Pandemic metaphors: bibliometric study of the COVID-19 (co)llateral effects

Metáforas da pandemia: estudo bibliométrico dos efeitos (co)laterais do COVID-19

Metáforas pandémicas: estudio bibliométrico de los efectos (co)laterales del COVID-19

Priscilla Chantal Duarte Silva

ORCID: https://orcid.org/0000-0001-5148-2423

Universidade Federal de Itajubá, Brasil

E-mail: priscillachantal@unifei.edu.br

Abstract

The objective of this study is to analyze the (co)llateral effects of the pandemic in a general aspect, showing positive and negative effects. However, highlighting marked changes to the environment, given the time when the emission of carbon dioxide into the atmosphere received a mandatory reduction as a result of social confinement. The methodological basis used is a systematic literature review, consulted in impact databases by the scientific community. We chose to search the Web of science, Science Direct and PubMed databases. The search keys were: pandemic, COVID-19, new coronavirus, effects of COVID-19. In addition, to analyze the presence of conceptual metaphors, opinion articles published in the world media, and published on the web during a pandemic were selected. The choice of texts is based on the theme of the new coronavirus and its impacts. The theoretical bias of Lakoff (1987; 2006) is adopted to explain metaphor on the cognitive plane, as a natural process of the human mind, that is, a way of thinking. This research is characterized in qualitative, bibliographic and analysis of content. The results show that the conceptual metaphors reveal an image of COVID-19 as the "savior" of the environment, for having forced man to stop as a need for carbon. It was concluded that the conceptual metaphors, being of a cognitive nature, appear in the form discourse, showing COVID-19 as agents of positive effects on the environment and business for the other areas of society.

Keywords: COVID-19; Pandemic, Conceptual metaphors; Social and environmental effects of COVID-19.

Resumo

O objetivo deste estudo é analisar os efeitos (co)laterais da pandemia num aspecto geral, exibindo efeitos positivos e negativos. Porém, destacando mudanças positivas ao meio ambiente diante do tempo em que a emissão de gás carbônico na atmosfera obteve uma redução significativa em decorrência do confinamento social. A base metodológica utilizada é a revisão sistemática da literatura, consultada em bases de dados de impacto pela comunidade científica. Optou-se pela busca nas bases da Web of science, Science Direct e PubMed. As chaves de busca foram: pandemia, COVID-19, novo coronavírus, efeitos do COVID-19. Além disso, para analisar a presença de metáforas conceptuais, selecionaram-se artigos de opinião publicados na mídia mundial e publicadas na web durante a pandemia. A escolha dos textos se dá pela temática do novo coronavírus e seus impactos. O viés teórico de Lakoff (1987; 2006) é adotado para explicar a metáfora no plano cognitivo, como um processo natural da mente humana, ou seja, uma forma de pensamento. Esta pesquisa tipifica-se em qualitativa, bibliográfica e de análise de conteúdo. Os resultados apontam que as metáforas conceituais revelam uma imagem do COVID-19 como "salvador" do ambiente por ter obrigado ao homem parar as emissões de carbono. Conclui-se que as metáforas conceituais, por serem, de ordem cognitiva, apresentam-se no discurso de forma, mostrar o COVID-19 como agente de efeitos positivos ao meio ambiente e negativos para os demais âmbitos da sociedade.

Palavras-chave: COVID-19; Pandemia; Metáforas conceptuais; Efeitos socioambientais do COVID-19.

Resumen

El objetivo de este estudio es analizar los (co) efectos secundarios de la pandemia en um aspecto general, mostrando efectos positivos y negativos. Sin embargo, se destacan câmbios positivos en el medio ambiente dado el momento en que la emisión de dióxido de carbono a la atmósfera obtuvo una reducción significativa como consecuencia del encierro social. La base metodológica utilizada es la revisión sistemática de la literatura, consultada en bases de datos de impacto por la comunidad científica. Elegimos buscar en las bases de datos Web of science, Science Direct y PubMed. Las claves de búsqueda fueron: pandemia, COVID-19, nuevo coronavirus, efectos de COVID-19. Además, para analizar la presencia de metáforas conceptuales, se seleccionaron artículos de opinión publicados en los medios mundiales y publicados en la web durante la pandemia. La elección de textos se basa en el tema del nuevo coronavirus y sus impactos. Se adopta el sesgo teórico de Lakoff (1987; 2006) para explicar la

metáfora en el plano cognitivo, como un proceso natural de la mente humana, es decir, uma forma de pensar. Esta investigación se caracteriza por el análisis cualitativo, bibliográfico y de contenido. Los resultados muestran que las metáforas conceptuales revelan una imagen del COVID-19 como el "salvador" del medio ambiente por haber obligado al hombre a detener las emisiones de carbono. Concluimos que las metáforas conceptuales, por ser cognitivas, se presentan en forma de discurso, mostrando al COVID-19 como un agente con efectos positivos en el medio ambiente y efectos negativos en otros ámbitos de la sociedade.

Palabras clave: COVID-19; Pandemia; Metáforas conceptuales; Efectos sociales y ambientales del COVID-19

1. Introduction

The virus that stopped the world in 2020 is called the New Coronavirus or COVID-19. It is an RNA virus of the order Nidovirales of the family Coronaviridae. The SARS-CoV, MERS-CoV, and 2019-nCoV viruses are from the subfamily Betacoronavirus that infect Only mammals (Ministry Of Health, 2020). COVID-19 is known to be part of the family of coronaviruses, common in animals. The name Coronavirus was assigned because of the viral surface that shapes the appearance of a crown under electron microscopy. They are positive

RNA, with a diameter between 60nm and 140nm (Richman, Whitley; Hayden, 2016). "The clinical spectrum of coronavirus infection is very broad, ranging from a simple cold to severe pneumonia" (Ministry Of Health, 2020). Symptoms by the infectious pathogen - such a sneezing, coughing, bleeding - spread to the next replicating host, or "R0" of a pathogen. Imperial College London estimated the R0 of the new coronavirus from 1.5 to 3.5 (Walsh, 2020).

Studies indicate that Coronaviruses can rarely infect people and subsequently reproduce in humans, as happened with MERS-CoV and SARS-CoV. However, the origin of the New Coronavirus is still a mystery. Walsh (2020) highlights that Covid-19 marks the return of an old - and familiar - "enemy" virus. Similar metaphors began to circulate in the international media involving COVID-19. Therefore, we aimed to understand how these metaphors, both from the semantic field of enmity and of friendship, were being produced, and what are their correlation with human cognition.

