Google Trends®: ready for real-time suicide prevention or just a Zeta-Jones effect?

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ABSTRACT

Two studies have shown that increasing the consultation of the word "suicide" in the Google search engine was associated with a subsequent increase in the prevalence of suicide attempts. The purpose of this paper was to analyse the trends in Google searches on suicide, depression and bipolar disorder. Methods. Based on previous studies, the frequency of the search words "how to suicide" and "commit suicide" were analysed for suicide, as well as "antidepressant" and "depression" for depressive disorders. Results and conclusions. Together, these analyses suggest that the search for the words "how to suicide" or "commit suicide" on the Google search engine may be a good indicator for suicide prevention policies. However, the tool is not developed enough to date to be used as a real time dynamic indicator of suicide epidemics. The frequency of the search for the word "suicide" was associated with those for "depression" but not for "bipolar disorder", but searches for psychiatric conditions seem to be influenced by media events more than by real events in the general population.

Keywords: *Suicide, Google, Internet, Prevention, Depression, Bipolar.*

1 BACKGROUND AND RATIONALE

Google Trends® is a device of Google Labs® that enables users to know the frequency of the search for a specific word in the Google® browser. Presented as a graph, the horizontal axis indicates the time scale year by year, starting with 2004, and the vertical shows the value of the search frequency. The tool also allows comparing the frequency of several terms. Google Trends® has several features, such as the presentation of news articles directly associated with pike popularity of the search word and the geographical distribution of the searches and their evolution over time.

It was recently proposed that Google Trends® can be used successfully in public health policies as a health monitoring engine [1, 2]. This is based on the correlation between an abnormal increase in the number of hits for a word describing an epidemiological event as detected by the search engine at a time point in a geographical area, on one hand and the true epidemiological event that takes place in the community, on the other hand. To further support the predictive value of Google Trends®, the point-sources of epidemic avian influenza (H1N1) outbreak from 2009 have been landmarked retrospectively, by targeting the geo-locations where words describing the disease or its symptoms (i.e.- "fever", "infection," "cramps",

"sweating", "influenza") were firstly approached by engine users1. The graphic associated with search for the word "influenza" is shown for example in Figure 1.
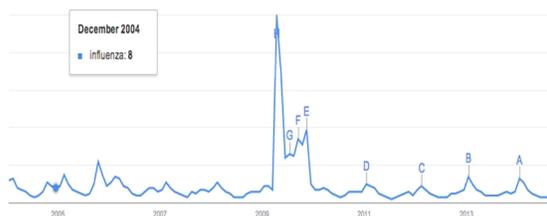

Fig. 1. Trends search for "influenza" in the Google search engine. We note the pike of the H1N1 flu in 2009. (Data Source: Google Trends). The letters correspond to articles published in the press, identified as having been the source of increased consultation word on the google® web browser.

In psychiatry, the so-called « Werther effect » or « suicide mimetic » is not new [3]. This concept perceived as a "suicidal contagion" was described in 1982 by the American sociologist David Phillips in reference to Goethe's book "The Sorrows of Young Werther" [4]. The publication in 1774 was followed by an increase in the number of suicides [5]. Two independent studies from Korea and the Unites States have recently reported that an "epidemic"-like increase of suicide rates was preceded with several days by an increase in the search for the word "suicide" [6, 7]. Key words such as "how to suicide" or "commit suicide" could therefore function as « real time » indicators of an increasing suicide risk in the community and could potentially guide prevention policies towards an added efficacy.

More than 90% of suicide attempts are linked to a psychiatric disorder and most often to major depressive disorder [8, 9]. Supposing that people who are looking for information about depression may have identified depressive symptoms in themselves or their entourage, searching for key terms describing depression or depressive states may also be a marker of interest for the general mental well-being and may approximate as well an increase in suicidal risks in the community.

The main goal of this article was to explore the trends generated by a search with key words associated with suicide, depression and bipolarity (the changes in consultation with key words corresponding to suicide and mood disorders) in an attempt to identify general trends in the French population and suggesting potential prevention strategies.

2   METHODS

We used the Google Trends® engine with the following search terms: "suicide" "major depressive disorder / depression" and "bipolar disorders / bipolar" limited to France. General trends were compared to world trends. Geographical data were also reported for the word "suicide" in France to explore if searches were stable across time and geographical areas or not between 2005 and 2014. All research was conducted October 20, 2014.

