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The Number and Characteristics of Newspaper and Twitter Reports on Suicides and Road Traffic Deaths in Young People

Jonathan Scourfield, Gualtiero Colombo, Pete Burnap, Rhiannon Evans, Nina Jacob, Matthew Williams, and Sarah Caul

In the light of concern about the harmful effects of media reporting of suicides and a lack of comparative research, this study compares the number and characteristics of reports on suicides and road traffic accidents (RTAs) in young people (aged 11–18) in newspapers and Twitter during a 6-month period. Tweets about young people's suicides were more numerous than newspaper reports. Twitter and newspaper reports were more strongly correlated for suicides than for RTAs. Recent suicides were less likely to be reported in newspapers than recent deaths by RTA. Bullying-related suicides were especially newsworthy. Suicide prevention organizations should consider routinely monitoring social media reporting.

Keywords newspapers, road traffic accidents, suicide, media, Twitter

INTRODUCTION

The field of suicidology has shown considerable interest in newspaper reporting,

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mostly through concern with its potentially negative impact on suicide ideation, attempts, and completion (Sisask & Varnik 2012). In recent years, researchers in this field have started to pay attention to social media material relating to suicide and self-harm (Daine et al., 2013) but there have not been studies which bring together the two different kinds of media—official news outlets and social media communication, which is generated both by journalists and by lay people. Studies of suicidality in social media have not tended to address the role

of social media platforms in referring to or reporting on specific deaths. This paper considers the interface between conventional news and social media through the analysis of youth suicide reporting in England. The aim of this analysis is to explore the relationship between social media and newspaper reporting of youth suicide and to describe the characteristics of the suicide cases which are most newsworthy in both kinds of media. The study focuses on the micro-blogging platform Twitter, because this is a heavily used site, which is predominantly used for the propagation of news (Kwak, Lee, Park, & Moon, 2010).

BACKGROUND

It is quite widely recognized that media reporting of suicide is associated with suicidal behavior. Certain types of media reporting of suicide have been shown to increase the risk of “contagion” amongst vulnerable individuals (Sisask & Varnik, 2012). In particular, this applies for articles that sensationalize suicide, contain explicit descriptions of the means of suicide, or portray it as a legitimate solution to one’s problems (Liu et al., 2007). Such reporting has been linked with real increases in population suicide, as well as influencing the use of certain methods of suicide and increasing the potential for suicide clusters (Gould, Kleinman, Lake, Forman, & Midle, 2014; Hawton & Williams, 2002; Stack, 2000). This process of suggestion was termed the “Werther effect” by Phillips (1974), with reference to Goethe’s novel *The Sorrows of Young Werther* which, on publication, is said to have prompted imitative behavior, leading to the banning of the book in some places.

Features of stories that studies have found to be especially newsworthy in various countries include suicides using less common or dramatic methods, suicides taking place in commercial areas or in medical and residential facilities, and suicides alongside multiple fatalities (Machlin, Pirkis, & Spittal, 2013; Pirkis, Burgess, Blood, & Francis, 2007). In terms of demographics, studies have found suicides in women and those with foreign citizenship to be more reported (Niederkrotenthaler et al., 2009; Pirkis et al., 2007) and suicides in the youngest age group have been found to be more newsworthy (Fu, Chan, & Yip, 2011; Machlin et al., 2013; Niederkrotenthaler et al., 2009) although Pirkis et al. (2007) found older suicides to be more reported.

Despite there being a potential process of suggestion, it is also possible for media reporting to have an important role in the prevention of suicide. Articles that are non-sensationalist, avoid disparaging terms, avoid describing the method of suicide in any detail, and offer a commentary on people adopting constructive coping mechanisms in the face of adversity have been linked with decreases in suicide rates. This effect has been termed the Papageno effect, referring to a character in the *Magic Flute* who is persuaded against suicide (Niederkrotenthaler et al., 2010).

The potential for both suicide contagion and limitation has been studied in relation to traditional news media, such as newspapers and broadcast news. However, the increasing dominance of the Internet has led to it becoming an increasingly powerful form of information media. Recent surveys have shown that 40% of the British population consume news online, with this medium now being more popular than print media (Ofcom, 2014). Moreover, the increasingly participatory

nature of the Internet, enabled by the technology of Web 2.0, means that users not only receive information but actively create and exchange their own content. Social media is now fundamental in the way people and organizations communicate and share ideas, opinions, and information (Luxton, June, & Fairall, 2012). Such participatory and user-generated content on social media has been recognized as a source of potential insights into a range of societal and geographical trends from problem drinking to monitoring earthquakes (Sakaki, Okazaki, & Matsuo, 2010; West et al., 2012). Significantly, the social media platform Twitter has been used to demonstrate that conversations indicative of suicidal ideation in the United States are associated with the wider state-level suicide rate, thereby highlighting the potential of the platform in exploring and understanding suicidal behavior (Jashinsky et al., 2014).

Social media's potential as a tool to monitor and track behavior is now becoming realized (Procter, Vis, & Voss, 2013; Williams & Burnap, 2016). However, despite the considerably different nature of these new media in comparison with the more traditional forms, many of the same concerns abound about its influence on suicidal behavior. In relation to suicide contagion for instance, there has been much speculation about the potential for suicide pacts to emerge through the Internet. Discussion forums and specific suicide-related sites that promote suicide through encouragement and detailed information on how to complete the act have been linked with suicide contagion (Alao, Yolles, & Armenta, 1999; Janson et al., 2001; Prior, 2004). Indeed the phenomenon of suicide pacts has been found to be facilitated by such forums, bringing together previously unknown individuals

to plan and carry out their death (Naito, 2007). However, digital cultures and practices are in a constant state of flux, resulting in studies quickly becoming outdated when interest moves on to new platforms. Indeed it has been noted that the once prevalent suicide and self-harm forums have fallen out of favor, with users' interest moving to new forms of social media and microblogging sites instead (Harris & Roberts, 2013).

