribution roughly corresponds to the number of control and intervention newsrooms in our sample. In the period after the intervention (Day  $\geq 174$ ), our analysis detected a total of 19 spikes. Of these 19 spikes,  $n = 15$  (78.9%) were identified for control newsrooms and only  $n = 4$  (21.1%) were found for intervention newsrooms. Thus, although the number of spikes in the control news reporting increased (as expected, due to the higher number of days in the post-intervention period), the number of identified key events in the reporting of intervention newspapers remained the same. Thus, it appeared that there were fewer detrimental “spike days” in the reporting provided by intervention newsrooms after the intervention. To formally test whether this difference over time was significant, we ran an exact McNemar test. This test indicated that there was a statistically significant difference in the proportion of detected spikes pre- and post-intervention,  $p = .019$ .

Taken together, although the general news reporting in the news environment of the German press has changed (macro-level, societal perspective), there was no evidence that the intervention elicited a general “chronic” change as assessed

via a comparison between the reporting of the control and intervention newsrooms (using segmented regression analysis). However, the intervention was related to a significant reduction in the occurrence of detrimental spikes in Werther stories. We call this unpredicted finding of high theoretical relevance the *dampening-the-spikes hypothesis*. This is a theoretical specification that provides support for H1. We will return to this discovery in the “General discussion” section.

#### More Papageno stories?

H2 predicted an increase in the number of Papageno stories. Overall, the news media reported very infrequently on stories of hope and recovery. Of all  $N = 4,015$  suicide articles in our sample, only 137 (3.4%) reported a positive role model. Figure 1 provides a visualization. Consistent with the analysis of Werther Stories presented above, we relied on a negative binomial model for the segmented regression analysis.

#### Macro-level perspective on the press

None of the coefficients indicated a significant effect of the newsroom intervention: baseline trend,  $\beta_1 = -0.004$ ,  $SE = 0.004$ ,  $IRR = 0.996$ , Wald  $\chi^2 = 1.313$ ,  $p = .252$ , level change

of intervention 1,  $\beta_2 = -0.069$ ,  $SE = 0.529$ ,  $IRR = 0.933$ ,  $\text{Wald } \chi^2 = 0.017$ ,  $p = .896$ , change in trend after intervention 1,  $\beta_3 = 0.009$ ,  $SE = 0.005$ ,  $IRR = 1.009$ ,  $\text{Wald } \chi^2 = 3.554$ ,  $p = .059$ , level change of intervention 2,  $\beta_4 = -0.945$ ,  $SE = 0.602$ ,  $IRR = 0.389$ ,  $\text{Wald } \chi^2 = 2.465$ ,  $p = .116$ , and change in trend after intervention 2,  $\beta_5 = -0.002$ ,  $SE = 0.008$ ,  $IRR = 0.998$ ,  $\text{Wald } \chi^2 = 0.047$ ,  $p = .828$ . This indicates that the newsroom intervention was not associated with an increase in Papageno stories, a finding that does not support H2.

#### Comparison of control and intervention newsrooms

Relying on the difference-score approach outlined above, we obtained no significant difference between the control and intervention newsrooms for Papageno stories: Both covariates—the number of suicide articles published in control newspapers,  $\beta = 0.009$ ,  $SE = 0.009$ ,  $IRR = 1.009$ ,  $\text{Wald } \chi^2 = 1.107$ ,  $p = .293$ , and the number of suicide articles published in intervention newspapers,  $\beta = -0.010$ ,  $SE = 0.014$ ,  $IRR = 0.990$ ,  $\text{Wald } \chi^2 = 0.475$ ,  $p = .491$ —did not predict the number of Papageno stories. More importantly, none of the conceptual variables of the segmented regression showed a significant effect: baseline trend,  $\beta_1 = 0.000$ ,  $SE = 0.001$ ,  $IRR = 1.000$ ,  $\text{Wald } \chi^2 = 0.049$ ,  $p = .824$ , level change of intervention 1,  $\beta_2 = 0.039$ ,  $SE = 0.147$ ,  $IRR = 1.040$ ,  $\text{Wald } \chi^2 = 0.072$ ,  $p = .789$ , change in trend after intervention 1,  $\beta_3 = 0.000$ ,  $SE = 0.001$ ,  $IRR = 1.000$ ,  $\text{Wald } \chi^2 = 0.002$ ,  $p = .968$ , level change of intervention 2,  $\beta_4 = 0.096$ ,  $SE = 0.161$ ,  $IRR = 1.100$ ,  $\text{Wald } \chi^2 = 0.351$ ,  $p = .553$ , and change in trend after intervention 2,  $\beta_5 = -0.010$ ,  $SE = 0.014$ ,  $IRR = 0.990$ ,  $\text{Wald } \chi^2 = 0.475$ ,  $p = .491$ . Taken together, Papageno stories were very rare, and our analysis indicated that the newsroom intervention was not able to substantially increase this low frequency of occurrence.

