
SEARCHING GOD IN AMIDST OF PANDEMIC INTERESTS IN RELIGION AND SPIRITUALITY DURING COVID-19 PANDEMIC

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Abstract

The public interest in religion/spirituality (R/S) during the COVID-19 pandemic was assessed to investigate the pandemic's effect on society's beliefs. Selected keywords in R/S, COVID-19 and non-communicable diseases were queried from Google trend in a five-year interval. Further statistical analysis was done to gain insight from the data. Cumulative normalized search volumes were compared with each other for each year. There is a clear relationship between the search for COVID-19 and R/S keywords during 2020. This relation can be seen as a coping mechanism through terror management, a piece of evidence against the common view of the problem of evil and an agreement to previous religious economy studies. This relation can provide researchers with a unique opportunity to test various hypotheses in psychology and behaviour. It can also attract policymakers' attention to rethink their mental health policy planning and service development during and after the pandemic.

Keywords: Covid-19, mental, health, religion, spirituality

1. Introduction

Many studies have tried to answer why people are still religious? Does Religion/Spirituality (R/S) offer anything to modern societies? What triggers R/S thoughts in peoples? The answer is debated extensively throughout literature. Whether it is investigating the relationship between R/S and mental [1, 2] and physical health [3] or trying to find mechanisms like; terror management [4, 5], religious coping [6, 7] and perceptual control theory [8] to gain a better

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understanding about the matter, this debate always generated curious results from various perspectives.

The relationship between disasters and R/S is wildly investigated in cyclones, earthquakes, outbreaks and other catastrophes that cause social or personal hardship. It has been shown that R/S can have positive or negative effects on how societies care for their sick [9] and how diseases can spread [10]. For example, while an earthquake might increase the R/S beliefs in affected areas [11], a flood might not affect people's R/S [12] beliefs. Two recent studies hint toward spirituality as a factor for posttraumatic growth, in the context of climate change and other natural disasters [13, 14], two previous studies also mention R/S as a vital source of resilience in adversity, especially for older adults [15, 16]. A study even suggests that R/S can serve as a potential source of meaning in the wake of disasters [17].

On March 12th, 2020, the WHO director-general declared COVID-19 as a pandemic [*WHO Director-General's opening remarks at the media briefing on COVID-19* on 11 March 2020, <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>, accessed on 22.08.2020]. Since then, more than 20 million people are affected by the disease, and more than 750 thousand are reported dead [Worldometer, Coronavirus Cases, <https://www.worldometers.info/coronavirus/>?, accessed on 22.08.2020]. Many private and public businesses have been hit [18]. Most religious and non-religious ceremonies have been cancelled or delayed [19, 20], it put a halt to many pieces of research [18], and it caused countries to enter into a state of anxiety and depression [Mental Health - Household Pulse Survey - COVID-19, <https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm>, accessed on 26.09.2020]. In this study, the authors used empirical evidence, provided through Google Trends, to explore R/S's public interest during the COVID-19 pandemic.

2. Method

Six English speaking countries (United States, United Kingdom, Australia, Ireland, New Zealand and Canada) were selected for further analysis. These countries were selected due to cultural similarity, the familiarity of authors with the English language and a previous study validating this approach for these countries [21]. Moreover, we took a holistic look at R/S global trends to understand our findings at the global level better.

Nine keywords related to three subsets (religious, NCD, COVID-19) were selected. The religious (God, prayer, Jesus) and NCD (cancer, diabetes, hypertension) indicators were validated in previous studies [21], and the COVID-19 measure (cough, fever, sore throat), which were selected according to CDC reported symptoms [Symptoms of Coronavirus, CDC, <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>, accessed on 16.08.2020], proved to be internally consistent too ($\alpha \approx 0.95$). Prayer (as a less religion-specific a proxy to R/S interest), cancer (which has the highest search

frequency among NCD), and cough (as one of the most common symptoms of the disease) topic relative search volumes were collected at a global scale in an attempt to gain a better insight into R/S reaction to the disease.

Relative search volume data were collected separately for each keyword from Google Trends in a five-year interval (last weeks of November to the first weeks of July from 2015 to 2020), aggregated by week. Weekly data were then summed across the subsets to put more emphasis on weekly variation. To account for the inconsistency in religious searches (e.g. new music release with the keywords in the title), each religious keyword was collected within Google trends' 'religion and beliefs' category. Similarly, the selected topics were collected separately in a five-year interval, in all categories worldwide. The search frequency for NCD and COVID-19 was compared to religion search after two weeks. Date selection was conducted manually to ensure consistency in time-selection throughout the process.

