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The Impact of Widely Publicized Suicides on Search Trends: Using Google Trends to Test the Werther and Papageno Effects

John F. Gunn III, Sara E. Goldstein, and David Lester

The objective of this study was to examine the impact of widely publicized suicides on the Werther and Papageno Effects using internet search trends. A list of widely publicized suicides from 2010 through 2018 was compiled along with dates of death for each of these individuals. Google.com/trends data were then collected for searches for “how to suicide” and “suicide prevention” for 14 days prior to a widely publicized suicide/14 days after a widely publicized suicide and 7 days prior to a widely publicized suicide/7 days after a widely publicized suicide. Comparisons were then made between these time periods for “how to suicide” and “suicide prevention.” Some celebrities, such as Robin Williams (2014) and Aaron Hernandez (2017) were associated with increased searches. However, for many there was no increase in search trends. Limited support was found for the impact of widely publicized suicides on internet search trends with one case supporting a Werther Effect and one case supporting a Papageno Effect. The finding that only some celebrities were associated with increased searches may be a byproduct of the impact of celebrity status on these effects, with more prominent celebrities having the greatest impact.

Keywords contagion, Google.com/trends, Papageno Effect, Werther Effect

Between 2010 and 2018 there were a number of high profile deaths by suicide that garnered media attention. For example, the death by suicide of Tyler Clementi, a Rutgers student, received media coverage both at the time of his suicide and with the criminal trial that subsequently came out of it (Parker, 2012). The

suicide deaths of Dave Duerson in 2011 and Junior Seau in 2012 also received media coverage and initiated conversations about the impact of traumatic brain injury on suicide deaths (Foley, 2011; Lopresti, 2012). The death of Robin Williams in 2014 received significant media coverage given his popularity and celebrity status as

well as the tributes and outpouring from other celebrities (Derschowitz, 2014). Chester Bennington and Chris Cornell's deaths by suicide in 2017 received widespread coverage both within and beyond the music industry (Grow, 2017; Kreps, 2017) and more recently the deaths of Kate Spade and Anthony Bourdain, both in June 2018, garnered widespread media attention (Levenson & Gingras, 2018; Stelter, 2018). While these deaths were tragic, there is also reason to be concerned when deaths by suicide are highlighted in the media. Media coverage of deaths by suicide, when executed in a particular manner, can increase the likelihood of copycat suicides. This phenomenon has been called the "Werther Effect" (Phillips, 1974).

The Werther Effect takes its name from the 1774 book by Johann Wolfgang von Goethe, *The Sorrows of Young Werther*. The book tells the story of Werther, a young artist who dies by suicide following an episode with unrequited love. The book was very popular and led to some of the first known examples of copycat suicides. Young men began to dress like Werther and to die by suicide by the same method, often with copies of the book present. Based on this story, Phillips (1974) coined the term "Werther Effect" to describe the role of contagion/suggestion in suicidal behavior.

However, when media coverage of a suicide is done properly the opposite can occur and suicide rates can be lowered immediately following such a publication. This is known as the Papageno Effect (Niederkrotenthaler et al., 2010b). The Papageno Effect takes its name from the 1791 opera from Wolfgang Amadeus Mozart, *The Magic Flute*. This opera features Papageno, who prepares to die by suicide but is saved by the intervention of three boys. Niederkrotenthaler et al.

(2010b), examining the impact of news reporting that follows the World Health Organization guidelines on safe reporting¹, found that news reporting on individuals surviving and overcoming suicidal desire can have the opposite effect as that seen in the Werther Effect. They coined this phenomenon the "Papageno Effect." The present study aims to examine both the Werther and Papageno Effects using Google.com/trends data. Specifically, search trends for "how to suicide" (Werther Effect) and "suicide prevention" (Papageno Effect) were compared in the time periods immediately before and after highly publicized suicides.

