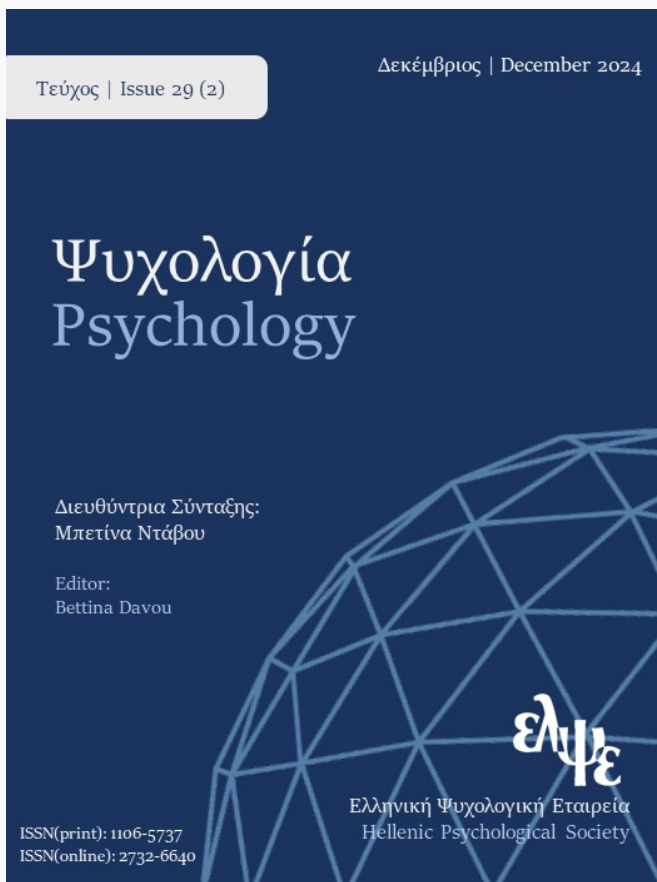


Ψυχολογία: το περιοδικό της Ελληνικής Ψυχολογικής Εταιρείας

Τόμ. 29, Αρ. 2 (2024)

Δεκέμβριος 2024



Αναζήτηση πληροφοριών για υπηρεσίες ψυχικής υγείας στην Ελλάδα από την παγκόσμια οικονομική έως την πανδημική κρίση: Μία ανάλυση δεδομένων των Google Trends

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doi: [10.12681/psy_hps.39612](https://doi.org/10.12681/psy_hps.39612)

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Βιβλιογραφική αναφορά:

Παρπούλα Χ., & Αναγνωστόπουλος Φ. (2024). Αναζήτηση πληροφοριών για υπηρεσίες ψυχικής υγείας στην Ελλάδα από την παγκόσμια οικονομική έως την πανδημική κρίση: Μία ανάλυση δεδομένων των Google Trends. *Ψυχολογία: το περιοδικό της Ελληνικής Ψυχολογικής Εταιρείας*, 29(2), 295–319. https://doi.org/10.12681/psy_hps.39612

ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Mental health information-seeking in Greece from the Global Financial Crisis to the COVID-19 pandemic: A multiple change-point Google Trends analysis

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KEYWORDS

Change-point analysis
COVID-19
Global Financial Crisis
Google Trends
Mental health services
Surveillance

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ABSTRACT

During the COVID-19 pandemic, the Greek population was already burdened by the strain of a decade-long financial crisis, which had caused life disruption, insecurity, uncertainty, and loss of symbolic capital, inevitably placing a huge cumulative burden on their mental health. Since other discernable population-level changes in mental health have not yet emerged, continued monitoring is warranted. Identifying emerging needs for mental health services was the major objective of the present study. To accomplish this, a multiple change-point detection and validation approach was employed to analyze Google Trends data, exploring community interest in mental health therapists and treatment practices in Greece. Specifically, Google search data from pre- and post-financial and pandemic crises periods (2004-2023) were analyzed to assess the search frequency of specific topics/terms of interest. The results revealed that, over the last six years or so, searches for terms like “psychologist”, “psychiatrist”, “psychotherapist”, and “neurologist”, as well as treatment practices such as “psychotherapy”, “meditation”, and “antidepressants”, have increased. However, a decline in searches for “mental health counselor”, “psychotherapy”, “psychoanalysis”, “meditation” and “mental health helplines” was observed after 2011 (persisting for at least the next 5-7 years in certain cases). Searches for “psychoanalyst”, “mental health centre” and “anxiolytics” remained relatively stable throughout the study period. These results, combined with ongoing surveillance, can offer insights into public interest in mental health services and guide public mental health initiatives to be better tailored to the needs of communities, ultimately addressing the psychological toll of the preceding socioeconomic crisis and the current COVID-19 situation.

Introduction

The influence of macro-level events and conditions on psychological variables is always of central interest within the social sciences (Parker et al., 2016). The impact of macrocontext (that is, national and/or international conditions or events) on an individual’s micro level has been a growing area of study in recent years, with various emotional, psychological, and social wellbeing aspects being thoroughly examined. The Global Financial Crisis (GFC) and the recent COVID-19 pandemic crisis are two prime examples of dramatic changes in the global environment and economy, both having a significant immediate influence on individual psychology and a longer-term impact on mental health worldwide. Current trends in medical communication emphasize patients’ active involvement in healthcare, while health information seeking behaviors and information gathering are critical components of shared decision-making (Tan & Goonawardene, 2017).

Online Health Information Seeking

Health information seeking is broadly conceptualized as “*the active pursuit of health information*” (Zimmerman & Shaw, 2020, p. 5), while sources of health information include the internet, traditional media, social networks, and healthcare professionals (Zhao et al., 2022a). However, when compared to other sources, the internet is accessible at low cost, fast, convenient, private, anonymous, and interactive. The fundamental processes involved in health information seeking are described by the Comprehensive Model of Information Seeking (CMIS; Johnson et al., 1995; see Yang et al., 2023, for a meta-analysis). The CMIS proposes that information seeking actions involve two groups of variables. The first group includes antecedents to information seeking that serve as its initial source of motivation (demographics, prior direct/personal experience, salience/perceived applicability of information, and beliefs about the outcomes of information seeking). The second group consists of information-carrier factors, including source characteristics and qualities (such as credibility, trustworthiness, style, and comprehensibility), as well as perceived utility of information sources, which is related to information importance and relevance to the needs of the individual. Antecedents and source characteristics influence the perceived utility of information sources. Information-carriers factors (characteristics and utility) are expected to influence information seeking actions. Anker et al. (2011) conducted a systematic review, offering a comprehensive summary of methods and measures that might help researchers develop and expand the basic organizational model of information seeking in the field of healthcare delivery. According to these authors, obtaining health information is essential for patients to actively participate in their treatment. Not only is it common- millions of people, according to estimates, have looked up health information online- but it is also seen as an integral part of contemporary healthcare practices. Moreover, the authors emphasized that, although cross-sectional studies are useful in determining associations between predisposing factors and health information seeking behaviors at a single point in time, longitudinal studies are better suited to characterizing aspects of the information search, such as the amount of time spent searching, the websites visited, and the subsequent outcomes causally associated with the search process and the use of information obtained (e.g., self-diagnosis, treatment decisions, adherence to public health guidelines, desire for second opinion). Yigzaw et al. (2020) found that health information seeking via the internet was associated with the decision to visit or not to visit a physician, suggesting online information seeking can either encourage or discourage service utilization. Furthermore, according to Kubba and Foran’s (2020) systematic review, about 90% of parents or caregivers engage in online health information seeking. Recently, Tulião et al. (2022) adapted the active information search methodology and created an online survey that asked prospective clients seeking mental health services to envision themselves in need of such services and to list the search terms they would use in a search engine, such as Google. By using content analysis and quantitative data analysis, they found that individuals who perceived that mental health help-seeking from a professional was more normative were more likely to use a search string based on symptoms, whereas participants who experienced higher stigma towards seeking mental health services were more likely to use resources-related search strings. Individuals with higher psychological distress were more likely to use symptom- and advice-based search strings. The authors concluded that, by understanding how people search for mental health services, mental health practitioners can gain valuable insights into what information should be included on their websites.

In the current study, adopting Niederdeppe et al.’s (2007, p. 154) definition of health information seeking as “*active efforts to obtain specific information in response to a relevant event*”, mental health information seeking is viewed as a purposeful and goal-oriented activity conducted via web media, especially via the Google search engine. In this particular context, our aim was to monitor, detect, and analyze changes in the Greek population’s Google queries for mental health services in response to the GFC and the COVID-19 pandemic incidents.

Google Trends for Mental Health Research

Google Trends has already been used to analyze people's needs and interests across various scientific fields, and provide deep insights into population behavior in a plethora of health (Nuti et al., 2014) and socioeconomic-related phenomena (see Brodeur et al., 2021, and references therein). Recently, several authors assumed and argued that Google search activity indices represent accurate information about emotional, behavioral and psychological status of the general population. For example, Barros et al. (2019) examined societal and Google Trends data for the purpose of assessing suicide risk in Ireland. Hoerger et al. (2020) utilized Google Trends search volumes to measure population mental health outcomes in the US and explore changing patterns focusing on a short time-period immediately following the World Health Organization (WHO) pandemic declaration. Knipe et al. (2020) used Google Trends to investigate public concern over mental health issues in the UK, including mental distress, coping and resilience during COVID-19. Knipe et al. (2021) used Google Trends to track mental and social distress during a public health emergency. They found statistical and graphical evidence that self-report and Google searches for loneliness tracked one another. Brodeur et al. (2021) utilized the Google Trends tool to compare people's searches carried out before and after the lockdown in the US and a few selected European countries to examine pandemic-related spikes or drops in searches associated with population wellbeing. De la Rosa et al. (2022) examined associations of lockdown stringency and duration with Google searches for mental health terms in nine countries during the pandemic. They found that policies that recommended or required schools to close were associated with higher searches for "depression", policies that imposed most stringent stay-at-home requirements were associated with lower searches for "anxiety", while policies that recommended or required public events to be canceled were associated with lower searches for "depression". This latter finding might suggest that people adapted psychologically to the pandemic and became less concerned about certain mental health symptoms over time as part of a normal coping response to the pandemic conditions. Sycińska-Dziarnowska et al. (2021) conducted an analysis of Google Trends data to evaluate shifts in expressions connected to mental health during the pandemic, and projected interest in mental health for a short period after the pandemic (from September 2021 to September 2023). These authors found that queries about "depression" were high shortly after the pandemic outbreak, but this expression was expected to decrease in the near future, due to the use of adaptive coping strategies. Increased interest in "psychiatry" and relatively stable interest in "psychologist" expressions was expected in the foreseeable future, due to more psychiatric and mental disorders.

The widespread use of Google Trends to investigate various aspects of mental health, mental disorders (such as substance use disorder), mental health service providers (e.g., psychiatrists, psychologists), psychiatric symptoms (such as loneliness, self-harm), and psychiatric disciplines (such as social psychiatry) reflects the emergence of a new field known as psychiatric and mental health infodemiology. Alibudbud (2023, p. 3) defined this field as "*the science of distribution and determinants of information in an electronic medium, or in a population to inform mental health services and policies*". Research on psychiatry and mental health can benefit greatly from the use of Google Trends. Real-time data, large sample sizes, cost-effectiveness, and complimentary insights over traditional data sources are all offered by this approach. However, its application in mental health research does entail methodological issues and limitations. When interpreting Google Trends data, researchers must carefully evaluate issues such as keyword selection, data validation, and be aware of biases, ecological fallacy, lack of context, and the limitation to online users. For further discussion on the advantages, applications, methodological issues, and restrictions associated with using Google Trends in psychiatric and mental health research, interested readers can consult the comprehensive review by Alibudbud (2023).