To check for yearly variation in religious, NCD, and COVID-19 keywords, a one way ANOVA with a two-tailed t-test was performed. Pearson's correlation with two-tailed significance was the statistic choice for exploring the relationship between subsets each year. Pearson's correlation with one-tailed significance was done at the global level since an increase in one direction was infrared from the English speaking countries' results.

The data gathering and analysis were conducted in Python 3.8.3 [*The Python Language Reference*, Python 3.8.5 documentation, <https://docs.python.org/3/reference/>, accessed on 16.08.2020] environment using PyTrends [*GitHub - GeneralMills/pytrends: Pseudo API for Google Trends*, <https://github.com/GeneralMills/pytrends>, accessed on 16.08.2020], Pandas [22], NumPy [23], SciPy [24], Matplotlib [25], Seaborn [*Qalieh MWOBDOPHSLDCGTAYHJB CJWJ de RCP SHJVS VGK*, mwaskom/seaborn: v0.8.1, Zenodo, September 2017, <https://zenodo.org/record/883859#.XwOHPyhKg2w>, accessed on 16.08.2020], and StatsModels [26]. Codes and data used in this study are available on a GitHub repository to comply with data and code sharing practices for data reproducibility [<https://github.com/aminkvh/COVID-RS-PyTrends>, accessed on 10.10.2020].

An independent reviewer was assigned to read this paper thoughtfully to ensure the method's accuracy and that the inferred result is not biased.

3. Results

For each country, the search volume for COVID-19 and R/S keywords and their connection in the past five years were investigated. Moreover, NCD search volume in the same period was explored to check the hypothesis that the public interest would drift away from previous topics in the face of a new and more imminent danger.

3.1. Australia

As seen in Figure 1 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to the other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other year except 2019 ($p = 0.22$), although we see a higher average in general. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.449$, sig = 0.019) that cannot be seen in other years. NCD search during COVID-19 remained popular in Australia despite a slight decrease after the 10th week.

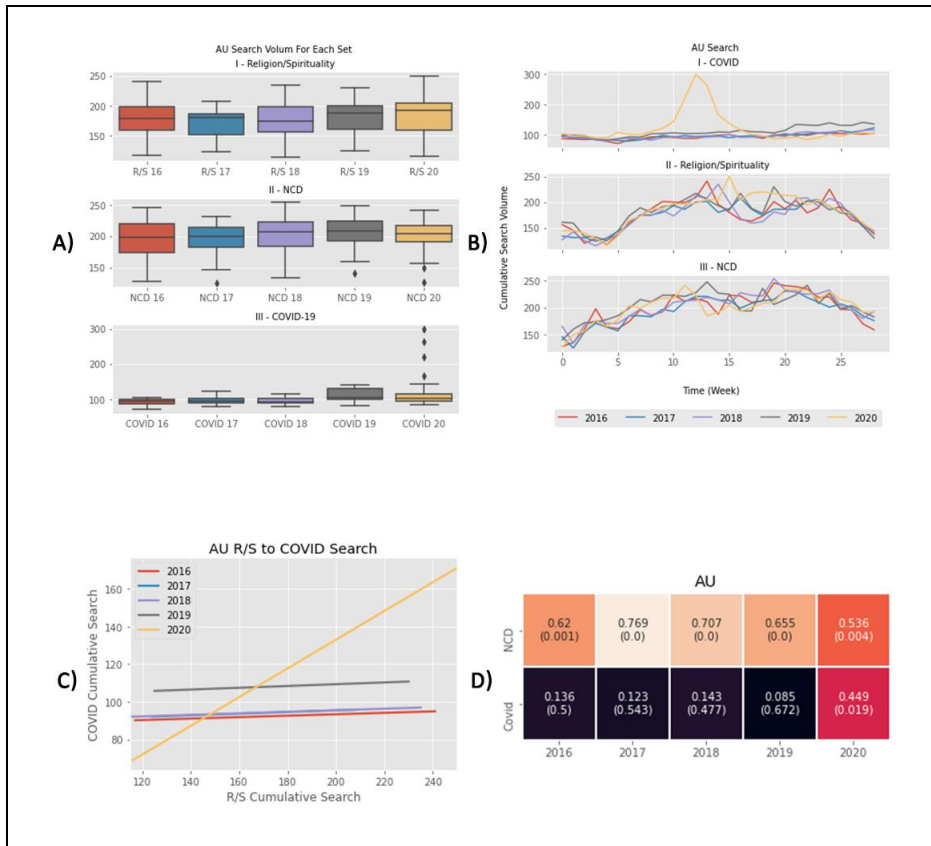


Figure1. Australia: A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.2. Canada

As seen in Figure 2 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to the other years. The all-time highest R/S

search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other year, and we can see a prolonged increase in R/S search volume from 12th to 20th week. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.494$, sig = 0.009). This connection can also be seen in 2016. NCD search during COVID-19 was decreased compared to previous years, but this decrease was not statistically significant.