Research examining the Werther and Papageno Effects generally finds support for both phenomena when those studies focus on entertainment or political celebrities, although the majority of research on these effects has focused on the negative impact (i.e., Werther Effect) of suicide publicity and failed to replicate in most studies examining non-famous suicides. For example, Schmidtke and Hafner (1988) found that when a television series depicted the suicide of a 19-year-old-male student using the railway there was an increase of up to 175% in that age group and by that method as long as 70 days after the airing of the episode. Wasserman (1984) also found support for the Werther Effect proposed by Phillips (1974) but found support for the importance of celebrity status on suicide rates for a nation. In reviewing 42 studies on publicized suicides, Stack (2003) found that approximately half of the studies examined supporting the Werther Effect, with published stories leading to increases in suicide. Further, a

¹These guidelines can be accessed at http://www.who.int/mental_health/suicide-prevention/resource_booklet_2017/en/

meta-analysis by Stack (2005) found some support for the Werther Effect, with a number of findings regarding the impact of reporting on suicide. The majority of studies examined (269/419 or 64.2%) did not support an imitation effect. However, those studies that found a Werther Effect were those examining articles on entertainment or political celebrities, studies focused on female suicides, and studies focused on newspaper articles. This finding supports the Werther Effect but only under certain circumstances (e.g., the death of a celebrity).

Due to the concern over the Werther Effect, the American Foundation for Suicide Prevention has provided media reporting guidelines in an effort to decrease the likelihood of the Werther Effect occurring (<http://afsp.org/wp-content/uploads/2016/01/recommendations.pdf>). These guidelines include recommendations such as not oversimplifying suicide, avoiding sensational headlines and statements, not including photos or details of the location and method used, and not using terms such as “successful” or “unsuccessful.” However, with the popularity of online news sources in the internet age, doubt has been expressed about the effectiveness of these guidelines in curtailing inappropriate reporting online (Gunn & Lester, 2012).

Interested in the impact of celebrity suicides on suicidality, Kumar, Dredze, Coppersmith, and De Choudhury (2015) examined posting prevalence on the site Reddit² following celebrity suicides. They found that Reddit posts pertaining to suicide increased following celebrity suicides. Furthermore, they found that while the

suicide of Robin Williams had a very significant impact on this trend, the trend persisted even when controlling for this. Ultimately, social media has been viewed as providing a source of potential identification and prevention of suicide while also being a potential source for the Werther Effect (Robinson et al., 2015). A meta-analysis conducted by Niederkrotenthaler et al. (2012) examined the impact of deaths by suicide of celebrities on subsequent suicides. Findings supported the role of celebrity suicides in increased suicide rates, with higher status celebrities having the most substantive impact. Other research has found that, after controlling for other contributing factors such as unemployment rates and seasonal variation, that only a small number (3 of 11) of celebrity suicides had an impact on suicide rates (Fu & Chan, 2013).

Another medium by which to examine the impact of celebrity suicides is the use of internet search volume. Google.com/trends provides data on trending search terms as well as a score associated with a specific search term. Research has shown that search trends for specific methods of suicide are positively associated with rates of suicide, though this relationship was moderated by age (Hagihara, Miyazaki, & Abe, 2012). These findings, however, have met with mixed results. For example, Yang, Tsai, Huang, and Peng (2011) found that Google search terms were associated with the suicide rate in Taipei City, Taiwan. Similarly, Gunn and Lester (2013) examined regional variation in search trends and suicide rates. They found that search trends for “how to suicide” and “suicide prevention” were both positively associated with the rates of suicide in those states. In contrast, Page, Chang, and Gunnell (2011)

²Reddit is a social media aggregation site that allows users to vote submissions (e.g., text posts, media links) up or down so that the most voted for materials appear at the top of the site.

did not find a significant association between Google search terms and suicide rates in Australia.

As noted above, the majority of research done on the impact of media on suicide rates focuses on the negative impact of media coverage (Sisask & Varnik, 2012). This is partly due to the variation in what types of suicides are seen as “newsworthy.” For example, research out of Australia has pointed to the increased news reporting of more sensational suicides, such as those by younger individuals, suicides that involve violent methods (such as firearms), suicides that occur in public, and suicides that involve multiple persons (such as suicide pacts or homicide-suicides; Machlin, Pirkis, & Spittal, 2013). In contrast, in partial support of the Papageno Effect, Arendt, Till, and Neiderkrotenthaler (2015) found some support for the role of positive portrayals of recovery in those exposed to an awareness material compared to a control group. Neiderkrotenthaler et al. (2010a) examined 497 suicide-related printed media reports and found that inappropriate reporting (such as repeated reference to a single suicide, reporting of suicide myths) was associated with increased rates of suicide, but that reporting suicide appropriately (e.g., discussing ways in which people overcame their suicide ideation, exhibited positive coping skills) was associated with a decrease in suicide rates.