Impact of the COVID-19 and Previous Economic Crisis on Mental Health

The subprime mortgage crisis in USA in August, 2007 caused enormous market instability, which gradually spread globally and contributed to the 2007-2008 GFC. The crisis resulted in a severe economic recession, with millions of people losing their jobs and many businesses going bankrupt worldwide. Systematic research on the impact of changes in local and/or global economic circumstances on personality, mental illness and wellbeing has grown significantly over the last two decades, especially following the global recession of 2008 and the European sovereign debt crisis of 2009. It is noteworthy that over 4000 publications on mental health economics were published in 2019 (Knapp & Wong, 2020) and these publications offered significant evidence in all directions. Specifically, these reports outlined the reciprocal association between mental health and financial hardship, highlighting both the huge economic burden of mental illness as well as the widespread recognition of the effects that difficult economic circumstances can exert on mental health.

The global economic recovery that had begun a decade after the GFC, was overshadowed by the global outbreak of coronavirus disease in December 2019. This novel coronavirus disease (COVID-19) first emerged in Wuhan, China, and then rapidly spread to all over China and the world, with confirmed cases and/or deaths in almost every country in the world. The WHO declared COVID-19 infectious disease as a pandemic on March 11, 2020 and an exponential growth in both infection rates and death rates was then followed, together with the collapse of healthcare systems and an unprecedented downturn in the global economy. This public health crisis and emergency led governments worldwide to adopt social restriction measures (such as self-quarantines, lockdowns, social distancing measures, working from home etc.) to control the spread of the virus and protect citizens. These physical distancing and social isolation measures, along with the unpredictable nature and the multitude of uncertainties surrounding the pandemic, posed a huge burden on the general public's mental health. Numerous community-based studies (see, for example, Bueno-Notivol et al., 2020; Pfefferbaum & North, 2020; Śniadach et al., 2021) investigated individual differences in the pandemic effects on people's psychological status, and reported that COVID-19 pandemic had a strong impact on mental health and wellbeing of people around the world.

The Case of Greece

In this paper, we seek to explore, in a longitudinal fashion, the cumulative impact that multiple crises, which have shaken the Greek society the last few years, have had on the mental health help-seeking behavior of the general population. It is a fact that the effects of GFC upon some countries were deeper and more destroying, with Greece being one of these countries. As the true state of Greece's economy became clear, the country was given three bailout packages from the European Union (EU) and International Monetary Fund (IMF) to keep afloat. Poverty soared as the Greek economy contracted by a quarter and unemployment reached 27%. Interestingly, based on theory of capability and actual economic and political development, in a study among PIGS-countries investigating the impact of GFC in several life domains, it was hypothesized that Greece "*being the worst case in terms of economic development*" may face the greatest decline of psychological health and individual's perceived satisfaction with life (Halvorsen, 2016, p. 1), while lack of political trust was found to stand out for the Greek people. Several studies have examined the effects of the Greek financial crisis and its consequences on the mental health of people in Greece, providing evidence of mental health problems (Drydakis, 2015; Laliotis et al., 2016; Paleologou et al., 2018), mental disorders (Konstantakopoulos et al., 2019) and prevalence of depression (Economou et al., 2013, 2016; Madianos et al., 2011; Mylona et al., 2014) significantly increased from pre- to post-crisis. Furthermore, a cross-national study by Stuckler et al. (2015) showed that Greece and Ireland experienced the highest increases in suicide rates (17% and 13%, respectively) among 20 EU nations.

Greece emerged from this decade-long financial crisis in 2018, but in 2020 the country experienced another 8.2% economic decline amid restrictions to stop the spread of COVID-19, which had also negatively impacted its vital tourism industry. In Greece, the first lockdown began in mid-March 2020 and ended gradually in May 2020. Regarding the Greek population's mental health status, during that very first lockdown several cross-sectional studies reported an increased prevalence of depression, anxiety, stress (Fountoulakis et al., 2021; Parlapani et al., 2020), and post-traumatic stress disorder (PTSD) symptoms (Karaivazoglou et al., 2021) among the general population. Additionally, there was evidence of significantly higher levels of distress and somatization for patients with chronic diseases (Louvardi et al., 2020) as well as higher rates of depression and suicide risk for university students (Patsali et al., 2020). In the meantime, loneliness and irritability in youth were found to be significantly increased during this first lockdown (Magklara et al., 2023). The second nationwide lockdown was announced in November 2020 and lasted until May 2021. Between the two COVID-19 lockdowns in Greece, existing comparative studies provided evidence for increased levels of anxiety (Gournellis & Efstathiou, 2021), loneliness, perceived stress, and PTSD symptoms (Kalaitzaki et al., 2022). Moreover, almost at the end of the second outbreak period, people in Greece reported that the pandemic had made their mental health worse (Stylianou & Ntelas, 2023), whereas unmarried individuals, young adults, and females reported higher levels of psychological symptoms and a heightened perception of COVID-related impact (Pezirkianidis et al., 2023).

The Present Study

Motivation. To date, the existing body of Greek and international literature as well, has mainly focused on investigating the burden of the GFC and COVID-19 pandemic on individuals' psychological status and various mental health outcomes. Less research has been conducted on how to address the effects of such crises, particularly concerning the emerging needs and demand for mental health services at a population level. Talamonti et al. (2023) noted that, surprisingly, the general demand for mental health services appeared to decrease from the pre-financial crisis to the post-crisis period. Furthermore, the COVID-19 pandemic has triggered changes in the way health care is delivered to different populations and systems. In their commentary paper, Arevian et al. (2020) offered a comprehensive perspective on community mental health service needs in the COVID-19 pandemic by integrating perceptions of academic, community, provider and policy stakeholders. This study not only outlined the rapid transition/shift toward telehealth modalities, remote mental care delivery, and preventive services, but also discussed the importance of being mindful of potential worsening of disparities and the necessity of addressing social determinants of health in order to improve public mental wellbeing and resilience to stressors. Moreno et al. (2020), in their position paper, commented on how mental health care should change due to the COVID-19 pandemic, incorporating the opinions and experiences of an international group of clinicians, mental health experts, and users of mental health services so as to address mental health issues and concerns that the pandemic had raised. More recently, Campion et al. (2022) noted that only a minority of people with mental disorders receive treatment, despite the existence of evidence-based public mental health (PMH) interventions; the COVID-19 pandemic has exacerbated this implementation failure, because of the associated adverse effects on population mental health, the decreased capacity of PMH services, and the minimal additional funding allocated for mental health. Further, in the "World Mental Health Report" by WHO (2022, p. vi), it is emphasized that "*we need to transform our attitudes, actions and approaches to promote and protect mental health, and to provide and care for those in need*". Thus, community-based mental health services can and should be developed, in order to achieve universal health coverage for mental health.

It is therefore evident that stakeholders have already warned of the escalating of mental health disorders and outlined the emerging challenges such crises posed as regards access and efficiency of social and mental healthcare services delivery. Since these crises represent an opportunity to innovate mental health policy and improve the implementation of mental health reforms, mental health should be given priority in the public health

agenda, as outlined by Stylianidis and Souliotis (2019). However, as mentioned above, no comprehensive summary of the current data on mental health service needs has been made widely available, while most relevant studies have been based on self-report measures and typically used cross-sectional designs, which provide a snapshot of a population at a specific point in time. Longitudinal research is thus required in order to allow researchers to track changes of mental health needs in individuals or groups over time. The same holds for Greece as well.

Scope. In this context, a multiple change-point detection and validation approach is employed here to analyze Google Trends data and assess help-seeking behavior for mental health issues in Greece. Although Google Trends data is not a “window to the mind and soul”, people’s uncensored internet searches may reveal their desires and information needs, which can potentially reduce the bias of self-report surveys. In this study, Google search data from pre- and post-financial and pandemic crises periods (2004-2023) were analyzed to examine the search frequency of specific topics/terms of interest. The search terms covered two general topics: “Therapists” and “Treatment Practices”. More details are given below. To the best of our knowledge, this is the first national study conducted in Greece aimed at tracking and detecting significant longitudinal changes in the general population’s interest in mental health service providers and treatment practices related to the GFC and the pandemic, using Google Trends data analysis. The conclusions drawn can help us understand what people in Greece search for more when looking for support services, as well as how the population’s online mental health information-seeking behavior has evolved in the wake of the nation’s consecutive crises over the past few decades.

In line with this goal, and drawing from previous study findings, the following research questions are being addressed:

RQ1: To what extent did the 2008 GFC and the subsequent recession discourage Greek people from seeking professional help or treatment for mental health issues?

RQ2: To what extent is the COVID-19 pandemic linked to Greek people searching more frequently on Google for mental health services delivery?

The research hypotheses are the following:

H1: Greek people’s overall demand for mental health services will decrease between before and after the financial crisis.

H2: Greek people will search more frequently on Google for mental health services between the pre- and post- pandemic periods.

Method

In this study, we retrieved Google Trends series data from pre- and post-financial and pandemic crises periods (2004-2023) for a set of mental health help-related search queries for Greece. Google Trends tool is a search platform that provides open access to a fairly representative sample of actual Google search requests. It displays the popularity of a search term over a specified period in a selected region. It is anonymized (no one is personally identified), categorized (identifies the topic of a search query) and aggregated (grouped together). In particular, rather than providing the absolute number of search volumes, Google Trends provides a normalized value, that is each data point is divided by the total searches of the geography and time range it represents to allow comparing relative popularity (Knipe et al., 2020). The resulting values are then scaled on a spectrum from 0 (the lowest point in relative popularity) to 100 (the highest point in relative popularity) based on a topic’s proportion to all searches on all topics, or relative search volumes (RSVs). RSV values here measure the search interest for a particular term relative to the total search volume on Google within a specific time frame and geographic area. Essentially, an RSV value shows how popular a search term is in relation to other terms being searched for over a period of time. For example, the observed RSV average value equal to 21.58 for the term

“psychologist” for the year 2008 in Greece would indicate that this term was searched 21.58% for more compared to other terms during that period and location (Bansal et al., 2021).

Search Strategy

In our study, we analyzed Google Trends data in order to assess help-seeking behavior for mental health issues at a population level for those living in Greece. To this end, we tracked, detected, and analyzed GFC- and pandemic-related changes in the Greek population’s need for information about mental health services, based on Google Trends RSVs. We focused on two main topics related to “Therapists” and “Treatment Practices”. The rationale behind this strategy was based on the assumption that everyday unpredictability and uncertainty that followed the two decades of consecutive crises Greece had experienced, along with recent social distancing measures and restrictions, would create negative emotions and discomfort associated with mental health deterioration. We therefore looked at coping strategies, such as seeking information and seeking out services, that people may be motivated to adopt in order to deal with mental health concerns and service needs, in an effort to restore their mental health and/or quality of life, when they face challenges in meeting their needs of mental health services. Previous research has demonstrated that these assumptions are neither unreasonable nor unrealistic, as evidenced by the work of Ginsberg et al. (2009) for detecting influenza epidemics using search engine query data. We also used Google Trends’ suggestions for related search queries to the topics already being selected to gather additional search terms relevant to our study and characteristic of the Greek population. In order to reduce sampling noise, we excluded from the analysis terms with very low-search volume or those displaying a relatively stable trend behavior over time (Eichenauer et al., 2022), such as “therapist near me”, “counselor near me”, “psychiatric medications”, “psychotropic drugs”, “antipsychotics”, “tranquilizers/sedatives”, and “sleeping pills/hypnotics”.

Inclusion and Exclusion Criteria

In this paper, we adopted the checklist for the preparation, documentation, and development of a Google Trends data analysis, as recommended by Alibudbud (2023). The minimum methodological documentation (i.e., six-point checklist) for our study is provided below.

