Surfing for Suicide Methods and Help:
Content Analysis of Websites Retrieved With Search Engines in Austria and the United States

Benedikt Till, DSc, and Thomas Niederkrotenthaler, MD, PhD, MMSc

ABSTRACT

Objective: The Internet provides a variety of resources for individuals searching for suicide-related information. Structured content-analytic approaches to assess intercultural differences in web contents retrieved with method-related and help-related searches are scarce.

Method: We used the 2 most popular search engines (Google and Yahoo/Bing) to retrieve US-American and Austrian search results for the term *suicide,* method-related search terms (eg, *suicide methods*, *how to kill yourself*, *painless suicide*, *how to hang yourself*), and help-related terms *(eg, suicidal thoughts, suicide help)* on February 11, 2013. In total, 396 websites retrieved with US search engines and 335 websites from Austrian searches were analyzed with content analysis on the basis of current media guidelines for suicide reporting. We assessed the quality of websites and compared findings across search terms and between the United States and Austria.

Results: In both countries, protective outweighed harmful website characteristics by approximately 2:1. Websites retrieved with method-related search terms (eg, *how to hang yourself*) contained more harmful (United States: $P < .001$, Austria: $P < .05$) and fewer protective characteristics (United States: $P < .001$, Austria: $P < .001$) compared to the term *suicide*. Help-related search terms (eg, *suicidal thoughts*) yielded more websites with protective characteristics (United States: $P = .07$, Austria: $P < .01$). Websites retrieved with US search engines generally had more protective characteristics ($P < .001$) than searches with Austrian search engines. Resources with harmful characteristics were better ranked than those with protective characteristics (United States: $P < .01$, Austria: $P < .05$).

Conclusions: The quality of suicide-related websites obtained depends on the search terms used. Preventive efforts to improve the ranking of preventive web content, particularly regarding method-related search terms, seem necessary.

Every year, approximately 1 million people die by suicide.[1] Suicide prevention requires a multimodal approach that includes the public raising of awareness on how to recognize suicidality and cope with mental illness.[2] The media, particularly the online media, play a crucial role in this endeavor.[3] The Internet has been identified as a preferred source of information on suicide in young people aged 14–24 years[4] and hosts a broad variety of suicide-related content, ranging from personal accounts on suicide to prevention services and information websites.[5]

The vast majority of individuals seeking health information online use search engines,[6] with Google covering more than 95% and 69% of online searches in Austria[7] and the United States, respectively.[8] There is limited research available on intercultural differences in search results obtained with the Google search engine. Cheng and colleagues[9] found that US-American search engine results provided more prosuicide information, but also more information on help-seeking and more professional resources than their Chinese counterparts. Prosuicide websites were also more common in US search results compared to searches conducted in New Zealand.[10]

The use of some online resources, particularly of so-called prosuicide discussion forums, has been linked to harmful effects.[4,11,12] Vulnerable individuals may use websites to learn about suicide methods and feel encouraged in preparing and acting out their suicide plans.[3,13] However, the Internet is considered to provide many opportunities for suicide prevention as well. For example, suicidal individuals may benefit from the easy accessibility of online resources compared to traditional approaches.[3]

An important methodological limitation in all available content-analytic studies on web search results is their use of highly heterogeneous classifications into *prosuicide*, *antisuicide*, and *neutral* websites.[5,9,10,14–17] These classifications are subjective in nature, and intercoder reliability has rarely been assessed. In light of earlier findings that highlight concurrent suicide-promoting and help-promoting information in news reports,[18] a simple classification into suicide-promoting and suicide-preventing is likely impractical for many websites. Therefore, a need for more elaborate content-analytic approaches has been noted in the literature.[3]

In particular, more research on variations in web contents retrieved with different search terms is needed. In a US study, prosuicide websites were shown to be more prevalent when searching for *suicide methods* than for other search terms.[5] Intuitively, more suicidal individuals may be more likely to search for specific suicide methods than to use general search terms,[19] which may reflect a further step in the suicidal process.[20,21] Similarly, individuals looking for help may use simple help-related search terms. The lack of focus on help-promoting contents, which may be retrievable with search terms such as *suicide help*, has been criticized.[22] In the present study, we aimed to address these issues

Clinical Points

- Online material related to suicide generally includes more protective than harmful characteristics, but the preventive quality of websites retrieved largely depends on the search terms used.

- A barrier to successful suicide prevention is the low visibility and low ranking of helpful professional resources when method-related search terms are used.

- There are several strategies available that could help mental health care providers with online representations to improve the quality of information retrieved when method-related searches are used.

with a structured content-analytic comparison of websites retrieved with simple method-related and help-related search terms. Because research from middle-European countries is currently lacking, we compared results conducted in the United States to results obtained in a German-speaking country, Austria.

METHOD

Sample

We conducted a content analysis of Internet websites, retrieved with the Google and Yahoo/Bing search engines, on February 11, 2013. Browser cache and history were cleared, and all filters were switched off.[15] Tor Browser Bundle, which relays the user's position from server to server across the world giving the user a foreign IP address, was used to simulate searches in US search engines. Google and Bing engines offer a set of so-called "related search terms" at the bottom of search results based on previous searches registered. We used previous related studies[5,9,10,14–17] and the related search terms displayed for the selection of 7 suicide-related search terms, with the aim of including both method-related terms as well as terms that may be useful for help-seeking purposes. The search terms were *suicide* (German translation: *Selbstmord*), *suicide help* (*Selbstmord Hilfe*), *painless suicide* (*Selbstmord schmerzlos*), *suicidal thoughts* (*Selbstmordgedanken*), *suicide methods* (*Selbstmordmethoden*), *how to kill yourself* (*Wie bringe ich mich um*), and *how to hang yourself* (*Wie erhänge ich mich*). The search term *how to hang yourself* was selected because hanging constitutes the most frequent suicide method in Austria[23] and the second most frequent method in the United States after suicide by firearms.[24] We also searched for the term *how to shoot yourself* (*Wie erschieße ich mich*) in an initial step of our web search. However, more than 50% (United States: 47.1%, Austria: 58.3%) of the search results retrieved with that term were not related to suicide or mental health, with many of these websites focusing on homicide. For that reason, we decided not to include this search term in the analysis. On the basis of intuitive reasoning and previous literature,[19,22] we categorized the query for *suicide* as "basic search"; queries for *suicide methods*, *how to kill yourself*, *painless suicide*, and *how to hang yourself* as "method-related searches"; and queries for *suicidal thoughts* and *suicide help* as "help-related searches."