The present study builds off the previous work of Gunn and Lester (2013) by examining the relationship between suicide and Google search trends while also attempting to fill a gap in the literature. While the Papageno Effect has been documented in previous work (e.g., Arendt et al., 2015; Neiderkrotenthaler et al., 2010a, 2010b), this phenomenon has not been examined as robustly as the Werther Effect. Specifically, the current study examines the

impact of widely publicized suicides on the search trends of “how to suicide” and “suicide prevention.” Both of these terms have been shown to be positively associated with suicide risk by state (Gunn & Lester, 2013). This study aims to examine search trends as a measurement of both the Werther (“how to suicide”) and Papageno Effects (“suicide prevention”) following widely publicized celebrity suicides.

METHOD

Procedure

In order to test the impact of widely publicized suicides on search trends for “how to suicide” and “suicide prevention,” an online search was done for widely publicized suicides for the years 2010 through 2018. This list was acquired via Wikipedia (https://en.wikipedia.org/wiki/List_of_suicides_in_the_21st_century). From this list, all suicides for the target years were collected and independently confirmed by searching through news stories pertaining to these widely publicized suicides. Independent corroboration was sought to offset the potential for erroneous material from Wikipedia by searching for news articles from reputable media sources to confirm dates and cause of death.

Given this study’s focus on the impact of celebrity/widely publicized deaths by suicide on search trends for suicide relevant terms, google.com/trends was used to eliminate any suicide deaths that did not meet this criteria. Each widely publicized suicide for a given year was entered into the Google.com/trends search engine. Only those widely publicized suicides who caused a spike (described in the following paragraphs) in search trends at the time of their deaths were included in the study. In

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other words, if a celebrity's death did not result in increased searches for that celebrity, then they were not included in the analysis. This was done to assess the impact of search trends for "how to suicide" and "suicide prevention" for suicides that garnered attention from the public as measured by google searches. Table 1 outlines the widely publicized suicides included in the study. In cases such as

suicide following a mass-shooting or ambiguity (such as a death by overdose that was not confirmed as a suicide) the widely publicized suicides were excluded from the analysis.

Google.com/trends was used to obtain data about search trends for the widely publicized suicides included in this analysis. Google.com/trends provides information on the relative weight of a specific

TABLE 1. Most Searched for Celebrity Suicides, 2010–2017

Year	Celebrity Suicides (Average Searches for each person 2 weeks prior to death)	Date of Death	Cause for Fame
2010	Tyler Clementi (—)	09/22/2010	Was outed by his roommate leading up to his suicide. Lead to a criminal prosecution for a hate crime.
	Kenny McKinley (14.29)	09/20/2010	American football player.
	Phoebe Prince (—)	01/14/2010	Teen who was bullied and whose suicide lead to a criminal trial.
2011	Dave Duerson (—)	02/17/2011	American football player.
	Jeret Peterson (—)	07/25/2011	American World Cup skier.
	Terry Thompson (—)	10/18/2011	Zookeeper who released his animals leading to local panic and national attention before his death by suicide.
2012	Junior Seau (44)	05/02/2012	American football player.
	Amanda Todd (—)	10/10/2012	Teen girl who posted a video to Youtube prior to her death.
2013	Mindy McCready (32.64)	02/17/2013	American country music singer.
2014	Robin Williams (61.5)	08/11/2014	American stand-up comedian and actor.
2015	Sam Sarpong (7.14)	10/26/2015	British actor, supermodel, and musician.
	Tom Schweich (7.14)	02/26/2015	American politician, diplomat, attorney, and author.
2016	Dave Mirra (34.57)	02/04/2016	American BMX rider.
2017	Chris Cornell (67.93)	05/18/2017	American musician, singer, and songwriter.
	Chester Bennington (39.79)	07/20/2017	American singer, songwriter, musician, and actor.
	Aaron Hernandez (17.36)	04/19/2017	American football player.
2018	Kate Spade (76.43)	06/05/2018	American fashion designer
	Anthony Bourdain (60.43)	06/08/2018	American celebrity chef

search term in comparison to all other searches for a given time and place. Further details on the scores provided by Google.com/trends will be discussed in detail below. Using Google.com/trends, scores for search volume for each of the terms were collected and downloaded into an Excel file directly from the Google.com/trends website. This information was then transferred into SPSS IBM 25 for analysis.