For Walsh (2020), throughout history, nothing has killed more human beings than the viruses, bacteria, and parasites that cause disease, which demonstrates human fragility in the face of biological issues. In principle, epidemics have turned into massacres on a scale that we

cannot imagine today - even at the time of the coronavirus. When a virus - like the new coronavirus - infects a host, it becomes a cell "factory" which creates more viruses (Walsh, 2020), revealing metaphors well known in the scientific world: Cell Is Factory. Virus Is A Living Being. Viruses Are Invaders. Viruses Are Enemies. In this sense, one can observe the presence of the metaphor.

The use of metaphors to explain Science is not new. For Brown (2008), this linguistic resource is used to understand the world. Many concepts have been determined by scientists using metaphors to explain abstract concepts. Terms such as time, quantity, and energy are understood through embodied experiences. "Energy Is A Surface", "Time Is A Linear Dimension", or even, "The Cell Is A Factory", as highlighted by Brown (2008, p.160), and "the mitochondria are The Cell Oven or Plant" due to the fact that they produce energy for cells, and behave similar to an oven in terms of energy-generating transformations and, as argued by Gentner & Maravilla (2018), they are examples of how metaphors became familiar with the field of Sciences. In the study in question, metaphors are associated with the virus.

The treatment protocol for COVID-19 of the Ministry of Health of Brazil (2020) states that, at the beginning of virus propagation, some people with outbreaks of respiratory diseases caused by 2019-nCov in China, were assumed to have some connection to the fruit market sea, as highlighted by Duarte (2020) and to live animals, as it was thought that the transmition first happened from animals to people. On the other hand, there is also an indication that the spread has occurred from person to person, by those who have not had exposure to animals.

According to UN Environment Program (2020), COVID-19 can be a response of the environment in relation to its degradation by the action of man. Once suffering the loss and deterioration of habitat due to deforestation or other actions that damage the environment, man is having more direct contact with wild animals, which may have caused the spread of a series of viruses to humanity.

> COVID-19 is a reminder that human health is linked to the health of the planet. Coronaviruses are zoonotic diseases, which means that they are transmitted between animals and humans. These diseases represent about 75% of all emerging infectious diseases. To prevent future outbreaks, we must address threats to ecosystems and wildlife, including habitat loss, illegal trade, pollution and climate change (UM Environment Programme, 2020).

The representations of COVI-19 in the media, at a global level, reflect the urgent need to build discursive scenarios around a disease classified as a pandemic, and, as such, highly

dangerous to human health, easily transmitted socially, and whose contagion mechanisms are still poorly understood. It is not surprising that the referred discursive scenarios constitute selective representation processes, as postulated by Fernandez (2012, p. 72): "the construction of the discourse takes place through a selective process capable of projecting a representation of the world [...] the speeches and social uses of the language reflect the representation of the speaker's world, group or community".

Thus, the speeches portray representations of how the world is understood. In thiscon text, analyzing the discourses on COVID-19 may help us understand how the virus is interpreted, as well as the actions taken because of it while facing the pandemic. Thus, the objective of this study is to verify, in the scientific discourses on COVID-19, what are the (co) side effects of the pandemic in a more general scope, as well as those of a more positive character, that is, which portray the positive side of the pandemic, especially concerning the description of the environment through metaphors. So, the problematic of this study is: how the covid-19 is found in the media?

2. Global Effects of COVID-19

COVID-19, the first pandemic in human history caused by coronavirus, brought with it several side effects in addition to the disease that spread throughout the world The term "Collateral" Co + lateral; from Latin collateralis, from Latin Com, alongside and Lateralis (Dicimedico, 2020), to the side has a connotation, according to Priberam (2020), referring to parallel, which happens indirectly. However, in medical vocabulary, this term usually refers to something bad, unpleasant or harmful (Dicio, 2020). In this study, the objective is to discuss both the harmful effects of the pandemic and those of a lateral order, positive for the environment. After all, many effects happened due to the quarantine period during the pandemic.

"The COVID-19 pandemic has enormous impacts on most aspects of human activities, as well as on the economy and health systems" (Zowalaty, Young & Järhult, 2020). With the quarantine, a period of seclusion of individuals to contain the spread of a disease according to the incubation period, humanity has seen negative effects of living with the pandemic. Quarantine is a known risk factor for psychological and psychiatric disorders (Parodi et al. 2020). In the quarantine of COVID-19, the authors highlight cases of depression and anxiety due to isolation. However, there are also other pandemic impact factors.

Despite the negative impacts such as psychological stress, fear, severe global economic losses, health system overload, and general societal disruption (Zowalaty, Young & Järhult, 2020), lifestyle changes in response to outbreak resistance, according to the authors can also bring positive changes to the environment, health to humans, animals and the ecosystem.

The guidelines adopted by governments regarding social distance led companies to reformulate their means and work routine, adoption to the home office, travel restrictions, which resulted in less oil use, consequently reducing emissions of gases generated by oil. If COVID-19 is a causal factor for an improvement in the global pollution situation, on the other hand, pollution may be the consequence or contributing factor for the advancement of COVID-19. According to Zhu et al. (2020), the scientific literature suggests that air pollutants are risk factors for respiratory infection, capable of transporting microorganisms to make pathogens more invasive, compromising immunity, which means that the less pollution, the better for health.

Paital (2020) defends the idea that although COVID-19 has brought serious side effects to humanity, as the economy has been drastically affected by human losses and the closure of businesses, nothing compares to the environmental gain during the COVID-pandemic period. 19. For Lal et al. (2020), the pandemic just caused great suffering and economic losses, interruptions in global supply chains, business, commodities, tourism, increased anxiety in general, etc.

However, nature is rejuvenating under social distance and lockdown policies (Specktor, 2020). "Mother Nature was waiting for a transformation process to revive her individual ecosystems. It seems that the social blockade in the fight against COVID-19 gave it a long-awaited break for self-regeneration" (Paital, 2020, p.3). In this sense, the effect was (co) lateral, that is, a positive result for the environment. The metaphor "Mother nature" can be seen, in the perspective of the Conceptual Metaphor Theory, as a mental way to understand that Nature Is A Mother, in the sense that mankind depends on her to survive, just as a son depends on his mother.

With the confinement and activities interrupted, "[...] important environmental indices, such as NO_2 reduction, CO_2 emissions, water pollution and increased air quality in many polluted cities were observed" (Paital et al., 2020). The COVID-19 pandemic has a severe negative impact on humans, as well as on health and the world economy. However, it results in a significant reduction in pollution, due to the limitations of social and economic activities (Dutheil et al., 2020; Sulaman & Salman, 2020).

Sulaman and Salman (2020) point out that NO2 (nitrogen dioxide) is a highly reactive pollutant emitted by the combustion of fossil fuels. According to He et al., 2020a, 2020b apud Sulaman and Salman, 2020), traffic pollution is considered the main source of NO2 emissions, which are highly lethal for human health. Sulaman and Salman (2020) highlight, through NASA satellite images, how the NO2 emission reduced significantly after lockdown. According to the authors, it is a "Blessing in disguise", "camouflaged blessing" or "disguised blessing" in the sense that everyone believes it is a tragedy, but it also brings something good. At the same time, although the positive effects are seen as a "blessing", it hides behind its real destructive function.