1. Keyword selection: The search terms of interest spanned two topics associated with “Therapists” and “Treatment Practices”. For the first topic, search terms as “psychologist”, “psychiatrist”, “psychotherapist”, “neurologist”, “psychoanalyst”, “mental health counselor”, and “mental health centre” were used. The second topic included terms such as “psychotherapy”, “psychoanalysis”, “meditation”, “anxiolytics”, “antidepressants”, and “mental health helplines”.
2. Time period selection: Monthly time points beginning January, 2004 to July 2023.
3. Region selection: Greece.
4. Query category: All searches included all Google query categories for Greece.
5. Type of search: All searches included all web searches in Greece.
6. Date of data retrieval: July 10th, 2023.

Given that this study focused on Google Trends monthly timeseries data for Greece, between January 2004 and July 2023, these monthly data were converted into yearly averages (from 2004 to 2023) for analysis purposes. While monthly data may be useful in some cases, it can be difficult to work with if you are trying to analyze trends over longer periods of time, as in our study; therefore, transforming Google Trends’ monthly data to yearly data allowed a better understanding of how search trends are evolving. Furthermore, in order to maintain comparability between the results, we excluded the years 2004 and 2005 from our analysis. This was because, for a number of search terms of interest, the RSV-related score was either very low (in some cases even zero) or

queries exhibited an initial noise level of 100 RSV. This noise may be attributed to a variety of factors, including the fact that Google Trends was launched in 2004, and at that time the tool was still relatively new, while personalized search results started in 2005 when the Smartphone Era actually began. As a result, these data may be less reliable compared to more recent data.

Statistical Analysis

Prior to the analysis of Google Trends data, homogeneity of variance and normality assumptions were examined. Levene's test for homoscedasticity and Kolmogorov–Smirnov test for normality were both statistically significant (alpha level was set at .05); thus, a non-parametric methodology was employed for the analysis. In particular, we adopted a distribution-free control charting technique based on change-point analysis, as introduced in Parpoula (2022), for detecting changes in location of univariate Google Trends series data. The main tool in this methodology is the detection of unusual trends, in the sense that the onset of an unusual trend marks a switch from an in-control state (typical behavior) to an out-of-control state (non-typical behavior).

For our sequences of individual observations, the control statistics and the possible change-points were computed using a forward Recursive Segmentation and Permutation (RS_P) approach as detailed in Parpoula (2022). The different test statistics were standardized and aggregated to produce an overall control statistic. Then, given a test statistic, its p -value was calculated, as the proportion of permutations (fixed number, say L) under which the statistic value exceeded or was equal to the statistic computed from the original sample of observations. By choosing an acceptable nominal false alarm probability (FAP), say α , the null hypothesis that the process was in-control is rejected if the p -value is less than α , indicating a transition from typical to atypical behavior. Performance was here evaluated using $L=1000$ random permutations as in Parpoula (2022). Recall here that change-point detection methods typically require specifying the maximum number of segments to search for and the minimum segment length. In this paper, we adopted the empirical rules given in Parpoula and Karagrigoriou (2022) for fine tuning these two input parameters. The analysis was carried out in the R statistical environment for statistical computing and visualization, calling the `rsp` function of the R package `dfphase1` (Capizzi & Masarotto, 2018).

Only statistically significant findings (significant change-points representing increases and/or decreases of related Google searches) are reported in detail in Tables 1 and 2, highlighted in the text and visualized. All non-significant findings are reported briefly in the text. Additionally, for the sake of completeness, not only level (shifts in mean) but also scale (shifts in variance) changes are illustrated in Figures 1 and 2. The multiple changes in dispersion were estimated using a computational rationale similar to that used by Parpoula and Karagrigoriou (2020).

Results

Our problem here is to recover the configuration of single or multiple change-points that represent spikes or drops in Google searches related to mental health service providers and treatment practices, and thus reveal the diverse patterns changing from year to year for the search terms of interest. In Tables 1 and 2, the observed values (Obs.) represent the yearly-averaged RSV values obtained through the Google Trends platform. The estimated values (Fit) of the time-varying process mean (that is mean estimates of the yearly-averaged RSV values through the RS_P procedure) are also presented in Tables 1 and 2, for each search term under study, for the two topics examined, respectively. Changes in mean of the yearly-averaged RSV values for the period under study ($p < \alpha$ for a mean shift) are highlighted in bold in Tables 1 and 2. For example, for the search term “psychologist” (see Table 1), a change-point (mean level change) occurs in the 13th consecutive year under study (i.e., 2018, starting from the year 2006), with the mean estimates for the years 2006-2017 and 2018-2023 being

equal to 25.87 and 62.26, respectively, suggesting a statistically significant increase in the yearly-averaged RSVs for this search term in the year following 2017.

Table 1. Multiple Mean Shifts of Population-level Mental Health-related Searches for “Therapists”

| Level | Therapists | | | | | | | | | |
|-------|-------------------|-----------------------------|-------------------|----------------------------|-------------------|---------------------------|-------------------|-----------------------------|-------------------------|---------------------------|
| | Psychologist | | Psychiatrist | | Psychotherapist | | Neurologist | | Mental health counselor | |
| Year | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit |
| 2006 | 20.33 | 25.87 | 4.25 | 1.62 | 4.83 | 2.42 | 10.42 | 20.10 | 15.58 | 4.58 |
| 2007 | 22.33 | 25.87 | 2.67 | 1.62 | 3.42 | 2.42 | 13.67 | 20.10 | 1.50 | 4.58 |
| 2008 | 21.58 | 25.87 | 0.75 | 1.62 | 2.42 | 2.42 | 10.08 | 20.10 | 3.75 | 4.58 |
| 2009 | 21.25 | 25.87 | 0.75 | 1.62 | 3.08 | 2.42 | 10.25 | 20.10 | 1.50 | 4.58 |
| 2010 | 22.25 | 25.87 | 1.00 | 1.62 | 1.58 | 2.42 | 13.42 | 20.10 | 0.58 | 4.58 |
| 2011 | 21.42 | 25.87 | 0.33 | 1.62 | 2.00 | 2.42 | 14.58 | 20.10 | 1.00 | 0.62 ^{**} |
| 2012 | 21.33 | 25.87 | 0.25 | 1.62 | 1.25 | 2.42 | 18.83 | 20.10 | 0.67 | 0.62 |
| 2013 | 25.42 | 25.87 | 0.08 | 1.62 | 1.67 | 2.42 | 25.58 | 20.10 | 0.42 | 0.62 |
| 2014 | 28.50 | 25.87 | 0.17 | 1.62 | 1.75 | 2.42 | 29.83 | 20.10 | 0.17 | 0.62 |
| 2015 | 30.83 | 25.87 | 0.25 | 1.62 | 1.83 | 2.42 | 32.50 | 20.10 | 0.25 | 0.62 |
| 2016 | 33.50 | 25.87 | 4.58 | 1.62 | 2.17 | 2.42 | 41.92 | 20.10 | 0.50 | 0.62 |
| 2017 | 41.67 | 25.87 | 4.33 | 1.62 | 3.00 | 2.42 | 53.33 | 73.11 ^{***} | 0.25 | 0.62 |
| 2018 | 47.25 | 62.26 ^{***} | 6.33 | 9.59 ^{***} | 3.92 | 5.01 ^{**} | 61.00 | 73.11 | 0.17 | 0.62 |
| 2019 | 52.58 | 62.26 | 7.42 | 9.59 | 3.75 | 5.01 | 67.83 | 73.11 | 0.58 | 0.62 |
| 2020 | 55.83 | 62.26 | 8.75 | 9.59 | 4.75 | 5.01 | 70.50 | 73.11 | 1.17 | 0.62 |
| 2021 | 67.00 | 62.26 | 10.08 | 9.59 | 5.42 | 5.01 | 83.17 | 73.11 | 0.67 | 0.62 |
| 2022 | 74.75 | 62.26 | 12.25 | 9.59 | 6.33 | 5.01 | 82.67 | 73.11 | 1.25 | 0.62 |
| 2023 | 76.14 | 62.26 | 12.71 | 9.59 | 5.86 | 5.01 | 93.29 | 73.11 | 1.00 | 0.62 |

*Note. ^aObserved. * $p < .05$. ** $p < .01$. *** $p < .001$. *P*-values hold for statistically significant change-points.

Table 2. Multiple Mean Shifts of Population-level Mental Health-related Searches for “Treatment Practices”

| Level | Treatment Practices | | | | | | | | | |
|-------|---------------------|--------------------------|-------------------|----------------------------|-------------------|---------------------------|-------------------|----------------------------|-------------------------|----------------------------|
| | Psychotherapy | | Psychoanalysis | | Meditation | | Antidepressants | | Mental health helplines | |
| Year | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit | Obs. ^a | Fit |
| 2006 | 6.25 | 3.27 | 11.08 | 8.52 | 3.67 | 2.13 | 14.58 | 14.55 | 6.75 | 4.17 |
| 2007 | 3.17 | 3.27 | 6.83 | 8.52 | 2.83 | 2.13 | 19.17 | 14.55 | 6.28 | 4.17 |
| 2008 | 2.92 | 3.27 | 9.17 | 8.52 | 0.67 | 2.13 | 19.17 | 14.55 | 1.92 | 4.17 |
| 2009 | 2.25 | 3.27 | 8.58 | 8.52 | 2.67 | 2.13 | 9.42 | 14.55 | 2.50 | 4.17 |
| 2010 | 1.75 | 3.27 | 6.92 | 8.52 | 0.83 | 2.13 | 13.50 | 14.55 | 3.42 | 4.17 |
| 2011 | 1.67 | 1.66 [*] | 3.33 | 3.34 ^{***} | 0.17 | 0.68 ^{**} | 12.33 | 14.55 | 0.81 | 0.97 ^{***} |
| 2012 | 1.58 | 1.66 | 4.00 | 3.34 | 0.25 | 0.68 | 13.50 | 14.55 | 0.89 | 0.97 |
| 2013 | 1.50 | 1.66 | 3.25 | 3.34 | 0.17 | 0.68 | 12.25 | 14.55 | 1.19 | 0.97 |
| 2014 | 1.75 | 1.66 | 2.33 | 3.34 | 0.17 | 0.68 | 13.58 | 14.55 | 0.67 | 0.97 |
| 2015 | 1.58 | 1.66 | 1.92 | 3.34 | 0.50 | 0.68 | 15.33 | 14.55 | 0.83 | 0.97 |
| 2016 | 1.58 | 1.66 | 3.17 | 3.34 | 1.33 | 0.68 | 17.25 | 14.55 | 0.72 | 0.97 |
| 2017 | 1.67 | 1.66 | 3.50 | 3.34 | 1.67 | 0.68 | 18.00 | 20.61 ^{**} | 1.72 | 0.97 |
| 2018 | 1.92 | 1.66 | 2.92 | 3.34 | 1.17 | 0.68 | 20.17 | 20.61 | 0.75 | 0.97 |
| 2019 | 2.67 | 3.60 [*] | 3.92 | 3.34 | 2.33 | 3.36 ^{**} | 20.92 | 20.61 | 1.00 | 0.97 |
| 2020 | 3.25 | 3.60 | 4.00 | 3.34 | 4.17 | 3.36 | 19.50 | 20.61 | 0.92 | 0.97 |
| 2021 | 3.50 | 3.60 | 3.67 | 3.34 | 3.83 | 3.36 | 20.08 | 20.61 | 1.11 | 0.97 |
| 2022 | 4.17 | 3.60 | 3.67 | 3.34 | 3.75 | 3.36 | 21.75 | 20.61 | 1.22 | 0.97 |
| 2023 | 4.43 | 3.60 | 3.71 | 3.34 | 2.71 | 3.36 | 23.86 | 20.61 | 0.76 | 0.97 |

*Note. ^aObserved. * $p < .05$. ** $p < .01$. *** $p < .001$. *P*-values hold for statistically significant change-points.