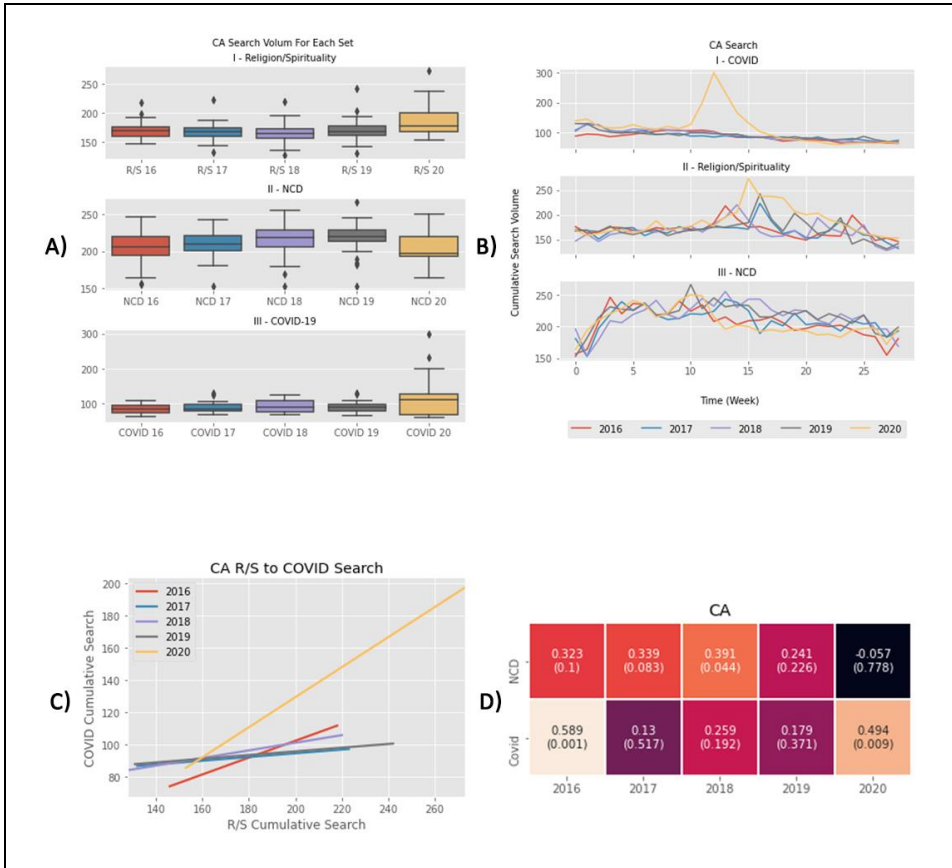


Figure 2. Canada: A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.3. United Kingdom

As seen in Figure 3 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to the other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other year, like Canada, we can see a prolonged increase in R/S search volume from 12th to 25th week. R/S and COVID-19 search

exhibit a strong correlation in 2020 ($\rho = 0.721$, sig = 0.000022), which cannot be seen in any other years. NCD search during COVID-19 was moderately decreased after a breakout search for NCD (this might happened due to a bake-off contest for cancer awareness and an increasing public interest in NCD as a COVID-19 risk factor). However, neither the increase nor the decrease was not statistically significant.

