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Substance Use-related Stigma: An Exploratory Study of Search Behavior using Google Trends (2004-2021)

Proposed running title: Stigma: A Study of Search Behavior using Google Trends

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Disclosures

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Abstract

Background. The use of stigmatizing language (e.g. "addict", "junkie", "alcoholic", "stoner") by researchers and health professionals to describe individuals with substance use disorders is increasingly recognized as detrimental to patient treatment outcomes, with the use of "person-first" less-stigmatizing language (e.g. "individual with substance use disorder") now encouraged by various professional organizations. This paper aims to analyze and quantify changes in the use of stigmatizing (and less stigmatizing) substance use and substance use disorder-related search queries in the United States over time utilizing Google Trends.

Methods. First, we tracked the relative frequency of substance use and substance use disorder-related stigmatizing search terms ("addict", "junkie, "alcoholic, "stoner") in the United States between January 2004 and December 2021 using Google Trends. Second, we tracked the relative frequency of stigmatizing phrases (e.g. "substance abuse", "alcohol abuse", "opioid abuse") compared with less stigmatizing phrases (e.g. "substance use", "alcohol use", "opioid use") between January 2004 and December 2021. We used the PyTrends Python interface to query Google Trends and collect data.

Results. Overall, we observed a decrease in the use of stigmatizing search queries and an increase in the use of less stigmatizing search queries over the seventeen year period from January 2004 to December 2021. There were some key exceptions however, chief among them the trajectory of "stoner" and "alcoholic". The prevalence of "stoner" was broadly consistent across time, whereas the prevalence of "alcoholic" decreased between 2004 and 2010, and then remained largely static.

Conclusion. These results provide preliminary evidence to support the contention that there has been a reduction in the relative volume of search queries containing potentially

stigmatizing content related to substance user over the period 2004 to 2021.

Introduction

In 2019, over 60% of individuals aged twelve or older in the United States engaged in **S**ubstance **U**se (**SU**) (1). Further, **S**ubstance **U**se **D**isorder (**SUD**) is a major public health concern in the United States, with an estimated 20.4 million individuals aged twelve or older meeting SUD diagnostic criteria in 2019. However, only around four million of these individuals receive treatment each year (1). There is now considerable evidence to suggest that individuals experiencing SUDs are faced with stigmatizing experiences at a higher rate than individuals without SUDs (2). In particular, there is growing consensus among public health researchers that the criminalization of SU serves to reinforce stigmatizing attitudes in both health professionals and the general public (3, 4). Further, high levels of SU and SUD-related stigma are known to deter individuals from seeking treatment and detrimentally affect public support for SUD treatment policy initiatives, with individuals labeled as "substance abusers" more likely to be subject to punitive measures (5). Even for those individuals that do receive appropriate care, provider stigma has a deleterious effect on the quality of services provided to individuals experiencing SUDs, resulting in measurably worse treatment outcomes (6).

In addition to provider stigma, many of those individuals experiencing SUDs face *internalized stigma* — i.e. the anticipation of social rejection due to a characteristic regarded by the wider community as undesirable (7) — which in turn reduces the willingness of individuals experiencing SUDs to both seek and maintain treatment.

Cumulatively, these findings have led to a recognition of the corrosive health effects of SU and SUD-related stigma, and an explicit shift away from the use of stigmatizing terms (e.g. *substance abuse*, *addict*) towards less-stigmatizing terms (e.g. *individual with substance use disorder*) to describe SU and SUD in professional discourse (8, 9, 10), the scientific literature (11, 12), publications issued by government agencies (13), patient advocacy organizations

(14, 15) and the mass media (16, 17).

Despite the shift in terminology in the clinical and research spheres, little is currently known regarding how SU and SUD-related stigmatizing language is evolving among the general public (2). Since choices in language use have substantial influence on perceptions of both individuals who use substances and individuals with SUD, examining the relative prevalence of stigmatizing versus less-stigmatizing terms is instructive in understanding shifting public attitudes towards individuals with SUDs and how these changes relate to shifts in professional norms.