Here, graphics are also used for diagnostic purposes. Figures 1 and 2 illustrate the application of the RS_P-based analysis to each search term under study, for the two topics under consideration. The points in the polygon-shaped solid line in each panel display the observed yearly averaged RSV values. The path of the dashed line in each panel represents the estimate of the time-varying process mean (or the time-varying process dispersion for scale changes respectively). The numbers on the dashed lines represent the consecutive years under study (beginning in 2006) that statistically significant change-points occurred. For example, for the search term “psychologist” (see Fig. 1a), a significant change-point (change in mean level) happens in 2018, the 13th year in a row under observation.

Regarding the first topic, “Therapists” (also see Table 1 and Figure 1), the RS_P procedure indicated statistically significant changes of the mean (all are cases of an “one-step” level change) for Google searches for the terms “psychologist”, “psychiatrist”, “psychotherapist”, “neurologist” and “mental health counselor”. In particular, searches for the terms “psychologist”, “psychiatrist”, and “psychotherapist” increased significantly a year after 2017, searches for the term “neurologist” increased in 2017, while searches for “mental health counselor” were found to decline significantly in the year following 2010. Further, marginally significant changes were observed in terms of searches for “psychoanalyst” ($\hat{\mu}=5.57, p=.05$) and non-significant changes for “mental health centre” ($\hat{\mu}=3.30, p=.428$). The highest estimated mean values were for searches for “neurologist” ($\hat{\mu}=73.11, p<.001$) and “psychologist” ($\hat{\mu}=62.26, p<.001$). Next came searches for “psychiatrist” ($\hat{\mu}=9.59, p<.001$) and “psychotherapist” ($\hat{\mu}=5.01, p<.01$). The lowest mean value was found for searches for “mental health counselor” ($\hat{\mu}=0.62, p<.01$).

As for “Treatment Practices” (also see Table 2 and Figure 2), statistically significant changes in the mean were observed for Google searches for “psychotherapy”, “psychoanalysis”, “meditation”, “antidepressants” and “mental health helplines”, whereas non-substantial level-changes were noted for searches for “anxiolytics” ($\hat{\mu}=5.51, p=.163$). Specifically, the behavior of the estimated time-varying process means indicates that searches for “psychotherapy” and “meditation” decreased a year after 2010 and increased in 2019; these represent cases of a “two-steps” level change. It also suggests that searches for “antidepressants” increased in 2017, and that searches related to “psychoanalysis” and “mental health helplines” decreased a year after 2010. The behavior of the latter three search terms represents a case of an “one-step” level change. The highest mean value estimated was for “antidepressants” ($\hat{\mu}=20.61, p<.01$), while the lowest one for searches pertaining to “mental health helplines” ($\hat{\mu}=0.97, p<.001$).

Discussion

In this paper, we sought to explore changes in online mental health help-seeking behavior associated with the GFC and the pandemic, emphasizing the population’s need for information about mental health services within the context of Greece. It is important to note here that, varying country-specific factors and realities may influence the self-perceived mental health, wellbeing and life satisfaction in times of financial adversity and/or public health emergency, especially for those countries presumably more severely hit by such crises. Together with Portugal, Ireland, and Spain, Greece is one of the four EURO countries most severely affected by the GFC. It also adopted a lockdown the earliest and enforced the strictest, most proactive measures implemented among European countries to combat the COVID-19 pandemic. Even if Greece has been hailed internationally as a “success story” for effectively and early stopping the spread of COVID-19, these measures inevitably threatened and negatively affected several human rights and social liberties for Greek citizens. Restricting personal liberties has already been linked to a decline in mental health, an increase in social isolation and loneliness, alcohol abuse, and domestic violence among the general population (see Rossell et al., 2021, and references therein). It is therefore clear that Greece is a country of exceptional research interest given that, prior to the pandemic, its citizens were already struggling with the strain and impacts of a decade-long financial crisis.

Figure 1. Level-and Scale-Changes in Searches for the “Therapists” Topic

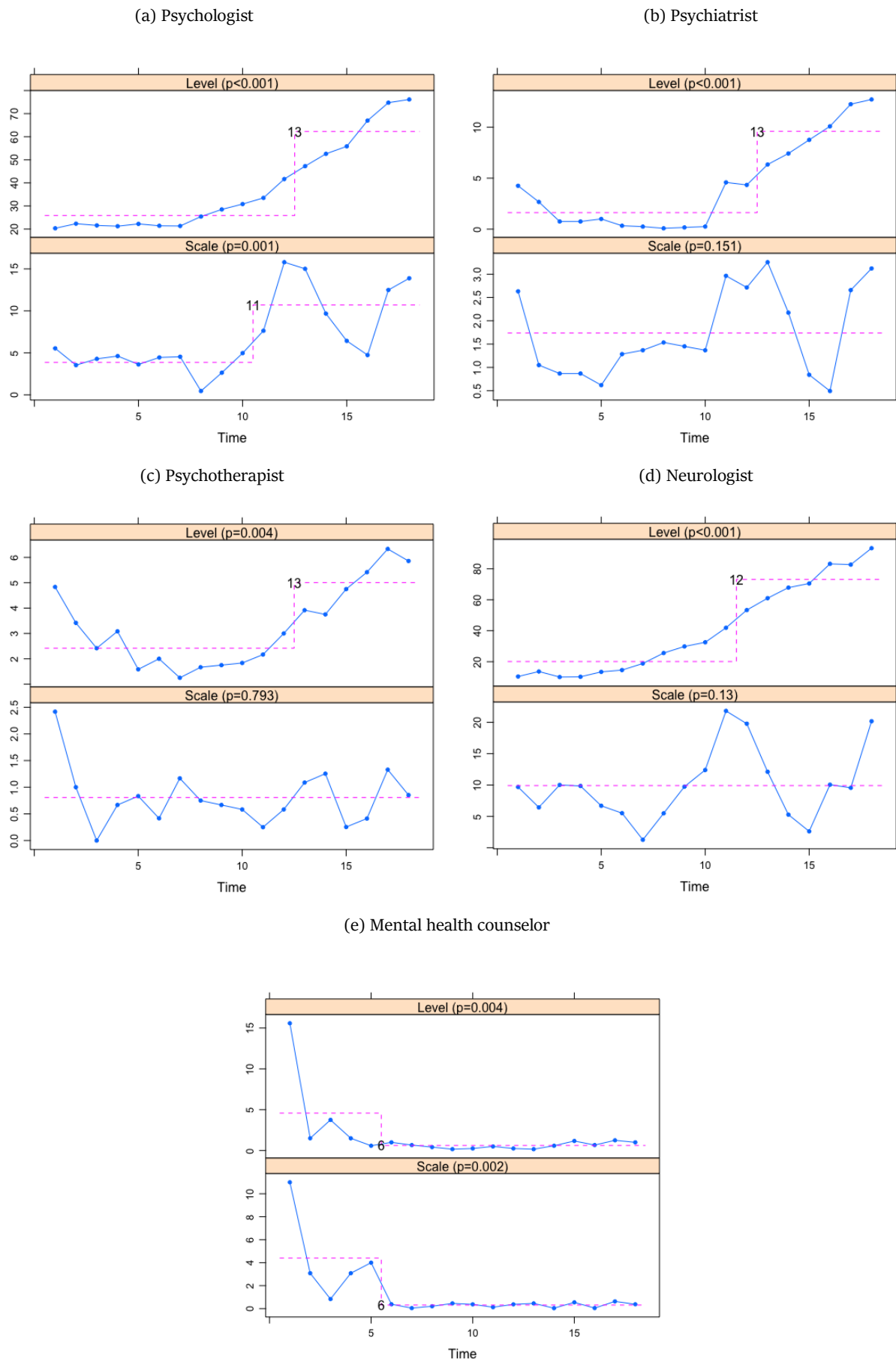


Figure 2. Level-and Scale-Changes in Searches for the “Treatment Practices” Topic



Verification of Research Hypotheses

The first research hypothesis is partially supported by the available data which show a general decline in the demand for mental health services from pre- to post- 2008 financial crisis. Specifically, regarding the first topic “Therapists”, only searches for “mental health counselor” were found to have significantly decreased, while evidence of statistically significant change-points between 2006 and 2013 (the Greek economy resumed growth in 2014 after six years of recession) was obtained for the majority of the terms included in the topic “Treatment Practices”. In particular, searches for “psychotherapy”, “psychoanalysis”, “meditation”, and “mental health helplines” were found to decrease significantly a year after 2010. The divergence and disparity in Google searches for “Therapists” versus “Treatment Practices” before and after the 2008 GFC can be attributed to several factors, including changes in search behavior, a focus on personalized care, affordability, and reduced stigma. Post-crisis, individuals may have searched for therapists to explore options or costs without committing to treatment, with financial constraints limiting actual engagement with treatment practices. This could result in a discrepancy between searches for therapists (seeking information) and searches for treatment practices (seeking specific interventions). Lastly, as awareness of mental health issues increased, people may have become more comfortable searching for therapists, indicating reduced stigma, while remaining hesitant to explore specific treatment practices, particularly if they associate them with more severe mental health conditions. Furthermore, these findings are in line with those of Talamonti et al. (2023), who suggested that tougher economic conditions likely discourage people from seeking the proper help, care and support for mental health issues, which may account for the rise in hospitalization rates and the rise in self-harm incidents during these times of financial hardship. Moreover, as noted by Stylianidis and Souliotis (2019), mental health services that were already in place in Greece have scaled back on operations and staffing, and public financing for mental health decreased by 20% between 2010 and 2011, and by an additional 55% between 2011 and 2012. Following the peak of the Greek debt crisis in 2010-2012, the country imposed significant austerity measures and structural reforms in exchange for financial aid from international creditors, impacting various sectors including mental health care and services due to budget cuts. Despite these obstacles, efforts were made to expand access to care and improve service quality in the field of mental health reform. In the early and middle 2010s, attitudes towards mental health also changed, with a focus on person-centered care, increasing promotion of mental health awareness, and anti-stigma campaigns (Christodoulou & Anagnostopoulos, 2013).

Furthermore, residents in Greece were found to start searching increasingly more for “neurologist” and “antidepressants” in 2017, their search for “psychologist”, “psychiatrist”, and “psychotherapist” increased significantly in 2018, while searches for “psychotherapy” and “meditation” began to rise significantly in 2019, with Greece having emerged from a decade-long financial crisis in August 2018, successfully exiting its third and last bailout program. By 2017, Greece had achieved economic stabilization, and the implementation of policies aimed at enhancing competitiveness and fiscal sustainability. Mental health reform initiatives continued, emphasizing prevention, early intervention, and community-based care. Initiatives were also made to fortify mental health laws, enhance workforce capacity, and raise public awareness about mental health issues. This shift in the late 2010s in Greek society toward a greater interest in and willingness to seek help for psychological concerns and mental health issues, can clearly be attributed to a combination of factors. These included mental health education campaigns, professional and organizational advocacy initiatives, media coverage and attention, and changes to healthcare regulations that prioritized mental health services. Overall, these factors may have contributed to a more conducive and accepting environment and led to a rise in the number of people in Greece who were seeking online information for certain treatment practices and mental health professionals.