Measures

Google.com/trends Search Volume. Google.com/trends is a search analysis tool provided by Google that is open to the public. This tool allows for terms to be examined about their popularity over a specific period and by region. These scores range from 0 to 100 and represent the search volume for that term in relation to the number of searches received by Google. This study used the search terms “how to suicide” and “suicide prevention” to examine the trends in suicide related searches. The terms “how to suicide” and “suicide prevention” were previously used in work by Gunn and Lester (2013) to examine the relationship between suicide search trends and rates of suicide by state.

Days Prior/Days After Celebrity Suicide. Time periods in which celebrity suicides occurred were calculated at 2-weeks prior/2-weeks after the death, and 1-week prior/1-week after the death. This variable was coded dichotomously: 0 (prior to celebrity suicide) and 1 (after a celebrity suicide). Two time periods were selected in order to address the immediate impact on search trends (1 week following) and more protracted impacts (2 weeks). The search trends were limited to 2 weeks before and after to avoid overlapping time periods. Only two cases of overlap occurred in the

sample. For the year 2010, the suicide of Kenny McKinley occurred on 9/20/2010 and the suicide of Tyler Clementi occurred on 9/22/2010 and for 2018 the death by suicide of Kate Spade occurred on 6/5/2018 and the death of Anthony Bourdain occurred on 6/8/2018. For 2010, therefore, calculations were based on 2 weeks/1 week prior and 2 weeks/1 week after Tyler Clementi’s suicide on 9/22/2010 and for 2018 Anthony Bourdain’s suicide on 6/8/2018. Included in the final sample were three celebrity suicides for 2010, three for 2011, two for 2012, one for 2013, one for 2014, two for 2015, one for 2016, three for 2017 and one for 2018.

Data Analysis Strategy

In order to test the impact of widely publicized suicides on google.com searches multiple independent sample t-tests were conducted to compare the mean search trends prior to and after celebrity deaths by suicide. However, one byproduct of conducting a series of t-tests is the increased occurrence of type 1 errors (i.e., false positives). The typical procedure for accounting for this is to perform a Bonferroni correction (Dunn, 1958, 1961). However, the Bonferroni correction is often cited as reducing power and increasing the likelihood of false negatives (Nakagawa, 2004). In order to avoid this, the Benjamini-Hochberg procedure was instead used to correct the false discovery rate (Benjamini & Hochberg, 1995). This procedure involves the rank ordering of p-values in ascending order, with the lowest p-value at rank 1. Corrected p-values are then calculated by dividing the rank number by the total number of tests and multiplying it by your false discovery criteria (in this case $p = .05$).

RESULTS

“How to Suicide” Searches

Results provided mixed support for both the Werther and Papageno Effects. Table 2 provides the results for “how to suicide” for 2 weeks prior and 2 weeks after celebrity suicides. For the majority of years there was no difference in mean scores for “how to suicide” searches 2 weeks prior to a celebrity suicide than there was 2 weeks following. However, there was a significant difference for the death of Robin Williams in 2014, $t(15.0) = -3.91, p = .001$. As was expected given the occurrence of the Werther Effect, the

average search volume in the weeks before this widely publicized suicide was lower than in the weeks following (see Table 2 for a breakdown of means and standard deviations). Table 3 reports the results for searches 1 week prior to and 1 week following widely publicized suicides. Unlike the 2-week time period, no support was found for the impact of celebrity suicides on search volume for “how to suicide” after corrections for multiple comparisons.

“Suicide Prevention” Searches

As with “how to suicide,” the majority of the results did not support a Papageno

TABLE 2. Search Trends by Year for “How to Suicide,” 2010–2017, USA

		14 Days Prior to Widely Publicized Suicide	14 Days After a Widely Publicized Suicide	<i>t</i>	<i>df</i>	<i>Sig.</i>
		M (SD)	M (SD)			
2010	Kenny McKinley/ Tyler Clementi	47.64 (13.91)	65.93 (23.66)	-2.49	26	.019
	Phoebe Prince	58.43 (19.53)	56.64 (20.40)	.24	26	.815
2011	Dave Duerson	72.36 (19.06)	78.14 (15.75)	-.88	26	.389
	Jeret Peterson	63.21 (17.18)	56.71 (13.49)	1.11	26	.276
	Terry Thompson	53.14 (14.22)	63.93 (15.44)	-1.92	26	.065
2012	Amanda Todd	62.29 (18.64)	60.79 (21.52)	.20	26	.845
	Junior Seau	59.36 (19.70)	64.29 (22.69)	-.61	26	.545
2013	Mindy McCready	69.14 (12.54)	72.43 (19.46)	-.53	26	.600
2014	Robin Williams	19.43 (5.61)	41.29 (20.18)	-3.91	15.0	.001*
2015	Sam Sarpong	73.79 (16.24)	70.50 (15.38)	.55	26	.587
	Tom Schweich	59.36 (16.97)	68.71 (20.72)	-1.31	26	.203
2016	Dave Mirra	71.29 (14.67)	72.86 (11.74)	-.31	26	.757
2017	Aaron Hernandez	64.00 (16.14)	72.14 (10.55)	-1.58	26	.126
	Chris Cornell	76.79 (10.91)	67.64 (12.60)	2.05	26	.050
	Chester Bennington	51.71 (11.13)	65.93 (19.90)	-2.33	26	.028
2018	Anthony Bourdain/ Kate Spade	36.50 (14.63)	43.86 (22.45)	-1.03	26	.314