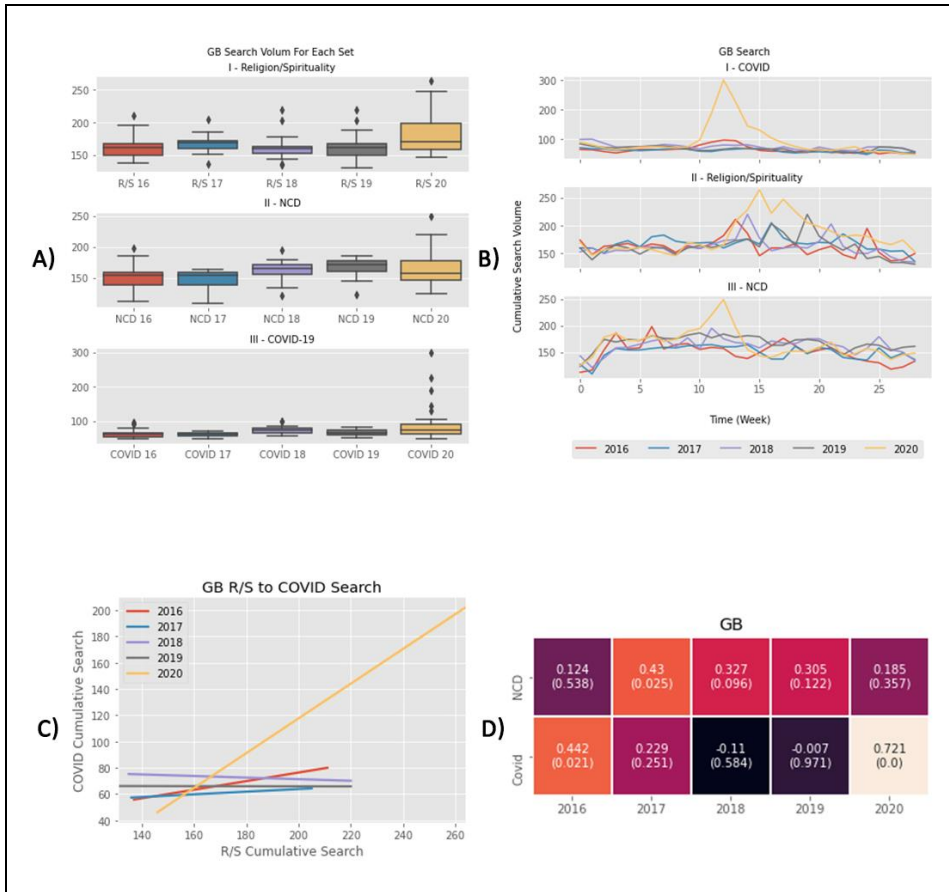


Figure 3. United Kingdom (Great Britain): A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.4. Ireland

As seen in Figure 4 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to the other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly

($p < 0.05$) different from any other year; similarly, we can see a prolonged increase in R/S search volume from 12th to 22nd week. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.491$, sig = 0.009) that cannot be seen in any other years. While NCD search during the pandemic experienced a slight decrease, this event was not statistically significant.

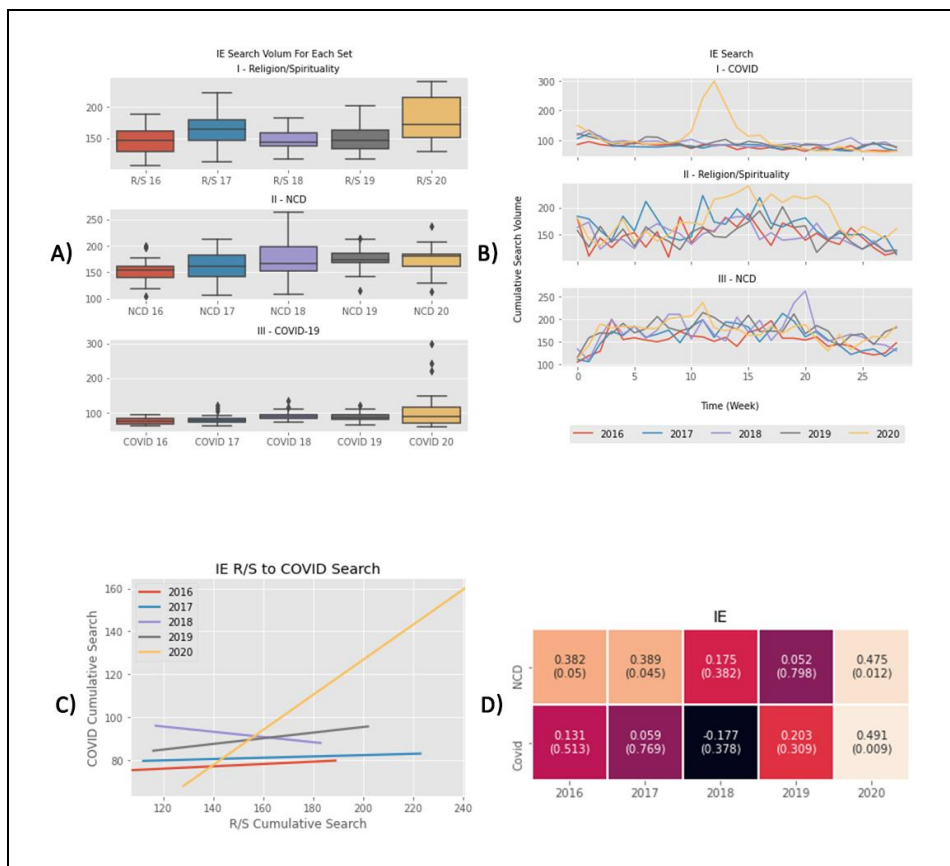


Figure 4. Ireland: A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.5. New Zealand