#### Discussion

The findings indicated that our newsroom intervention was temporarily associated with a decrease in the number of Werther stories in the message system of the entire German press. News about Papageno stories was scarce and the newsroom intervention was not associated with an increase. Although there was no increase in helpful Papageno stories, the analysis indicated a reduction in Werther stories on “spike days” and, theoretically—based on our theoretical knowledge and available empirical evidence—, a reduced risk for Werther effects.

#### Study 2: Real-life impact on actual suicides

Study 2 aimed at investigating whether there were consequences of the newsroom intervention on actual suicides (RQ 1). Importantly and unexpectedly, the COVID-19 pandemic might have overshadowed the end of our post-intervention period (ending in March 2020)—the month in which numerous countries, including Germany, had already initiated severe COVID-19-related lockdown measures. The pandemic was a mental health stressor, as indicated, for example, by increased crisis hotline call volumes in Germany (Arendt et al., 2020). Although not *a priori* defined, we decided to consider the emerging COVID-19 pandemic in our analysis. To increase the confidence in causal interpretations, a design feature came to our rescue: We took advantage of the fact that  $n = 19$  newsrooms that participated in our newsroom

intervention were local newsrooms—only  $n = 3$  were national newspapers. These local newsrooms were all located in 5 (out of 16) different German States (i.e., Bavaria, Hesse, North Rhine-Westphalia, Rhineland-Palatinate, Saarland), together forming the *intervention region*. Conversely, there were 11 States without participating newsrooms, thus, the *control region*. The comparison between these two regions allowed us to control for possible “noise” induced by stressors such as the COVID-19 pandemic. Any beneficial effects of the newsroom intervention should be more pronounced in the intervention region (Schaffer et al., 2021; see the subsequent section).

#### Method

We used monthly data on the number of suicides, which we had to request separately from each of the 16 Statistical Offices for each of the German Federal States. We obtained monthly suicide numbers for all German States from December 2013 to March 2020. Of note, daily or weekly data for all States was impossible to obtain due to privacy protection laws and different suicide data management policies in the States of Germany. Monthly suicide data typically show seasonal fluctuations (i.e., seasonality), which suggested the use of a (seasonal) ARIMA model. We followed the guidelines for evaluating large-scale health interventions using ARIMA models provided by Schaffer et al. (2021). In fact, we used the automated *auto.arima()* algorithm available in the *forecast* package for R. We allowed the algorithm to automatically select the most appropriate values for  $p$ ,  $d$ ,  $q$ ,  $P$ ,  $D$ , and  $Q$ , which define an ARIMA model (see Schaffer et al., 2021). Afterward, a Ljung–Box Q test was performed to test for any remaining autocorrelation.

Consistent with the procedure outlined by Schaffer et al. (2021), we used a *step* and a *ramp* function to test for intervention effects. This is similar to the segmented regression used for the content-analytic data. Importantly, we were able to test whether there was a step change (months before intervention = 0, months after intervention = 1) and a ramp effect (months before intervention = 0, values for the months after intervention increase by 1 with each month, i.e., 1, 2, 3, etc.). We specified April 2019, the month in which the dissemination process started, as the start of the post-intervention period. This ensured that we had a 12-month post-intervention period. A significant step change indicates that there is a sudden, sustained change where the time series shifts either up or down by a given value. A significant ramp effect indicates that there is a longer term increase or decrease. Given that our dissemination process occurred over time, ramp effects may be especially adequate to reveal change. However, we used both, as outlined by Schaffer et al. (2021).

As already noted, we interpreted the control region's suicide rates as a *control series*. In fact, including a control series in an interrupted time series analysis improves causal inference: Schaffer et al. (2021) argued that this involves running the ARIMA model for the series of interest (intervention region), and separately for the control series (control region). They noted that if a change is observed in the intervention series but not in the control series, this provides evidence that the impact was specific to the intervention. Thus, we compared step and ramp effect coefficients between both regions to assess whether our intervention may have elicited actual effects on suicide numbers. There might have been trends in both regions, possibly elicited by stressors such as COVID-19. However, if there



are differences in both time series, this may indicate the effects from the newsroom intervention. Analyses were performed in SPSS (IBM, version 21) and R (The R Foundation for Statistical Computing, version 4.1.2).