This English idiom also brings with it the metaphor that COVID-19 is Camouflage. "COVID-19 is a global pandemic and a serious threat to human health that paralyzes economic activities, but it is also considered a "Blessing in Disguise", and pollution is reducing and nature is complaining to itself" (Sulaman and Salman, 2020, p.5). However, the authors emphasize that the change, while positive, is temporary and that it will serve for governments and people, in general, to learn how to reduce pollution in the world.

In addition to the effects on pollutant emissions, the research by Monserrate et al. (2020) also highlights the ass ociation between contingency measures and improved air quality, clean beaches, and reduced environmental noise. On the other hand, there is also a reduction in recycling and an increase in waste, due to greater indoor consumption. This, according to the authors, can put the contamination of physical spaces at an increased risk. Also, some countries have stopped recycling programs in some cities for fear of spreading the virus in these centers. Waste management was also restricted. Disposables have been revoked because plastic can harbor viruses and bacteria.

The effects of COVID-19 also have their social and psychological effects. Li et al. (2020) argue, through research, that there was an increase in negative emotions such as: anxiety, depression and indignation, greater sensitivity to social risks, and a decrease in positive emotions after the declaration of the pandemic in China. Besides, other effects have been observed in several segments. In education, for example, the changes were too sudden in some sectors. Both students and teachers had to adapt to remote education, often without adequate preparation. Dealing with the "new normal", a name popularly recognized as a paradigm shift followed by new health and hygiene care in establishments, has also had na impact on society.

On the other hand, as (co) side effects in education, there was an increase in combined

learning, collaborative work, and availability of learning material (Misra, 2020). Teachers started to have greater experience with technology, transforming traditional classes into new forms of learning; reformulation of the way of thinking about distance learning. It was also na opportunity for students to deal with new technologies and forms of teaching as well as greater preparation for changes and adversities. There was also an opportunity to develop learning management systems for use in universities.

For Currie (2020), the "new normal" is likely to have an effect on organizations with more flexible work hours for staff and remote tasks, where this kind of activity is more practical and convenient. Also, new practices that are currently adopted to contain the spread of the virus may be implemented as conventional practices. For example, similar to patient screening, pre-service research or on-site monitoring is likely to persist beyond the recovery of COVID-19, as a general precaution for infectious diseases. Therefore, the "new normal" metaphor includes a series of procedures, attitudes, and behaviors that affect society.

3. Cognitive Linguistics and Conceptual Metaphors

With a revolution in neural studies on the functioning of the mind and brain, ways of thinking were also the target of analysis and understanding. As Lakoff (2008) points out, discoveries about neural computing and brain sciences contributed to the understanding of how conceptual metaphors work as components of human thought. According to the author, all body actions are controlled by the brain, and thinking is physical. Ideas and concepts are computed by brain structures. Brown (2008, p. 31) states that many entities used to think about things and talk about them, such as love, time, or meanings of scientific observations, are all abstract concepts.

Everything that the human being possibly thinks stems from cognitive processing. Thus, the processing of metaphor, as a phenomenon that people observe linguistically, is anchored in mental operations. For Lakoff (2008), the metaphor does not reside in words, but in ideas. It is present in people's daily lives, not only in language but fundamentally in human thought and actions. For him, it is not a simple figure of speech. Charteris-Black (2004) believes that metaphor cannot be defined by a simple criterion that can be applied in all circumstances, but it is necessary to follow linguistic, pragmatic, and cognitive criteria. The author defends the idea that the metaphor must be understood taking into account the specific communication context, while its cognitive characteristics should not be treated without observing the persuasive function of the metaphor in the discourse.

The conceptual system in terms of what one thinks and acts is of metaphorical nature. In this way, the concepts about all things in the world are structured, according to the Theory of Conceptual Metaphor (TMC) from physical and social experiences. Literature maintains that the essence of metaphor consists of understanding and experiencing a type of thing in terms of another. Yet. TMC explains that this process is structured based on certain experiences. In this way, abstract concepts can only be understood as metaphorical mappings of domains of origin based on direct physical and social experiences (Brown, 2008). According to Lakoff and Johnson (1980), the conceptual metaphor involves a relationship between source and target domains. In these domains, metaphorical correspondences are considered mappings. Coulson (2008), also argues that the understanding of metaphor involves the construction of cognitive models involving mappings or correspondences between represented objects and relations.

In Lakoff and Jonhson's (1980) theory, these relationships occur through conceptual domains. Thus, the domain over which metaphorical expressions are extracted to understand the other domain is called the source domain. Consequently, the conceptual domain that is interpreted with those particular characteristics is the target domain. Thus, in the metaphorical expression Life Is A Journey, for example, the target domain is life because this term will be interpreted under the aspects that contemplate the JOURNEY domain. In this sense, the conceptual apparatus will interpret by building conceptual and analog relations to create the effect of meaning.

The conventional way of representing a certain phenomenon, for example, presupposes a metaphor that is often elaborated without the person being aware of it. In this conception, everyday language is full of metaphors without awareness of its metaphorical character (Brown, 2008, p.32). Lakoff (1980) refers to the metaphor Argument Is War, in which, relating to the term "Argument", the target domain is mapped in the light of the source domain of War. For him, actions are in accordance with the way people conceive things and act according to the way they conceive them. Thus, thought processing is metaphorical, conceptual, and systematic. In this way, metaphorical concepts can be recognized underlying the metaphorical term because they use expressions from one domain to explain another. For Lakoff (1993), the place of metaphor is not in the language itself, but in the way in which one mental domain is conceptualized in terms of another. A conceptual metaphor consists of a set of mappings between two domains of experience (Kovecses, 2017).

In ARGUMENT as WAR, for example, it is possible to find several expressions that lead to this metaphor, such as ideas of attack, defense, strategy, etc. Likewise, in Time Is Money it is common to find expressions such as "you are spending my time", or "there is still no time to give", etc. It is worth highlighting the reason why TIME is represented in the light of Money, given that in capitalist societies the working time is allocated in a certain monetary value. Therefore, as with money, we can spend, lose, invest time, or even save some time to perform a certain action.

In this way, an abstract term can be represented from another, and this mapping is necessarily partial, that is, it is based only on some characteristics of the element in the source domain. The author stresses that the understanding of the metaphorical concept is partial, considering what it communicates. It is understood that TIME is represented as MONEY, once spending time on something that is not possible to get back, much less give someone time, and get that person the same time as a return.