It is also worth noting here that the highest values for these searches were found for the years 2020-2023, which correspond to a period that may be called the “post-pandemic era” and denotes the period that followed the COVID-19 pandemic’s effects on world health and socioeconomic conditions. Our results partially support the

second research hypothesis, which stated that Google searches for mental health services after the pandemic would be significantly higher compared to the pre-pandemic period among the Greek population. This is in accordance with the findings of Arevian et al. (2020) and Campion et al. (2022) who suggested that individuals will experience not only different but also increased pandemic-associated mental health service needs (e.g., switching from searching for in-person therapists to remote therapy modalities, such as telecare, telephone counselling services, mental health helplines etc., or/and alternative therapeutic techniques like meditation). However, we have not found any pandemic-related statistically significant changes to date. There are a few possible explanations for these results.

One is that the onset of these changes may be delayed, suggesting the need for ongoing Google Trends surveillance. This perspective is consistent with the findings of Hoerger et al. (2020), whose research on the pandemic's impact on mental health showed that there was an initial surge in Google searches pertaining to worry and panic, followed by the emergence of searches indicating symptoms of anxiety. However, they did not observe significant changes in other mental health symptoms. Additionally, their research revealed a shift in therapy preferences from in-person to remote, along with a rise in interest in practices like deep breathing and body scan meditation. These findings imply that the impact of major events, such as the pandemic, on mental health-related search activity may unfold gradually over time, and different aspects of mental health may manifest in varying degrees of immediacy. Moreover, the observed changes in the behavior of seeking treatment and the interest in specific coping mechanisms underscore the dynamic nature of mental health reactions to crises and the evolving needs of those looking for support and resources during challenging times.

Recently, Szilagyi et al. (2023) examined the psychological impact of COVID-19 containment measures across Europe, including Greece. By performing informetric analyses and checking Google Trends queries, the researchers were able to identify several psychological factors that were given more attention during the pandemic. Notably, they observed a substantial increase in search queries related to mental health professionals and services, including “psychologist”, “psychotherapist” and “psychotherapy”. This implies that, during the pandemic, there may have been a higher need, an increased demand, or interest in mental health services and support. However, it is important to note that the study period covered by Szilagyi et al. (2023) spanned from January 2017 to June 2021. Therefore, their findings offer valuable insights into trends within this particular time period. By analyzing Google Trends data over a more extended period, researchers may uncover additional patterns and fluctuations in mental health-related search queries, providing deeper insights into the changing psychological responses to significant external stressors (e.g., the extreme stress caused by global financial markets and banking systems between mid- 2007 and early- 2009, the peak of the Greek debt crisis in 2010-2012, etc.). In fact, given the dynamic character of the 18-year time series examined in this paper, it is plausible that the highest values recorded in the years 2020-2023 for Google search trends relating to mental health, are only a part of a larger, ongoing trend. It might take more time points to precisely identify and describe peaks in search activity related to mental health issues after the pandemic. This perspective aligns with the notion that major events, like pandemics, can have long-lasting and multifaceted repercussions on PMH, that may take different forms throughout time. Thus, continued tracking, examination, and analysis of Google Trends data over an extended period can yield valuable insights about how mental health-related search activity is evolving and how it connects to broader societal factors.

Another possibility is that Greek people may be more resilient than anticipated in rationalizing some aspects of the pandemic, as also underscored in Hoerger et al. (2020). It should be noted that a recent national survey on Greek people's beliefs and emotional states conducted in September 2022 by the research and policy institute “Dianeosis” (Georgakopoulos, 2022), revealed that the most common feelings among those who live in Greece were insecurity and disappointment, with optimism significantly declining (from 2019 to 2022). Therefore, from another perspective, one could argue that the current study was also carried out during a period when insecurity,

threats, and negative psychosocial effects on the Greek population were already present. Given that Greek society had already gone through multiple and long-lasting socioeconomic crises, one would expect Greek people to become more resilient and better prepared for the challenges posed by the pandemic. In this way, Greek people were already under stress from the previous socioeconomic crisis at the beginning of or during the pandemic, which had also disrupted life, and caused insecurity, uncertainty, unpredictability, and loss of symbolic capital. As a result, they developed resilience and preparedness to face new risks and more primitive threats such as the idea of death and the loss of human life due to COVID-19.

In sum, these analyses of Google Trends data suggest that Greek people who were experiencing financial hardship were less likely to seek out online mental health information about treatment for mental health issues, while starting in 2018, when Greece began to stabilize and return to financial normalcy, the Greek population showed increased interest in obtaining information about mental health professionals and certain treatment methods. Furthermore, it could be hypothesized that reduced mental health help-seeking could imply that these individuals were also less likely to receive mental health care and support, as there is evidence that changes in search behavior reflect broader patterns and correlate with actual changes in health care utilization (Jia et al., 2021; Shneyderman et al., 2016; Wei et al., 2016). Continued monitoring of Google Trends may reveal further changes and significant emerging trends in long-term help-seeking behavior for mental health services that have not been identified or detected yet.

In this study, we examined the needs of the general population with regard to mental health, as captured and quantified through the online information seeking behaviour that was measured as the relative search volume of relevant online queries conducted on the Google Trends platform (Cheng, 2022). The research design chosen and the data-gathering procedures followed raise seven important issues that must be considered when interpreting our findings.

First, the Google Trends tool employed here is based on RSVs data which is a scaled representation of search query data that takes into account the total number of searches made over a specific period of time. However, RSV data can be affected by a number of factors, including shifts in search behavior, changes in Google's algorithms, and modifications to the methods of data collection and aggregation. As mentioned earlier, we excluded queries with high noise levels (queries for the 2004-2005 years); however, it is important to keep in mind that even queries with some noise might still be valuable in certain contexts, such as when comparing trends across multiple queries or time periods. Thus, the optimal strategy would depend on the particular research questions and analysis goals.

Second, out of all the search engines that were available (Bing, Yahoo, Baidu, etc.), we exclusively used Google's search engine to collect web-based data for our research purposes. Nevertheless, according to Statista (2024), Google Trends is one of the most popular search engines worldwide (holding nearly 82% of the global desktop search engine market as of July 2023). It is also one of the most widely used tools for tracking web-based human behavior, assessing and even preventing health-related issues (Mavragani et al., 2018).

Third, when it comes to using search engines, older people may have different levels of familiarity and comfort with the platforms compared to young people. Factors such as digital literacy, internet access, and technological competence can influence their ability and willingness to use resources like Google Trends. However, it is true nowadays that older people are increasingly embracing technology and the internet for various purposes, including seeking health information (Bachofner et al., 2024; Reynolds et al., 2023; Zhao et al., 2022b). Although data on internet usage may favor younger age groups, a sizable proportion of elderly persons are also using the internet for searching health-related information. Future studies should examine factors such as search habits, information preferences, and the effect of digital literacy on older adults' access to and interpretation of online data, and should delve deeper into how elderly populations interact with online platforms like Google

Trends. Such studies may provide important information about how to raise older adults' digital health literacy and modify online resources to better suit their needs.

Fourth, previous research has shown that people frequently turn to online search engines, including platforms like Google, to find health-related information at different points in their healthcare journey (Kubb & Foran, 2020). This behavior includes seeking information before scheduling doctor visits, to decide whether to make appointments, to prepare for appointments, and to follow up with any unanswered questions. Although the internet is a useful and easily accessible resource for health information, it is essential to recognize that it cannot replace the expertise, advice, and guidance of healthcare professionals. Rather, it often functions as a preliminary stage of information gathering prior to consulting a healthcare professional. Regarding the usage of Google Trends for seeking mental health information, it is indeed unclear whether users of this platform are truly in need of mental health care and/or have received treatment. This gap highlights the importance of further research to comprehend why people search on Google Trends, how they go about getting information, and how they use that knowledge to take appropriate action, such as seeking professional help when necessary. Reviews of models for seeking health information on the web have been published (Marton & Wei Choo, 2012). Nevertheless, the adaptation of a comprehensive model that encompasses the various stages of the help-seeking behavior- problem recognition, decision to seek help, service selection, and service utilization, can lead to the development of more effective intervention initiatives targeting better identification and treatment of mental health issues in the general population. According to Eiraldi et al. (2006), such multi-stage pathway models may offer a structured approach to understand the several stages people go through when dealing with mental health issues. By incorporating this framework into their intervention strategies, mental health practitioners and policymakers can more effectively customize their efforts to meet the unique needs of individuals at each point of the pathway. This will ultimately improve outcomes and increase access to mental health services.

Fifth, there are significant challenges and good reasons for caution when using big data involving internet search and page views for psychological research (Ford, 2020). In comparison to measures and results obtained from traditional surveys, the meaningfulness and validity of the scores as indicators of psychological states, derived from internet searches, are less clear and evident. It is debatable whether scores for searches related to mental health issues actually represent differences in needs, desire, intention, interest, thoughts, emotions, concerns, distress, or psychopathology. Moreover, big data can only be accessed at the aggregate level and may not be used to represent individual-level constructs. When inferences regarding individual-level relationships are made from data that have been aggregated to the group level, ecological fallacy can arise.

Sixth, Google Trends does not provide information about why people search for mental health terms. For example, people might be searching for information on how to treat their symptoms, the different roles and types of mental health professionals, or the aims, techniques, advantages, and effectiveness of various therapeutic approaches to mental health problems. We do not know whether they ultimately sought help from a mental health professional or if they searched for information online to support a family member's mental health amid the challenges of the pandemic or economic crisis. We can only make assumptions about people's motives for engaging in online mental health information-seeking behavior. Moreover, using Google search data as a measure of population-level experiences relies on the assumptions that (a) most searches on mental health are conducted by individuals who are experiencing such issues, difficulties, or concerns themselves, (b) individuals are intrinsically motivated, both physiologically and psychologically, to take individual and social actions to restore their health and/or quality of life, and (c) symptom elevation and/or functional impairment among themselves, relatives, and friends (problem recognition) may increase information needs and stimulate health information seeking (as noted by Zhao et al., 2022a). Furthermore, we assume that when experiencing discomfort of a physiological or psychological nature, people use symptomatic search terms in commonly used internet search engines to seek information, guidance, recommendations, and support (as described by Szilagyi et al., 2023).

These assumptions may be accurate or may not be entirely reasonable, justified, or realistic. Nevertheless, evidence supports such assumptions. For example, Ginsberg et al. (2009) found that influenza-related search behavior correlated with flu activity. Szilagyí et al. (2023) found that psychological distress caused by the pandemic correlated significantly with increased searches for psychological and psychotherapeutic support. Yigzaw et al. (2020) found correlations between search behavior and physician visits, while Rotter et al. (2021) provided evidence that people's interests, motives, and psychological states were significantly affected during times of crisis and lockdown. They concluded that, since changes in search behavior were consistent across multiple domains, Google Trends analysis might offer valuable insights for policymakers on how to adapt and develop intervention, information, and prevention strategies.

Seventh, our study included individuals who searched online for terms related to both professional therapists such as "psychologist", "psychiatrist", "psychotherapist", "neurologist", "psychoanalyst", "mental health counsellor" and treatment practices such as "psychotherapy", "meditation", "antidepressants", "psychoanalysis" and "anxiolytics". However, a survey conducted across 27 member countries of the European Union, including Greece (European Commission, 2023) revealed that, in the last 12 months, only a small percentage of Greek people had received professional help for mental health problems from psychologists (10%), psychiatrists (15%), psychotherapists (4%), or psychoanalysts (3%). A notable proportion of people living in Greece had received professional help for mental health problems from general practitioners (8%), pharmacists (4%), social workers (2%), and nurses (1%). The majority of Greek people (61%) had not received help for mental health problems from professionals in the previous year, although 60% reported that they had experienced some emotional or psychosocial problems (such as feeling depressed). Additionally, this survey showed that the most frequently-mentioned effective solutions to tackle mental health issues Greek people indicated "counselling or therapy" (50%), discussions with close ones (31%), physical activity (34%), and social activity (37%). Medication was cited as an effective solution by only 22% of Greek respondents. Thus, future studies employing Google Trends should extend the search terms in order to include more "therapists" and "treatment practices" categories.