## Results

As can be seen in Figure 2's seasonal decomposition (seasonal subplot)—we used the STL method for seasonal decomposition developed by Cleveland et al. (1990); see Hyndman & Athanasopoulos (2021)—the time series of monthly suicide numbers in the control region and the intervention region showed a seasonal pattern, as is common with suicide data. For the control region's suicide data, the automatic algorithm identified a  $(1,0,3) \times (0,1,1)_{12}$  model,  $Q = 10.24$ ,  $df = 8$ ,  $p = .250$ . For the intervention region's suicide data, the algorithm identified a  $(1,0,0) \times (1,1,0)_{12}$  model,  $Q = 10.10$ ,  $df = 10$ ,  $p = .432$ . Thus, the automatic algorithm correctly identified seasonality. Note that both of the Ljung–Box  $Q$  tests were not significant, indicating that there was no remaining autocorrelation.

### Control region

The ARIMA model for the control region estimated no significant step effect,  $B = -23.19$ , 95% CI  $-60.03, 13.64$ ,  $SE = 18.79$ ,  $z = -1.23$ ,  $p = .217$ , but a significant ramp effect,  $B = 4.83$ , 95% CI  $0.003\text{--}9.66$ ,  $SE = 2.46$ ,  $z = 1.96$ ,  $p = .0499$ . The ramp effect indicated that there was an estimated increase of 4.83 suicides every month in the control region after the intervention. Note that this ramp effect can also be identified by visual inspection as an increasing trend in the trend subplot of the seasonal decomposition plot in Figure 3 (indicated by a dashed circle). It is also supported by a visual inspection of predicted vs. observed suicide numbers after the intervention: As indicated in Figure 4, observed suicides (gray) tended to be above the predicted suicides (black), especially during the end of the post-intervention period. Taken together, the analysis indicated a small, ramp-like increase in suicides in the control region.

### Intervention region

The analysis indicated a different pattern for the intervention region. The ARIMA model did not estimate a significant step change,  $B = -10.40$ , 95% CI  $-32.58, 11.78$ ,  $SE = 11.32$ ,  $z = -0.92$ ,  $p = .358$ . This is consistent with the control region. However, we obtained a different finding related to the ramp effect: Although the ramp effect was significant in the control region (see above), it failed to reach significance in the intervention region,  $B = 2.33$ , 95% CI  $-0.58, 5.25$ ,  $SE = 1.49$ ,  $z = 1.57$ ,  $p = .116$ . This is supported by a visual inspection of the trend subplot using the seasonal decomposition approach (Figure 3) and a comparison between observed and predicted suicide numbers (Figure 4)—when compared to the control series.

### Estimating lives saved

ARIMA modeling allowed us to derive point estimates of excess suicides or, positively stated, lives saved by the newsroom intervention (see Schaffer et al., 2021, for how to calculate numbers). The analysis showed a significant monthly increase of about five (4.83) suicides in the control region (see the ramp coefficient reported above). Thus, for the 12-month post-intervention period, this corresponds to 58 excess suicides (i.e.,  $4.83 \times 12 = 57.96$ ) relative to the April 2019 level.

We do not know the actual cause of this increase—several stressors may have been responsible for that, possibly including the emerging COVID-19 pandemic.