Evidence for the risks of contagion from these microblogging sites is scant, despite there being considerable concern about the use of such platforms in the aftermath of youth suicides, for example in the case of the 2008 Bridgend cluster in the UK (Jones et al., 2013) and a few highly publicized individual cases. One study has examined possible contagion effects on suicidal behavior via social media and microblogging sites, in particular changes in suicidal ideation as a result of exposure to different sources of suicide stories (Dunlop, More, & Romer, 2011). Whilst social media sites were frequently reported as a source of information about suicide, this was not found to be associated with increases in suicidal ideation. However, online discussion forums were both cited as sources and associated with increases in ideation in this study. It should be noted however that research into contagion, the Internet and social media use is really in its infancy, and whilst there is evidence to suggest contagion is an important issue, any direct associations with Internet use are still relatively tentative (Daine et al., 2013).

The potential support afforded by social media and microblogging sites has also been highlighted as important (Daine et al., 2013). Such sites can provide space for vulnerable individuals free of judgement, thereby alleviating any feelings of

shame they may feel as well as offering opportunities to develop relationships and connect with others (Smithson et al., 2011). The informal support provided by such platforms, particularly microblogging sites, is becoming recognized (Lewis & Michal, 2016), although as there is currently no evidence of effectiveness for professional suicide prevention programs using such sites (Jacob, Scourfield, & Evans, 2014), their potential for prevention can only be speculated.

Although there has been recent research attention paid to the role of social media communication in either normalizing or preventing suicidal behavior, there is a surprising lack of evidence about the role of social media in referring to and reporting on actual suicide cases and the communication of deaths by suicide through social media. Moreover, little is known about how this communication relates to conventional news media and what kinds of cases are considered to be newsworthy in social media. There is also a general lack of control conditions in studies of media (of all kinds) in relation to suicide. In particular, there is a lack of comparison with the reporting of other sudden young deaths. The sudden death of a young person is shocking and therefore likely to result in news reports at least at a local level. Little is known about whether suicide is uniquely newsworthy, when compared with other kinds of sudden death. It is important for suicide prevention to better understand what, if anything is distinctive about the reporting of suicide, in all kinds of media. With these research gaps in mind, the present study was guided by the following research questions:

1. Is there a correlation between the reporting of youth suicide

cases in newspapers and in the micro-blogging site Twitter? (And is there a stronger correlation for youth suicides than for other sudden deaths in young people?)

2. Which characteristics of sudden deaths in young people are associated with higher numbers of reports in Twitter and newspapers?
3. What is the overall number of reports per case of suicides in newspapers and Twitter and how does this compare with other sudden deaths in young people?
4. Are youth suicides more likely to be reported than other sudden deaths in young people?

METHOD

This section describes the methods used in the data collection for both teenage suicide cases and Road Traffic Accidents (RTAs), with the latter used as a comparison group as they represent another kind of sudden death in young people of the same age. For all cases we have collected daily the related newspaper reports and postings on the micro-blogging platform Twitter. Ethical approval for the study was granted by Cardiff University School of Social Sciences Research Ethics Committee.

Data

Identifying Cases. A “case” was defined as any death by suicide or RTA of a young person aged 11–18 in England that was reported in a newspaper from February 1 to July 31, 2014. Reports included both deaths that happened within the study period and earlier deaths with inquests reported in the study period. Inclusion criteria for the suicide cases were as follows:

- Suicide is explicitly mentioned as the cause of death.
- An inquest reported an open verdict or a suicide verdict. Deaths recorded at inquest as “accidental” were not included.
- The method clearly indicates the intention to self-harm (e.g., non-accidental hanging, jumping onto train tracks etc.).

An inclusive definition of RTA deaths was used, encompassing any death apparently caused by a road accident, as long as there was no suggestion of suicide. The deceased included both drivers and passengers of cars, motorbikes and in one case a mini-bus. They also included pedestrians and young people riding bikes.

Daily news reports were monitored from two different sources:

- a. The on-line service Nexis (UK).¹ This is a comprehensive newspaper database, updated daily, that provides full text access. For this collection, the UK regional newspaper database was used. It was hypothesized that any suicide reported in national newspapers would also be reported in regional papers, but not vice versa. Nexis allows users to conduct searches using up to three sets of keywords, so the following words and phrases were used, with the asterisk denoting any letter:
 - “suicid**,” “hanged,” “overdose,” and the combination of the words

“took” or “taken” and “own life,” to monitor deaths by suicide.

- “killed” or “died” and “teen****” or “youth,” to monitor RTA deaths.

From the set of retrieved articles, a daily manual inspection was needed to filter the articles relevant to our investigation (actual suicide and RTA cases happening in England and within the age range considered)

- b. RSS (Rich Site Summary) on-line services. RSS readers are desktop client software or web applications that aggregate syndicated web content such as online newspapers, blogs, podcasts, and video blogs that are made available from news-related sites, weblogs and other online content providers. A list of RSS feeds was constructed from the published list of all UK local papers provided by The Newspaper Society (accessible online)² filtered for English publications only. This resulted in a dataset of 545 URLs accessible for RSS feeds collection.

RSS news feeds were monitored daily through an automated procedure that collected any posts containing any of the keyword searches listed in a) above, either in the article title, the news summary, or in the raw text returned by the feed (for those feeds which made this available). News text can be extracted from any web page or feed using a number of third-party services, such as reading list software, sentiment analysis, or natural language processing tool, usually accessible through APIs (Application Programming Interfaces).