Note: Kenny McKinley and Tyler Clementi’s suicides occurred within 2 days of each other. This time span is calculated from Tyler Clementi’s suicide, which occurred on 9/22. Kenny McKinley’s suicide occurred on 9/20.

*significant following a Benjamini-Hochberg correction for multiple comparisons

TABLE 3. Search Trends by Year for “How to Suicide,” 2010–2017, USA

		7 Days Prior to Widely Publicized Suicide	7 Days After a Widely Publicized Suicide	<i>t</i>	df	Sig.
		M (SD)	M (SD)			
2010	Kenny McKinley/ Tyler Clementi	69.43 (22.34)	57.86 (10.87)	1.23	12	.241
	Phoebe Prince	56.86 (15.04)	57.57 (27.15)	-.06	12	.952
2011	Dave Duerson	45.71 (15.81)	52.71 (26.78)	-.60	12	.563
	Jeret Peterson	65.4 (15.26)	69.14 (23.43)	-.38	12	.712
	Terry Thompson	55.00 (14.20)	71.14 (22.24)	-1.62	12	.132
2012	Amanda Todd	67.29 (12.01)	75.00 (17.19)	-.97	12	.350
	Junior Seau	67.86 (15.07)	79.29 (14.48)	-1.45	12	.174
2013	Mindy McCready	76.71 (18.60)	83.29 (12.51)	-.78	12	.453
2014	Robin Williams	16.57 (5.35)	45.00 (24.73)	-2.97	12	.012
2015	Sam Sarpong	71.57 (14.71)	83.86 (12.69)	-1.67	12	.120
	Tom Schweich	64.86 (12.59)	73.43 (15.35)	-1.14	12	.276
2016	Dave Mirra	70.00 (19.28)	65.57 (12.52)	.51	12	.619
2017	Aaron Hernandez	68.29 (17.46)	76.00 (12.61)	-.95	12	.362
	Chris Cornell	75.71 (8.36)	73.71 (18.90)	.26	8.3	.804
	Chester Bennington	53.57 (14.01)	77.71 (11.88)	-3.48	12	.005
2018	Anthony Bourdain/ Kate Spade	37.29 (16.39)	52.71 (25.79)	-1.34	12	.206

Note: Kenny McKinley and Tyler Clementi’s suicides occurred within 2 days of each other. This time span is calculated from Tyler Clementi’s suicide, which occurred on 9/22. Kenny McKinley’s suicide occurred on 9/20.

*significant following a Benjamini-Hochberg correction for multiple comparisons

Effect for search trends of “suicide prevention.” Table 4 show the results for 2 weeks prior to and 2 weeks after a celebrity suicide. There were significant differences for searches of “suicide prevention” 2 weeks prior to and 2 weeks after for only Aaron Hernandez in 2017, $t(26) = -5.03$, $p = .001$. As anticipated given a Papageno Effect, the mean scores were in the expected direction with search trends for “suicide prevention” higher in the 2 weeks following Aaron Hernandez’s death by suicide (see Table 4 for means and standard deviations).

Table 5 shows the results for our comparisons of 1 week prior to and 1 week following widely publicized suicides for the

search term “suicide prevention.” As with “how to suicide,” there were no significant differences between 1 week prior and 1 week after widely publicized suicides.