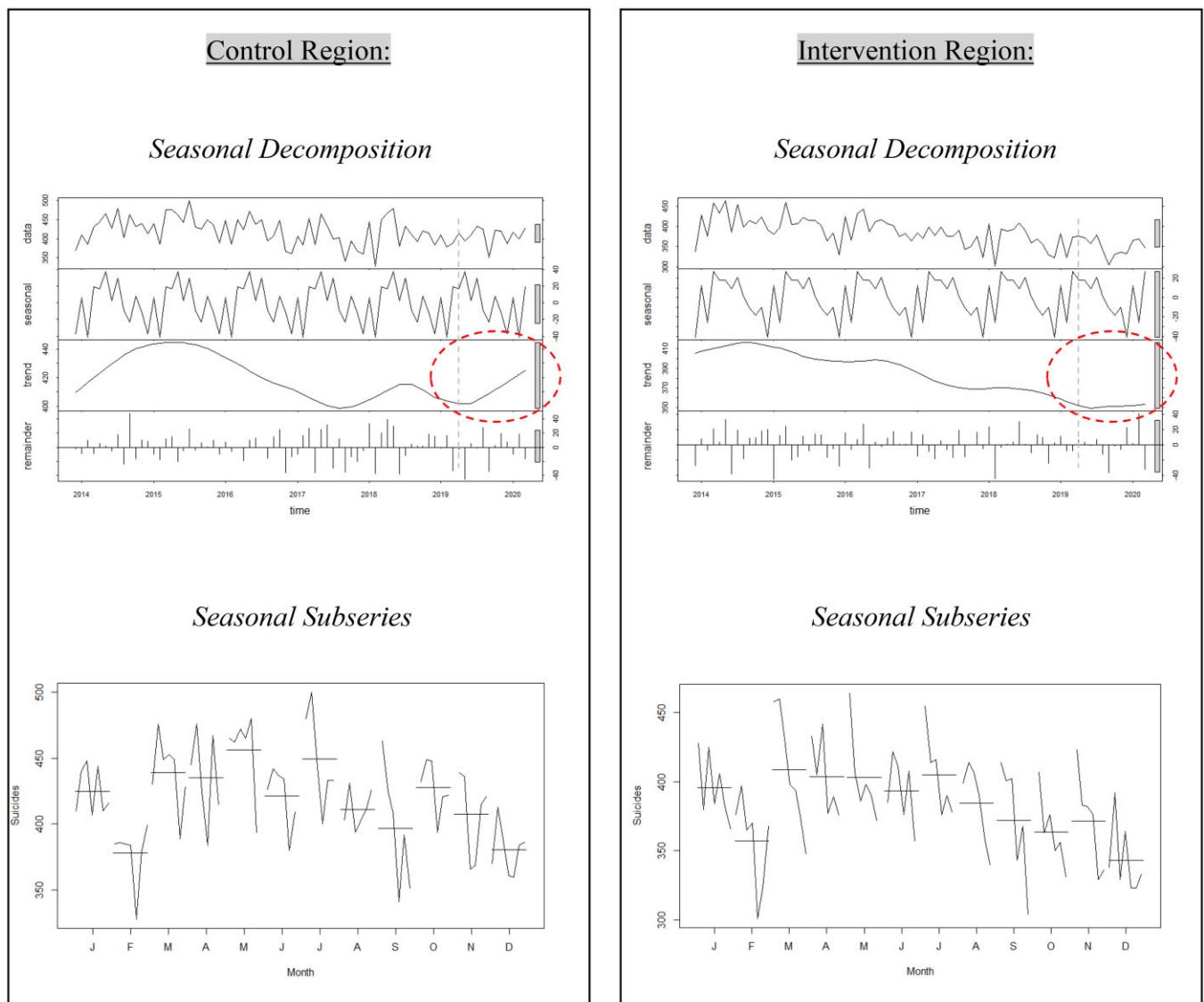
No significant trend was observed in the intervention region. However, the ramp coefficient also had a positive sign and hinted at an increase of 28 excess suicides (i.e.,  $2.33 \times 12 = 27.96$ ) within the post-intervention period relative to April 2019. When additionally considering the step coefficients, we estimated about 35 excess suicides (i.e.,  $-23.19 [\text{step}] + 57.96 [\text{ramp effect for 12 months}] = 34.77$ ) in the control region vs. about 18 excess suicides (i.e.,  $-10.40 [\text{step}] + 27.96 [\text{ramp effect for 12 months}] = 17.56$ ) in the intervention region. Assessing the difference between the intervention and the control regions (see Schaffer et al., 2021), we estimated  $n = 17$  saved lives caused by the intervention (i.e.,  $34.77 - 17.56 = 17.21$ ).