¹<http://www.lexisnexis.com/uk/nexis/search/loadForm.do>

²<http://www.newspapersoc.org.uk/a-to-z-of-local-newspaper-websites>

The AlchemyAPI³ tool was used for text extraction and subsequently Named Entity Recognition was applied, using the Natural Language Toolkit library (NLTK),⁴ to further collect person names from the retrieved articles. Finally, a daily manual inspection was performed to filter the cases in relation to our specific age and geographical criteria.

Monitoring Newspaper and Twitter Reports. To ensure adequate coverage over the six-month period, the monitoring and collection of reports of deaths continued for a fortnight after the end of the study period (so until August 15, 2014) although any death which was first reported after July 31, 2014 was disregarded. This decision was based on the finding that tweet cycles have two weeks duration after an apparent spike (Burnap et al., 2014).

A database was set up of the number of newspaper report by case per day. These frequencies were obtained from the Nexis database service, through retrieval of news articles containing the name of the deceased, this time extending the search to all UK publications, both regional and national. A second database consisted of all tweets worldwide that mentioned the name of the deceased. These were collected using the Twitter API service (REST API version 1.1).⁵ It is possible to limit data collection to Twitter accounts that have selected the London time zone or whose profiles include UK place identifiers (see Sloan et al., 2013) but this would not be guaranteed to capture every tweet originating in the UK. Hence the decision was taken to search all tweets worldwide.

A standardized procedure was used for removing false positives. These were primarily caused by namesakes, which could be numerous since we collected tweets worldwide. Both automated and manual methods were used for filtering out relevant posts. First, automated procedures identified the most relevant terms characterizing each specific case, via Term Frequency-Inverse Document Frequency (TF-IDF) for computing the most frequently used terms (Manning, Raghavan, & Schütze, 2008) and Latent Dirichlet Allocation (LDA), a statistical topic model that allows sets of observations to be explained in terms of similarity between parts of the data (Blei, Andrew, & Jordan, 2003). Of these two techniques, the former produced the most effective results.

Despite initially intending to apply these methods within an automated procedure by subsequently filtering the tweets containing the most frequent words, a more in-depth analysis revealed that in many cases the most used words belonged to unrelated cases—tweets about namesakes that were re-tweeted many times and became viral. However, these methods were successful in filtering out unrelated tweets based on the inclusion of frequent words highlighted by the computerized methods above, after a manual investigation revealed those tweets as unrelated to our cases.

Analysis

A Spearman's rank-order correlation was calculated in the statistical software Stata 14, to test the correlation between Twitter and newspaper reporting of cases. The data used for this test were the daily count of reports in both types of media that mentioned the names of the deceased and also the number of reports in 48-hour

³<http://www.alchemyapi.com>

⁴<http://www.nltk.org>

⁵<https://dev.twitter.com/rest/public>

intervals, recognizing that newspapers can sometimes be slower to report events than social media.

To investigate which features of cases were associated with a higher report count, it was first necessary to identify a peak in reporting, because some cases attracted more than one phase of intensive reporting, e.g., a peak when the death was first reported, followed by a later peak when the inquest was reported. The cut-off point for a peak was defined as one standard deviation away from the mean daily report rate for that case. For each case, we then considered a period of 48 hours from the start of a peak and then analyzed the nature of the posts/reports within this period by coding their content against a number of variables that were derived inductively from inspection of the reports. The duration of the peak was determined on the basis that peaks tend to expire, on average, two days after an apparent spike in a plot of tweet count vs. time (Burnap et al., 2014). The variables identified were as follows (all assuming binary values):

- Age of deceased (<16 v 16+)
- Gender (M/F)
- Is the death within the study period? (Y/N)
- Has a link ever been made to another case? (Y/N)
- Has there been any related campaign or petition? (Y/N)
- Has there been any memorial event or fundraising? (Y/N)
- Is there a related conviction? (Y/N)
- Does the deceased have a criminal history? (Y/N) (suicides only)
- Has the case resulted in an open verdict? (Y/N) (suicides only)
- Has bullying ever been reported? (Y/N) (suicides only)

- Has a social media connection ever been reported? (Y/N) (suicides only)
- Has there been a related research study or documentary? (Y/N) (suicides only)

As can be seen in the list above, several of these characteristics only applied to suicides and not to RTAs, either on a theoretical basis, because they were not relevant to an accidental death (e.g., social media connection, bullying), or empirically, because their incidence in RTA reports was too low for their inclusion to be meaningful (deceased's criminal history). The variable "campaigns and petitions" refers to attempts to generate support for a specific cause via social media. Examples were a petition to close a particular web site and a campaign to stop cyber-bullying. A separate variable was used to record the presence or absence of fundraising for memorial events and other tributes. Where there could be any doubt about the coding of campaigns, petitions, memorials and fundraising, agreement was reached within the research team to improve reliability. A distinction was also made between the criminal history of the deceased and a conviction related to the death, featuring the deceased as victim.

To determine which features of cases resulted in a higher count of reporting, negative binomial regression was used. There exists a growing methodological and empirical literature on regression models for count data (see Land, McCall, & Nagin, 1996; Zorn, 1998). Linear regression models are not appropriate for count variables given the nonlinear distribution of the data. Count models are suited to this kind of data as they are built on assumptions about error distributions that are consistent with the nature of rare events (Cameron & Trivedi, 1998). Negative binomial regression was found

more appropriate than Poisson given the skewed distribution and over-dispersion of the data (conditional mean not equal to the conditional variance). In total there were four regression models, to cover Twitter and newspaper reporting separately for each type of death (suicides and RTAs), assuming as dependent variable the number of reports contained within a peak period and as independent variables the characteristics listed above. Incidence-rate ratios were produced.