Further, findings regarding the impact of the GFC and COVID-19 crises on financial markets and individual mental health remain mixed, due to the varied financial and fiscal policies, as well as the protective measures taken in response to these crises. As mentioned earlier, the majority of studies conducted in the last two decades have focused to the unique effects of either the GFC or COVID-19 on several mental health and wellbeing outcomes, among the various countries (Ahmed et al., 2023; Blendermann et al., 2024; Sun et al., 2023; Talamonti et al., 2023). However, the COVID-19 is still ongoing, and although the pandemic may not be a financial crisis per se, the long-term impact of COVID-19-related financial difficulties on mental health outcomes is expected to differ greatly between countries and socio-economic groups; thus, COVID-19 determinant may affect future findings, since most previous research studies considered financial crises as main or primary determinants of mental health outcomes (see, among others, Frasquilho et al., 2015; Marazziti et al., 2021; Ng et al., 2013; Volkos & Symvoulakis, 2021). As such, longitudinal research is urgently required to assess the full course of the impact of the ongoing pandemic on financial difficulties, and the subsequent effects on mental health symptoms and service needs, while it is unclear whether the war in Ukraine will have a more profound impact; and, if so, in what direction. This kind of research could allow for comparisons of the effects of different types of crises, like floods and earthquakes, and create opportunities for the development and implementation of tailored interventions aimed at preventing mental illness and promoting mental health and overall wellbeing, as stated by Pezirkianidis et al. (2023). Further, a unified approach that integrates the use of Google Trends analysis and self-report surveys, could assist practitioners and the PMC community in continuously monitoring the psychological health status of the population, better understanding the short- and long-term psychosocial burden of such crises, and acting as a comprehensive intelligence approach to acknowledge issues of substantive importance, identify potential mechanisms of change, design customized interventions, and intervene earlier.

Monitoring the behavior of those seeking mental health information might be helpful to identify shifting trends and demands in mental health services early on, which can lead to earlier responses and improved outcomes for people and communities. By utilizing such data-driven insights, stakeholders can work collaboratively to meet the evolving challenges and opportunities in mental health care. Governments could use such data to gain insight into how mental health service and treatment needs are evolving, and inform public policy development and resource allocation. This could involve funding research initiatives to expand mental health services in areas of increased public interest or it could involve prioritizing funding for studies that address issues on emerging mental health trends or implementing preventive measures to address emerging mental health concerns. Based on real-time data on the availability of mental health professionals and treatment preferences, mental health organizations could modify their strategies and services. To adapt to changing needs, this may entail expanding the range of telehealth alternatives, establishing focused awareness efforts, or changing service offers. In terms of service availability, insights gained from infodemiology mental health data can help ensure that assessment and treatment services are available “where” and “when” people need them. This could involve providing resources to underserved areas, adjusting service hours to meet periods of high demand, or improving access to specialized care for specific populations.

Moreover, as noted by Hoerger et al. (2020), public health initiatives and marketing campaigns for mental health organizations could benefit significantly from promoting mental health services that are in high demand. By identifying the most popular services that people are searching for, using tools like Google Trends, these initiatives can tailor their communications and outreach efforts to better meet the needs of the population. In order to ensure that people know where to turn for support when they need it most, it could be helpful to promote mental health services that are frequently searched for. This will help increase awareness of and improve accessibility to these resources. By normalizing help-seeking behaviors and highlighting the fact that many others are pursuing comparable services, it can also help reduce the stigma surrounding mental health treatment. In addition, promoting popular mental health services in advertising campaigns might encourage more people to proactively take charge of their mental health issues, which can result in earlier intervention and better outcomes. By coordinating their efforts with the current demand for specialized services, public health programs and mental health organizations can effectively reach their target audience and positively improve community mental health and wellbeing.

Four years after the start of the COVID-19 outbreak, a number of population-level changes in behavioral and psychological processes have emerged, necessitating continuous monitoring of mental health status and related needs. In the absence of longitudinal surveillance data that allow for meaningful comparisons, the current study made a valuable contribution to the body of research by using Google search data as a “proxy measure” of the impact of the GFC and the pandemic on the Greek population’s interest in mental health services and treatment practices. The data provide an important characterization of the psychological health status of Greek people and contribute an alternative perspective to the growing literature documenting the implications of GFC and COVID-19 crisis. The findings indicate that Google Trends can be a useful infodemiology tool for the field and psychological community, complementing traditional self-report surveys, and guiding psychology practitioners at multiple ecological levels. The derived conclusions can help us understand what people search for more when looking for support services specific to Greece, as well as how the Greek population’s online mental health information-seeking behavior has evolved in response to the nation’s successive crises experienced in the last few decades. Thus, and in keeping with suggestions made by Arora et al. (2019) about web search engine data refinements, these findings can serve as a valuable guide for policymakers and mental health experts to identify emerging trends in public interest for mental health services and to build more inclusive support networks in case future adversities arise.

Acknowledgements

Data supporting the findings of this study are available within the article and its supplementary material. Authors have no conflict of interest to declare.

References

- Ahmed, N., Barnett, P., Greenburgh, A., Pemovska, T., Stefanidou, T., Lyons, N., Ikhtabi, S., Talwar, S., Francis, E. R., Harris, S. M., Shah, P., Machin, K., Jeffreys, S., Mitchell, L., Lynch, C., Foye, U., Schlief, M., Appleton, R., Saunders, K. R. K., . . . Johnson, S. (2023). Mental health in Europe during the COVID-19 pandemic: A systematic review. *The Lancet Psychiatry*, *10*(7), 537–556. [https://doi.org/10.1016/S2215-0366\(23\)00113-X](https://doi.org/10.1016/S2215-0366(23)00113-X)
- Alibudbud, R. (2023). Google Trends for health research: Its advantages, application, methodological considerations, and limitations in psychiatric and mental health infodemiology. *Frontiers in Big Data*, *6*, Article 1132764. <https://doi.org/10.3389/fdata.2023.1132764>
- Anker, A. E., Reinhart, A. M., & Feeley, T. H. (2011). Health information seeking: A review of measures and methods. *Patient Education and Counseling*, *82*(3), 346–354. <https://doi.org/10.1016/j.pec.2010.12.008>.
- Arevian, A. C., Jones, F., Moore, E. M., Goodsmith, N., Aguilar-Gaxiola, S., Ewing, T., Siddiq, H., Lester, P., Cheung, E., Ijadi-Maghsoodi, R., Gabrielian, S., Sugarman, O. K., Bonds, C., Benitez, C., Innes-Gomberg, D., Springgate, B., Haywood, C., Meyers, D., Sherin, J. E., & Wells, K. (2020). Mental health community and health system issues in COVID-19: Lessons from academic, community, provider and policy stakeholders. *Ethnicity & Disease*, *30*(4), 695–700. <https://doi.org/10.18865/ed.30.4.695>
- Arora, V. S., McKee, M., & Stuckler, D. (2019). Google Trends: Opportunities and limitations in health and health policy research. *Health Policy*, *123*, 338–341. <https://doi.org/10.1016/j.healthpol.2019.01.001>
- Bachofner, Y., Seifert, A., Sepahniya, S., & Fabian, C. (2024). Exploring online health information seeking and sharing among older adults: A mini-review about acceptance, potentials, and barriers. *Frontiers in Digital Health*, *6*, Article 1336430. <https://doi.org/10.3389/fdgth.2024.1336430>
- Bansal, A., Gupta, S., Jain, V., Kumar, A., & Klein, A. (2021). Utilizing Google Trends to assess worldwide interest in COVID-19 and myocarditis. *Journal of Medical Systems*, *45*(2), Article 18. <https://doi.org/10.1007/s10916-020-01685-5>
- Barros, J. M., Melia, R., Francis, K., Bogue, J., O’Sullivan, M., Young, K., Bernert, R. A., Rebholz-Schuhmann, D., & Duggan, J. (2019). The validity of Google Trends search volumes for behavioral forecasting of national suicide rates in Ireland. *International Journal of Environmental Research and Public Health*, *16*(17), Article 3201. <https://doi.org/10.3390/ijerph16173201>
- Blendermann, M., Ebalu, T. I., Obisie-Orlu, I. C., Fried, E. I., & Hallion, L. S. (2024). A narrative systematic review of changes in mental health symptoms from before to during the COVID-19 pandemic. *Psychological Medicine*, *54*(1), 43–66. <https://doi.org/10.1017/S0033291723002295>
- Brodeur, A., Clark, A. E., Fleche, S., & Powdthavee, N. (2021). COVID-19, lockdowns and well-being: Evidence from Google Trends. *Journal of Public Economics*, *193*, Article 104346. <https://doi.org/10.1016/j.jpubeco.2020.104346>
- Bueno-Notivol, J., Gracia-García, P., Olayab, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2020). Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies. *International Journal of Clinical and Health Psychology*, *21*(1), Article 100196. <https://doi.org/10.1016/j.ijchp.2020.07.007>
- Campion, J., Javed, A., Lund, C., Sartorius, N., Saxena, S., Marmot, M., Allan, J., & Udomratn, P. (2022). Public mental health: Required actions to address implementation failure in the context of COVID-19. *The Lancet Psychiatry*, *9*(2), 169–182. [https://doi.org/10.1016/S2215-0366\(21\)00199-1](https://doi.org/10.1016/S2215-0366(21)00199-1)