We restricted the analysis to the first 3 pages per search combination on the basis of earlier research that showed that most search engine users restrict their access to results retrieved on these pages.[25,26] We included sponsored links that appeared in the results lists. The entire website was used as the unit of analysis. Exemptions to this rule were encyclopedia entries (eg, Wikipedia), specific articles of newspapers or journals (eg, CNN), and discussion forums within 1 web platform (eg, Yahoo! Answers), which were considered to represent a full unit of analysis.

A total of 1,035 websites were retrieved. Exclusion criteria included damaged links (31; 3.0%), use of suicide only as a metaphor (4; 0.4%), a focus on suicide bombings (6; 0.6%), or a focus not related to mental health or suicide, as reflected in brief references (making up < 20% of the website) (99; 9.6%). Of the remaining websites (895; 86.5%), 333 websites (37.2%) appeared more than once on the results lists. The websites were coded in terms of country of origin, primary language used, their rank within the respective results list, and the primary type of website. In an iterative process that was based on previous research,[5,9,10,14–17] and on a careful review of the websites retrieved, we differentiated 10 types of websites: news items, gaming websites, advertising/commercial, art, information/education about suicide, support website for suicide prevention, support website for grief and bereavement, suicide research, discussion forums, and personal accounts of suicidality. See Supplementary eTable 1 for descriptions and coding examples. Country of origin was determined by a WHOIS search for each website via http://whois.domaintools.com. The specifics of each website were coded in accordance with its position in the results list, with the rank number 1 assigned to the first website listed. The ranking of a website reflects its prominence and likelihood of being accessed.[14]

For the following detailed content analysis on potentially harmful and protective characteristics, usability, and number of links of the websites, we excluded news items (80; 7.7%) and websites that featured a game (1; 0.1%), used suicide for commercials (30; 2.9%), or displayed art (53; 5.1%), because these types of websites were either not text-based or not deemed to be primary resources for individuals actively seeking information on suicide and prevention. In total, 731 websites (70.6%) were included in the detailed content analysis.

The content analyses aimed at identifying potentially harmful and protective item characteristics of website content as outlined in media recommendations for suicide reporting.[27,28] While these recommendations are primarily tailored to traditional news media,[27,28] many of the recommendations listed (eg, to avoid detailed descriptions of suicide methods) are also relevant to online media.[3] On the basis of these guidelines and on previous content analyses on suicide-related web content,[5,9,10,14–17] we conceptualized 20 text characteristics, including 9 characteristics listed as potentially harmful and 11 as protective (eg, provides warning signs for suicidal behavior, contact details to support service). See Supplementary

Table 1. Numbers and Percentages of Website Types for Each Search Term in US and Austrian Searches[a]

	Basic Search	Method-Related Searches[b]				Help-Related Searches[b]	
Website Type	Suicide	Suicide Methods	How to Kill Yourself	Painless Suicide	How to Hang Yourself	Suicidal Thoughts	Suicide Help
United States (n = 476)	(n = 71)	(n = 65)	(n = 59)	(n = 63)	(n = 58)	(n = 68)	(n = 92)
News item	8 (11.3)	4 (6.2)	5 (8.5)	7 (11.1)	1 (1.7)*	8 (11.8)	1 (1.1)*
Art	1 (1.4)	2 (3.1)	12 (20.3)**	2 (3.2)	12 (20.7)**	9 (13.2)**	0 (0.0)
Information	43 (60.6)	32 (49.2)	8 (13.6)***	11 (17.5)***	3 (5.2)***	37 (54.4)	44 (47.8)
Support: prevention	15 (21.1)	1 (1.5)***	1 (1.7)**	5 (7.9)	0 (0.0)***	7 (10.3)	33 (35.9)
Discussion forum	1 (1.4)	15 (23.1)***	27 (45.8)***	34 (54.0)***	41 (70.7)***	2 (2.9)	6 (6.5)
Personal account	0 (0.0)	2 (3.1)	4 (6.8)*	3 (4.8)	0 (0.0)	1 (1.5)	3 (3.3)
Other	3 (4.2)	9 (13.8)	2 (3.4)	1 (1.6)	1 (1.7)	4 (5.9)	5 (5.4)
Austria (n = 420)	(n = 76)	(n = 52)	(n = 52)	(n = 50)	(n = 54)	(n = 62)	(n = 74)
News item	22 (28.9)	1 (1.9)***	5 (9.6)**	1 (2.0)***	3 (5.6)**	7 (11.3)*	7 (9.5)**
Art	2 (2.6)	0 (0.0)	1 (1.9)	6 (12.0)	3 (5.6)	2 (3.2)	1 (1.4)
Information	19 (25.0)	12 (23.1)	2 (3.8)**	7 (14.0)	5 (9.3)*	14 (22.6)	19 (25.7)
Support: prevention	9 (11.8)	2 (3.8)	0 (0.0)*	0 (0.0)*	0 (0.0)*	10 (16.1)	21 (28.4)*
Discussion forum	9 (11.8)	32 (61.5)***	33 (63.5)***	33 (66.0)***	39 (72.2)***	26 (41.9)***	22 (29.7)**
Personal account	3 (3.9)	1 (1.9)	4 (7.7)	2 (4.0)	1 (1.9)	3 (4.8)	1 (1.4)
Other	12 (15.8)	4 (7.7)	7 (13.5)	1 (2.0)*	3 (5.6)	0 (0.0)**	3 (4.1)*

[a]The website types gaming site, advertising, support (grief), training, and research were combined into the category "other" based on low frequencies.
[b]Symbols indicate significant differences compared to the search term *suicide* with Fisher exact tests.
*$P < .05$.
**$P < .01$.
***$P < .001$ (2-tailed).

eTable 2 for an overview of all coded characteristics including definitions and coding examples. All characteristics were coded as absent (0) or present (1). We also calculated a sum score for the quantity of harmful and protective website characteristics.