DISCUSSION

The Werther Effect, first coined by Phillips (1974), is the phenomenon by which a widely publicized suicide, either fictional or non-fictional, increases the occurrence of suicide in a population at a specific period, which is to be contrasted with the Papageno Effect proposed by Niederkrotenthaler et al. (2010b), which is the phenomenon by which proper

TABLE 4. Search Trends by Year for “Suicide Prevention,” 2010–2017, USA

		14 Days Prior to Widely Publicized Suicide	14 Days After a Widely Publicized Suicide	<i>t</i>	df	Sig.
		M (SD)	M (SD)			
2010	Kenny McKinley/ Tyler Clementi	38.50 (22.06)	33.14 (10.28)	.82	26	.418
	Phoebe Prince	43.07 (22.13)	43.21 (26.67)	-.02	26	.988
2011	Dave Duerson	53.93 (23.35)	53.36 (22.87)	.07	26	.948
	Jeret Peterson	53.21 (21.77)	55.43 (24.90)	-.25	26	.804
	Terry Thompson	51.14 (21.25)	52.29 (19.50)	-.15	26	.883
2012	Amanda Todd	51.29 (18.96)	49.43 (13.10)	.30	26	.765
	Junior Seau	67.93 (22.86)	50.50 (22.48)	2.03	26	.052
2013	Mindy McCready	55.29 (21.11)	58.07 (15.57)	-.40	26	.694
2014	Robin Williams	9.36 (3.39)	29.21 (23.17)	-3.17	13.6	.007
2015	Sam Sarpong	69.57 (18.19)	59.43 (17.52)	1.50	26	.145
	Tom Schweich	55.21 (25.30)	52.36 (20.20)	.33	26	.744
2016	Dave Mirra	59.71 (18.69)	65.64 (24.20)	-.73	26	.475
2017	Aaron Hernandez	45.43 (11.48)	72.14 (16.22)	-5.03	26	.001*
	Chris Cornell	52.79 (14.61)	52.86 (19.96)	-.01	26	.991
	Chester Bennington	26.21 (6.91)	38.93 (20.73)	-2.18	15.9	.045
2018	Anthony Bourdain/ Kate Spade	8.07 (4.20)	21.43 (25.64)	-1.92	26	.065

Note: Kenny McKinley and Tyler Clementi’s suicides occurred within 2 days of each other. This time span is calculated from Tyler Clementi’s suicide, which occurred on 9/22. Kenny McKinley’s suicide occurred on 9/20.

* significant following a Benjamini-Hochberg correction for multiple comparisons

reporting of a suicide can lower the rates of suicide. The current study set out to examine the impact of widely publicized suicides on the search trends of “how to suicide,” our proxy measure of the Werther Effect, and “suicide prevention” our proxy measure of the Papageno Effect. Limited support was found for an impact of celebrity suicides on the search trends for both “how to suicide” and “suicide prevention.”

That only some of the widely publicized suicides were associated with increased search volume for “how to suicide” and “suicide prevention” is not surprising. As previously discussed, Wasserman (1984) found that the celebrity status of suicide could have an influence on the likelihood of the Werther Effect occurring. Kumar

et al. (2015) found that the suicide of Robin Williams (which occurred in 2014) had a noticeable impact on suicide related Redditt posts. Support for the role of celebrity status on impacting Google search terms in relation to suicidal behavior may be seen in the present study. The time points in which search volume was statistically higher following a widely publicized suicide consistently may represent the most widely publicized of the suicides on our list (e.g., Robin Williams).

The clearest example of this is the case of Robin Williams. Figure 1 shows the search trends across the year 2014 for “how to suicide” and “suicide prevention.” With the exception of the week in September in which World Suicide Prevention Day