As seen in Figure 5 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to the other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other year except 2019 (which a terror attack at a mosque and New Zealand’s prime minister subsequent actions created a breakout in the search for the word prayer). Here we can also see a prolonged increase in

R/S search volume from 12th to 20th week. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.669$, sig = 0.000137) that cannot be seen in any other years. While NCD search during the pandemic experienced a slight increase and decrease, this event was not statistically significant.

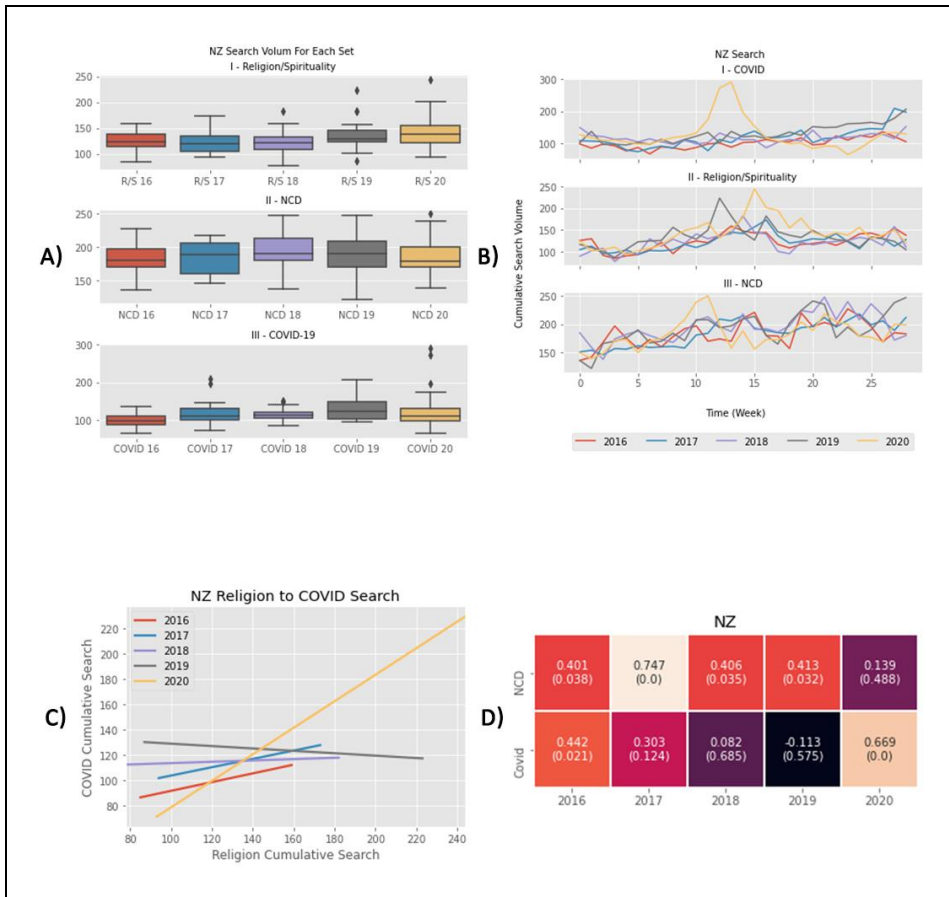


Figure 5. New Zealand: A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.6. United States

As seen in Figure 6 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other; here, we can see a prolonged increase in R/S search volume from 12th to 18th week. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.758$, sig = 0.000007) that cannot be seen in any

other years. While NCD search during the pandemic experienced a slight decrease, this event was not statistically significant.