The usability of websites was assessed with the usability checklist by Cappel and Huang.[29] This checklist consists of 11 items evaluating "good" design practices such as avoiding self-links on homepages or including a breadcrumb trail. Because homepage providers in the European Union are legally bound to provide contact information, we added a corresponding item to the checklist. The number of website links to that site was assessed using the site explorer http://www.majesticseo.com, and links pointing to other websites were counted using http://linkcounter.submitexpress.com.

Websites were screened and analyzed separately by 2 coders (B.T. and T.N.). Intercoder reliability was measured for all qualitative codes, using 58 (5%) randomly selected websites. Percentage of agreement and Krippendorff α[30] were used to measure agreement between coders. Krippendorff α ranged from 0.87 to 1.00, which indicates a high level of agreement.[30] The corresponding percentage of agreement was larger than 96% for all codes.

Data Analysis

χ^2 tests and Fisher exact tests (for small cell values[31]) were used to compare item characteristics across search terms and between searches conducted in the United States and Austria. Mann-Whitney U tests were used to examine differences in the number of harmful and protective website characteristics and in usability scores across search terms used. Spearman correlations were calculated to assess associations of the websites' number of harmful and protective item characteristics with their usability, number of links, and ranking.

RESULTS

Of the 396 relevant websites retrieved with US search engines, 319 (80.6%) were US-American, 22 (5.6%) were British, 18 (4.5%) were Australian, and 11 (2.8%) were Canadian. Of the 335 websites retrieved with Austrian engines, 71 (21.2%) were Austrian, 223 (66.6%) were German, and 8 (2.4%) were Swiss. Among the 731 websites that were included for content analysis, the mean number of harmful item characteristics was 1.24 (SD = 1.49) for searches retrieved via US engines and 1.19 (SD = 1.45) for searches in Austria. The mean number of protective item characteristics was 3.49 (SD = 2.95) in the United States and 2.35 (SD = 2.21) in Austria. These numbers correspond to a ratio of protective to harmful characteristics in the retrieved websites of 2.8:1 for US searches and a ratio of 2:1 for searches in Austria, respectively.

Differences in Types of Websites Across Search Terms

See Table 1 for an overview of the frequencies of the different types of websites for each search term. For both US and Austrian search engines, searches focusing on suicide methods contained more discussion forums and fewer websites focusing on information or prevention than those provided when searched with the basic term *suicide*. Of note, there were no or few sponsored links providing access to professional resources such as crisis intervention centers or counseling services when method-related terms were used in either US or Austrian searches, while the numbers of such links were highest for the term *suicide* (United States: 13 sponsored links, Austria 18 sponsored links) (data not shown).

Differences in Potentially Harmful and Protective Contents Across Search Terms

Tables 2 and 3 provide an overview of the numbers of each harmful and protective item characteristic per search term for

Table 2. Numbers and Percentages of Potentially Protective and Harmful Item Characteristics per Search in US Searches

Characteristic	Basic Search Suicide (n = 62)	Method-Related Searches[a] Suicide Methods (n = 57)	How to Kill Yourself (n = 40)	Painless Suicide (n = 53)	How to Hang Yourself (n = 45)	Help-Related Searches[a] Suicidal Thoughts (n = 50)	Suicide Help (n = 89)	All Searches Total (n = 396)
Protective								
Self-quiz	11 (17.7)	1 (1.8)**	1 (2.5)*	0 (0.0)	0 (0.0)	17 (34.0)	13 (14.6)	43 (10.9)
Suicide research	29 (46.8)	27 (47.4)	1 (2.5)***	4 (7.5)***	1 (2.2)***	12 (24.0)*	23 (25.8)*	97 (24.5)
Focus on suicidal ideation	18 (29.0)	3 (5.3)**	4 (10.0)*	4 (7.5)*	1 (2.2)***	38 (76.0)***	48 (53.9)**	116 (29.3)
Mental disorder related to suicide	47 (75.8)	19 (33.3)***	8 (20.0)***	7 (13.2)***	2 (4.4)***	39 (78.0)	57 (64.0)	179 (45.2)
Myths debunked	18 (29.0)	11 (19.3)	1 (2.5)**	5 (9.4)*	0 (0.0)***	14 (28.0)	32 (36.0)	81 (20.5)
Complexity	38 (61.3)	15 (26.3)***	2 (5.0)***	5 (9.4)***	0 (0.0)***	35 (70.0)	44 (49.4)	139 (35.1)
Provides alternatives	47 (75.8)	17 (29.8)***	16 (40.0)***	25 (47.2)***	12 (26.7)***	47 (94.0)*	74 (83.1)	238 (60.1)
Provides warning signs	39 (62.9)	9 (15.8)***	2 (5.0)***	2 (3.8)***	2 (4.4)***	36 (72.0)	52 (58.4)	142 (35.9)
Mastering of suicidal crisis	10 (16.1)	9 (15.8)	6 (15.0)	16 (30.2)	3 (6.7)	11 (22.0)	25 (28.1)	80 (20.2)
Contact support service	49 (79.0)	21 (36.8)***	4 (10.0)***	19 (35.8)***	5 (11.1)***	42 (84.0)	80 (89.9)	220 (55.6)
Protective picture/video	15 (24.2)	0 (0.0)***	1 (2.5)**	0 (0.0)***	0 (0.0)***	9 (18.0)	24 (27.0)	49 (12.4)
Harmful								
Details of a suicide method	1 (1.6)	32 (56.1)***	17 (42.5)***	29 (54.7)***	26 (57.8)***	0 (0.0)	1 (1.1)	106 (26.8)
Information on celebrity suicide	5 (8.1)	15 (26.3)*	4 (10.0)	10 (18.9)	7 (15.6)	2 (4.0)	4 (4.5)	47 (11.9)
Name of a suicide victim	14 (22.6)	23 (40.4)*	13 (32.5)	21 (39.6)	10 (22.2)	6 (12.0)	23 (25.8)	110 (27.8)
Method in headline	0 (0.0)	6 (10.5)*	3 (7.5)	3 (5.7)	44 (97.8)***	0 (0.0)	1 (1.1)	57 (14.4)
Suicide location or site	11 (17.7)	16 (28.1)	5 (12.5)	12 (22.6)	14 (31.1)	1 (2.0)*	8 (9.0)	67 (16.9)
Reference to a suicide epidemic	9 (14.5)	8 (14.0)	1 (2.5)	1 (1.9)*	0 (0.0)*	2 (4.0)	4 (4.5)*	25 (6.3)
Public myths	0 (0.0)	3 (5.3)	1 (2.5)	2 (3.8)	2 (4.4)	0 (0.0)	0 (0.0)	8 (2.0)
Suicide is heroized	0 (0.0)	2 (3.5)	2 (5.0)	2 (3.8)	8 (17.8)**	0 (0.0)	0 (0.0)	14 (3.5)
Harmful picture/video	4 (6.5)	14 (24.6)*	11 (27.5)**	9 (17.0)	9 (20.0)*	5 (10.0)	4 (4.5)	56 (14.1)