Descriptive statistics were produced to compare the rate of reports per case, for each type of death and each type of media. Effect sizes (Hedges's g) were calculated to assess the difference between suicides and RTAs for each type of media. The relative risk of RTAs and suicides being reported at all was calculated from mortality data for 11–18-year-olds dying by suicide (including open verdicts) or RTA during the study period, provided to the study team by the Office for National Statistics.

As recommended by Gorard (2014), the paper does not include standard errors, confidence intervals, or claims about statistical significance. Interpretation using inferential statistical techniques is only suitable for data generated using random probability sampling. Inferential techniques are based on the underlying assumption of random samples, and not samples (however “representative”) selected in any other way. Therefore, inferential statistical tests used on non-random samples cannot produce useful information (Gorard, 2016; Shaver, 1993). In the statistical analysis of non-random samples, only the effect sizes associated with variables and their contribution to the fit of the model need be considered.

RESULTS

This section presents the results obtained after analyzing the whole six months'

collection, which resulted in 81 reported cases of suicide (with 23 deaths happening during the monitored period and 58 being inquests on cases) and 68 reported RTAs (29 within the period and 39 inquests).

Correlation Between Newspaper Reporting and Social Media Posts

The Spearman's rank-order correlations for newspaper and Twitter reporting of all suicides (not broken down by case) were moderate at 0.588 for daily frequencies and very strong at 0.897 for frequencies grouped every 48 hours.

The retrieval of tweets by given name and family name of the deceased was based on the inclusion of them either in the text of the Tweet or in the URL link to the original news article. There was a skewed distribution of case-by-case daily correlations, i.e., whether or not a case was reported at all in both types of media. The mean value (60%, [SD 37%]) was lowered by the high number of cases presenting a correlation of zero percent, whereas the rest of the distribution was skewed toward higher correlations.

The Features Associated with Volume of Reports in Newspapers and Twitter

Frequencies of story characteristics, for both types of media and both types of death, are presented in Table 1. These refer to 48-hour peaks.

Suicides. Table 2 shows the negative binomial regression results for reporting of suicides. Model diagnostics indicate a robust fit to the data in both models. The McFadden's R^2 values indicate that only a small proportion of the variance is explained by the independent variables in the models (consistent with related work

TABLE 1. Characteristics of Stories in Twitter and Newspapers (Suicides and RTAs)

	Twitter		Newspapers	
	Suicides: <i>n</i> (%)	RTAs: <i>n</i> (%)	Suicides: <i>n</i> (%)	RTAs: <i>n</i> (%)
N of 48-hour story peaks	93	66	112	76
Age of deceased—<16	41 (44.1%)	18 (27.3%)	50 (44.6%)	18 (23.7%)
—16+	52 (55.9%)	48 (72.7%)	62 (55.4%)	58 (76.3%)
Gender—Male	52 (55.9%)	37 (56.1)	56 (50.0%)	41 (54.0%)
—Female	41 (44.1%)	29 (43.9%)	56 (50.0%)	35 (46.1%)
Death within the study period	25 (26.9%)	29 (43.9%)	38 (33.9%)	34 (44.7%)
Case resulted in an open verdict	13 (14.0%)	N/A	28 (25.0%)	N/A
Bullying ever been reported	25 (26.9%)	N/A	31 (27.7%)	N/A
Social media connection ever been reported	24 (25.8%)	N/A	25 (22.3%)	N/A
Link ever been made to another case	30 (32.3%)	8 (12.1%)	26 (23.2%)	9 (11.8%)
Any related campaign or petition	18 (19.6%)	12 (18.2%)	29 (26.1%)	11 (14.5%)
Deceased has a criminal history	6 (6.5%)	N/A	9 (8.0%)	N/A
A related conviction	11 (11.8%)	24 (36.4%)	11 (9.8%)	28 (36.8%)
Memorial event or fundraising	12 (12.9%)	15 (22.7%)	15 (13.4%)	16 (21.1%)
Related research study or documentary	9 (9.7%)	N/A	10 (8.9%)	N/A

in the social sciences). Suicides with associated campaigns increased the count of suicide-related tweets by a factor of near ten (IRR = 9.70), compared to those without, and suicides in young women increased the count of suicide related tweets by a factor of three, compared to suicides in young men (IRR male: female = 0.32). Cases featuring bullying had a greater count of reports than those that did not, in both Twitter (IRR = 4.43) and newspapers (IRR = 1.80). Having a link with another case (e.g., by happening soon after, in the same area, or being potentially connected via social media) resulted in a higher count of newspaper reports, when compared with cases that had no link (IRR 1.79). Similarly, a social media dimension to a story—for example a case ostensibly involving cyber-bullying or use of self-harm-related websites—resulted in a greater count in newspapers (IRR 1.64). There was no strong evidence of increased

attention to recent deaths, compared to older deaths whose inquests were reported on. Although in Twitter there was weak evidence of more reporting of recent deaths, in newspapers the level of reporting of these two categories of suicide was roughly equal.

Road Traffic Accidents. The overall correlation values for tweets and newspaper reports about RTA cases are lower than those obtained for suicides, at 0.476 for daily frequencies and 0.520 for frequencies grouped every 48 hours. The mean per-case correlation was also lower than for suicides, at 51%.