Google Trends, a service that has allowed public access to historical search engine query statistics since January 2004, offers a means of measuring the changing relative use of stigmatizing language over time. Google is the most popular search engine in the world, representing 88% of the United States search market in 2020 (18). By contrast, the second most popular search engine in the United States, Bing — Microsoft's search product — has a 6% market share. Google Trends has been used extensively for understanding changes in health-related behaviors and attitudes (19) in such contexts as measuring public awareness regarding the existence of an SUD-related national helpline (20), predicting the outcome of a cannabis legalization referendum (21), and monitoring the popularity of Electronic Nicotine Delivery Systems (22), albeit with caveats regarding the relatively opaque methodology adopted by Google to generate trends data (23).

This short paper reports on an analysis of changes in the use of stigmatizing terms and phrases over time using search queries derived from Google Trends localized to the United States for the seventeen year period January 2004 to December 2021. The goal of this work is to determine whether the relative volume of SUD-related stigmatizing language has increased or decreased during the study period.

Methods

In this study, we used Google Trends to collect longitudinal search engine query volume data. Google Trends normalizes data on a scale from 0-100 by dividing each data point by the total searches in the selected geographical region and time range (i.e. the United States in the period January 2004 to December 2021). We collected and analyzed Google Trends data using Pytrends[1], a Python interface to the Google Trends service that has been extensively used in public health research (21, 24, 25). We queried Google Trends on January 4th 2022. We searched within the United States from January 1st 2004 to December 31st 2021. Search terms and syntax used to interact with the Google Trends service are presented in **Table 1**. Our selection of search terms were partially based on guidance from the National Institute on Drug Abuse on the use of stigma-reducing terms to characterize SU and SUD (13). We restricted our analysis to the United States as we are primarily interested in changes in the use of stigmatizing language in the United States. To enhance the reproducibility of this study, our full queries and Python code are publicly available in the form of Jupyter Notebooks at https://maconway.github.io/google_trends.html.

[Table 1 about here.]

Our analysis consisted of two steps. First, we generated scatter plots designed to illustrate longitudinal changes in relative search query volume between January 2004 and December 2021 by month for four stigmatizing terms: *junkie* (including *junkies* and the alternative spelling, *junky*); *addict* (including *addicts*); *alcoholic* (including *alcoholics*); and *stoner*) (including *stoners*). These scatter plots allow us to observe broad changes in stigmatizing terms over the seventeen year study period.

Second, we tracked the relative volume of stigmatizing phrases (*substance abuse*, *opioid*

[1]Pytrends documentation available at: https://github.com/GeneralMills/pytrends.

abuse, *alcohol abuse*) and their less stigmatizing counterparts (*substance use*, *opioid use*, *alcohol use*, respectively). Our queries included lexical variants of stigmatizing phrases. For example, our *substance abuse* query also included *substance abuser* and *substance abusers*.[2] We generated scatter plots to track the broad changes in the relative volume of stigmatizing and less-stigmatizing search queries over the seventeen year study period.

This study was exempted from review by the University of Utah Institutional Review Board (IRB_00076188).

Results

[Figure 1 about here.]

Figure 1 [*a* - *d*] shows the results of plotting monthly relative search volume for the period 2004 to 2021 for the the terms *alcoholic*, *junkie*, *stoner*, and *addict*. It can be observed that for the stigmatizing term *addict* (Figure 1 [*d*]) there has been a steady reduction in relative search volume since 2014, a point at which the opioid epidemic was beginning to attract the attention of the mass media. (26). The term *junkie* (Figure 1 [*b*]) reduced in relative volume between 2004 and 2014, and increased thereafter.

The terms *alcoholic* (Figure 1 [*a*]) and *stoner* (Figure 1 [*c*]) reflect a different pattern, with the relative frequency of the term *alcoholic* decreasing between 2004 and 2010, and then remaining largely static. The term *stoner* exhibited generally stable frequency between 2004 and 2021, perhaps because the term is related to cannabis use, a substance that is less heavily stigmatized than, for example, opioids (27).