In this sense, Lakoff (1980) postulates that through linguistic expressions or forms, it is possible to discover what is the type of metaphorical concept involved, that is, what is behind the linguistic use, in terms of a way of thinking the world. Lakoff (1980) highlights that, through linguistic expressions, it is possible to study the nature of metaphorical concepts, and thus understand the metaphorical nature of human activities.

4. Protective Discourses in a Cognitive Analysis and Socio-Environmental Effects of COVID-19

Regarding the context related to the pandemic, there is a use of metaphorical mappings aimed at the source domains War, Enmity Or Friendship, in the sense of combating the harmful agent in the first two and subversion in the last regarding the positive effects of the pandemic, especially concerning to the benefits to the environment. After understanding the panorama of what COVID-19 is, as well as the (co)llateral effects, in Portuguese, and side effects, in English, of the disease at global levels, which are fundamental to understand the context in which metaphors are located, this section starts with the understanding of the reason why these metaphors were being formulated mainly within the semantic field of enmity and friendship.

Some studies have pointed to the figure of COVID-19 as an Enemy, leading to the direction of the metaphorical mapping of the WAR domain. As Charteris-Black (2004), Hidalgo-Downing & Karljevic-Mujic (2009) developed a quantitative study on the metaphors

of immunity, involving a corpus of 60 articles from the journal Scientific American. This study highlights the pragmatic functions of metaphor in the discourse, focusing on discursive intentionality and temporality of metaphorical representations, in conjunction with its persuasive function, as pointed out by the studies by Charteris-Black (2004).

The results of the quantitative study revealed that most of the metaphorical images referring to the immunity of the human body to various viruses were, for the most part, conventionalized based on the source domains War, Travel, Or Personification. Personification refers to something that is inanimate using a word or phrase that within another context refers to something animated (Charteris-Black, 2004). In this context, the virus is personified by being assigned to act, invade, threaten, etc.

This personification can be seen in the following excerpt, the title of an opinion article on Science and Health, from the Portuguese media. It is noted in the excerpt that the title brings to the population's attention an unexpected controversy: COVID-19 as Friend Of The Environment. The conceptual metaphor used to deconstruct and demystify that all harm brings harm is strategically chosen to expose how the pandemic, due to the absence of large circulation of people and the subsequent reduction on the emission of polluting gases, brought to the environment the possibility of Breathing Better, in the sense of having fewer pollutants.

It is worth remembering that the term "breathe better" brings in the context of the article the idea of a personification, both of the environment that is capable of breathing, and of a virus, although being an acellular living being, it has the competence to have the quality of friend. The other terms such as contribute and bring improvement, even if not metaphorical, join the semantics of explaining why COVID-19 is considered a Friend Of The Environment. Metaphorically the term is associated in the context of the Friendship domain. Thus, the subject conceptually interprets certain characteristics that are part of what is considered as a friend: the one who helps, as well as the one who contributes to some state of improvement. This scenario of measures to combat a virus, whose forms of dissemination are partially unknown, elects as a primary combat measure the permanence of people in confinement in their homes, depriving them of social or professional coexistence in person.

Table 1 - Enviroment Friend.

COVID-19: enemy of Man, friend of the environment: Data from the European Environment Agency show that the quarantine caused by the coronavirus is indirectly contributing to the improvement of the state of our planet, allowing it to "breathe" better.

Source:https://www.juponline.pt/ciencia-saude/artigo/34883/covid-19-inimigo-do-homem-amigo-do-ambiente.aspx.

On the other hand, a questioning survey was found in the international media questioning if the COVID-19 is a friend or an enemy of the climate. In the excerpt below, the title raises a paradoxical reflection. The text, however, suggests that, although there is a benefit to the environment due to the reduction of polluting gases, there is also a predominant opinion that the pandemic may focus society's attention on the economic crisis, and no longer on the environmental crisis.

Table 2 - COVID-19 Friend or Enemy of the climate?

Climate friend or foe? The COVID-19 pandemic has had a dramatic impact on carbon emissions - more than that of the financial crisis, World War II or the Spanish flu. But will it help or hurt the green agenda in the long run?

Source: Nordea (2020).

Due to the lack of control over the pandemic outbreak, representations of the vírus proliferate as Natural Catastrophes, namely tsunamis, hurricanes, or other equally overwhelming natural phenomena that are beyond human control. The catastrophe is semantically associated with calamity, with something disastrous. Thus, the conceptual metaphor COVID-19 Is Catastrophe is observed in the table below. Although the metaphor is not explicitly marked in the linguistic expression of the sentence, it is possible to arrive at the conceptual metaphor by looking at the semantic domains involved.

Table 3 - COVID-19 IS Catastrophe.

"Covid-19 pandemic is one of the most complex catastrophes of all time", says economist José Pio Martins

Source: Health Debate (2020).

In principle, it is commonly noted the use of metaphors in forms of media discourse, although some scientific articles may also present metaphorical mappings, especially relating to the ways in which the virus acts and spreads, as well as the measures to be taken. As Brown (2008) states, human language is full of metaphors that people use without being aware of its metaphorical character. In order to explain how the virus works, many metaphors have emerged correlating the effects of the pandemic with the representations that people have about it. On the other hand, Lakoff (1980) refers to metaphor as a conceptualization In principle, it is commonly noted the use of metaphors in forms of media discourse, although

some scientific articles may also present metaphorical mappings, especially relating to the ways in which the virus acts and spreads, as well as the measures to be taken. A Brown (2008) states, human language is full of metaphors that people use without being aware of its metaphorical character. In order to explain how the virus works, many metaphors have emerged correlating the effects of the pandemic with the representations that peopl have about it. On the other hand, Lakoff (1980) refers to metaphor as a conceptualization process, even though one can observe the representations involved in the metaphorization of the pandemic, it must also be considered that it is a matter of thought.

Since COVID-19 is a virus that invades the human body and establishes itself in a host cell, it is expected that it will necessarily request a response from your immune system in order to fight it. In this sense, the individual's immune system will respond in an attempt to eliminate the invading agent. In terms of metaphorical mapping, it is inevitable that the source domain of WAR will be predominant in the metaphorical elaborations conveyed by the international press, as illustrated in the excerpt below:

Table 4 - Biological warfare.

"Covid-19: a biological war - the role of the Armed Forces: Portugal is not prepared for an attack with these proportions. Each day it is learning, adapting and trying to respond".

Source:https://sol.sapo.pt/artigo/689906/covid-19-uma-guerra-biologica-o-papel-das-forcas-armadas.

Considering a larger context, observing other parts of the text, the source domain War can be observed taking into account other terms, such as those highlighted in the table below: attack, combat, war, threat, enemy and weapon comprise the war context emphasizing the idea of the title of treating COVID-19 as an enemy and agent of biological war. It can be observed, in this case, that the war refers to something that is intended to fight, in which there are opponents in a fight.