Table 3 presents the findings of the negative binomial regression analysis for the RTAs. Model diagnostics indicate a robust fit to the data in both models. McFadden’s R² statistics are slightly lower for news reports than for tweets. If the young person dying in an RTA was 16 or

TABLE 2. Multi-Variate Negative Binomial Regression Models: Count of Suicide-Related Tweets and Newspaper Reports Within 48-hours of a Peak

Feature of story	Tweets (<i>n</i> = 93)			News reports (<i>n</i> = 112)		
	IRR	coeff.	<i>z</i>	IRR	coeff.	<i>z</i>
Deceased is aged >16	1.04	0.04	0.09	1.17	0.16	0.77
Deceased is male	0.32	-1.14	-2.82	1.16	0.15	0.79
Death within study period	2.26	0.81	1.84	1.01	0.01	0.06
Bullying	4.43	1.49	2.82	1.80	0.59	2.46
Social media dimension	1.10	0.10	0.19	1.64	0.49	2.13
Link with case	1.04	0.04	0.10	1.79	0.58	2.56
Campaigning	9.70	2.27	3.32	1.35	0.30	1.19
Criminal history	1.29	0.25	0.24	0.69	-0.37	-0.90
Related conviction	3.12	1.14	1.91	1.88	0.63	1.92
Memorial/fundraising	0.69	-0.37	-0.63	1.02	0.02	0.07
Research/documentary	0.21	-1.55	-1.94	0.77	-0.26	-0.67
Log likelihood		-399.00			-289.07	
Chi-square		46.48			24.75	
<i>p</i> -value		<i>p</i> < .001			<i>p</i> = .01	
McFadden's R ²		0.06			0.04	
LR test of alpha = 0		<i>p</i> < .001			<i>p</i> < .001	

under, the count of death-related tweets increased by a factor of 2.5, compared to over-16s dying in an RTA (IRR for >16: ≤16 = 0.40). Female deaths were more reported than male deaths in both Twitter (IRR male: female = 0.43) and newspapers (IRR = 0.59). A death through RTA that happened during the study period increased the count of death-related tweets by a factor of 2.83, compared to a less recent RTA death. In newspapers there was also an increased number of reports for deaths during the study period (IRR = 1.89). Deaths that were linked to another case were reported more often in newspapers than deaths that were not (IRR = 2.88).

Are Suicides Reported More Than RTAs?

Descriptive statistics comparing the two types of death in terms of reports per

case are presented in Table 4. In Twitter, the mean number of reports per case is 2.33 times higher for suicides than for RTAs, however, the median number of tweets per case is very similar, both types of death having many cases with zero tweets. Standard deviations are large, with outliers for both types of death, so the effect size, comparing reports in Twitter for both types of death, is small at 0.27. In newspapers there is little difference between the mean number of reports per case for suicides and RTAs (ES = 0.07). The number of Twitter mentions is far higher than the number of newspaper reports for both types of death. For suicides, the mean rate of mentions per suicide case in Twitter is 10.5 times the mean rate in newspaper reports.

As noted earlier, there were 29 English teenage RTA deaths reported in newspapers that occurred during the study period,

TABLE 3. Multi-Variate Negative Binomial Regression Models: Count of RTA Death-Related Tweets and Newspaper Reports Within 48-hours of a Peak

Feature of story	Tweets (n = 66)			News reports (n = 76)		
	IRR	coeff.	z	IRR	coeff.	z
Deceased is aged >16	0.40	-0.91	-2.69	0.84	-0.17	-0.79
Deceased is male	0.43	-0.71	-2.54	0.59	-0.53	-2.63
Death within study period	2.83	1.04	3.07	1.89	0.64	2.71
Link with case	0.77	-0.26	-0.54	2.88	1.06	3.56
Campaigning	1.18	0.16	0.42	0.80	-0.23	-0.84
Related conviction	0.99	-0.01	0.04	1.18	0.16	0.72
Memorial/fundraising	1.79	0.58	1.64	1.43	0.36	1.55
Log likelihood		-265.87			-195.45	
Chi-square		51.65			29.10	
p-value		p < .001			p < .001	
McFadden's R ²		0.06			0.03	
LR test of alpha = 0		p < .001			p < .001	

TABLE 4. Comparison of Reports Per Case in Twitter and Newspapers: Suicides and Road Traffic Accidents (RTAs)

n of cases	Twitter reports					Newspaper reports			
	Mean (SD)	Median	IQR	ES*	Mean (SD)	Median	IQR	ES*	
Suicides 81	125.98 (334.44)	15	2-60	0.27	12.00 (15.56)	5	2-16	0.07	
RTAs 68	54.09 (148.66)	14	3-45		10.88 (15.97)	7	3-11		

*Hedges's g.

compared with 23 teenage suicides. Of course, this does not represent the real rate of these deaths in the population, but only the rate of media-reported deaths. Mortality rates for the 11-18 age group during the study period show there were 30 RTA deaths and 45 suicides. The relative risk of being reported for RTAs is therefore 1.89 (95% CI 1.41, 2.54).

DISCUSSION

The reporting of suicide is an important issue for prevention because the quality and amount of reporting have been found

to be associated with variation in suicide rates. The micro-blogging platform Twitter is commonly used for the reporting of news by both professional news outlets and lay users. Before we can improve reporting of suicide, with the aim of preventing deaths, we need evidence about the volume and character of reporting, including in social media platforms such as Twitter.

Comparing the reporting of deaths that occurred within the study period with previous mortality statistics suggests that suicides are clearly less newsworthy than RTAs once the mortality rate is taken into account. Arguably there may be an

implicit assumption in some research on media reporting of suicide that self-inflicted deaths are uniquely newsworthy. If such an assumption is made by some researchers, it is certainly challenged by the comparison of suicide and RTA deaths that occur within the study period. If suicides are less likely to be reported close to the time of death this may be because it is unclear whether or not the death was self-inflicted. It may also be because these are more private events, with the cause of death less publicized, due perhaps in part to the stigma surrounding suicide (Sudak, Maxim, & Carpenter, 2008).