[a]Symbols indicate significant differences compared to the search term *suicide* with Fisher exact tests.
*$P < .05$.
**$P < .01$.
***$P < .001$ (2-tailed).

US and Austrian searches, respectively. Websites retrieved with method-related searches generally contained fewer protective and more harmful characteristics compared to the term *suicide*. For example, the results lists generated with suicide method searches featured fewer websites that provided suicide research, accurate contact details of support services, alternatives to suicidal behavior, and suicide warning signs, but provided more details on suicide methods. However, fewer websites with references to suicide epidemics were retrieved with method-related searches compared to the term *suicide*. A pattern of more protective and fewer harmful characteristics for help-related search terms was present for US and Austrian searches. For example, there were more websites that focused on suicidal ideation or provided alternatives to suicidal behavior compared to the basic term *suicide*.

A comparison of the total numbers of harmful and protective website characteristics across search terms showed that websites retrieved with help-related searches (ie, *suicide help* and *suicidal thoughts)* also had the highest total numbers of protective characteristics in both countries, while search results based on the term *how to hang yourself* had the largest number of harmful characteristics. See Table 4 for an overview of the means and standard deviations of the sum scores of harmful and protective characteristics for all searches.

Comparison of US and Austrian Contents

Generally, US search results provided more information/education websites ($P < .001$), and Austrian results contained more news reports ($P < .05$), advertising items ($P < .001$), and discussion forums ($P < .001$). US search results had a higher number of protective item characteristics than Austrian search results ($P < .001$). In particular, websites retrieved with US search engines more frequently linked suicidality to mental disorders ($P < .01$), debunked suicide myths ($P < .001$), portrayed suicidality as a complex phenomenon ($P < .001$), portrayed an individual's mastering of his or her suicidal crisis ($P < .05$), or provided suicide warning signs ($P < .001$) or contact information to help services ($P < .01$). However, websites retrieved with US search engines more frequently provided the name of a suicide victim ($P < .01$) and contained more often a potentially harmful picture or video ($P < .05$) than did Austrian searches.

Content Characteristics and Ranking

The better a website was ranked, the greater was the number of harmful characteristics on the website (United States: $P < .01$, Austria: $P = .06$). Further, the higher a website was ranked in Austrian searches, the smaller was the number of protective characteristics ($P < .05$).

Website Usability

Generally, American websites tended to have a higher usability than Austrian websites ($P = .06$). The fewer harmful characteristics an American website had, the better was its usability ($P < .05$). In Austria, website usability correlated negatively with the number of protective characteristics ($P < .05$). Furthermore, the websites retrieved in US search engines with the term *suicide* had better usability than those

Table 3. Numbers and Percentages of Potentially Protective and Harmful Item Characteristic per Search in Austrian Searches