The conceptual metaphor is then constructed in this context by the fact that COVID-19 has emerged as something bad, difficult to control and to eliminate. In a way, humanity was not prepared to deal with such a biological agent. In this regard, it became helpless in the face of the virus's actions. The term "attack" refers to the type of invasion of the virus itself, which attacks the cell and makes it produce copies of the virus. The adjective "biological" that accompanies the noun "war" in the title leads to the interpretation of the type of war that involves the COVID-19 virus as a theme. Many lexicons that people use to describe abstract concepts are full of metaphors (Glucksberg, 2001).

The "fight", in this context, is the virus versus the human being who is trying to find a solution to the pandemic. It is a constant "threat" because it is an invisible unknown Enemy, which makes it hard to be avoided. Thus, the terms converge for all semantic traits belongin to the context of war, reinforcing the understanding of the reason for the semantic and conceptual relationship, at a metaphorical level, between "war" and COVID-19. Likewise, the term "weapon" refers to the tools it has in an attempt to win the "war.

Sabucedo, Alzate, and Hur (2020) believe that metaphor is a good rhetorical resource capable of associating the new to an image of a family situation. For the authors, metaphors, in the light of Lakoff and Johnson (1980), consist of conceptual structures for interpreting reality, and this interpretation is based on the perception of reality. The way the subject perceives the reality of the world influences the way he responds to that reality. In Other words, the war metaphor is very present in the pandemic because it evokes images, in the authors' opinion, of confrontation, obedience, while the enemy metaphor denotes conflict. In a way, metaphor, in this sense, comprises a form of representation of the world. For the authors, the war metaphor in this context can bring negative consequences, both for the management of the crisis and for the socio-political dynamics, because it evokes even more negativ emotions. This can lead to a "save whomever we can" belief or thought, as it incites war behavior.

Indeed, as described by Charteris-Black (2004), the metaphor consists of a communicative resource by which users of language can increase the expressiveness of their message. After all, it is possible to understand how the conceptual system works, and how human beings establish relations of similarity of meanings, cognitive and semantic domains. "The metaphor is a kind of linguistic representation that results from a change in the use of aword or phrase in the context or domain in which it is expected to occur [...]" (Charteris-Black, 2004, p.21).

Table 5 - COVID-19: a biological war - the role of the Armed Forces.

The covid-19 pandemic behaves as if it were a biological attack. The agent used - the SARS-CoV-2 coronavirus - contaminates hundreds of thousands of people worldwide and has already caused thousands of deaths. As in other countries in the world, the situation in Portugal is worrying. Faced with the threat to National Security, the Armed Forces, as a component of the National Security and Defense system, can and must play an important role in combating this crisis. We have a widespread biological agent with relevant contagion capacity that causes a disease. As a consequence, the community was socially and economically shaken, becoming fragile. A biological war is like that. The only difference is that the threat is not an identified state or force. The enemy is the agent itself and there is (so far) no weapon capable of eliminating or neutralizing it. The consequences of the covid-19 pandemic are already effective in Portugal, with the number of sick and dead in progress and the severe impact on the economy and society. We are facing a serious threat to national security.

Source: https://sol.sapo.pt/artigo/689906/covid-19-uma-guerra-biologica-o-papel-das-forcas-armadas.

The following table highlights other terms related to the WAR domain, which are widely used in communications, and in articles that portray COVID-19. The terms tactic, strategic thinking, war, threat and front line can be found widely in the media. The tactic is related to the ability to deploy and employ troops for war, who work strategically to fight the enemy. In this context, the author of this opinion article exposes the terms of war by placing analogical associations on the agents who are acting more directly in dealing with COVID-19, pointing out that it is necessary to act cautiously and strategically, with organization and discipline, to achieve success against the vírus.

Health professionals, being in direct contact with patients, deal directly with the virus, which allowed the comparison with the term "front line", as they are the ones who face the enemy first. Indeed, it can be inferred that the use of conceptual metaphors confirms the notion of how the conceptual system consists of attributing concepts through a semantic network of other terms that contemplate some similarity. The metaphor is a cognitive process that acts on the structures of language. According to Lakoff (2008, p. 18), thinking is physical. Ideas and concepts are physically computed by brain structures. In the conception of Lakoff and Johnson (1980), the conceptual metaphor represents the interaction of two cognitive structures or domains.

Table 6 - Terms of war.

This is a biological war for which there is adequate doctrine and tactics. The Portuguese Armed Forces can and should be engaged in other dimensions. They have strategic thinking, organization and discipline, training and capacity in the face of biological threats and have operational means prepared and available. In this war, health professionals have been at the forefront, often without the right conditions.

Source: https://sol.sapo.pt/artigo/689906/covid-19-uma-guerra-biologica-o-papel-das-forcas-armada

Other terms from the War source domain appear in the argumentation of the text in the following excerpt, as terms such as soldiers, struggle, battle and troops traditionally show up in the context of war. In the text, there are soldiers like health professionals: doctors, nurses, and assistants who deal directly with patients infected with COVID-19, so they face the risk of becoming infected too. Thus, the source domain is WAR, in the sense of generalizing and understanding several terms related to war and its target, the COVID-19.

However, considering internally, that is, within each expression or phrase, we have, in this case, the source domain as Soldiers and target domain as health professionals, in the conceptual metaphor: Health Professionals Are Soldiers. In this way, the interpretation of the conceptual metaphor can start from the metaphorical expression and be understood more broadly when one perceives the larger domain, which in this case is WAR.

Troops are equated with teams that work together for something. In this case, the medical team usually works with many people. They are nurses, technicians, speech therapists, doctors, etc., who are part of the team that takes care of the patient. Therefore, one can observe the conceptual metaphor Medical Team Is War Troop, as they face the "enemy" (virus) in constant activity. Thus, the struggle and the battle are related to the effort, in na attempt to eradicate the disease, and to the difficulty, given of the lack of protective equipment, medicine. However, despite all their efforts, they do not obtain a response from the patient. The fight is also related to their continuous exposure to danger. For this reason, some professionals end up isolating themselves to avoid further contagion (Caires, 2020)

Table 7 - Terms of war.

The soldiers in this fight are our health care professionals. It's the doctors, it's the nurses, it's the people who are working in the hospitals, it's the aids. They are the soldiers who are fighting this battle for us. You know the expression, "Save our troops", troops, quote/unquote. In this battle, the troops are healthcare professionals. Those are the troops who are fighting this battle for us. We need to recruit more healthcare workers. We need to share healthcare professionals within this state and within this country.

Source: REV (2020).

The same conceptual metaphor is recognized by the United Nations when they publish on the world wide web that "We are at war with a virus - and we have not beaten it". Looking at the context of the publication, it was noted that if humanity is at war with the virus, it leads to the understanding that COVID-19 is an Enemy. After all, in a war there is a confrontation between enemies, and there can be a winner and a loser. In this case, the war concerns efforts to eliminate the virus, and "we did not win" because there are still many cases of COVID-19 in the world.