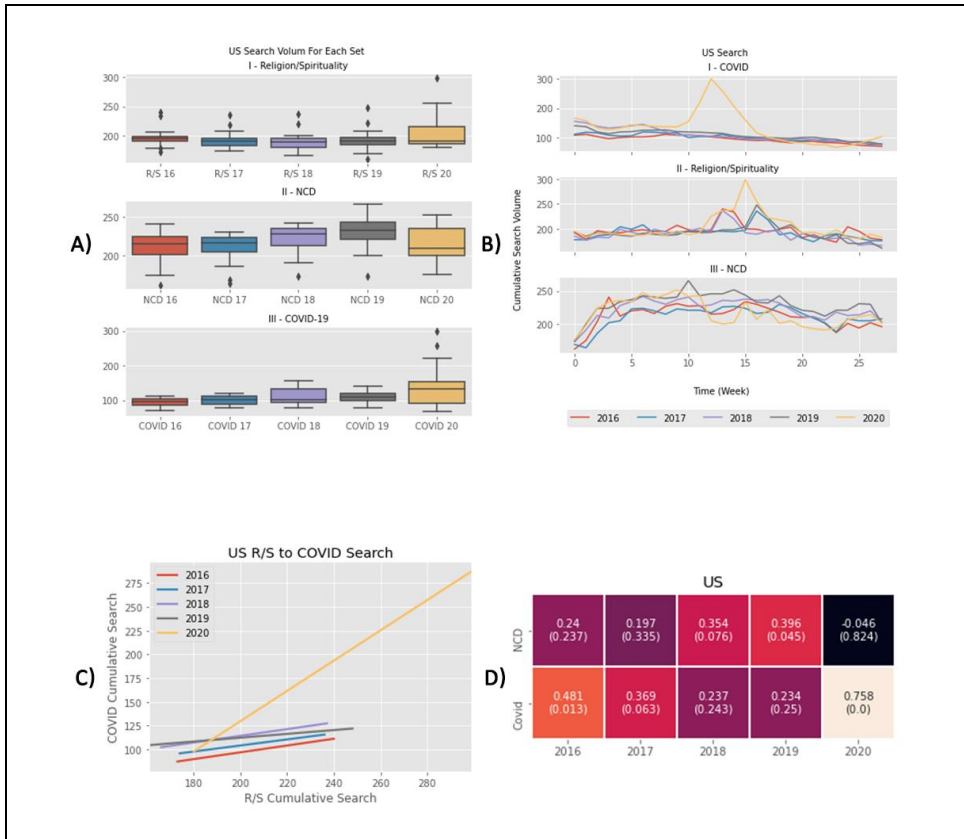


Figure 6. United State America: A) dispersion of R/S, NCD, and COVID-19 keywords search in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlation between R/S search volume and COVID-19 keywords in each of the past five years; D) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

3.7. Global trend

As seen in Figure 7 COVID-19 keywords search was significantly ($p < 0.05$) higher in 2020 compared to other years. The all-time highest R/S search frequency during this period happened in 2020, and it is significantly ($p < 0.05$) different from any other year; there is also a prolonged increase in R/S search volume from 8th to 25th week. R/S and COVID-19 search exhibit a strong correlation in 2020 ($\rho = 0.487$, sig = 0.016) that cannot be seen in any other years. NCD search during the pandemic experienced a significant ($p < 0.05$) decrease.