Considering all deaths reported in the study period, including those whose inquests were taking place, the number of newspaper reports per case is very similar for suicides and RTA deaths, further emphasizing that caution may be needed in separating out suicide from other sudden deaths in young people in research on media reporting. There is some difference in the “newsworthiness” of suicide in Twitter, compared with RTAs, with a higher mean tweet rate per case for suicides, driven by a small number of cases that attracted a large number of tweets, with the median tweet rate being very similar). The social and psychological contexts of suicide cases are perhaps more likely to have a moral dimension (see Coyle & MacWhannell, 2002; Owens, Lambert, Lloyd, & Donovan, 2008) that stimulates campaigns and debate in Twitter than is true for RTAs. It could also be argued that suicides are uniquely shocking and that although any sudden death can shock, the idea that someone has decided to take their own life is more existentially challenging than the occurrence of an accident. Because it implies the deliberate choice of death over life, a suicide challenges the fundamental

norms and values of society and therefore needs to be morally accounted for.

The reporting of suicides was more highly correlated between newspapers and Twitter than the reporting of RTAs and the strongest correlation was for the overall volume of suicide reporting (i.e., not matched by individual case) over a 48-hour period, possibly because this longer unit of time allows newspapers to catch up with events that may first be reported in social media, or vice versa. For suicides, and not for RTA deaths, *campaigning*—i.e. seeking support for a specific change to policy or behavior that is linked to a young person’s death—was associated with a much higher number of postings in Twitter. We could speculate that the causes of RTA deaths are more familiar, so less likely to prompt campaigns, whereas there are some relatively newer features associated with youth suicides, especially the role of social media itself, through alleged “cyber-bullying.” There was a fairly high percentage of zero correlations per suicide case between Twitter and newspapers and there are a number of reasons for this. Memorial R.I.P. messages in Twitter from family and friends of the deceased are typically not matched by a newspaper report and in some cases these happen before the death has been reported in newspapers. Some cases of death reporting initially have a very low coverage in newspapers, often resulting in only one or two articles appearing in local publications. This low level of reporting tends not to cause any spike of attention within Twitter.

The fact that bullying is associated with greater number of reports of suicides in both kinds of media suggests that it is an especially newsworthy feature (Wayne, 2013). So-called “cyber-bullying” is especially topical. Arguably, bullying is a (currently) familiar mono-causal explanation for a

phenomenon that is in fact multi-faceted and rarely reducible to a single factor.

There was no strong evidence of differential reporting of recent suicides, compared with inquests. The attention paid to the two categories of suicide in newspapers was very similar. This is an important point to note, given the tendency of previous research on media reporting of suicides to ignore the reporting of inquests. There was a suggestion of more mentions of recent suicides than inquests in Twitter, which might make sense in terms of the immediacy of social media reporting. The greater attention in Twitter, though not in newspapers, to suicides in young women might perhaps be explained by the rate of completed suicide being about three times lower in women than in men, so lay people may therefore be more likely to consider a woman's suicide worthy of comment. Previous research has also found disproportionate attention to suicides in women (of all ages) in newspaper reporting (Fu et al., 2011; Pirkis et al., 2007). The interaction of the two kinds of media is brought into relief by the apparently greater attention in newspapers to suicide cases with a social media dimension.

It is important to note the study's limitations. Reports and mentions of the deceased were monitored for only six months and a longer period of monitoring would result in larger and possibly more representative samples of reported deaths. The sample consisted only of cases reported in newspapers, rather than all cases. This strategy is justifiable since it is precisely the reporting that is being studied, however some other deaths may have been reported only in Twitter and not in newspapers. Only one social media platform was used in the study, selected because it is dominated by news reporting (Kwak et al., 2010). Twitter has a particular style and rigid format—140 characters at the time of the study. This places some limits on its

content, although it should be noted that multiple tweets are possible. Other social media platforms may contain more lengthy and introspective blogs about suicide cases—an example might be Tumblr which is popular for sharing images of self-harm (Jacob, Evans, & Scourfield, 2017).

CONCLUSION

This is the first study to compare the reporting of suicide cases in social media and conventional media. It is important that research in this field is extended to longer time-frames, other age groups, countries, and social media platforms. The study demonstrates that, in newspapers, the attention paid to inquests on suicides is roughly equal to the attention paid to recent deaths, arguing for more research on the reporting of inquests, which has not to date been the focus of many studies. More research is also needed which uses a control group of another kind of sudden death, to get beyond the often untested *a priori* assumption that suicide reporting is unique. Furthermore, it is important to study audience reactions to the reporting of suicides in social media, compared with traditional news media. There is potentially scope for the kind of media monitoring that some suicide prevention organizations (e.g., Samaritans in the UK) currently undertake to be extended to social media platforms such as Twitter, to ensure good quality reporting which contributes to reducing stigma and encouraging help-seeking.

AUTHOR NOTE

Jonathan Scourfield, Cardiff University School of Social Sciences, Cardiff University, Cardiff, UK.

Gualtiero Colombo and Pete Burnap, Cardiff University School of Computer

Science and Informatics, Cardiff University, Cardiff, UK.

Rhiannon Evans, Cardiff University School of Social Sciences, Cardiff University, Cardiff, UK.

Nina Jacob, Cardiff University Centre for Trials Research, Cardiff, UK.

Matthew Williams, Cardiff University School of Social Sciences, Cardiff University, Cardiff, UK.

Sarah Caul, Office for National Statistics, Newport, UK.