[2]Example Google Trends query for *substance abuse*: " 'substance abuse' + 'substance abusers' + 'substance abuse' ". Note that in the context of Google Trends queries "+" equates to logical OR.

Figure 1 [*e* - *g*] shows the results of tracking the stigmatizing phrases *alcohol abuse*, *substance abuse*, and *opioid abuse* and the associated less-stigmatizing phrases *alcohol use*, *substance use*, and *opioid use*, respectively. It can be seen that during the study period there has been a decline in the phrase *alcohol abuse* (see Figure 1 [*e*]) and its variants, and a concomitant increase in the less stigmatizing phrase *alcohol use*, a pattern that is repeated for the phrases *substance abuse* and *substance use* (see Figure 1 [*f*]).

Discussion

With this study, we examined trends in the relative volume of SUD-related Google searches over the period January 2004 to December 2021.

Analysis of data derived from Google Trends revealed some heterogeneity in relative search volume trends associated with the stigmatizing terms *alcoholic*, *junkie*, *stoner*, and *addict*. Of most interest is the fact that the relative volume of the term *stoner* has been consistent throughout the seventeen year period for which we have Google Trends data, with the exception of the year 2015, where a marked increase in relative frequency can be observed. We believe that this spike may be due to two cultural factors not directly related to SU and SUD. First, the 2015 resurgence in popularity of the 1965 novel *Stoner* by John Edward Williams (28). Second, the release of the rapper Young Thug's debut single *Stoner*.

Our analysis revealed an increase in instances of the query phrases *substance use* and *alcohol use* (i.e. less-stigmatizing query phrases), and a decrease in the use of the query phrases *substance abuse* and *alcohol abuse* (i.e. more stigmatizing query phrases). This result suggests that the general public is — at least in these specific cases and in the context of Google search behavior — adopting less-stigmatizing language to describe SU and SUDs. However, whether this trend is the result of changing professional norms affecting the wider culture

(i.e. the general public entering Google queries) or the wider culture affecting professional norms is not clear, especially given that the stigmatizing phrases *alcohol abuse* and *substance abuse* have been declining in frequency since 2004, well before explicit policy changes in the addiction field towards adopting less-stigmatizing language (11). Related to this, the rate of decline in the stigmatizing terms varied substantially, indicating that the different terms have different valences and are associated with different degrees of stigma (e.g. the relatively steep decline in the stigmatizing term *junkie* can be compared to the relatively stable frequency of the term *stoner*).

Further, for the stigmatizing phrase *substance abuse*, a steep decline in relative search volume was observed over the study period suggesting that the general public is gradually adopting the less stigmatizing phrase *substance use*. The decline in relative search queries over time was less marked for the phrase *alcohol abuse*. In the event that future data are consistent with past trends, it is possible that search queries will continue their long-term shift away from more stigmatizing terms and phrases towards less stigmatizing terms and phrases, perhaps implying a decrease in SU and SUD stigma-related terms in the general public.

The trend for *opioid abuse* and its less-stigmatizing alternative *opioid use* (see Figure 1 [*g*]) is more challenging to interpret than the trends for *substance use* and *alcohol use*, but may reflect a general increase in public awareness of opioid use since 2014 (i.e. an increase in both stigmatizing and less-stigmatizing phrases), and a more recent — post 2018 — reduction in the use of stigmatizing phrases and an increase in the use of less-stigmatizing phrases.

The research reported in this paper is not without limitations. First, the methodology adopted by Google Trends does not necessarily reflect raw search frequencies, but rather normalized relative frequency. That is, increases or decreases in the total number of Google queries are not reflected in Google Trends data.

Second, the extent to which Google Trends research is reproducible is not entirely clear,

with some researchers indicating inconsistent results over time (29). This concern regarding reproducibility is exacerbated by the fact that Google's methodology for processing and collating search queries is proprietary, and not available to external researchers. We have attempted to address the issue of reproducibility by providing access to the code used to perform our analyses.