TABLE 5. Search Trends by Year for “Suicide Prevention,” 2010–2017, USA

		7 Days Prior to Widely Publicized Suicide	7 Days After a Widely Publicized Suicide	<i>t</i>	<i>df</i>	Sig.
		<i>M (SD)</i>	<i>M (SD)</i>			
2010	Kenny McKinley/ Tyler Clementi	53.57 (24.44)	52.00 (17.15)	.14	12	.892
	Phoebe Prince	22.14 (11.13)	49.86 (30.15)	-2.28	7.6	.054
2011	Dave Duerson	52.71 (29.53)	44.86 (14.89)	.63	12	.541
	Jeret Peterson	44.71 (15.77)	53.71 (24.49)	-.82	12	.430
	Terry Thompson	61.71 (17.41)	69.14 (23.98)	-.66	12	.520
2012	Amanda Todd	73.57 (18.91)	62.14 (17.34)	1.18	12	.261
	Junior Seau	72.0 (19.88)	59.71 (8.81)	1.50	12	.161
2013	Mindy McCready	62.86 (20.71)	59.43 (18.37)	.33	12	.749
2014	Robin Williams	9.00 (6.08)	35.43 (30.47)	-2.25	12	.044
2015	Sam Sarpong	75.86 (12.93)	55.57 (23.02)	2.03	9.4	.065
	Tom Schweich	60.43 (27.46)	71.00 (28.27)	-.71	12	.491
2016	Dave Mirra	68.14 (18.83)	76.43 (25.30)	-.70	12	.500
2017	Aaron Hernandez	63.14 (74.43)	74.43 (17.31)	-1.43	12	.178
	Chris Cornell	51.71 (11.83)	68.14 (22.59)	-1.70	12	.114
	Chester Bennington	31.86 (9.56)	58.00 (26.58)	-2.45	7.5	.042
2018	Anthony Bourdain/ Kate Spade	10.14 (5.08)	33.86 (34.16)	-1.82	12	.094

Note: Kenny McKinley and Tyler Clementi’s suicides occurred within 2 days of each other. This time span is calculated from Tyler Clementi’s suicide, which occurred on 9/22. Kenny McKinley’s suicide occurred on 9/20.

*significant following a Benjamini-Hochberg correction for multiple comparisons

occurs, the searches for “how to suicide” and “suicide prevention” reached their peak the week of Robin William’s suicide. Additionally, an examination of Table 1 reveals that the most searched for celebrities, 2 weeks prior to their deaths, were Chris Cornell, Robin Williams, Chester Bennington, Kate Spade, and Anthony Bourdain. Given that Chester Bennington, Chris Cornell, Anthony Bourdain, and Kate Spade were also highly searched for celebrities, the finding that their deaths did not impact the search trends is surprising and discussed in greater detail below.

Although results from the present study provide limited support for the Werther and Papageno Effects, this support was found in only 2 of 16 celebrity deaths.

Celebrities such as Chris Cornell, Chester Bennington, Anthony Bourdain, and Kate Spade all possessed search trends prior to their deaths that were similar to those of Robin Williams and far greater than those of Aaron Hernandez. How then was there an impact on search terms for Aaron Hernandez and Robin Williams but not for these celebrities? The answer to this may be a byproduct of the impact of their deaths on searches compared to the deaths of other included in this analysis. Some evidence of this can be seen in google.com/trends data on top search terms annually. In 2014, the year Robin Williams died, “Robin Williams” was the number 1 searched for term for the entire year (<https://trends.google.com/trends/topcharts>