### Additional analysis

The analysis reported above followed a guide for evaluating large-scale health interventions provided by Schaffer et al. (2021), who argued that a comparison between two time series involves running the ARIMA model for the time series of interest (intervention region) and separately for the control series (control region). If a change is observed in one time series but not in the other, this provides evidence that the impact was specific to the intervention. We found a significant increase in suicides in the control region during the post-intervention period, but no significant increase in the intervention region. Importantly, this does not imply that the increase in the control series was significantly different from the increase in the intervention region. Therefore, we conducted an additional analysis. First, we calculated the difference in the number of suicides between the control and intervention regions for each month of the observation period ( $M = 35.20$ ,  $SD = 30.83$ ,  $Mdn = 31.50$ ,  $Min = -28$ ,  $Max = 91$ ,  $skewness = 0.00$ ,  $kurtosis = -0.71$ ). The higher this difference score in a given month, the higher the suicide number in the control region relative to the intervention region. Second, we tested whether this difference score significantly increased during the post-intervention period by using a before–after design. Using ARIMA modeling, we included a before–after dummy variable as the predictor (0 = pre-intervention period, 1 = post-intervention period). The automated *auto.arima()* algorithm identified a  $(0,0,0) \times (0,0,0)_{12}$  model,  $Q = 17.19$ ,  $df = 13$ ,  $p = .191$ . Of importance, this analysis showed a significant effect of the before–after dummy,  $B = 32.13$ , 95% CI  $13.09\text{--}51.18$ ,  $SE = 9.72$ ,  $z = 3.31$ ,  $p < .001$ . This indicates that the difference in suicide numbers between the control and the intervention regions significantly increased in the post-intervention period. Figure 5 provides a visualization.

### Discussion

According to our findings, the intervention was temporarily associated with a difference in suicide numbers between the intervention and control regions. Point estimates indicated 17 fewer suicides in the intervention region during the 12-month post-intervention period as compared to the control region. Importantly, this estimate accounts for seasonal effects, autocorrelation, and trends using ARIMA modeling techniques. Thus, in every month within the year following the newsroom intervention, this analysis estimated that the intervention saved the life of approximately (more than) one individual. We remain very cautious when interpreting this estimate as there are limitations in terms of causal interpretations, which



**Figure 3.** Monthly Suicide Rates in the “Control Region” (Left) and the “Intervention Region” (Right): Seasonal Decomposition and Seasonal Subseries. Note. The “control region” includes States without participating local newsrooms and the “intervention region” includes States with participating local newsrooms. The horizontal lines in the seasonal subseries plots represent the means of the suicide numbers within each month, indicating a seasonal pattern. The gray dashed line in the seasonal decomposition plots represents the intervention. Note the different trends in the seasonal decomposition plots (trend subplots) in both regions after the intervention, indicated by dashed circles.

we will address in the General Discussion section below. Nevertheless, the findings support the claim that high-quality news can save lives.

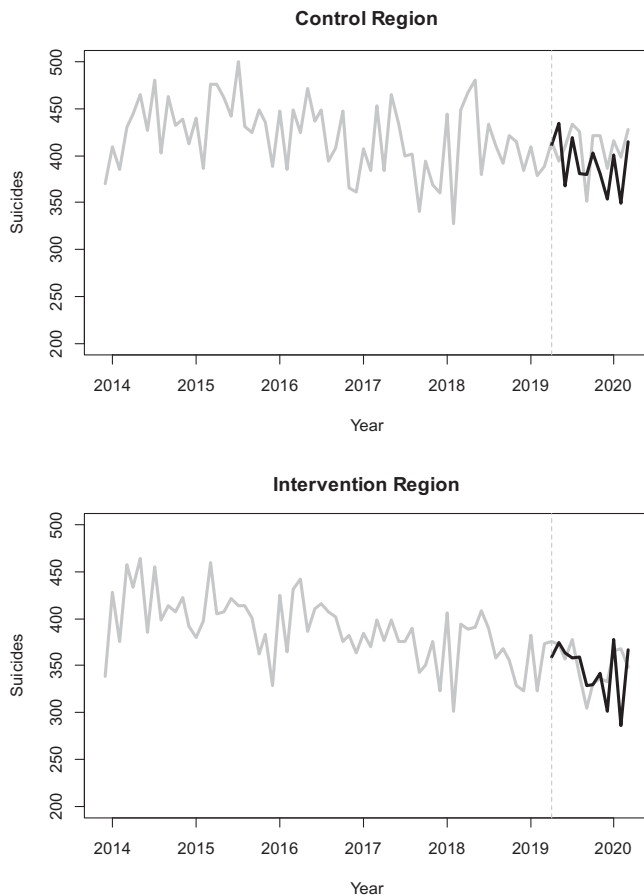
## General discussion

Quality in news reporting has been at the center of numerous heated debates from the seventeenth century up until today. Despite much available (normative) theorizing, there is limited actual empirical evidence for beneficial effects of improved news quality on societal outcomes. It is important to determine whether increasing the quality of news can beneficially influence relevant societal outcomes. We focused on one important topic: suicide, a severe public health threat in which journalism can play a key role. Media guidelines on responsible reporting have been developed to both reduce Werther effects and promote Papageno effects. Unfortunately, knowledge about the effectiveness of (web-based) large-scale

interventions, implemented in the digital age, aiming at raising awareness of high-quality suicide reporting is limited. This lack of empirical knowledge was the starting point for the present study.