Characteristic	Basic Search Suicide (n = 40)	Method-Related Searches[a] Suicide Methods (n = 49)	How to Kill Yourself (n = 39)	Painless Suicide (n = 42)	How to Hang Yourself (n = 47)	Help-Related Searches[a] Suicidal Thoughts (n = 53)	Suicide Help (n = 65)	All Searches Total (n = 335)
Protective								
Self-quiz	1 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.1)	4 (7.5)	7 (10.8)	13 (3.9)
Suicide research	13 (32.5)	0 (0.0)*	2 (5.1)**	1 (2.4)***	3 (6.4)*	7 (13.2)*	17 (26.2)	43 (12.8)
Focus on suicidal ideation	7 (17.5)	4 (8.2)	7 (17.9)	1 (2.4)*	8 (17.0)	38 (71.7)***	30 (46.2)**	95 (28.4)
Mental disorder related to suicide	15 (37.5)	5 (10.2)**	11 (28.2)	11 (26.2)	2 (4.3)***	35 (66.0)*	37 (56.9)	116 (34.6)
Myths debunked	0 (0.0)	0 (0.0)	2 (5.1)	0 (0.0)	3 (6.4)	5 (9.4)	10 (15.4)*	20 (6.0)
Complexity	10 (25.0)	0 (0.0)***	0 (0.0)**	1 (2.4)**	0 (0.0)***	14 (26.4)	16 (24.6)	41 (12.2)
Provides alternatives	25 (62.5)	14 (28.6)**	19 (48.7)	20 (47.6)	6 (12.8)***	46 (86.8)*	51 (78.5)	181 (54.0)
Provides warning signs	9 (22.5)	2 (4.1)*	1 (2.6)*	0 (0.0)**	5 (10.6)	16 (30.2)	20 (30.8)	53 (15.8)
Mastering of suicidal crisis	0 (0.0)	6 (12.2)*	9 (23.1)**	9 (21.4)*	2 (4.3)	13 (24.5)*	8 (12.3)*	47 (14.0)
Contact support service	21 (52.5)	13 (26.5)*	11 (28.2)*	21 (50.0)	3 (6.4)***	32 (60.4)	46 (70.8)	147 (43.9)
Protective picture/video	3 (7.5)	0 (0.0)	2 (5.1)	1 (2.4)	0 (0.0)	10 (18.9)	14 (21.5)	30 (9.0)
Harmful								
Details of a suicide method	6 (15.0)	20 (40.8)*	19 (48.7)**	28 (66.7)***	27 (57.4)***	2 (3.8)	2 (3.1)	104 (31.0)
Information on celebrity suicide	8 (20.0)	4 (8.2)	0 (0.0)**	9 (21.4)	5 (10.6)	1 (1.9)	7 (10.8)	34 (10.1)
Name of a suicide victim	14 (35.0)	8 (16.3)	6 (15.4)	12 (28.6)	4 (8.5)**	4 (7.5)**	17 (26.2)	65 (19.4)
Method in headline	0 (0.0)	3 (6.1)	1 (2.6)	0 (0.0)	41 (87.2)***	2 (3.8)	0 (0.0)	47 (14.0)
Suicide location or site	13 (32.5)	4 (8.2)**	3 (7.7)*	7 (16.7)	16 (34.0)	1 (1.9)***	13 (20.0)	57 (17.0)
Reference to a suicide epidemic	9 (22.5)	3 (6.1)*	1 (2.6)*	1 (2.4)**	2 (4.3)**	6 (11.3)	8 (12.3)	30 (9.0)
Public myths	0 (0.0)	2 (4.1)	6 (15.4)*	8 (19.0)**	4 (8.5)	1 (1.9)	5 (7.7)*	26 (7.8)
Suicide is heroized	0 (0.0)	2 (4.1)	0 (0.0)	2 (4.8)	3 (6.4)	0 (0.0)	0 (0.0)	7 (2.1)
Harmful picture/video	4 (10.0)	4 (8.2)	1 (2.6)	6 (14.3)	5 (10.6)	3 (5.7)	5 (7.7)	28 (8.4)

[a]Symbols indicate significant differences compared to the search term *suicide* with Fisher exact tests.
*P<.05.
**P<.01.
***P<.001 (2-tailed).

Table 4. Descriptive Statistics of the Total Number of Protective and Harmful Website Characteristics for Different Search Terms in US and Austrian Searches[a]

Characteristic	Basic Search Suicide	Method-Related Searches[b] Suicide Methods	How to Kill Yourself	Painless Suicide	How to Hang Yourself	Help-Related Searches[b] Suicidal Thoughts	Suicide Help
Protective (United States)	5.18 (2.4)	2.32 (2.4)***	1.15 (1.7)***	1.64 (2.1)***	0.58 (0.9)***	6.00 (1.7)	5.30 (2.6)
Harmful (United States)	0.71 (1.3)	2.09 (1.7)***	1.43 (1.2)***	1.68 (1.3)***	2.67 (1.7)***	0.32 (0.7)	0.51 (0.9)
Protective (Austria)	2.60 (2.3)	0.90 (1.2)***	1.64 (1.5)	1.55 (1.5)	0.70 (1.0)***	4.15 (2.1)**	3.94 (2.1)**
Harmful (Austria)	1.35 (1.7)	1.02 (1.2)	0.95 (0.9)	1.74 (1.4)	2.28 (1.7)**	0.38 (0.9)**	0.88 (1.5)

[a]Values are presented as mean (SD) of the sum scores representing the numbers of harmful and protective website characteristics.
[b]Symbols indicate significant differences compared to the search term *suicide* with Mann-Whitney U tests.
*P<.05.
**P<.01.
***P<.001 (2-tailed).

received for method-related searches, eg, *suicide methods* (P<.001). In Austria, an opposite pattern emerged. Usability was higher for websites retrieved via *how to hang yourself* compared to *suicide* (P<.05).

Website Links

The number of links that pointed to a website correlated negatively with the number of potentially harmful characteristics on that website (United States: P<.001, Austria: P<.01) and positively with the number of protective characteristics (United States: P<.001, Austria: P<.001). Regarding links pointing away from the website, the number of links increased with the number of both harmful (United States: P<.001, Austria: P<.01) and protective characteristics (United States: P=.06, Austria: P<.001).

DISCUSSION

In the present analysis, the mean number of identified protective characteristics on suicide-related websites outweighed the number of harmful characteristics by approximately 2:1 in both US and Austrian searches. This finding suggests that information provided on the Internet is generally more geared toward characteristics that are considered protective than toward harmful information. However, the type and quality characteristics of websites retrieved with suicide-related searches using search engines were largely determined by the search terms used. In both US and Austrian searches, there were fewer websites dedicated to suicide prevention and to information/education when using method-related search terms. Regarding website

content, suicide method searches yielded websites with more potentially harmful characteristics than searches based on the term *suicide*. In contrast, websites with the largest numbers of potentially protective characteristics were retrieved with help-related search terms, ie, *suicide help* and *suicidal thoughts*. Providing details of a suicide method was the most common harmful characteristic found on websites retrieved with method-related search terms. This finding confirms that information on how to commit suicide is easily retrievable when users search specifically for suicide methods.[14] Interestingly, references to a suicide epidemic were less frequent among method-related search results than among those retrieved with the term *suicide*. An explanation may be that websites focusing on information on suicide and suicide prevention frequently highlight the importance of the topic of suicide by highlighting large or increasing numbers of suicides in the population. From a public health perspective, this approach warrants careful consideration, because sensationalist portrayals of suicide can lead to copycat behavior.[28]

This analysis also revealed important intercountry differences. Online information and support resources seem to be more common in the United States than in Austria, as indicated by the higher prevalence of resources dedicated to public education and the larger amount of protective website contents. Help-related websites in the United States also had better usability scores than those of method-related searches. In contrast, usability was linked to a low number of protective characteristics in Austria. This finding may indicate issues regarding website design of help providers from German-speaking countries, particularly Germany (66.6% of websites) and Austria (21.2%).