Correspondence concerning this article should be addressed to Jonathan Scourfield, Cardiff University School of Social Sciences, Cardiff University, The Glamorgan Building, King Edward VII Avenue, Cardiff, CF10 3WT, UK. E-mail: Scourfield@cardiff.ac.uk

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REFERENCES

- Aiao, A., Yolles, J., & Armenta, W. (1999). Cybersuicide: The Internet and suicide. *The American Journal of Psychiatry*, *156*(11), 1836–1837. doi:10.1176/ajp.153.7.861
- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent Dirichlet allocation. *Journal of Machine Learning Research*, *3*(4–5), 993–1022.
- Burnap, P., Williams, M. L., Sloan, L., Rana, O., Housley, W., Edwards, A., ... Voss, A. (2014). Tweeting the terror: Modelling the social media reaction to the Woolwich terrorist attack. *Social Network Analysis and Mining*, *4*(1), 1–14. doi:10.1007/s13278-014-0206-4
- Cameron, A. C., & Trivedi, P. K. (1998). *Regression analysis of count data, econometric society monograph No.30*. Cambridge: Cambridge University Press.
- Coyle, J., & MacWhannell, D. (2002). The importance of ‘morality’ in the social construction of suicide in Scottish newspapers. *Sociology of Health & Illness*, *24*(6), 689–713. doi:10.1111/1467-9566.00314
- Daine, K., Hawton, K., Singaravelu, V., Stewart, A., Simkin, S., & Montgomery, P. (2013). The power of the Web: A systematic review of studies of the influence of the Internet on self-harm and suicide in young people. *PLoS One*, *8*(10), e77555. doi:10.1371/journal.pone.0077555
- Dunlop, S. M., More, E., & Romer, D. (2011). Where do youth learn about suicides on the Internet and what influence does this have on suicidal ideation? *Journal of Child Psychology & Psychiatry*, *52*(10), 1073–1080. doi:10.1111/j.1469-7610.2011.02416.x
- Fu, K., Chan, Y., & Yip, P. S. F. (2011). Newspaper reporting of suicides in Hong Kong, Taiwan and Guangzhou: Compliance with WHO media guidelines and epidemiological comparisons. *Journal of Epidemiology and Community Health*, *65*, 928–933. doi:10.1136/jech.2009.105650
- Gorard, S. (2014). The widespread abuse of statistics by researchers: What is the problem and what is the ethical way forward? *Psychology of Education Review*, *38*(1), 3–10.
- Gorard, S. (2016). Damaging real lives through obstinacy: Re-emphasising why significance testing is wrong. *Sociological Research Online*, *21*(1), 1. doi:10.5153/sro.3857
- Gould, M. S., Kleinman, M. H., Lake, A. M., Forman, J., & Midle, J. B. (2014). Newspaper coverage of suicide and initiation of suicide clusters in teenagers in the USA, 1988–96: A retrospective, population-based, case-control study. *Lancet Psychiatry*, *1*(1), 34–43. doi:10.1016/S2215-0366(14)70225-1
- Harris, I. B., & Roberts, L. M. (2013). Exploring the use and effects of deliberate self-harm