## News for life: empirical evidence for fewer suicides

A web-based newsroom intervention targeting entire newsrooms was launched in Germany. Twenty-two newsrooms participated in our web-based training. Study 1’s content analysis of suicide reporting in the news environment of the German press showed that the intervention was temporarily associated with a decrease in the number of Werther stories (see below), while there was no increase in Papageno stories. Study 2 used an interrupted time series analysis to explore the impact of the newsroom intervention on actual suicides. In order to control for possible confounders (including the unexpected emerging COVID-19 pandemic at the end of our observation period), we compared German States without



**Figure 4.** Predicted and Observed Suicides in the Control and Intervention Regions: Interrupted Time Series Analysis Using Autoregressive Integrated Moving Average Models.

*Note.* This figure shows the suicide numbers over time, separately for the “control region” and the “intervention region.” The plots represent observed (gray) and predicted (black) suicide numbers. The latter are predictions derived from ARIMA modeling. Note that in contrast to the ARIMA analysis of the step and ramp effects reported in the body of the text, this observed–predicted comparison relies on predicted values that are based on the baseline period only—they represent forecasts without considering any additional possible stressors such as the emerging COVID-19 pandemic that occurred during the post-intervention period.

participating local newsrooms (i.e., “control region”) with States who had participating local newsrooms (i.e., “intervention region”). This analysis indicated a significant increase in suicides in the control region. Conversely, there was no significant increase in suicides in the intervention region, and ARIMA modeling techniques accounting for seasonality, autoregressive effects, and trends, indicated a total difference of  $n=17$  suicides (point estimate) between both regions within the 12-month post-intervention period. Therefore, point estimates indicated that, on average, (more than) one less person died every month within the year after the intervention in the intervention region. We very carefully interpret this finding and consider it as tentative. Given the relevance of this finding, more research on possible life-saving newsroom intervention effects is essential.

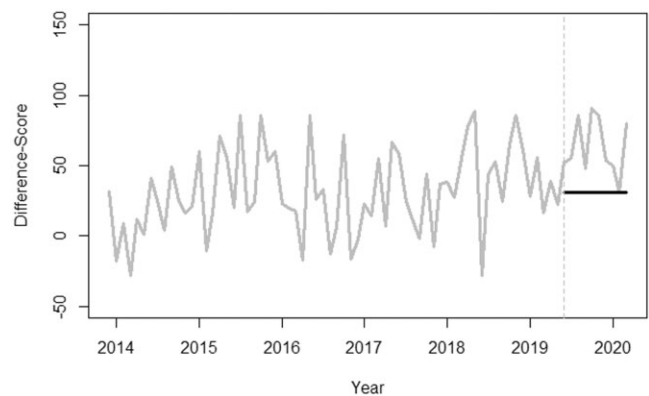
### Theoretical contribution: dampening-the-spikes hypothesis

The longitudinal macro-level design allowed for an important discovery related to the suicide-protective effect’s underlying mechanism. This is of high theoretical relevance: The

newsroom intervention was statistically related to a reduction of detrimental spikes. We interpret this finding insofar as the intervention might have dampened the extent of negative spikes. We put this discovery into the *dampening-the-spikes hypothesis*. Only our large-scale and long-term assessment of daily (macro-level) news coverage—we content-analyzed all German news outlets that were digitally available—using time series techniques was able to reveal this phenomenon.

It may make a fundamental difference in the promotion of suicide-protective effects whether a campaign only targets a *long-term* “chronic” change in news quality or additionally the *dampening of detrimental spikes*, focusing on key suicide events that occur from time to time. Both appear to be important campaign goals, but it might possibly be especially the dampening-the-spikes approach that may help in saving lives. More research on this phenomenon is much needed: What drives life-saving effects to a stronger extent, a “chronic” decrease (i.e., making it better “on average”) or a dampening of the spikes? A thorough theoretical understanding of this question may make future campaigns more effective. A better theoretical understanding may even translate into more lives saved. We offer a starting point for future research by providing post hoc theorizing on this discovery.