Websites with a high number of harmful and a small number of protective content characteristics were associated with a better ranking in both US and Austrian searches. This finding is concerning and replicates a previous study that demonstrated a high proportion of number 1 ranks of prosuicide websites on the basis of UK search engines.[14] The present study also showed that the number of links pointing to a website was smaller for websites with high numbers of harmful characteristics and thereby confirmed a hypothesis that was raised in an earlier study on the basis of searches in New Zealand.[15] It seems that websites with more harmful contents are not operating in a network, but on a more isolated basis, which hinders their accessibility and supports better linked prevention websites in increasing their ranking by sustained networking efforts.

Practice Implications

Earlier studies have noted that suicide-related information on the Internet includes both potentially harmful and protective resources,[5,12] and that psychiatrists should ask patients about their Internet consumption and help potentially suicidal individuals to connect with helpful, rather than harmful, resources on the Internet.[5] The present study highlights that the quality of websites largely depends on the search terms used. Suicidal individuals who are not actively

seeking help from mental health professionals are intuitively more likely to use search terms on suicide methods, which may reflect a further step in the suicidal development.[21] Particular concern about the quality of information retrieved and any effects of that information on patients is necessary when individuals report the use of method-related search terms, because these resources include the largest amount of harmful characteristics. The present findings also show that public health approaches need to complement clinical approaches to prevent suicide in individuals searching the Internet for suicide-related information. In particular, mental health organizations with online representations need to put a stronger focus on how to improve the quality of information retrieved with method-related search terms. Organizations working to prevent suicide could use ads or sponsored links in results lists of method-related searches to offer information, counseling, and emergency services. In the present analysis, prevention-related sponsored links were nearly exclusively retrieved with the terms *suicide* and *suicide help*, but for both US and Austrian search engines, these ads were not provided when search terms such as *how to hang yourself* were used.

The finding that help-related searches yielded significantly fewer websites with harmful characteristics and significantly more websites with protective characteristics than searches using the term *suicide* may reflect current meta-tagging practices of prevention websites with suicide prevention–related terms. Of note, meta-tags are keywords used by administrators to describe the website contents and, while not visible to the website user, they increase the visibility of the website when those keywords are searched with search engines. On the basis of the current analysis, the addition of meta-tags on suicide methods (eg, *how to hang yourself*) to prevention websites may help to increase the likelihood of retrieving such websites also when method-related search terms are used. Other efforts to increase the visibility of protective websites may include the integration of social media into the web services and efforts to increase the number of links pointing to the website.[32] The lower usability of protective websites retrieved with Austrian searches compared to US search results suggests a need for a detailed revision of usability issues with German-speaking suicide prevention and education websites.

Limitations

The present study has several limitations. A website's number of harmful and protective content characteristics may be an indicator for potential impact on users, but further studies are needed to examine actual effects of different types of websites on suicide.[9] Furthermore, it is still unclear which search terms are actually used by suicidal individuals to get information on suicide methods or help.[17] Information on search strategies particularly used by vulnerable individuals would be important to offer tailored preventive interventions. The constantly changing nature of the Internet is another limitation, because it is impossible to scrutinize permanent details,[21] which hampers the generalizability of findings.

However, we identified several relatively constant patterns across US and Austrian search engine results, and it has been suggested in earlier literature that the overall balance between prosuicide and antisuicide websites in a given culture seemed relatively stable over time.[10]