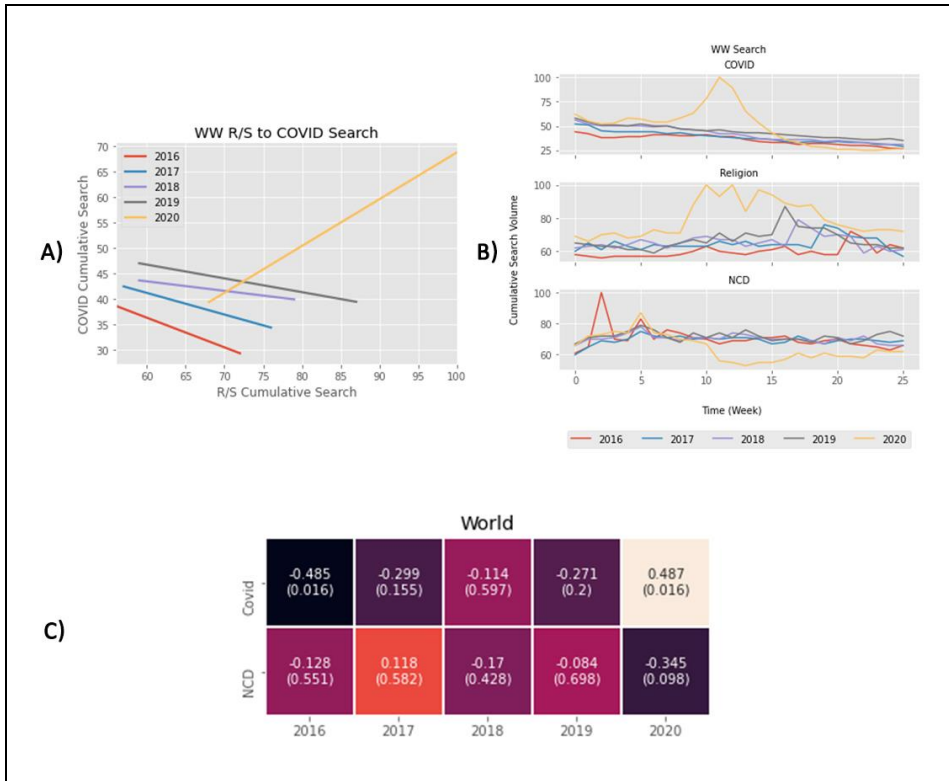


Figure 7. Global trend: A) correlation between R/S search volume and COVID-19 keywords in each of the past five years; B) search volume for R/S, NCD, and COVID-19 keywords in the past five years, in weekly intervals; C) correlations of COVID-19 and NCD with R/S keywords in the past five years and its significance.

4. Discussion

As the data show, search for COVID-19 symptoms spiked in 2020; in addition, an increase in R/S search frequency is present in the selected countries and the world. There seems to be a connection between COVID-19 search volume and R/S search. In general, NCD search experienced a decrease in March following the WHO announcement that declared COVID-19 a pandemic.

Another curious outcome is that while the search for Jesus and God were increased, this growth in prayer was far beyond any other R/S keywords. The result becomes even more interesting when no rise in religion search ‘topics’ can be seen during the pandemic; in fact, when looked back at sixteen years’ trend of search in religion topic, a gradual decline can be seen. These hint more towards an increased public interest in spirituality or reinforcement of previous beliefs rather than a drastic changed of public opinion about religion. That being said, it seems that it does not matter which religion we are talking about; a meaningful increase in religious keyword searches in English speaking countries (with Christian majority) has been recorded similar to the world results. Although, based on the related queries in this topic and interest by region, Abrahamic

religions seem to account for most of this increase. Recent empirical data suggest that this take might be correct [Christian Aid, Savanta ComRes, *Spirituality During Lockdown Public Omnibus Research - May 2020*, 0–91, <https://comresglobal.com/polls/christian-aid-good-neighbours-poll>]; in a survey, most people responded that they did not have significant shifts in their R/S beliefs during the pandemic. Still, People with R/S beliefs were more likely to become more attentive to their faith after the pandemic. In a 2025 population sample, One fourth had prayed for the end of the pandemic or healthcare workers, and 15% stated that after the pandemic, they would spend more time in quiet reflection.

Inferring these results can take many twists; terror management and coping mechanisms [27] from a psychology point of view, the problem of evil in a purely philosophical stand [*The Problem of Evil*, Stanford Encyclopedia of Philosophy, <https://plato.stanford.edu/entries/evil/>, accessed on 8.09.2020], one can even justify these findings with a supply and demand model [28, 29].

From a psychology perspective, the results are in agreement with previous terror management findings. Terror management states that human awareness of death's inevitability exerts a profound influence on diverse aspects of human thought, emotion, motivation and behaviour [27]. Deeply held religious beliefs can reduce worries about death [21, 30], considering that a pandemic can introduce a more imminent life-threatening danger as well as a persistent reminder of the possibility of death, it is safe to think that people might cope with this new fear through terror management. For this, in the age of information, people would start searching for others who held the same belief, face this challenge together, or remind themselves of their values and principles.

Another view in Psychology concerns loneliness. The effect of loneliness on depression and other mental health issues has been studied extensively. The relationship between religious beliefs and loneliness has been studied before. While this relationship exists [31], its casualty is not well defined. Loneliness can act as a motivation toward R/S [32, 33]; however, R/S might also have a buffering effect on loneliness and depression [34, 35]. Since the start of the COVID-19 pandemic, many countries adopted social distancing and temporary mandatory quarantines; with social initiatives like Stay Home hash tag on social media, many people opt not to leave their houses to help healthcare workers, governments and to avoid the disease. These actions proved to increase the feeling of loneliness in vulnerable groups [36], but its effect on the public was not significant. Thus, while the authors suggest a more comprehensive look into the effects of loneliness on mental health and religiosity during the pandemic, the increase in search results seems unlikely to happen due to loneliness.

