

# The Impact of Coronavirus on our Mental Health

## *El Impacto del Coronavirus en nuestra Salud Mental*

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**Abstract:** The Coronavirus represents the greatest threat to physical health in modern times. Simultaneously, fear of the unknown and the fear of the very real repercussions of the virus is threatening to impact the mental health of many around the world. To provide insights on the impact of Coronavirus on our mental health, we are constantly monitoring millions of conversations on Twitter each day, and analysing this enormous amount of data by means of psychological models trained with artificial intelligence techniques and deep neural networks.

**Keywords:** Coronavirus, COVID19, mental health, psychological models, deep learning

**Resumen:** El Coronavirus representa la mayor amenaza para la salud física en tiempos modernos. A su vez, el miedo a lo desconocido y a las repercusiones reales del virus, está amenazando con impactar en la salud mental de las personas alrededor de todo el mundo. Para analizar dicho impacto, estamos monitorizando millones de conversaciones en Twitter en tiempo real, y analizando esta gran cantidad de datos mediante modelos psicológicos entrenados con técnicas de inteligencia artificial y redes neuronales profundas.

**Palabras clave:** Coronavirus, COVID19, salud mental, modelos psicológicos, aprendizaje profundo

## 1 Introduction

Social media allow instant and borderless communication of what happens in people's daily lives, giving immediate access to knowledge that would otherwise be limited or biased at the discretion of a few. This is even more important when it comes to spreading information regarding threats. And we are living the greatest threat to physical health in modern times: the Coronavirus. Add into this the huge lifestyle changes we're all being asked to make and it's easy to see why our emotions and feelings are being affected. Our aim is at analysing the impact of the virus on the mental health of people around the world through our psychological models trained with artificial intelligence.

At Symanto<sup>1</sup>, we have created two live trackers based on English and German<sup>2</sup> tweets with mentions of Coronavirus-related

terms. Furthermore, together with our partner Atribus<sup>3</sup>, we have created another tracker to monitor the mental health of people in Spanish speaking countries<sup>4</sup>.

In this paper, we summarise some of our key findings in the development of mental health discussion in different countries, the triggering factors, the rising of digital psychotherapy and its perception, and much more.

## 2 Social Media Monitoring and Data Collection

We are constantly retrieving discussions about the Coronavirus on Twitter. We search for terms such as Covid-19, Coronavirus or SARS-Cov-2. We exclude spam (e.g., the same tweet changing only a user mention) and retweets. For this paper, we have analysed the data collected between March 10 and April 22. In Table 1, we present the to-

<sup>1</sup><https://www.symanto.net/>

<sup>2</sup><https://www.symanto.net/live-insights/mental-health-coronavirus/>

<sup>3</sup><https://www.atribus.com/>

<sup>4</sup><https://www.atribus.com/covid19-esplatam/>

tal number of tweets and the total number of tweets referring to mental health issues<sup>5</sup>.

Lang.	# Tweets	# Mental health
English	14M	811K
German	1.6M	75K
Spanish	11.2M	1.1M

Table 1: Number of tweets collected between March 10 and April 22

### 3 Mental Health Issues amid Coronavirus Pandemic

Within the conversations around Coronavirus, an essential volume of discussion is around mental health issues, which strongly indicates the negative impact of the pandemic on our mental health. We are closely monitoring both the volume of these conversations and the concrete issues in the discussion. *Anxiety* is by far the most dominant mental health issue, followed by *Stress*, *Depression*, *OCD*, and *Suicide*. Though less significant, there are also mentions of *Eating Disorder*, *Personality Disorder*, and *Self-harm* in relation to Covid-19<sup>6</sup>.

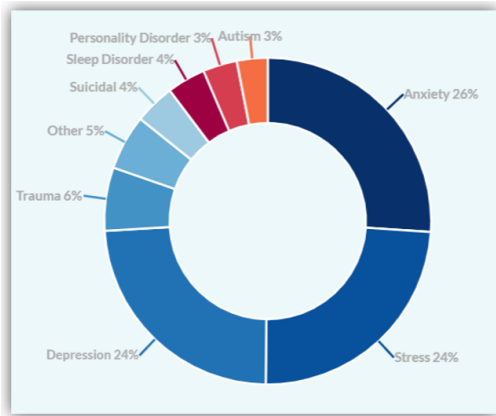


Figure 1: Mental Health Issues (18 Apr)

#### 3.1 Why are People discussing Mental Health Illness on Social Media?

Based on Carl Gustav Jung’s Psychological Types and the Communication model of

<sup>5</sup>Due to space limitations, in the next sections, we use the English set to present the insights.