REFERENCES

1. World Health Organization. Suicide prevention (SUPRE). June 6, 2013. http://www.who.int/mental_health/prevention/suicideprevent/en/index.html. Accessed June 26, 2013.
2. Mann JJ, Apter A, Bertolote J, et al. Suicide prevention strategies: a systematic review. *JAMA*. 2005;294(16):2064–2074.
3. Collings S, Niederkrotenthaler T. Suicide prevention and emergent media: surfing the opportunity. *Crisis*. 2012;33(1):1–4.
4. Dunlop SM, More E, Romer D. Where do youth learn about suicides on the Internet, and what influence does this have on suicidal ideation? *J Child Psychol Psychiatry*. 2011;52(10):1073–1080.
5. Recupero PR, Harms SE, Noble JM. Googling suicide: surfing for suicide information on the Internet. *J Clin Psychiatry*. 2008;69(6):878–888.
6. Ybarra ML, Suman M. Help seeking-behavior and the Internet: a national survey. *Int J Med Inform*. 2006;75(1):29–41.
7. PromoMasters. Suchmaschinen in Prozent [Search engines in percent]. http://www.promomasters.at/suchmaschinen-nutzungsdaten-2011-04.html. Updated February 4, 2013. Accessed December 19, 2012.
8. Nielsen. Nielsen reports March 2010 US search rankings. http://www.nielsen.com/us/en/newswire/2010/nielsen-reports-march-2010-u-s-search-rankings.html. Updated April 28, 2010. Accessed January 2, 2013.
9. Cheng Q, Fu KW, Yip PSF. A comparative study of online suicide-related information in Chinese and English. *J Clin Psychiatry*. 2011;72(3):313–319.
10. Collings SC, Macdonald C, Kemp CG, et al. *In the Balance: Pro-Suicide and Support Material Located by New Zealand–Based Web Searches*. Auckland, New Zealand: Te Pou; 2010.
11. Becker K, Schmidt MH. Internet chat rooms and suicide. *J Am Acad Child Adolesc Psychiatry*. 2004;43(3):246–247.
12. Durkee T, Hadlaczky G, Westerlund M, et al. Internet pathways in suicidality: a review of the evidence. *Int J Environ Res Public Health*. 2011;8(10):3938–3952.
13. Baume P, Cantor CH, Rolfe A. Cybersuicide: the role of interactive suicide notes on the Internet. *Crisis*. 1997;18(2):73–79.
14. Biddle L, Donovan J, Hawton K, et al. Suicide and the Internet. *BMJ*. 2008;336(7648):800–802.
15. Kemp CG, Collings SC. Hyperlinked suicide: assessing the prominence and accessibility of suicide Web sites. *Crisis*. 2011;32(3):143–151.
16. Westerlund M, Hadlaczky G, Wasserman D. The representation of suicide on the Internet: implications for clinicians. *J Med Internet Res*. 2012;14(5):e122.
17. Wong PW-C, Fu K-W, Yau RS-P, et al. Accessing suicide-related information on the Internet: a retrospective observational study of search behavior. *J Med Internet Res*. 2013;15(1):e3.
18. Niederkrotenthaler T, Voracek M, Herberth A, et al. Role of media reports in completed and prevented suicide: Werther v Papageno effects. *Br J Psychiatry*. 2010;197(3):234–243.
19. Biddle L, Gunnell D, Owen-Smith A, et al. Information sources used by the suicidal to inform choice of method. *J Affect Disord*. 2012;136(3):702–709.
20. Fu KW, Wong PWC, Yip PSF. Internet and emerging suicide method: a case study of contagion of charcoal burning suicide via the Internet. In: Sher L, Vilens A, eds. *Internet and Suicide*. New York, NY: Nova Science; 2009:153–168.
21. Wassermann D. *Suicide: An Unnecessary Death*. London, UK: Dunitz; 2001.
22. Grohol JM. Suicide and the Internet: study misses Internet's greater collection of support Web sites. *BMJ*. 2008;336(7650):905–906.
23. Statistik Austria. Gestorbene [Deceased] [Data file]. http://sdb.statistik.at/superwebguest/login.do?guest=guest&db=degestorbene_ext. Accessed June 12, 2012.
24. Centers for Disease Control and Prevention. Injury prevention and control: data and statistics. http://www.cdc.gov/injury/wisqars/index.html. Updated September 20, 2013. Accessed October 14, 2013.
25. Eysenbach G, Köhler C. How do consumers search for and appraise health information on the World Wide Web? qualitative study using focus groups, usability tests, and in-depth interviews. *BMJ*. 2002;324(7337):573–577.
26. Jansen BJ, Spink A. An analysis of Web searching by European AlltheWeb.com users. *Inf Process Manage*. 2005;41(2):361–381.
27. Niederkrotenthaler T, Sonneck G. Assessing the impact of media guidelines for reporting on suicides in Austria: interrupted time series analysis. *Aust N Z J Psychiatry*. 2007;41(5):419–428.
28. World Health Organization. *Preventing Suicide. A Resource for Media Professionals*. Geneva, Switzerland: World Health Organization; 2008.
29. Cappel JJ, Huang Z. A usability analysis of company Web sites. *J Comput Inf Syst*. 2007;48(1):117–123.
30. Krippendorff K. *Content Analysis: An Introduction to Its Methodology*. Thousand Oaks, CA: Sage; 2004.
31. Cochran WG. Some methods for strengthening the common χ^2 tests. *Biometrics*. 1954;10(4):417–451.
32. Searchmetrics. SEO ranking faktoren für Google Deutschland 2012 [SEO ranking factors for Google Germany 2012]. http://www.searchmetrics.com/de/services/whitepaper/seo-ranking-faktoren-deutschland/. Accessed October 1, 2013.

Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Maria A. Oquendo, MD, at moquendo@psychiatrist.com.

See supplementary material for this article at PSYCHIATRIST.COM.

THE JOURNAL OF CLINICAL PSYCHIATRY

Supplementary Material

Article Title:
Surfing for Suicide Methods and Help: Content Analysis of Web Sites Retrieved With Search Engines in Austria and the United States

Author(s):
Benedikt Till, DSc, and Thomas Niederkrotenthaler, MD, PhD, MMSc

List of Supplementary Material for the article

Disclaimer

This Supplementary Material has been provided by the author(s) as an enhancement to the published article. It has been approved by peer review; however, it has undergone neither editing nor formatting by in-house editorial staff. The material is presented in the manner supplied by the author.

Supplementary eTable 1

Descriptions and Coding Examples for Types of Websites

Type	Description	Example
News item	News article about suicide or related news item.	CNN: http://edition.cnn.com/2013/01/12/us/new-york-reddit-founder-suicide
Gaming site	Website that featured a game about suicide or a game containing suicide as a topic.	Adult Swim Games: http://games.adultswim.com/five-minutes-to-kill-yourself-adventure-online-game.html
Advertising/commercial	Advertisement or commercial that uses suicide for promotional purpose or a commercial online-shop (incl. online pharmacies).	Abilify: http://www.abilify.com
Art	Visual or audio material on suicide: pictures, videos, songs, poems, lyrics, etc.	Lyrics freak: http://www.lyricsfreak.com/j/johnny+mandel/suicide+is+painless_20801409.html
Information /education	Websites to inform about the topic of suicide, including statistics, prevention, negative consequences of suicide.	Wikipedia: http://en.wikipedia.org/wiki/Suicide
Support (suicide prevention)	Website designed to offer support to suicide-risk individuals.	National Suicide Prevention Lifeline: www.suicidepreventionlifeline.org
Support (grief)	Website designed to offer support to individuals grieving after suicide.	Open to Hope: http://www.opentohope.com
Research	Websites related to suicide research, including case studies, letters, and scientific books.	Beijing Suicide Research and Prevention Center: http://www.crisis.org.cn/UploadFile/ReadParty/Methods--lethality.pdf
Discussion forum	Suicide-related message boards and blogs.	Suicide Forum: http://www.suicideforum.com/forum.php
Personal account	Personal accounts of own suicidality or accounts of suicidal behavior of friends or family members.	It Gets Better Project: http://www.itgetsbetter.org

Supplementary eTable 2

Code Categories, Code Definitions, and Coding Examples for the Protective (n=11) and