Table 8 - Viruses and War.

We are at war with a virus – and not winning it.

Source: United Nations (2020).

COVID-19 was also found metaphorized as a THIEF. In the table below, the conceptual metaphor is observed: COVID-19 is Invisible Thief. The term thief refers to the fact that COVID-19 appeared unexpectedly and invisibly because it is so small. The world was not prepared for this pandemic. Thus the association with a thief who suddenly appears, without warning and with a treacherous side. COVID-19 "steals" not only people's health but also their freedom. Also, with the confinement, a series of side effects were observed.

Table 9 - Invisible thief.

'Invisible mugger': how Boris Johnson's language hints at his thinking

Source: The Guardian (2020).

Still considering the condition of the confinement, the discourse of health officials, given that there is no vaccine that can effectively fight the disease, is to appeal to the need to control the pandemic outbreak by using confinement, as well as ways of social detachment. Therefore, the control of the pandemic is built, discursively, based on the metonymies of Confinement and Social Distancing which refer, respectively, to the image schemes of the Container, specifically the residences. Another prominent metonymy is the (NEAR) -FAR relationship to maintain a safe distance from other human beings. In this regard, it is Worth remembering that the method of Social Barrier was also recommended, which metonymically comprises social distance. The same occurs with the use of masks. After all, they consist of protective equipment, a physical barrier to prevent the spread of the virus through the respiratory tract, based on the Barrier image scheme. The following table shows an example of how the term has been used by the media to speak about protective masks.

Table 10 - Mask Is Barrier.

A physical barrier against the coronavírus Experiment conducted in China indicates that surgical masks can reduce the transmission of agents that cause respiratory diseases

Source: FAPESP (2020).

The actions and measures to combat the pandemic have been in force as a topic widely discussed in the media. Thus, new metaphorical representations have emerged with the evolution of the control of the pandemic outbreak. According to Johnson (1987), cognition is a form of embodied action, allocated to the interactions between organism and environment. In the following example, there is a humorous criticism of the metonymic expression Chinese Virus. The term circulates during the pandemic to demonstrate the origin or "homeland" of COVID-19 - China - as the place where it was discovered. However, in the text, the author criticizes this possible nationality of the virus. In the field of conceptual metaphor, it is possible to observe that, in this context, the virus having a nationality would also have a human characteristic, since only humans regularly have nationality, which leads to understand the personification of metaphoric fields, as highlighted by Johnson (1987).

Table 11 - Chinese vírus.

People who make a point of referring to the coronavirus as "the Chinese virus" deserve my recognition [...] Knowing the virus from a scientific point of view is important, but taking a look at your passport is also helpful. I imagine that these people, after being run over, communicate to the doctor, on arrival at the hospital, the brand of the vehicle that ran over them, so that he knows if they were victims of a French, Swedish or German run over, and can determine the appropriate treatment. The identification of the nationality of the virus fills a gap that has been causing great discomfort for a long time: we never have the information about the country from which the viruses originate - and, what also disturbs, the germs in general. You never hear about the Hungarian bacteria, the Norwegian fungus or the German protozoan. They are always bacteria, fungi and protozoa, without reference to nationality, affiliation and, by the way, any other data on the citizen card of the germ in question.

Source: Pereira (2020).

As Flusberg, Matlock and Thibodeau (2018) explain, metaphors can help you talk and think about the problem by simplifying it, highlighting certain aspects and reducing the emphasis on others. It can be said that the same extends to metonymies. By using them, the subject simplifies and highlights aspects of one object in the other. To name COVID-19 as a Chinese virus is to attribute to it all the stereotyped semantic load that is often found in Chinese products, in addition, of course, to the possibility of highlighting a certain Chines "culpability", attributed by the media, about the origin of the virus. Therefore, the expression "Chinese virus" carries with it a negative stereotype linked to most people low opinions about Chinese products. Gibbs (1999) states that both metaphor and metonymy work with mappings. In the metaphor, there are two domains, where one is understood in terms of the other, while metonymy involves only one conceptual domain.

However, another form of personification in the scope of fiction, is the relationship between COVID-19 and a monster. In the table below, it is possible to observe the conceptual metaphor COVID-19 Is Monster. It is important to understand the use of this metaphor within the context of the pandemic, as well as its effects on society. It is known that there are countless effects involving the appearance of COVID-19. The semantic field of the term "monster" contemplates the notion of being bad, evil, cruel and capable of having certain "powers" of an evil character. Hence, the term "terrible spell" is a metaphor that is pertinente to the condition that COVID-19 has an ability to spread evil as well. In this context, it is

hardly related to the disease that COVID-19 causes in humans. That said, it is clear that the interpretation of the conceptual metaphor requires semantic integration between the terms and between the domains involved.

Table 12 - Monster COVID-19.

Trump reflects on "the terrible spell" of the "monster" Covid-19 and speaks in the past: "We were fine"

Source: Observador (2020).

The relationship between COVID-19 and religion was also found in the media, contemplating the conceptual metaphor COVID-19 Is Punishment; COVID-19 Is Purpose. The article entitled "Covid: punish the purpose", in the table below, discusses the possibility that God has punished men with COVID-19. Like a "plague", the pandemic is equated to something bad for humanity. On the other hand, the purpose is raised by questioning whether COVID-19 is a divine plan, perhaps to adjust and correct humanity. Comparatively, to the metaphorical scenario of COVID-19 and the environment, it is noted that, in focus, there will be two different points of view of environmentalists about COVID-19. There is a group of environmentalists who design a "storyline" based on a chain of cause-and-effect metonymies between the environment and this pandemic outbreak. In his view, the environmental crimes committed by humanity for decades will be at the origin of the pandemic outbreak. Therefore, the "storyline" chooses Punishment as the source domain for metaphorical mappings. This scenario is inspired intertextually in the biblical frame of the plagues of Egypt, configured metaphorically as a divine punishment for the sinful conduct of the leaders of the Egyptian nation.

Table 13 – Covid Is Punishment. COVID-19 Is Purpose.

The Coronavirus in the world has caused havoc, the effects of a punishment or God's purpose?

Source: El Verbo (2020).

5. Metodologia

The work uses research methods qualitative and quantitative analyze bibliometric approaches to scientific production about metaphor and COVID-19. bibliometric analysis is a methodology for counting bibliographic content. The identification of the number of times in

which terms are found can indicate the level of research activity on the topic (Vidican; Woon & Madnick, 2009; Porter, A., 2007).

The methodological basis used is the systematic review of the literature, in the firstvmoment of the research, searched, in impact databases by the scientific community, the correlation between COVID-19 and the environment and COVID-19 and possible effects. We chose to search the Web of science, Science Direct and PubMed databases. The search Keys were: pandemic, COVID-19, new coronavirus, effects of COVID-19.