When theorizing on the substantial effects of such spikes in news coverage, we may conceptualize the media impact as a *drench effect* (Greenberg, 1988). Using figurative language, “spike days” may be seen as extraordinary “thunderstorms” that are potent and elicit an increase in suicide numbers in the immediate aftermath. Note that previous research observed that the Werther effect seems to be more evident when there is a high amount of (low-quality) coverage, with greater numbers of media items being associated with a stronger effect (Pirkis et al., 2006). We argue that there are generally two broad categories of “drench events” on such spike



**Figure 5.** Difference in Suicide Numbers Between the Control and Intervention Regions.

*Note.* This figure shows a difference score related to the difference in observed suicide numbers between the control and intervention regions. The higher the difference score in a given month, the higher the suicide number in the control region relative to the intervention region in that given month. The plot represents observed (gray) and predicted (black) numbers. Predictions for the post-intervention period were derived from ARIMA modeling using the pre-intervention (baseline) period only—they represent forecasts and can be compared with actually observed scores in the post-intervention period. In the case of the identified  $(0,0,0) \times (0,0,0)_{12}$  ARIMA model (see the body of the text), forecasts appear in the form of a straight (black) line. Note that actually observed numbers were significantly higher compared to predicted numbers (see the body of the text), indicating that the difference in suicide numbers between the control and intervention regions was stronger in the post-intervention period (than what we would have expected based on the pre-intervention period).

days: (1) *celebrity suicides* and (2) *suicides* (of lesser-known people) *with high sensational value*. We provide examples from the observation period of the present study: Regarding the first category of celebrity suicides, Thomas Schäfer, the high-profile Minister of Finance of the German State of Hesse, died by suicide on March 30, 2020, at the very end of our post-intervention period. Schäfer's death is an example of a celebrity suicide that clearly had the potential to result in a negative spike. Indeed, there was a massive spike in reporting by those newspapers that did *not* participate in our campaign (i.e., control newsrooms), as can be seen in Figure 2 (see the last vertical line at the very end of the observation period). Conversely, there was *no* massive spike in the reporting provided by the intervention newsrooms: Figure 2 does not show a vertical line at the very end of the observation period. (Note that this is evidence consistent with the dampening-the-spikes hypothesis.) Regarding the second category of "drench events," that is, suicides (of lesser-known people) with high sensational value, we observed a massive spike for a "crossbow suicide" at the baseline period. There was high media attention placed on this suicide case, including the highest daily number of Werther stories observed throughout the whole observation period, in which the news media speculated about a suicide pact among three individuals. Note that this spike occurred during the baseline period (i.e., *before* our newsroom intervention) and was observable in both the reporting of the control *and* intervention newsrooms (see Figure 2).

As a supplement to drench effects, there can also be a different form of media impact that we may conceptualize as a rather more gradual, cumulative, *drip-drip-drip effect* (Greenberg, 1988). Using figurative language, "drip events" (i.e., all media reporting on suicide that does not include salient celebrity news coverage or suicides with high sensational value) can *individually* be perceived to be of lower risk; however, they may sum up to a "light drizzle"—without necessarily influencing the strength of detrimental spikes. Note that meta-analytic evidence indicates that "general reporting on suicide," a variable that broadly corresponds to reporting on drip events as conceptualized here, seems *not* to be related to increasing suicide numbers (Niederkrötenhaler et al., 2020). We interpret the available evidence to date as follows: (Individual) drip events do not appear to be strongly associated with increasing suicide numbers. However, such effects cannot be ruled out.

Based on our conceptualization of the *media impact as drench and/or drip effects*, we can, in turn, conceptualize the *impact of a newsroom intervention* as an effect related to a *reduction in undesired drench and drip effects* (or the promotion of desired drench and drip effects). Using figurative language, a reduction in the number of "thunderstorms" and episodes of "light drizzle" in the reporting may cumulatively sum up to a measurable long-term impact of a newsroom intervention on suicide numbers. The question of how exactly this happens is unanswered and is a valuable starting point for future research. The findings from the present study, however, seem to indicate that the possible suicide-protective effects of our newsroom intervention instead operated through a dampening of the detrimental spikes—via a reduction in undesired drench effects.

### A field-general theory contribution

It seems reasonable to assume that promoting the quality of news reporting for the greater societal good is relevant in

many different subfields of communication scholarship. In fact, we argue that our findings as well as our theorizing on the dampening-the-spikes phenomenon, including our argumentation regarding drench and drip effects, speaks to a wide range of subfields: One area that is closely related to the present study is, for example, mass shootings. While journalists typically aim to report the full story as precisely and comprehensively as possible, refraining from providing details may help in preventing temporal clusters and copycat behaviors (see Meindl & Ivy, 2017).