Third, there is some evidence to support the view that, at least for some query types — the mass media is an important driver of queries, with topics that receive substantial media coverage likely to generate an increased proportion of queries (30) (see our prior discussion of cultural factors that may have affected searches for the term *stoner*). A potential consequence of this fact is that search queries — whether stigmatizing or less-stigmatizing — may not reflect the underlying prevalence of stigmatizing attitudes. Further, and specifically related to our research, we do not know if the query emanates from, say, an individual with SUD, an individual without SUD but who uses substances, a clinician, or an individual with a family member with SUD.

Fourth, some of the query terms analyzed in this paper are potentially ambiguous. For example, the term *addict* can occur in the context of the phrase *chocolate addict*, and the term *junkie* can occur in the context of the phrase *adrenaline junkie*. These kind of non-SUD-related contexts are challenging to exclude in a principled way when working with Google Trends data.

Finally, our analysis consisted of a limited number of terms and phrases. While our terms were selected based on an analysis of the literature (11), there are many examples of stigmatizing and less-stigmatizing terms and phrases that were not included in our analysis. Related to this, our selection of search queries, while rooted guidance provided by the National Institute on Drug Abuse to encourage the use of less-stigmatizing SU and SUD-related language (13), did require a degree of interpretation.

In conclusion, these results provide preliminary evidence to support the contention that there has been a reduction in the relative volume of search queries containing potentially stigmatizing content related to substance user over the period 2004 to 2021.

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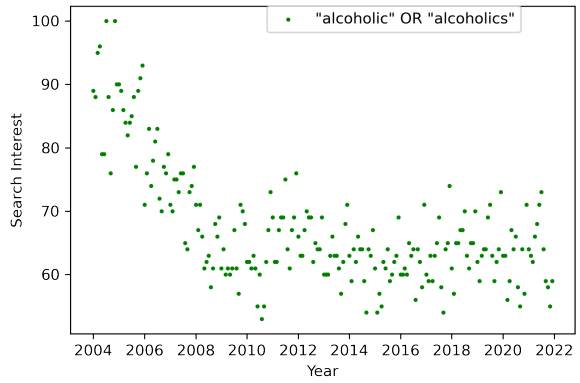
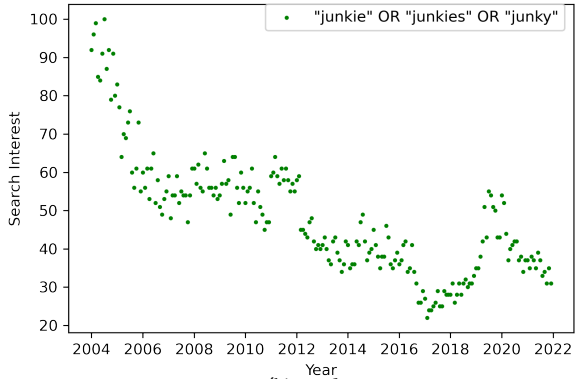
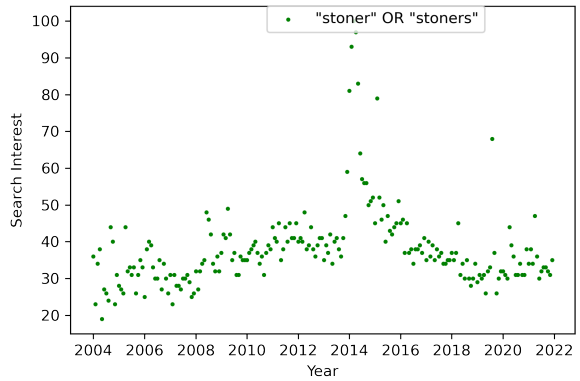
List of Figures