- Capizzi, G., & Masarotto G. (2018). Phase I distribution-free analysis with the R package *dfphase1*. In S.Knoth & W. Schmid (Eds.), *Frontiers in statistical quality control* (pp. 3–19). Springer. https://doi.org/10.1007/978-3-319-75295-2_1
- Cheng, C. (2022). Time-series associations between public Interest in COVID-19 variants and national vaccination rate: A Google Trends analysis. *Behavioral Sciences*, 12(7), Article 223. <https://doi.org/10.3390/bs12070223>
- Christodoulou, N. G., & Anagnostopoulos, D. C. (2013). The financial crisis and the future of mental health in Greece. *International Psychiatry: Bulletin of the Board of International Affairs of the Royal College of Psychiatrists*, 10(1), 3–5.
- De la Rosa, P. A., Cowden, R. G., de Filippis, R., Jerotic, S., Nahidi, M., Ori, D., Orsolini, L., Nagendrappa, S., Pinto da Costa, M., Ransing, R., Saeed, F., Shoib, S., Turan, S., Ullah, I., Vadivel, R., & Ramalho, R. (2022). Associations of lockdown stringency and duration with Google searches for mental health terms during the COVID-19 pandemic: A nine-country study. *Journal of Psychiatric Research*, 150, 237–245. <https://doi.org/10.1016/j.jpsychires.2022.03.026>
- Drydakakis, N. (2015). The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013: A longitudinal study before and during the financial crisis. *Social Science & Medicine*, 128, 43–51. <https://doi.org/10.1016/j.socscimed.2014.12.025>
- Economou, M., Angelopoulos, E., Peppou, L. E., Souliotis, K., & Stefanis, C. (2016). Major depression amid financial crisis in Greece: Will unemployment narrow existing gender differences in the prevalence of the disorder in Greece? *Psychiatry Research*, 242, 260–261. <https://doi.org/10.1016/j.psychres.2016.05.041>
- Economou, M., Madianos, M., Peppou, L. E., Patelakis, A., & Stefanis, C. N. (2013). Major depression in the era of economic crisis: A replication of a cross-sectional study across Greece. *Journal of Affective Disorders*, 145(3), 308–314. <https://doi.org/10.1016/j.jad.2012.08.008>
- Eichenauer, V. Z., Indergand, R., Martínez, I. Z., & Sax, C. (2022). Obtaining consistent time series from Google Trends. *Economic Inquiry*, 60, 694–705. <https://doi.org/10.1111/ecin.13049>
- Eiraldi, R. B., Mazzuca, L. B., Clarke, A. T., & Power, T. J. (2006). Service utilization among ethnic minority children with ADHD: A model of help-seeking behavior. *Administration and Policy in Mental Health*, 33(5), 607–622. <https://doi.org/10.1007/s10488-006-0063-1>
- European Commission. (2023). Flash Eurobarometer 530 Report (Mental health). Ipsos European Public Affairs, Publications Office of the European Union. GESIS, Cologne. ZA8761 Data file Version 1.0.0. <https://doi.org/10.4232/1.14204>
- Ford, M. T. (2020). Internet search and page view behavior scores: Validity and usefulness as indicators of psychological states. In S.E. Woo, L. Tay, & R.W. Proctor (Eds.), *Big data in psychological research* (pp. 89–107). American Psychological Association.
- Fountoulakis, K. N., Apostolidou, M. K., Atsiova, M. B., Filippidou, A. K., Florou, A. K., Gousiou, D. S., Katsara, A. R., Mantzari, S. N., Padouva-Markoulaki, M., Papatriantafyllou, E. I., Sacharidi, P. I., Tonia, A. I., Tsagalidou, E. G., Zymara, V. P., Prezerakos, P. E., Koupidis, S. A., Fountoulakis, N. K., & Chrousos, G. P. (2021). Self-reported changes in anxiety, depression and suicidality during the COVID-19 lockdown in Greece. *Journal of Affective Disorders*, 279, 624–629. <https://doi.org/10.1016/j.jad.2020.10.061>
- Frasquilho, D., Matos, M. G., Salonna, F., Guerreiro, D., Storti, C. C., Gaspar, T., & Caldas-De-Almeida, J. M. (2015). Mental health outcomes in times of economic recession: A systematic literature review. *BMC Public Health*, 16, Article 115. <https://doi.org/10.1186/s12889-016-2720-y>
- Georgakopoulos, T. (2022), *What Greeks believe in 2022 - Part A*. DiaNEOsis Research and Policy Institute. Retrieved from: <https://www.dianeosis.org/en/2022/09/what-greeks-believe-in-2022-part-a/>
- Ginsberg, J., Mohebbi, M. H., Patel, R. S., Brammer, L., Smolinski, M. S., & Brilliant, L. (2009). Detecting influenza epidemics using search engine query data. *Nature*, 457, 1012–1014. <https://doi.org/10.1038/nature07634>

- Gournellis, R., & Efstathiou, V. (2021). The impact of the COVID-19 Pandemic on the Greek population: Suicidal ideation during the first and second lockdown. *Psychiatrike=Psychiatriki*, 32(4), 267–270. <https://doi.org/10.22365/jpsych.2021.041>
- Halvorsen, K. (2016). Economic, financial, and political crisis and well-being in the PIGS-countries. *Sage Open*, 6(4). <https://doi.org/10.1177/21582440166675198>
- Hoerger, M., Alonzi, S., Perry, L. M., Voss, H. M., Easwar, S., & Gerhart, J. I. (2020). Impact of the COVID-19 pandemic on mental health: Real-time surveillance using Google Trends. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(6), 567–568. <https://doi.org/10.1037/tra0000872>
- Jia, X., Pang, Y., & Liu L. S. (2021). Online health information seeking behavior: A systematic review. *Healthcare* (Basel), 9(12), Article 1740. <https://doi.org/10.3390/healthcare9121740>
- Johnson, J. D., Donohue, W. A., Atkin, C. K., & Johnson, S. (1995). A comprehensive model of information seeking. *Science Communication*, 16(3), 274–303. <https://doi.org/10.1177/1075547095016003003>
- Kalaitzaki, A., Tsouvelas, G., Tamiolaki, A., & Konstantakopoulos, G. (2022). Post-traumatic stress symptoms during the first and second COVID-19 lockdown in Greece: Rates, risk, and protective factors. *International Journal of Mental Health Nursing*, 31(1), 153–166. <https://doi.org/10.1111/inm.12945>
- Karaivazoglou, K., Konstantopoulou, G., Kalogeropoulou, M., Iliou, T., Vorvolakos, T., Assimakopoulos, K., Gourzis, P., & Alexopoulos, P. (2021). Psychological distress in the Greek general population during the first COVID-19 lockdown. *British Journal of Psychiatry Open*, 7(2), Article e59. <https://doi.org/10.1192/bjo.2021.17>
- Knapp, M., & Wong, G. (2020). Economics and mental health: The current scenario. *World Psychiatry*, 19(1), 3–14. <https://doi.org/10.1002/wps.20692>
- Knipe, D., Evans, H., Sinyor, M., Niederkrotenthaler, T., Gunnell, D., & John, A. (2020). Tracking online searches for emotional wellbeing concerns and coping strategies in the UK during the COVID-19 pandemic: A Google Trends analysis. *Wellcome Open Research*, 5: 220, 1–11. <https://doi.org/10.12688/wellcomeopenres.16147.1>
- Knipe, D., Gunnell, D., Evans, H., John, A., & Fancourt, D. (2021). Is Google Trends a useful tool for tracking mental and social distress during a public health emergency? A time-series analysis. *Journal of Affective Disorders*, 294, 737–744. <https://doi.org/10.1016/j.jad.2021.06.086>
- Konstantakopoulos, G., Pikouli, K., Ploumpidis, D., Bougonikolou, E., Kouyanou, K., Nystazaki, M., & Economou, M. (2019). The impact of unemployment on mental health examined in a community mental health unit during the recent financial crisis in Greece. *Psychiatrike=Psychiatriki*, 30(4), 281–290. <https://doi.org/10.22365/jpsych.2019.304.281>
- Kubb, C., & Foran, H. M. (2020). Online health information seeking by parents for their children: Systematic review and agenda for further research. *Journal of Medical Internet Research*, 22(8), Article e19985. <https://doi.org/10.2196/19985>
- Laliotis, I., Ioannidis, J. P. A., & Stavropoulou, C. (2016). Total and cause-specific mortality before and after the onset of the Greek economic crisis: An interrupted time-series analysis. *The Lancet Public Health*, 1(2), e56–e65. [https://doi.org/10.1016/S2468-2667\(16\)30018-4](https://doi.org/10.1016/S2468-2667(16)30018-4)
- Louvardi, M., Pelekasis, P., Chrousos, G. P., & Darviri, C. (2020). Mental health in chronic disease patients during the COVID-19 quarantine in Greece. *Palliative & Supportive Care*, 18(4), 394–399. <https://doi.org/10.1017/S1478951520000528>
- Madianos, M., Economou, M., Alexiou, T., & Stefanis, C. (2011). Depression and economic hardship across Greece in 2008 and 2009: Two cross-sectional surveys nationwide. *Social Psychiatry and Psychiatric Epidemiology*, 46(10), 943–952. <https://doi.org/10.1007/s00127-010-0265-4>

- Magklara, K., Lazaratou, H., Barbouni, A., Poulas, K., & Farsalinos, K. (2023). The impact of COVID-19 lockdown on children's and adolescents' mental health in Greece. *Children & Society*, 37(2), 469–484. <https://doi.org/10.1111/chso.12605>
- Marazziti, D., Avella, M. T., Mucci, N., Della Vecchia, A., Ivaldi, T., Palermo, S., & Mucci, F. (2021). Impact of economic crisis on mental health: A 10-year challenge. *CNS Spectrums*, 26(1), 7–13. <https://doi.org/10.1017/S1092852920000140>
- Marton, C., & Wei Choo, C. (2012). A review of theoretical models of health information seeking on the web. *Journal of Documentation*, 68(3), 330–352. <https://doi.org/10.1108/00220411211225575>
- Mavragani, A., Ochoa, G., & Tsagarakis, K. P. (2018). Assessing the methods, tools, and statistical approaches in Google Trends research: Systematic review. *Journal of Medical Internet Research*, 20(11), Article e270. <https://doi.org/10.2196/jmir.9366>
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., Cannon, M., Correll, C. U., Byrne, L., Carr, S., Chen, E. Y. H., Gorwood, P., Johnson, S., Kärkkäinen, H., Krystal, J. H., Lee, J., Lieberman, J., López-Jaramillo, C., Männikkö, M., . . . Arango, C. (2020). How mental health care should change as a consequence of the COVID-19 pandemic. *The Lancet Psychiatry*, 7(9), 813–824. [https://doi.org/10.1016/S2215-0366\(20\)30307-2](https://doi.org/10.1016/S2215-0366(20)30307-2)
- Mylona, K., Tsiantou, V., Zavras, D., Pavi, E., & Kyriopoulos, J. (2014). Determinants of self-reported frequency of depressive symptoms in Greece during economic crisis. *Public Health*, 128(8), 752–754. <https://doi.org/10.1016/j.puhe.2014.05.009>
- Niederdeppe, J., Hornik, R. C., Kelly, B. J., Frosch, D. L., Romantan, A., Stevens, R. S., Barg, F. K., Weiner, J. L., & Schwartz, J. S. (2007). Examining the dimensions of cancer-related information seeking and scanning behavior. *Health Communication*, 22(2), 153–167. <https://doi.org/10.1080/10410230701454189>
- Ng, K. H., Agius, M., & Zaman, R. (2013). The global economic crisis: Effects on mental health and what can be done. *Journal of the Royal Society of Medicine*, 106(6), 211–214. <https://doi.org/10.1177/0141076813481770>
- Nuti, S. V., Wayda, B., Ranasinghe, I., Wang, S., Dreyer, R. P., Chen, S. I., & Murugiah, K. (2014). The use of google trends in health care research: A systematic review. *PloS One*, 9(10), Article e109583. <https://doi.org/10.1371/journal.pone.0109583>
- Paleologou, M. P., Anagnostopoulos, D. C., Lazaratou, H., Economou, M., Peppou, L. E., & Malliori, M. (2018). Adolescents' mental health during the financial crisis in Greece: The first epidemiological data. *Psychiatrike=Psychiatriki*, 29(3), 271–274. <https://doi.org/10.22365/jpsych.2018.293.271>
- Parker, P. D., Jerrim, J., & Anders, J. (2016). What effect did the global financial crisis have upon youth wellbeing? Evidence from four Australian cohorts. *Developmental Psychology*, 52(4), 640–651. <https://doi.org/10.1037/dev0000092>
- Parlapani, E., Holeva, V., Voitsidis, P., Blekas, A., Gliatas, I., Porfyri, G. N., Golemis, A., Papadopoulou, K., Dimitriadou, A., Chatzigeorgiou, A. F., Bairachtari, V., Patsiala, S., Skoupra, M., Papigkioti, K., Kafetzopoulou, C., & Diakogiannis, I. (2020). Psychological and behavioral responses to the COVID-19 pandemic in Greece. *Frontiers in Psychiatry*, 11, Article 821. <https://doi.org/10.3389/fpsy.2020.00821>
- Parpoula, C. (2022). A distribution-free control charting technique based on change-point analysis for detection of epidemics. *Statistical Methods in Medical Research*, 31(6), 1067–1084. <https://doi.org/10.1177/09622802221079347>
- Parpoula, C., & Karagrorgiou, A. (2022) On optimal segmentation and parameter tuning for multiple change-point detection and inference. *Journal of Statistical Computation and Simulation*, 92(18), 3789–3816. <https://doi.org/10.1080/00949655.2022.2083127>