Harmful (n=9) Item Characteristics

Code	Code definition	Coding Example[1]
Protective characteristics:		
Contains a self-quiz	Contains an interactive self-quiz on suicidality or depression (e.g. "Are you suicidal? Take this quiz to find out!").	"Use this brief 18-question online automated quiz to help you determine if you may need to see a mental health professional for diagnosis and treatment of depression, or for tracking your depression on a regular basis." (BT176)
Contains suicide research	Elaborates on academic research on suicide.	"Studies from Sri Lanka suggest that less than 20% of pesticides used for self-harm are bought for the purpose; the majority are freely available in the home or nearby garden (Eddleston et al., 2006a)." (BT55)
Focus on suicidal ideation	The website focuses primarily on suicidal ideation (and not on suicide, suicide attempts, or the act of planning suicidal behavior).	"If you have thoughts of suicide, these options are available to you:…" (BT139)
Mental disorder related to suicide	The relationship between mental disorder and suicidality is acknowledged, either at the level of an individual suicide, or in general terms. Colloquial terms such as 'crazy' do not qualify as a reference to mental disorder.	"And remember that any untreated mental illness, including depression, bipolar disorder, schizophrenia, and others, may cause suicide." (BT142)
Myths debunked	Myths (see section with harmful characteristics) are explicitly debunked or the website contains a story or report with focus on the debunking of a myth.	"Suicide Myth: Suicide always occurs without any warning signs. Suicide Fact: There are almost always warning signs." (BT142)
Portrays suicide as complex	Suicidality is portrayed as complex phenomenon and is not explained monocausally.	"Although the reasons why people commit suicide are multifaceted and complex, life circumstances that may immediately precede someone committing suicide include the time period of at least a week after discharge from a psychiatric hospital or a sudden change in how the person appears to feel (for example, much worse or much better)." (BT232)
Provides alternatives	Provides specific alternatives to suicide or alternative solutions for crises or ways to distract the individual from suicidal ideation (e.g. use of antidepressants, psychotherapy, talking to a friend, sports, etc.).	"Speaking to a therapist or attending a support group can help you work through your grief and improve your overall mental health." (BT135)
Provides warning signs	Provides warning signs for suicidality (talks about committing suicide, has trouble eating or sleeping, experiences drastic changes in behavior, withdraws from friends and/or social activities, loses interest in hobbies, work school, etc., prepares for death by making out a will and final arrangements, gives away prized possessions, has attempted suicide before, takes unnecessary risks, has had recent severe losses, is preoccupied with death and dying, loses interest in personal appearance, or increases use	"These signs may mean someone is at risk for suicide. [...] Talking about wanting to die or to kill oneself. Looking for a way to kill oneself, such as searching online or buying a gun. [...]" (BT139)

of alcohol or drugs).

Contains mastering of suicidal crisis	Provides the portrayal of an individual's mastering of his/her suicidal crisis.	"I have created these sites from my own life experiences going through and coming out of some terribly suicidal times. [...] What I wanted and needed to know, was that I could absolutely, positively, get rid of the terrible suffering I could no longer endure." (BT565)
Provides details of a contact support service	Provides phone numbers or other contact information for crisis intervention or suicide prevention resources in the website's country of origin.	"The National Suicide Prevention Lifeline is a 24-hour, toll-free suicide prevention service available to anyone in suicidal crisis. If you need help, please dial: 1-800-273-TALK (8255)" (BT176)
Contains potentially protective picture or video	The website contains a prominent placed picture or video that portrays a therapy or any medical or psychological treatment.	-

Harmful characteristics:

Details of a suicide method	Provides detailed suicide methods or instructions (at least two consecutive steps in the accomplishment of a specific suicide method are reported; excludes humorous or sarcastic descriptions, statistical reports of suicide rates by method, sociological or historical information about suicide in the context of cultural research, and brief lists).	"Most experts recommend combining drugs with alcohol and a garbage bag over the head, secured with an elastic." (BT301)
Information on celebrity suicide	Contains information about a celebrity's suicide or suicide attempt (e.g. Kurt Cobain).	"For example, Cleopatra supposedly had an asp bite her when she heard of Marc Antony's death." (BT314)
Name of a suicide victim reported	The first and/or family name of an individual that committed or attempted suicide is reported.	"Lindsay died by suicide." (BT142)
Method in headline	Reference to a specific method in the headline.	"Factors influencing the decision to use hanging as a method of suicide: qualitative study" (TN48)
Suicide location or site reported	Readers are provided with enough information to identify the location or site where the event took place. The exact mail address is identifiable, a well-defined area of local interest is reported or a map showing the location is provided.	"In 1933, Kiyoko Matsumoto committed suicide by jumping into the Mihara crater." (BT314)
Reference to a suicide 'epidemic'	Wording that describes suicide as spreading and involving more and more individuals, or an extraordinarily high number of individuals.	"Over the last decade, the suicide rate among young children has increased dramatically." (BT380)
Public myths reported	One or more of the following public myths is enhanced by the text: those who talk about suicide are less likely to attempt suicide; there are no preceding warning signs; there is nothing you can do about suicidality; someone who has a history of making 'cries for help' will not commit suicide; talking about suicide encourages suicide; only the mentally ill exhibit suicidal behavior; once a person is suicidal, he or she is always suicidal; suicide can be a blessed relief for the individual or those around him or her.	"People who are so unhappy and decide to do a suicide are very determined would do anything, no one can usually stop them (unless you are next to them all the time, but you can't really find out whether she/he is actually going to do it)..." (TN41)

Suicide is heroized	Suicidal behavior is described in a heroic way, portraying suicide as an desirable goal (e.g. characterized as "special death").	"Or maybe she saved somebody else with doing this [committing suicide] not realizing of course." (TN41)
Contains potentially harmful picture or video	The website contains a prominent placed picture or video that portrays a suicide method, the location or site of a suicide, the body of a suicide victim, or a suicide note.	-

[1]References to the location of the text segments in the material are given in parentheses.