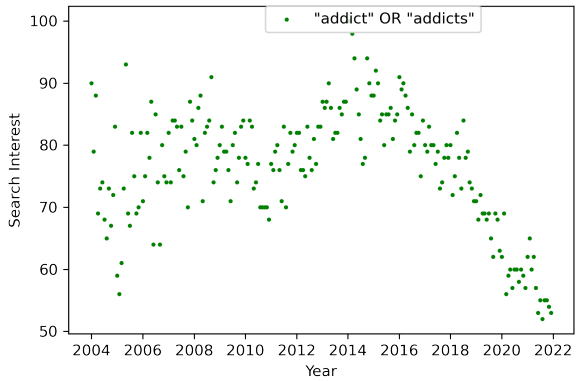
(a) *alcoholic*



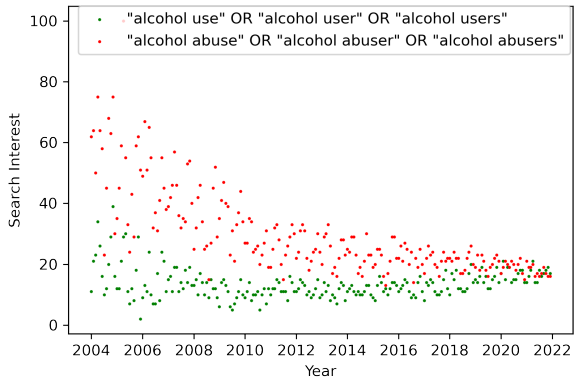
(b) *junkie*



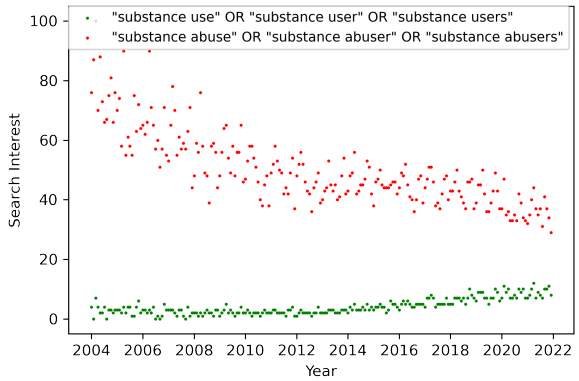
(c) *stoner*



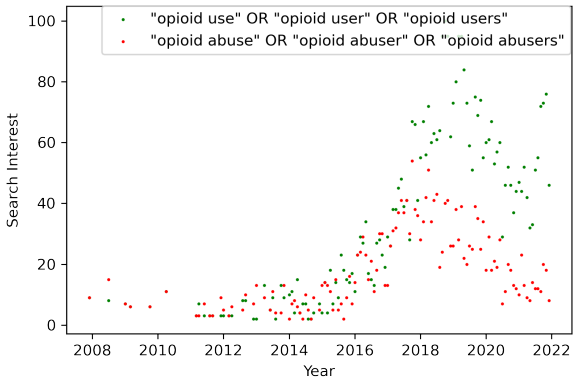
(d) *addict*



(e) comparison between *alcohol use* and *alcohol abuse*



(f) comparison between *substance use* and *substance abuse*



(g) comparison between *opioid use* and *opioid abuse*

Figure 1: Google Trends relative query volumes

List of Tables

Group	**Query**
addict	[“addict” + “addicts”]
alcoholic	[“alcoholic” + “alcoholics”]
junkie	[“junkie” + “junkies” + “junky”]
stoner	[“stoner” + “stoners”]
alcohol use	[“alcohol user” + “alcohol users” + “alcohol use”]
alcohol abuse	[“alcohol abuser” + “alcohol abusers” + “alcohol abuse”]
opioid use	[“opioid user” + “opioid users” “opioid use”]
opioid abuse	[“opioid abuser” + “opioid abusers” + “opioid abuse”]
substance use	[“substance user” + “substance users” + “substance use”]
substance abuse	[“substance abuser” + “substance abusers” + “substance abuse”]

Table 1: Google Trends queries [Note that queries are case insensitive and “+” indicates logical OR]