Using Google Trends to Test the Werther and Papageno Effects

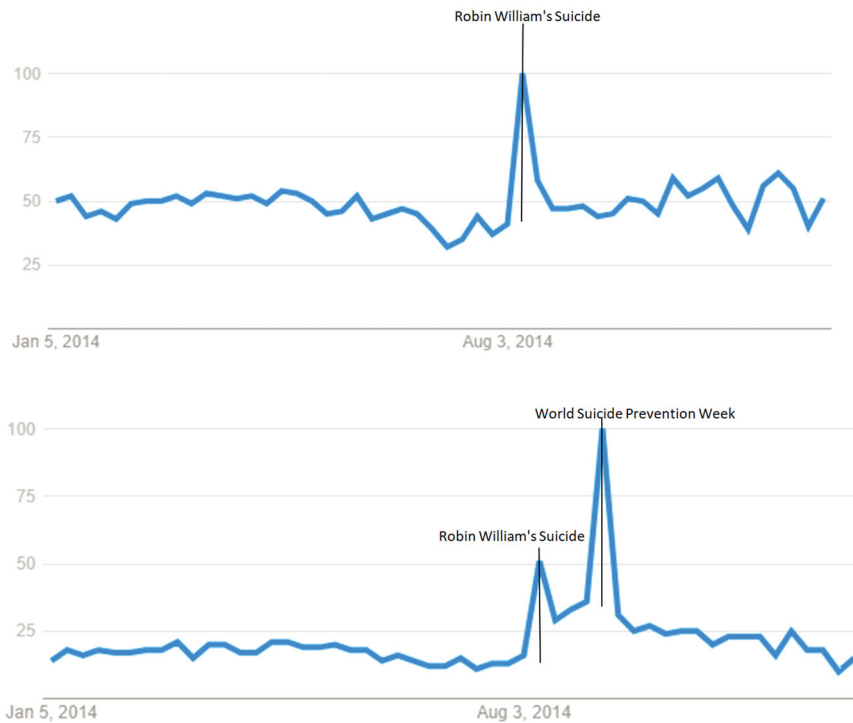


FIGURE 1. “How to Suicide” and “Suicide Prevention” Trends Across, 2014

[#vm=cat&geo=US&date=2014&cid](https://trends.google.com/trends/topcharts#vm=cat&geo=US&date=2014&cid)) while Aaron Hernandez was number 9 of 10 for search trends of 2017 (<https://trends.google.com/trends/topcharts#vm=cat&geo=US&date=2017&cid>). Despite their celebrity status (as determined by [google.com/trends searches](https://trends.google.com/trends/topcharts#vm=cat&geo=US&date=2017&cid)), Chester Bennington and Chris Cornell, who also died in 2017, did not make the top 10 listing. This may suggest that the impact of Aaron Hernandez and Robin Williams’s suicides on Werther and Papageno-esque search trends is a result, not of their celebrity status but rather the celebrity status afforded to their deaths by suicide. Finally, because these data represent population based data, we are unable to ascertain if those searching for “how to suicide” or “suicide prevention” have been exposed to the widely publicized suicides

being examined. Additionally, our failure to find a significant increase in search terms following the deaths of Kate Spade and Anthony Bourdain may be the result of the close proximity of both deaths. Kate Spade passed just 3 days prior to Anthony Bourdain and therefore the impact of both celebrities’ deaths on search terms prior to and after are confounded by the coverage each received.

When interpreting the results of the present study, some limitations should be taken into consideration. Information on rates of suicide by week are not available to examine the potential associations between the popularity of these search terms and rates of suicidal behavior. However, monthly data are available on suicide mortality and recent work by Fink,

Santaella-Tenorio, and Keyes (2018) points to an almost 10% increase in suicide mortality following the death of Robin Williams, for whom the present findings are the most clear. Although previous work has linked these search terms to rates of suicide (Gunn & Lester, 2013), we are unable to say if the increases in search volume are associated with increased death by suicide. In contrast, a recent analysis by Tran et al. (2017) found convincing evidence for low validity in predicting national suicide rates based on Google.com/trends. Thus, the present paper is meant to test two phenomena tied to suicide, but must be viewed with caution before making any connections between these search trends and actual rates of suicide. Future research should explore the impact of these widely publicized suicides on actual rates of suicide as this is needed to support the present findings and measure whether the Werther and Papageno Effects are truly present. Finally, our focus on search trends in assessing celebrity status may be influenced by the type of celebrities themselves. For example, it is impossible for us to assess whether or not the high search volumes result from searches specific to the celebrity or to linked materials. For example, searches for Kate Spade may be linked to Kate Spade the celebrity or Kate Spade the fashion brand.

Despite these limitations, the present study contributes to understanding ways in which media has an impact on people experiencing the suicide of celebrities. The present study found limited support for both the Werther and Papageno Effects, though similarly to the work of Wasserman (1984) and Kumar et al. (2015), we found some support for the impact of celebrity status on the likelihood of these effects occurring. When a particularly widely publicized

suicide, such as that of Robin Williams in 2014 or Aaron Hernandez in 2017, occurs, there may be an increase in suicide related searches (such as “how to suicide” or “suicide prevention”). Taken together, this highlights the critical balance that must be taken when reporting on and discussing celebrity suicides. Why the suicide death of Robin Williams’s was associated with searches in line with a Werther Effect, but Aaron Hernandez’s death is linked to searches associated with a Papageno Effect is not readily apparent. One avenue of future research opened up by the present study is an in-depth examination of the news coverage of both deaths. If a Werther and Papageno effect is to be supported, media coverage of Robin Williams’s death should be less in line with media guidelines while Aaron Hernandez’s death should be more in line with media guidelines. Media reporting can play a role in suicide prevention by following the guidelines outlined by the WHO. While the focus on what *not* to do is often discussed, what *should* be done in reporting is of even greater importance. As Niederkroenthaler et al. (2010a) demonstrated, media reporting that follows media guidelines on what should be emphasized (such as messages of coping and recovery) can save lives. Media reporting of widely publicized suicides, such as Robin Williams’s in 2014, should make it a point to focus on including information on help-seeking, on recovery, and on the negative impact that suicide can have.

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