- Parpoula, C., & Karagrigoriou, A. (2020). On change-point analysis-based distribution-free control charts with phase I applications. In M. Koutras & I. Triantafyllou (Eds.), *Distribution-free methods for statistical process monitoring and control* (pp. 157–182). Springer. https://doi.org/10.1007/978-3-030-25081-2_5
- Patsali, M. E., Mousa, D. V., Papadopoulou, E. V. K., Papadopoulou, K. K. K., Kaparounaki, C. K., Diakogiannis, I., & Fountoulakis, K. N. (2020). University students' changes in mental health status and determinants of behavior during the COVID-19 lockdown in Greece. *Psychiatry Research*, 292, Article 113298. <https://doi.org/10.1016/j.psychres.2020.113298>
- Pezirkianidis, C., Parpoula, C., Athanasiades, C., Flora, K., Makris, N., Moraitou, D., Papantoniou, G., Vassilopoulos, S., Sini, M., & Stalikas, A. (2023). Individual differences on wellbeing indices during the COVID-19 quarantine in Greece: A national study. *International Journal of Environmental Research and Public Health*, 20, Article 7182. <https://doi.org/10.3390/ijerph20247182>
- Pfefferbaum, B., & North, C. S. (2020). Mental health and the covid-19 pandemic. *The New England Journal of Medicine*, 383(6), 510–512. <https://doi.org/10.1056/NEJMp2008017>
- Reynolds, K. A., Mackenzie, C.S., Medved, M., Dudok, S., & Koven, L. (2023). Older adults' mental health information preferences: A call for more balanced information to empower older adults' mental health help-seeking. *Ageing and Society*, 43(12), 2845–2874. <https://doi.org/10.1017/S0144686X21001896>
- Rossell, S. L., Neill, E., Phillipou, A., Tan, E. J., Toh, W. L., Van Rheenen, T. E., & Meyer, D. (2021). An overview of current mental health in the general population of Australia during the COVID-19 pandemic: Results from the COLLATE project. *Psychiatry Research*, 296, Article 113660. <https://doi.org/10.1016/j.psychres.2020.113660>
- Rotter, D., Doebler, P., & Schmitz, F. (2021). Interests, motives, and psychological burdens in times of crisis and lockdown: Google Trends analysis to inform policy makers. *Journal of Medical Internet Research*, 23(6), Article e26385. <https://doi.org/10.2196/26385>
- Shneyderman, Y., Rutten, L. J., Arheart, K. L., Byrne, M. M., Kornfeld, J., & Schwartz, S. J. (2016). Health information seeking and cancer screening adherence rates. *Journal of Cancer Education*, 31(1), 75–83. <https://doi.org/10.1007/s13187-015-0791-6>
- Śniadach, J., Szymkowiak, S., Osip, P., & Waszkiewicz, N. (2021). Increased depression and anxiety disorders during the COVID-19 pandemic in children and adolescents: A literature review. *Life (Basel, Switzerland)*, 11(11), Article 1188. <https://doi.org/10.3390/life11111188>
- Statista (2024). Market share of leading desktop search engines worldwide from January 2015 to January 2024. Statista. Retrieved March 7, 2024, from <https://www.statista.com/statistics/216573/worldwide-market-share-of-search-engines>
- Stuckler, D. (2015). Economic shocks, resilience, and male suicides in the Great Recession: Cross-national analysis of 20 EU countries. *European Journal of Public Health*, 25(3), 404–409. <https://doi.org/10.1093/eurpub/cku168>
- Stylianidis, S., & Souliotis, K. (2019). The impact of the long-lasting socioeconomic crisis in Greece. *British Journal of Psychiatry International*, 16(1), 16–18. <https://doi.org/10.1192/bji.2017.31>
- Stylianou, T., & Ntelas, K. (2023). Impact of COVID-19 pandemic on mental health and socioeconomic aspects in Greece. *International Journal of Environmental Research and Public Health*, 20(3), Article 1843. <https://doi.org/10.3390/ijerph20031843>
- Sun, Y., Wu, Y., Fan, S., Dal Santo, T., Li, L., Jiang, X., Li, K., Wang, Y., Tasleem, A., Krishnan, A., He, C., Bonardi, O., Boruff, J., Rice, D. B., Markham, S., Levis, B., Azar, M., Thombs-Vite, I., Neupane, D., ... Thombs, B.D. (2023). Comparison of mental health symptoms before and during the covid-19 pandemic: Evidence from a systematic review and meta-analysis of 134 cohorts. *BMJ*, 380, Article e074224. <https://doi.org/10.1136/bmj-2022-074224>
- Sycińska-Dziarnowska, M., Szyszka-Sommerfeld, L., Kłoda, K., Simeone, M., Woźniak, K., & Spagnuolo, G. (2021). Mental health interest and its prediction during the COVID-19 pandemic using Google Trends. *International*

- Journal of Environmental Research and Public Health*, 18(23), Article 12369. <https://doi.org/10.3390/ijerph182312369>
- Szilagyi, I.-S., Eggeling, E., Bornemann-Cimenti, H., & Ullrich, T. (2023). Impact of the pandemic and its containment measures in Europe upon aspects of affective impairments: A Google Trends informetrics study. *Psychological Medicine*, 53(16), 7685–7697. <https://doi.org/10.1017/S0033291723001563>
- Talamonti, D., Schneider, J., Gibson, B., & Forshaw, M. (2023) The impact of national and international financial crises on mental health and well-being: A systematic review. *Journal of Mental Health*. Advance online publication. <https://doi.org/10.1080/09638237.2023.2278104>
- Tan, S. S-L., & Goonawardene, N. (2017). Internet health information seeking and the patient- physician relationship: A systematic review. *Journal of Medical Research*, 19(1), Article e9. <https://doi.org/10.2196/jmir.5729>
- Tuliao, A. P., Mullet, N. D., Hawkins, L. G., Holyoak, D., Weerts, M., & Inyang, A. (2022). Searching for mental health services: Search strings and information acquisition. *Journal of Technology in Behavioral Science*, 7(2), 198–210. <https://doi.org/10.1007/s41347-021-00238-y>
- Volkos, P., & Symvoulakis, E. K. (2021). Impact of financial crisis on mental health: A literature review ‘puzzling’ findings from several countries. *The International Journal of Social Psychiatry*, 67(7), 907–919. <https://doi.org/10.1177/00207640211011205>
- Wei, X., Du, Z., & Zhang, S.(2016). Analysis of barriers to health information seeking and utilizing in patients with diabetes. *Cross-Cultural Communication*, 12(2), 48–51. <http://dx.doi.org/10.3968/8153>
- World Health Organization. (2022). *World mental health report: Transforming mental health for all*. Retrieved from <https://www.who.int/publications/i/item/9789240049338>
- Yang, Q., Van Stee, S. K., & Rains, S. A. (2023). Comprehensive model of information seeking: A meta-analysis. *Journal of Health Communication*, 28(6), 360–374. <https://doi.org/10.1080/10810730.2023.2214097>
- Yigzaw, K. Y., Wynn, R., Marco-Ruiz, L., Budrionis, A., Oyeyemi, S. O., Fagerlund, A. J., & Bellika, J. G. (2020). The association between health information seeking on the internet and physician visits (The Seventh Tromsø Study - Part 4): Population-based questionnaire study. *Journal of Medical Internet Research*, 22(3), Article e13120. <https://doi.org/10.2196/13120>
- Zhao, X., Coxe, S. J., Timmons, A. C., & Frazier, S. L. (2022a). Mental health information seeking online: A Google Trends analysis of ADHD. *Administration and Policy in Mental Health*, 49(3), 357–373. <https://doi.org/10.1007/s10488-021-01168-w>
- Zhao, Y. C., Zhao, M., & Song, S. (2022b). Online health information seeking behaviors among older adults: Systematic scoping review. *Journal of Medical Internet Research*, 24(2), Article e34790. <https://doi.org/10.2196/34790>
- Zimmerman, M. S., & Shaw, G., Jr (2020). Health information seeking behaviour: A concept analysis. *Health Information and Libraries Journal*, 37(3), 173–191. <https://doi.org/10.1111/hir.12287>



ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Αναζήτηση πληροφοριών για υπηρεσίες ψυχικής υγείας στην Ελλάδα από την παγκόσμια οικονομική έως την πανδημική κρίση: Μία ανάλυση δεδομένων των Google Trends

Χριστίνα ΠΑΡΠΟΥΛΑ, Φώτιος ΑΝΑΓΝΩΣΤΟΠΟΥΛΟΣ

Τμήμα Ψυχολογίας, Πάντειον Πανεπιστήμιο Κοινωνικών & Πολιτικών Επιστημών

| ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ | ΠΕΡΙΛΗΨΗ |
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| Ανάλυση σημείων αλλαγής κατάστασης Επιτήρηση Παγκόσμια Οικονομική Κρίση Υπηρεσίες Ψυχικής υγείας COVID-19 Google Trends | Κατά την πανδημία του κορωνοϊού, ο Ελληνικός πληθυσμός βίωσε μία ήδη επιβαρυνόμενη καθημερινότητα λόγω της δεκαετούς οικονομικής κρίσης που προκάλεσε ανασφάλεια, αβεβαιότητα, και απώλεια συμβολικού κεφαλαίου, επιβαρύνοντας σημαντικά την ψυχική του υγεία. Δεδομένου ότι δεν έχουν ακόμη προκύψει άλλες διακριτές αλλαγές σε επίπεδο πληθυσμού στην ψυχική υγεία, δικαιολογείται η συνεχής παρακολούθηση. Ο προσδιορισμός των αναδυόμενων αναγκών για υπηρεσίες ψυχικής υγείας ήταν ο κύριος στόχος της παρούσας μελέτης. Για το σκοπό αυτό, υιοθετήθηκε μία μέθοδος ανίχνευσης πολλαπλών σημείων αλλαγής κατάστασης σε χρονοσειρές δεδομένων προερχόμενων από την πλατφόρμα Google Trends, με στόχο την αξιολόγηση του δημόσιου ενδιαφέροντος για τους θεραπευτές ψυχικής υγείας και τις ανάλογες θεραπευτικές πρακτικές στην Ελλάδα, για τις περιόδους πριν και μετά την οικονομική και πανδημική κρίση (2004-2023). Τα αποτελέσματα έδειξαν ότι τα τελευταία περίπου έξι χρόνια, οι Έλληνες πολίτες αναζητούν συχνότερα όρους όπως «ψυχολόγος», «ψυχίατρος», «ψυχοθεραπευτής» και «νευρολόγος» και θεραπευτικές πρακτικές όπως «ψυχοθεραπεία», «διαλογισμός» και «αντικαταθλιπτικά». Μετά το 2011 (και σε ορισμένες περιπτώσεις για τουλάχιστον τα επόμενα 5-7 χρόνια), παρατηρήθηκε πτώση στις αναζητήσεις για τους όρους «σύμβουλος ψυχικής υγείας», «ψυχοθεραπεία», «ψυχανάλυση», «διαλογισμός» και «γραμμές βοήθειας ψυχικής υγείας». Επιπλέον, δεν διαπιστώθηκαν σημαντικές αλλαγές στις αναζητήσεις για όρους όπως «ψυχαναλυτής», «κέντρο ψυχικής υγείας» και «αγχολυτικά» για την περίοδο μελέτης. Τα ανωτέρω ευρήματα, σε συνδυασμό με τη συνεχή επιτήρηση, παρέχουν πληροφορίες σχετικά με το δημόσιο ενδιαφέρον για την αναζήτηση πληροφοριών ψυχικής υγείας και μπορούν να κατευθύνουν τις πρωτοβουλίες δημόσιας ψυχικής υγείας ώστε να προσαρμοστούν καλύτερα στις ανάγκες της κοινότητας, αντιμετωπίζοντας τον ψυχολογικό αντίκτυπο της προηγούμενης κοινωνικοοικονομικής και της τρέχουσας μετα-πανδημικής κρίσης. |
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