The objective was to identify the effects of COVID-19 in the literature, and then analyze them as positive or negative. In this phase of the study, a bibliometric analysis was carried out, in which the scientific articles found in the Science Direct database were published between 2015 d2020 (last 5 years, from the beginning of the year 2015 to the month of August of the year of 2020). Its choice of PubMed and Clarivate Web of Science is justified because both are relevant and huge databases, with widespread and wide use for all areas of science. In a second step, to analyze the presence of conceptual metaphors, the articles selected in the bibliometric study were analyzed, as well as opinion articles published in the world media during the pandemic. The search keys were those of the bibliometric study, and also COVID-19 and Enemy, COVID-19 and friend, in order to find possible metaphorical mappings of this semantic field to contrast with the effects of COVID-19 in several aspects.

The choice of texts is based on the theme of the new coronavirus and its impacts. The basic theoretical bias focuses on the postulations of Lakoff (1987; 2006), whose orientation is the study of metaphor on the cognitive plane, as a natural process of the human mind, something pertinent to the cognitive apparatus. Finally, a mixed methodological profile is designed for the present study, which aims to identify the recurrent source domains of metaphorical mappings representing the disease as a phenomenon, unknown, overwhelming and highly dangerous to human health, and also, in a character qualitative approach under the principles of Lakoff and Johnson (1980), and Charteris-Black (2004) to analyze the metaphorical construction about COVID-19 that gave rise to the representation of the virus as Friend And Enemy.

6. Results and Discussions

From the bibliometric analysis, there was an evolution in the number of articles published over the years, which were inserted in the database of Pubmed and Clarivate Web

of Science and Science Direct around the theme COVID / COVID-19. The search keys for the research were as shown in Table 14. There was a greater number of articles involving the effects of COVID-19 in the Web of Science and Science Direct database. Research Papers involving the effects of COVID-19 were more frequent on PubMed, which suggests a greater number of effects on COVID-19 and health.

When it comes to the positive or negative effects of COVID-19, it is observed that there is a greater number of research papers about the negative effects. However, it is noteworthy that among the research papers on positive effects, these are related to the environment. There is a greater number of research papers involving the environment and COVID-19 more focused on health aspects, which also include studies on how the environment changed during the pandemic.

In this study, the objective was to show the side effects of COVID-19 and, later, to verify the conceptual metaphors present in the selected texts, therefore, the bibliometri survey helped in the understanding of these effects, especially with regard to the understanding about the relationship between COVID and friendship, present in texts whose theme involves COVID-19, and positive effects of COVID-19. Compared to other topic involving COVID-19, research on the effects of the pandemic is still growing. It is believed that other studies may be in the process of publication. With the search key involving metaphors and COVID / COVID-19, few results were found compared to others related to studies on Science, which indicates originality regarding the studies on this correlation. The largest number (196 articles) was found in PubMed, which suggests a greater use of metaphors and COVID-19 related to Health and Environment.

Throughout the semantic analyzes carried out, based on the interpretation of metaphors found with this semantic bias, there were many other effects here named by the authors of this study as (co) lateral, given the harmful and positive character of COVID-19 in various aspects. However, what really stands out as a positive effect of COVID-19 is the benefit to the environment during the quarantine period, when the circulation of people is limited.

In terms of positive and negative effects there was a greater number of metaphors with the source domain related to negative effects such as: War And Enemy. When it comes to the positive effects of COVID-19, metaphors were found whose source domain is Friendship. The results show that there is a greater presence of (explicit) metaphors in opinion articles, compared to scientific articles, which suggests greater freedom of writing in journalistic

genres. The metaphors found in scientific articles tend to be more implicit, focused on the argument itself, and revolving around the concepts of scientific terms, often to explain them, such as the studies by Brown (2003

Furthermore, it can be seen, as argued by Lakoff (1980) and Glucksberg (2001), that the metaphor transcends linguistic manifestations as it deals with something in the conceptual apparatus itself. The language for Lakoff (1980) is secondary and the mapping is primary because, before it is manifested as a phenomenon, there is a cognitive conceptualization process.

Table 14 - Bibliometric Research.

2015-2020 Chaves de busca	Web of science	PubMed	Science Direct
COVID	29537	48235	20279
COVID-19	29236	53905	20174
EFFECTS OF COVID	2797	19633	7506
EFFECTS OF COVID-19	2808	22589	7482
"COVID" + "POSITIVE EFFECTS OF COVID"	7	0	10
"COVID" + "NEGATIVE EFFECTS OF COVID"	1	0	12
"COVID-19" + "POSITIVE EFFECTS OF COVID-19"	7	0	10
"COVID-19" + "NEGATIVE EFFECTS OF COVID-19"	1	0	12
COVID + ENVIRONMENT	752	10435	4812
"COVID-19" + ENVIRONMENT	743	10616	4774
"COVID" + "METAPHOR"	13	196	66
"COVID-19" + METAPHOR"	13	196	66

Source: Authors.

Initially, it was defined that the type of search selected would be summaries limitingthe results to the last 5 years, and the search language for the researched scientific articles was English. For opinion articles, the search language has also been expanded to Portuguese and Spanish. A refinement was made in the search and the keywords were expanded to better filter the articles. With these filters, it was observed that most of the articles, involving the COVID-19 theme are from 2020.

Graph 1 - Results of bibliometric research.
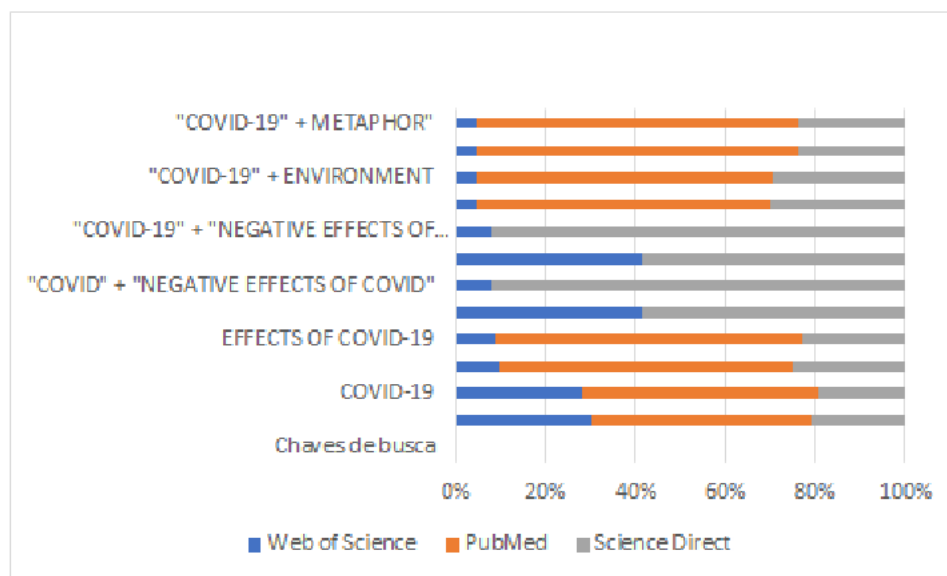
Source: Authors.