From the Philosophy's point of view, the synchronous increase in R/S and COVID-19 search can suggest an argument in favour of spirituality and religious beliefs with the problem of the evil paradigm. Historically, the problem of the evil, in which it states that a wholly good, omniscient and omnipotent God would not allow pain, evil and suffering in this world, had been treated as a compelling argument against R/S beliefs [37]. By contrast, this empirical study

hints that intense and definite suffering on societies can push people towards religion instead of acting as antagonists in their beliefs. It is essential to note that this increase in R/S related search can correspond to pro or anti-religious people because of the unavoidable keyword overlapping in this domain, meaning people can take the pandemic as a sign to support or contradict their opinion. Those who become more attentive to R/S during and after pandemic might come to this realization after experiencing a state of helplessness, powerlessness and loss of control over life because of government, academia or research institutes' responses to the pandemic. Moreover, this return to spirituality and feeling the need for spirituality during this pandemic had been captured in Italy's healthcare workers [38].

Looking at the results through the religious economy or marketing rule glasses, a possibility to view the whole package as a supply and demand model emerges. After declaring COVID-19 a pandemic and the placement of various social restrictions, including the limitation on mass gatherings, many in-person religious rites cancelled [*The Hajj Pilgrimage Is Canceled, and Grief Rocks the Muslim World*, The New York Times, <https://www.nytimes.com/2020/06/23/world/middleeast/hajj-pilgrimage-canceled.html>, accessed on 8.09.2020; *Myanmar cancels Thingyan celebrations amid coronavirus fears*, Myanmar News. Al Jazeera, <https://www.aljazeera.com/news/2020/04/myanmar-cancels-thingyan-celebrations-coronavirus-fears-200412091829340.html>, accessed on 8.09.2020; *Coronavirus: Catholic churches preparing to suspend Mass*, BBC News <https://www.bbc.com/news/uk-51887510>, accessed on 8.09.2020]. Some services offered an online alternative, others turned toward other measures such as driver thru ceremonies [39]. For people to find these alternatives in 2020, the easiest way is to relay on the Internet. While online prayer services existed before COVID-19 [40, 41], these platforms experienced a surge in demand post-COVID-19 pandemic [*Keeping the faith: religion in the UK amid coronavirus*, Art and design, The Guardian, <https://www.theguardian.com/artanddesign/2020/jul/03/keeping-the-faith-religion-in-the-uk-amid-coronavirus>, accessed on 22.09.2020; *Coronavirus: Big audiences for online church services amid UK lockdown*, UK News, Sky News, <https://news.sky.com/story/coronavirus-big-audiences-for-online-church-services-amid-uk-lockdown-11971643>, accessed on 22.09.2020; *Survey reveals surge in online religious worship during pandemic*, Belfast News Letter, <https://www.newsletter.co.uk/news/people/survey-reveals-surge-online-religious-worship-during-pandemic-2867121>, accessed on 22.09.2020], and with this increase in demand comes the competing part of the market. Different services would compete with each other over users, and users would test a few different sites before settling for the one that provides him/her with the best personal experience. We can see this surge through the Google trend results and industry leaders rushing into answering these high demands. Subsequently, after a few weeks, we see a new equilibrium in the market, which has a higher value than before, meaning that we have a higher baseline for demand in online religious services in post-COVID-19.

Google trends normalize search data in each time frame with Z score so that the highest search volume would be scaled to 100 and other values are proportional to that; thus, it was not possible to work with absolute search volume. However, while accessing absolute values might help with further hypothesis testing, in general, this does not yield a severe problem.

Each year, the highest amount of search for prayer corresponds to Ramadan's beginning (Muslim's holy month). Similarly, yearly spikes for Jesus can be seen during Christmas and Easter. Accounting for these variations, the authors choose an extended time interval to capture the searches' relationship better. The authors also compared R/S keywords with other groups with a two-week shift because first, the COVID-19 incubation period is between 2-14 days [*Clinical Questions about COVID-19: Questions and Answers*, CDC, <https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html>, accessed on 5.09.2020]. Second, a one-week interval for NCD had been investigated before [21] and yielded meaningful results. Finally, based on a disaster's magnitude, coping mechanisms can take weeks to months to show a significant behaviour change [*Phases of Disaster*, SAMHSA, <https://www.samhsa.gov/dtac/recover-in-g-disasters/phases-disaster>, accessed on 5.09.2020].

5. Conclusion

In this study, the authors investigated the public interest in religion and spirituality during the COVID-10 pandemic. The data showed an uplift in public search when the disease was declared a pandemic. While determining this event's casualty requires a multi-approach investigation, it seems that the pandemic caused an upturn in public attention to the R/S topics. This relation can provide researchers with a unique opportunity to test various hypotheses in Psychology and behaviour. It can also attract policymakers' attention to seize this opportunity to rethink their mental health policy planning and service development during and after the pandemic.

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