<sup>6</sup>Look at Figure 1 as an example for day 18 of April

Schulz von Thun, we have developed the personality and communication style identification model which allows to identify the communication purpose.

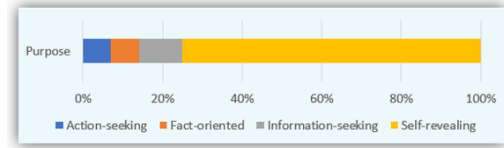


Figure 2: Communication Purpose

According to Figure 2, most of the users share their own experience and struggles (*self-revealing*), followed by users seeking for support and tips (*information-seeking*), participating in general discussions to obtain information and support (*fact-oriented*) and asking for attention, awareness campaigns (*action-seeking*).

#### 3.2 A different perspective to look at Depression

Depression poses greater potential threat to our mental health than it may appear. Of the general conversation around Covid-19, less than 1% mentions explicitly “*depression*” and related terms. However, by applying our models trained on conversations from people diagnosed with depression, we find that up to 10% of the conversations show linguistic signs of depression<sup>7</sup>.

#### 3.3 How is Covid-19 affecting young people’s mental state?

Over 35% of tweets about mental health struggles in Covid-19 discussion are from younger adults (18-24 yrs). Alarmingly, *Suicide* is mentioned more frequently (over 50%) by younger people than the entire older age group. Young people are talking about *Anxiety* as frequently as the older generations. *Stress* and *Depression* on the other hand, are significantly more prevailing among older age groups.

#### 3.4 How is Covid-19 affecting different genders?

Around 60% of tweets about mental health struggles in Covid-19 discussion come from women. *Anxiety*, *Stress* and *Sleeping disorder* are much more prevailing among women

<sup>7</sup>To notice that the prediction reflects the tendency and is by no means diagnostic.

than men. *Self-harm* and *Personality disorder* are more frequently mentioned by men than women.

### 3.5 What factors are triggering mental health issues during the pandemic?

*Isolation* is the biggest trigger across different mental health issues. *Financial issues*, *Job insecurity* are triggering *Suicidal* thoughts more drastically than other triggers. *Burnout*, though triggered by all various factors, is linked most to discussion around workload.

### 3.6 The Supporting of Mental Health

Appointment cancellation due to Covid-19 has lead to mounting health issue challenge. Using digital psychotherapy as alternative is so far creating a mixed sentiment, especially around anxiety.

For example, a user says *"My therapist wants to do the telehealth thing , but it actually gives me more anxiety to talk over video chat"* while another says *"I am SO thankful telemedicine is a thing . Being able to continue my weekly sessions with my therapist during the stay at home order has helped me keep my anxiety mostly under control over the past few weeks"*.

Though India and South Africa have higher volume of general mental health discussion, yet they are lagging behind in the conversation around digital psychotherapy. In other developing countries such as Philippines, Nigeria and Malaysia, there has not been much discussion around teletherapy.

## 4 Society Resilience

We are also monitoring the major topics of discussion to gain more insights on what is drawing our attention or keeping us occupied, in order to identify the main factors that are impacting mental health.

### 4.1 Coping in this Challenging Time

People of different cultures are engaged in various activities, some contributing to better mental health, and some less. *Playing* and *Watching TV* are equally frequently mentioned across different countries. In US and Canada, *Socialising* makes up to the most important activities in their daily life.

*Exercising* has gained more conversations in countries such as UK and Germany. *Working* is more frequently mentioned by Germans than in any other country.

### 4.2 How is the Mood in the Discussion around Coronavirus?

We detect the emotions expressed in the tweets and calculate the Mood Index following Equation 1: the ratio of the number of tweets conveying positive emotions and the number of tweets conveying any emotion.

$$MoodIndex = 100 \cdot \frac{\#positive}{\#positive + \#negative} \quad (1)$$

We use the Mood Index to gauge the positivity and negativity of people. The more positive the mood, the higher the index and vice versa when the mood is more pessimistic. In Figure 3, we show an example of the Mood Index evolution in the range of a week.