Our findings and post hoc theorizing are also of relevance for other subfields such as political communication: Considering the impact that political news coverage can have on a well-functioning democracy, a newsroom intervention may be used to increase voter turnout and/or to reduce political cynicism. Note that heavy exposure to strategically framed political news emphasizing the self-interested nature of the political process has long been assumed to increase cynicism in the citizenry (Cappella & Jamieson, 1997). A future study could assess, for example, if a newsroom intervention can decrease (1) the number of strategically framed news stories about politics (via a content analysis) and (2) political cynicism in the citizenry (via an interrupted time series analysis). Theoretically speaking, such an intervention should also elicit its impact via a reduction in undesired drench and/or drip effects. However, we acknowledge that the relative impact of drench vs. drip effects (and the effectiveness of a reduction thereof via a newsroom intervention) may be conditional and thus depend on the specific context.

### Room for improvement: Papageno stories

Stories of hope and recovery were very rare in the news. Note that our findings seem to point in the direction that it might be easier for campaigns to promote the avoidance of harmful elements rather than the additional use of helpful ones. Arguably, it might be easier for journalists to avoid harmful content elements, such as the method and location, than to additionally include elements that create a Papageno story (which requires journalists to undertake additional research, despite the well-known limited resources of today's newsrooms; see Steindl et al., 2017). This is also a valuable starting point for future research on the effectiveness of different intervention messages. At the heart of our web-based intervention was a self-produced short video that included an expert explaining responsible suicide reporting, how journalists can reduce detrimental Werther effects, and how they can stimulate preventive Papageno effects. Future research could test different versions of such a video, for example, with a stronger emphasis on stories of hope and recovery or by providing more vivid examples of how to easily create and include Papageno stories.

In this regard, we see a conceptual overlap with a more recent concept of journalism that focuses on reporting evidence for effective responses and solutions to social problems, termed *solutions journalism* (see Lough & McIntyre, 2021). The latter is conceptualized as an antidote to the negativity bias in traditional news and encourages contextual, thematic reporting with the aim of increasing trust and empowering audiences. Lessons might be drawn from this literature, helping to promote the integration of Papageno elements in currently dominating, negatively valenced, and problem-focused suicide news.



## Limitations

An interrupted time series analysis is considered one of the best research designs when experimental work is not feasible and/or ethical (Schaffer et al., 2021). However, given that this is an observational design, other factors might have been responsible for the estimated reduction of  $n = 17$  suicides in the intervention region. On the other hand, evaluations of large-scale interventions showed that, when combined with a control series, interrupted time series analysis designs generate very robust findings similar to experiments (Fretheim et al., 2015; Schaffer et al., 2021). Indeed, we used a control series. Although we cannot claim causality, this increased our confidence in causal interpretations. Furthermore, causal claims in interrupted time series analysis are stronger when a clear differentiation of the pre-intervention and post-intervention periods can be made and it works best with outcomes that are expected to change either quickly after an intervention or after a clearly defined lag (Lopez-Bernal et al., 2017). The present study has limitations related to both points. Convincing newsrooms to participate (and their actual participation) needed some time. However, including a ramp effect as a supplement to the basic step effect allowed us to capture effects that developed over time and address the somewhat unclear definition of the start of the intervention. Furthermore, it is possible that the reporting changed due to other reasons than our newsroom intervention. However, small-scale experimental evidence on short-term causal effects in journalism students showed an increase in the quality of suicide news reporting after a similar expert video-based intervention (Scherr et al., 2017), thus, causal effects of the newsroom intervention in this real-world setting seem plausible. Finally, we want to emphasize that this project focused on the news environment provided by the press only. Future studies may expand this perspective by also including television and social media. One anonymous reviewer noted an interesting thought in this regard when questioning whether interventions that target newsrooms also have an impact on stories generated by nonprofessional journalists crafting stories for online dissemination (e.g., via social media).

## Conclusions

The present study is consistent with claims that newsroom interventions about high-quality suicide reporting can beneficially influence reporting quality and contribute to a reduction in actual suicides. All limitations considered, the present study's findings rectify and echo previous calls for high-quality suicide reporting. It appears that it can help in saving lives. Running comparable campaigns in other countries may positively contribute to a reduction in the number of suicides on a global scale. This may positively contribute to reducing suicides as a global public health threat and therefore it seems to be plausible to assume that this may contribute to saving hundreds of lives—every year.

## Supplementary material

Supplementary material is available online at *Journal of Communication* online.

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## Conflict of Interest

Authors report no conflicts of interest.

## Data availability

Research materials, including stimulus materials and data, can be requested by the authors. Please, contact the corresponding author.

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