3   RESULTS

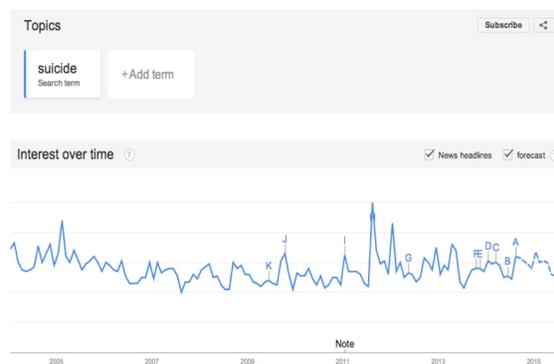1) Evolution of research on the word "suicide" in France between 2005 and 2014 (Figure 2 and 3)

Fig. 2. Evolution of the search of the word "suicide" in France between 2005 and 2014 (the dashed lines show the forecasts for 2015). The letters stand for news articles whose publication was associated with the search of the word "suicide." (Data Source: Google Trends).
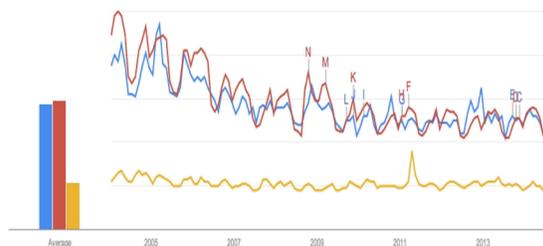

Fig. 3. Comparative evolution of research on the google search engine for the words "suicide" (blue) "depression" (red) and "bipolar" (yellow) worldwide between 2005 and 2014. Research conducted on 2014, October the 20th (Data Source: Google Trends). Searches for "suicide" correlate with "depression" but not with "bipolar disorders".
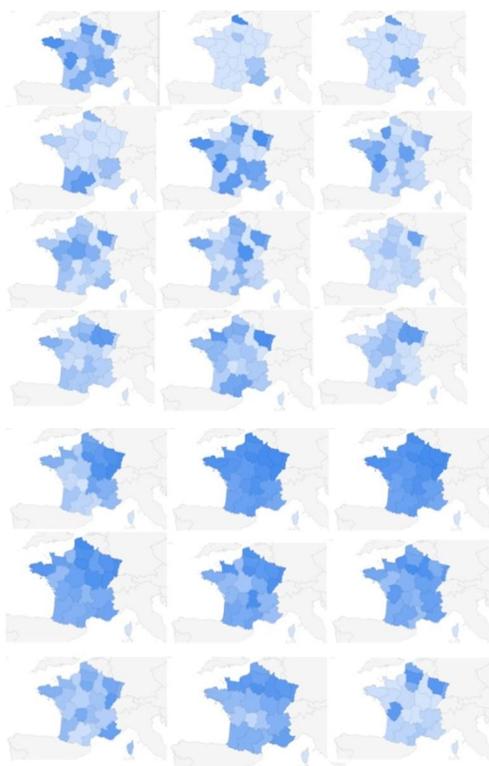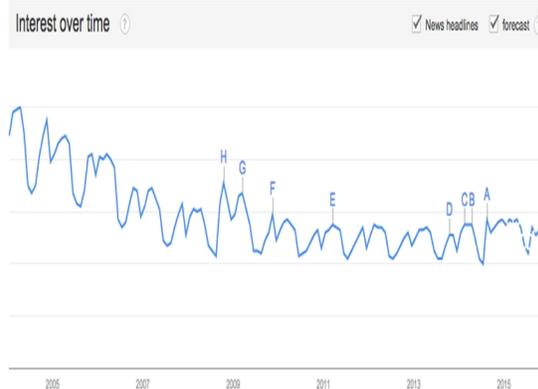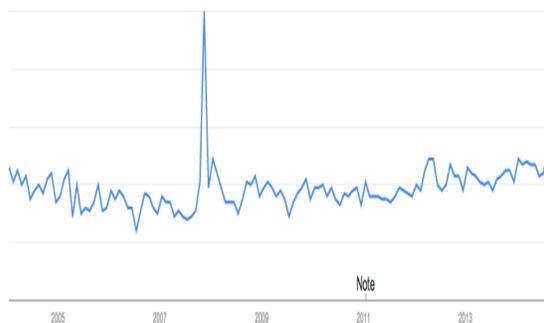
Fig. 5. Trends in research on the google® search engine for the French word "depression" in France (top line) and for the words "major depressive disorder" worldwide (bottom) between 2005 and 2014. Research conducted on 2014, October the 20th (Data Source: Google Trends). A pick was identified in France that did not appear worldwide. Cyclic features appear worldwide while French searches seem rather stable.

Fig. 4. Yearly evolution of the search for the word "suicide" in France between the 2005 and 2014. More dark blue is the more research was important. These maps demonstrate high variations of the search frequencies in time and in space.