- websites: An Internet-based study. *Journal of Medical Internet Research*, 15(12), e285. doi:10.2196/jmir.2802
- Hawton, K., & Williams, K. (2002). Influences of the media on suicide researchers, policy makers and media: Personal need to collaborate on guidelines. *BMJ*, 325(7377), 1374–1375. doi:10.1136/bmj.325.7377.1374
- Jacob, N., Evans, R., & Scourfield, J. (2017). The influence of online images on self-harm: A qualitative study of young people aged 16–24. *Journal of Adolescence*, 60(4), 140–147. doi:10.1016/j.adolescence.2017.08.001
- Jacob, N., Scourfield, J., & Evans, R. (2014). Suicide prevention via the Internet: A descriptive review. *Crisis*, 35(4), 261–267. doi:10.1027/0227-5910/a000254
- Janson, M., Alessandrini, E., Strunjas, S., Shahab, H., El-Mallakh, R., & Lippmann, S. (2001). Internet-observed suicide attempts. *The Journal of Clinical Psychiatry*, 62(6), 478. doi:10.4088/JCP.v62n0612f
- Jashinsky, J., Burton, S. H., Hanson, C. L., West, J., Giraud-Carrier, C., Barnes, M. D., & Argyle, T. (2014). Tracking suicide risk factors through Twitter in the U.S. *Crisis*, 35(1), 51–59. doi:10.1027/0227-5910/a000234
- Jones, P., Gunnell, D., Platt, S., Scourfield, J., Lloyd, K., Huxley, P., ... Dennis, M. (2013). Identifying probable suicide clusters in Wales using National Mortality Data. *PLoS One*, 8(8), e71713. doi:10.1371/journal.pone.0071713
- Kwak, H., Lee, C., Park, H., & Moon, S. (2010). What is Twitter, a social network or a news media? In *Proceedings of the 19th International Conference on World wide web* (pp. 591–600). Raleigh, NC: Association for Computing Machinery.
- Land, K. C., McCall, P. L., & Nagin, D. S. (1996). A comparison of Poisson, negative binomial, and semiparametric mixed Poisson regression models with empirical applications to criminal careers data. *Sociological Methods and Research*, 24(4), 387–442. doi:10.1177/0049124196024004001
- Lewis, S. P., & Michal, M. J. (2016). Start, stop, and continue: Preliminary insight into the appeal of self-injury e-communities. *Journal of Health Psychology*, 22(2), 250–260. doi:10.1177/1359105314527140
- Liu, K. Y., Beautrais, A., Caine, E., Chan, K., Chao, A., & Conwell, Y. (2007). Charcoal burning suicides in Hong Kong and urban Taiwan: An illustration of the impact of a novel suicide method on overall regional rates. *Journal of Epidemiology Community Health*, 61(3), 248–253. doi:10.1136/jech.2006.048553
- Luxton, D., June, J., & Fairall, J. (2012). Social media and suicide: A public health perspective. *American Journal of Public Health*, 102 (Suppl 2), s195–s202.
- Machlin, A., Pirkis, J., & Spittal, M. J. (2013). Which suicides are reported in the media – and what makes them “newsworthy”? *Crisis*, 34(5), 305–313. doi:10.1027/0227-5910/a000177
- Manning, C. D., Raghavan, P., & Schütze, H. (2008). “Scoring, term weighting, and the vector space model”. *Introduction to Information Retrieval*. New York, NY: Cambridge University Press.
- Naito, A. (2007). Internet suicide in Japan: Implications for child and adolescent mental health. *Clinical Child Psychology and Psychiatry*, 12(4), 583–597. doi:10.1177/1359104507080990
- Niederkröthenthaler, T., Till, B., Herberth, A., Voracek, M., Kapusta, N. D., Etzersdorfer, E., ... Sonneck, G. (2009). The gap between suicide characteristics in the print media and in the population. *European Journal of Public Health*, 19(4), 361–364. doi:10.1093/eurpub/ckp034
- Niederkröthenthaler, T., Voracek, M., Herberth, A., Till, B., Strauss, M., Etzersdorfer, E., ... Sonneck, G. (2010). Role of media reports in completed and prevented suicide: Werther v. Papageno effects. *The British Journal of Psychiatry: The Journal of Mental Science*, 197(3), 234–243. doi:10.1192/bjp.bp.109.074633
- Ofcom (2014). *News Consumption in the UK: 2014 report*. Retrieved from <https://www.ofcom.org.uk/research-and-data/tv-radio-and-on-demand/tv-research/news-consumption-2014> (accessed 24 February 17)
- Owens, C., Lambert, H., Lloyd, K., & Donovan, J. (2008). Tales of biographical disintegration: How parents make sense of their sons’ suicides. *Sociology of Health & Illness*, 30(2), 237–254. doi:10.1111/j.1467-9566.2007.01034.x
- Phillips, D. P. (1974). The influence of suggestion on suicide: Substantive and theoretical implications of the Werther effect. *American Sociological Review*, 39(3), 340–354. doi:10.2307/2094294
- Pirkis, J., Burgess, P., Blood, R. W., & Francis, C. (2007). The Newsworthiness of Suicide. *Suicide*

- and Life-Threatening Behavior, 37(3), 278–283. doi:10.1521/suli.2007.37.3.278
- Prior, T. (2004). Suicide methods from the Internet. *American Journal of Psychiatry*, 161(8), 1500–1501.
- Procter, R., Vis, F., & Voss, A. (2013). Reading the riots on Twitter: methodological innovation for the analysis of big data. *International Journal of Social Research Methodology*, 16, 197–214. doi:10.1080/13645579.2013.774172
- Sakaki, T., Okazaki, M., & Matsuo, Y. (2010). Earthquake shakes Twitter users: real-time event detection by social sensors. In the proceedings of the 19th International Conference on World Wide Web, 851–860. Retrieved from <http://dl.acm.org/citation.cfm?id=1772777> (accessed 24 February 2017)
- Shaver, J. P. (1993). What statistical significance testing is, and what it is not. *The Journal of Experimental Education*, 61(4), 293–316. doi:10.1080/00220973.1993.10806592
- Sisask, M., & Varnik, A. (2012). Media roles in suicide prevention: A systematic review. *International Journal of Environmental Research and Public Health*, 9(1), 123–138. doi:10.3390/ijerph9010123
- Sloan, L., Morgan, J., Housley, W., Williams, M., Edwards, A., Burnap, P., & Rana, O. (2013). Knowing the tweeters: Deriving sociologically relevant demographics from Twitter. *Sociological Research Online*, 18(3), 1–11. doi:10.5153/sro.3001
- Smithson, J., Sharkey, S., Hewis, E., Jones, R., Emmens, T., Ford, T., & Owens, C. (2011). Problem presentation and responses on an online forum for young people who self-harm. *Discourse Studies*, 13(4), 487–501. doi:10.1177/1461445611403356
- Stack, S. (2000). Media impact on suicide: A quantitative review of 293 findings. *Social Science Quarterly*, 81(4), 957–971.
- Sudak, H., Maxim, K., & Carpenter, M. (2008). Suicide and stigma: A review of the literature and personal reflections. *Academic Psychiatry*, 32(2), 136–142. doi:10.1176/appi.ap.32.2.136
- Wayne, R. (2013). The social construction of childhood bullying through U.S. news media. *Journal of Contemporary Anthropology*, 4(1), 36–49.
- West, J. H., Hall, P. C., Prier, K., Hanson, C. L., Giraud-Carrier, C., Neeley, E. S., & Barnes, M. D. (2012). Temporal variability of problem drinking on Twitter. *Open Journal of Preventive Medicine*, 2(1), 43–48. doi:10.4236/ojpm.2012.21007
- Williams, M. L., & Burnap, P. (2016). Cyberhate on social media in the aftermath of Woolwich: A case study in computational criminology and big data. *British Journal of Criminology*, 56(2), 211–238. doi:10.1093/bjc/azv059
- Zorn, C. J. W. (1998). An analytic and empirical examination of zero-inflated and hurdle Poisson specifications. *Sociological Methods and Research*, 26(3), 368–400. doi:10.1177/0049124198026003004