Figure 3: Mood Index (12 Apr-18 Apr)

As shown in Figure 4, African countries are showing a higher Mood Index than European and Asian countries.

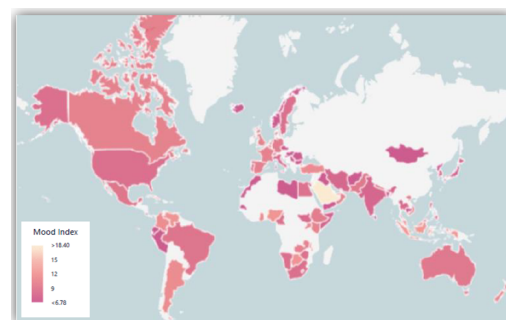


Figure 4: Mood Index around the World

Figure 5 shows the Mood Index in some countries. You can see that the negativity prevails all around the world; in these examples, the index ranges from less than 10 to around 20.

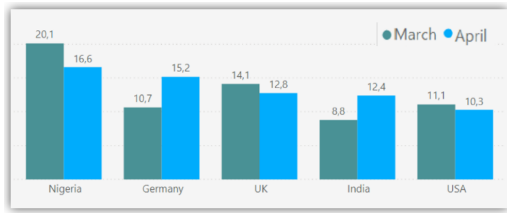


Figure 5: Mood Index in some Countries in the different Continents

### 4.3 Individualistic vs. Collectivistic attitudes

Collectivists attitude can be crucial in pandemic especially as conformity and self-sacrifice are key to the success of regulation and virus containment. It can also greatly impact our mental well-being state, especially when isolation and loneliness are one of the greatest challenges to our mental health.

Our preliminary results, although inconclusive, point out that individualistic cultures are more emotional, while collectivists are more information-oriented as they want to take advantage of rational information for the sake of "we".

## 5 Insights

The vast social media conversations have opened up a unique opportunity to understand and monitor the impact of Covid-19 on our mental health on a global scale. Our live Mental Health Trackers have raised the awareness around this topic and offered a first data-driven glimpse into the world of mood, emotions and struggles in this crisis time. Here, we summarise some of the key findings of this study:

- Nearly 6% of mental health issue discussion are related to Covid-19.
- Suicide is mentioned more frequently by younger people between 18-24 yrs than the entire older population.
- Digital Psychotherapy still out of reach for most in developing countries.
- Less prevailing issues such as Eating Disorder, Personality Disorder, and Self-harm can also be related to Covid-19.
- African countries are showing a higher Mood Index than European and Asian country.

- Depression poses great potential threat to our mental health and often understated.

## 6 Beyond Insights

The mental health of individuals and collectives is affected by physical threats such as the Coronavirus, as well as earthquakes or terrorist attacks. As an example, we can see in Figure 6 how the Mood Index correlated negatively ( $r=-0.831$ ) to the rate of change in new Coronavirus cases in Spain for nine days.

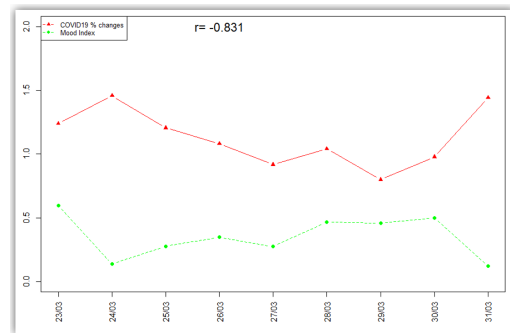


Figure 6: Pearson Correlation between the rate of change in new Coronavirus cases in Spain and the Mood Index in a 9 days time span

Furthermore, mental health can also affect our daily life. Fear of the unknown, such as losing your job, affects the economy. If politicians capitalise fear, instead of working for the social good; if they seize the population's affiliation feeling by spreading fake news and misinformation, fostering hate; if they use technology to monitor and censor our opinions; they will only further polarise society. And this might raise civil conflicts, or even worse.

We plan to navigate through the pandemic and post-pandemic era, and we will also decode the mood development through the lens of psychology aiming to provide an indicator of the social dynamics as a whole. A holistic approach should give us the proper instruments to fight against these threats and to work together for the social good.

## Acknowledgements

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