2) Comparative analysis of researches for the search terms « major depressive disorder » and « bipolar disorder »
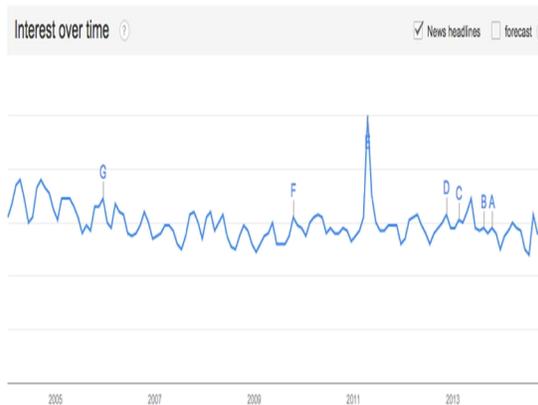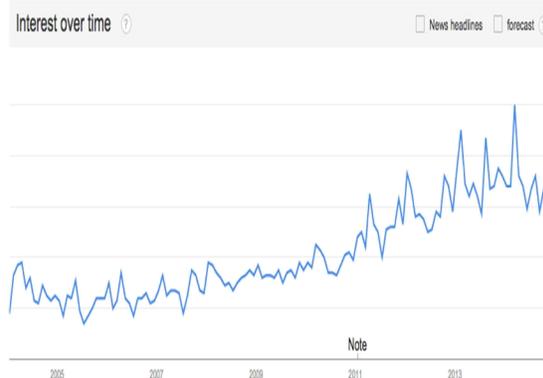

Fig. 6. Trends in research on the search engine Google for the French word "bipolar" in France (topline) and for the words "bipolar disorder" worldwide (bottom) between 2005 and 2014. Research conducted on 2014, October the 20th (Data Source: Google Trends). The worldwide "E" pick in April 2011 was not found in

France, and was associated with the news that the actress Catherine Zeta-Jones was treated for bipolar disorder.

4 DISCUSSION

The analysis of the evolution of the frequency of the search terms "commit suicide" or "how to suicide" and their distribution on the French territory (Figures 2 and 4) demonstrates high variations of the search frequencies in time and in space, and could probably be used as a good indicator for health surveillance, as suggested by previous studies. However there remain several limits to this tool to date: Google Trends® only offer a semi-annual testing to date, which would fail at the time to help real time policies preventing suicide. The numbers of the absolute values of research are also not freely available in the software to date. An accurate search of daily variations of the word « suicide » across cities would be more appropriate for example. To avoid any "big brother" effect (in reference to the George Orwell's novel "1984")10, only collective but not individual data and/or interventions should be recommended. It also remains to be demonstrated that this frequency is associated with an increase in the number of suicide attempts in the French population, as it was demonstrated in other countries [6, 7].

The search curve of the word « suicide » was strongly correlated with the search of the word "depression" but not the word "bipolar", while bipolar disorders are considered to be the psychiatric disorder associated with the most increased suicide risk (Figure 3) [11]. We expected an overall increase in the search for the word "depression" worldwide after the economic and financial crisis of 2008, which was not the case.

The change in the search of the word "depression" follows cyclical movements, the annual hollows corresponding for summer holidays (July and August) and holiday season (December) (Figure 5), contrary to popular belief that the holidays season may worsen depressive disorders, especially among single people. The same trough in summer is found for the word "bipolar", however the effect of year-end holidays does not appear for this term. It may be simply suggested that searches for medical condition are less frequent during summer holidays. The hypothesis that the word "bipolar" would be more frequently searched during spring and autumn (the two seasons during when symptoms were described to be exacerbated in bipolar patients) was not confirmed.

Finally, we see a clear pike search for the words "bipolar disorders" in April 2011, according to Google Trends® corresponding to the publication of

an article in the Bangkok Post announcing that the actress Catherine Zeta-Jones was treated for bipolar mood disorder [3]. However this result was not found in France. Figure 6 shows the magnitude of the phenomenon; we suggest, on the model of the "Werther effect", a "Zeta-Jones effect" corresponding to the increase of research on mental illness following the announcement of the disease in a media celebrity.

5 CONCLUSION

Together, these analyses suggest that the search for the words "how to suicide" or "commit suicide" on the Google search engine may be a good indicator for suicide prevention policies. However, the tool is not developed enough to date to be used as a real time dynamic indicator of suicide epidemics. The frequency of the search for the word "suicide" was associated with those for "depression" but not for "bipolar disorder", but searches for psychiatric conditions seem to be influenced by media events more than by real events in the general population.

6 CONFLICTS OF INTEREST

The authors report no conflict of interest with this article.

7 ACKNOWLEDGEMENTS

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