7. Conclusion

It was concluded that COVID-19, in terms of metaphorical object, is usually understood in the media and scientific texts as Enemy, considering the sphere of the semantic field virus, and its invader role regarding the human organism. Therefore, most of the metaphorical terms and expressions will contain semantic features that bring a semanti correlation to the universe or domain of WAR. War source domain is the most found due t its association to the negative effects of COVID-19 for humanity. After all, the current scenario presents favorable conditions for this semantic correlation, since the entir socioeconomic, cultural and health spheres of society are in a critical situation, on the path t a world crisis of dimensions that are still incalculable, in some aspects.

The construction of the conceptual metaphor COVID-19 Is Enemy is widely adopted during the pandemic, which suggests that, in fact, the human cognitive apparatus involves metaphorical formulations, since the association was easily disseminated. The enemy (the virus) has been identified and a strategy is needed, such as measures to contain and spread the virus, the need to "flatten the curve" to avoid further damage, and still "save the economy."
 Soldiers as those whose role it is to face the enemy of the front line (health professionals), defense of the territory (measures of isolation and social distance), in addition to possible traitors and deserters (people who break the rules).

However, COVID-19 appears as a subversion of the negative circumstances of the pandemic, very much focused on an evil that brought something positive to humanity despite all the harmful trail to men. It is observed that the use of metaphors in this pandemic contexto not only brings to the fore the awareness that man thinks through metaphors, but also reveals a certain argumentative appeal to encourage the relation of the condition of the pandemic to something serious and harmful to humanity, such as a world war. For future work, research on the use of metaphor in other fields of science is recommended.

Referências

Brown, T. L. (2008). *Making truth: metaphor in Science*. University of Illinois Press.

Bruno, C. (2020). *Trump reflete sobre "o feitiço terrível" do "monstro" Covid-19 e já fala no passado: "Estivemos bem".* Observador. Saúde/Coronavírus. Retrieved from: https://observador.pt/2020/04/10/trump-reflete-sobre-o-feitico-terrivel-do-monstro-covid-19-e-ja-fala-no-passado-estivemos-bem/

Caires, L. (2020) *O cotidiano dos profissionais de saúde na linha de frente da COVID-19.* Jornal da USP. Retrieved from: https://pfarma.com.br/coronavirus/5522-cotidiano-profissional-saude.html.

Coulson, S. (2008). *Metaphor Comprehension and the brain*. In: GIBBS, R.W. Metaphor and thought. New York: Cambridge University Press, 2008, .177-194.

Currie, G. M. (2020). *A Lens on the Post-COVID-19 ''New Normal'' for Imaging* Departments. Journal of Medical Imaging and Radiation Sciences,2020, 1-3

Dicimedico. *Dicionário de etimologia médico.* (2020). Retrieved from: https://dicimedico.com/colateral/.

Dicio. *Dicionário Online de Português.* (2020). Retrieved from: Https://Www.Dicio.C Om.Br/Colateral/.

Downing, L., & Mujic, B. K. (2009). *Infectious diseases are sleeping monsters:Conventionaland culturally adapted new metaphors in a corpus of abstracts on immunology*. Ibéria, 17, 2009, 61-82.

Duarte, P. M. (2020). COVID-19: Origem do novo coronavírus. *Braz. J. Hea. Rev*., Curitiba, 3(2), 3585-3590, 2020.

Dutheil, F., Baker, S. J., & Navel, V. (2020). COVID-19 as a factor influencing air pollution? *Environ. Pollut*. Retrieved from: https://doi.org/10.1016/j.envpol.2020.114466.

Fapesp. (2020). Uma barreira física contra o coronavírus: Experimento realizado na China indica que máscaras cirúrgicas podem reduzir a transmissão de agentes causadores de doenças respiratórias. *Pesquisa FAPESP. Saúde Pública.* Retrieved from: https://revista pesquisa.fapesp.br/uma-barreira-fisica-contra-o-coronavirus/.

Fe-nix. (2020). COVID: castigo o proposito. El Coronavirus en el mundo ha causado estragos, ¿efectos de un castigo o propósito de Dios? El Verbo,. Retrieved from https://elverbo.org/castigo-o-proposito/.

Gibbs Jr, R. W. (1999). Researching metaphor. In: Cameron, L., Low, G. *Researching and applying metaphor.* New York: Cambridge University Press, 29-47

Gentner, D., & Maravilha, F. (2018). Analogical reasoning. L. J. Ball V. A. Thompson (eds.). *International Handbook of Thinking & Reasoning.* NY, Psychology Press, 186-203.

Glucksberg, S. (2001). *Understanding figurative language: from metaphor to idioms*. New York: Oxford University Press, 2001.

He, M. Z., Kinney, P. L., Li, T., Chen, C., Sun, Q., Ban, J., Wang, J., Liu, S., Goldsmith, J. & Kioumourtzoglou, M. A., (2020a.) Short- and intermediate-term exposure to NO2 and mortality: a multi-county analysis in China. *Environ Pollut.*

He, L., Zhang, S., Hu, J., Li, Z., Zheng, X., Cao, Y., Xu, G., Yan, M., Wu, Y., (2020b). On- road emission measurements of reactive nitrogen compounds from heavy-duty diesel trucks in China. *Environ. Pollut*. Retrieved from: https://doi.org/10.1016/j.envpol.2020.114280.

Johnson, M. (1987). *The body in the mind: the bodily basis of meaning, imagination and reason*. Chicago: The University of Chicago Press, 1987.

Lakoff, G. (2008). The neural theory of metaphor. In: Gibbs, R.W. *Metaphor and thought.* New York: Cambridge University Press, 17-38.

Lal, A. P., Kumar, A., Kumar, S., Kumari, S., Saikia, P., Dayanandan, A., Adhiakari D., & Khan, M. L. (2020). *The dark cloud with a silver lining: Assessing the impact of the SARS*

COVID-19 pandemic on the global environment. Science of the Total Environment, 732 (2020) 139297.

Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users. Int. J. Environ. Res. Public Health, 17(6), 2032. Retrieved from: https://doi.org/10.3390/ijerph17062032

Martins, M.T. (2020). *Covid-19: inimigo do homem, amigo do ambiente. JUP, Ciência e Saúde*. Retrieved from: https://www.juponline.pt/ciencia-saude/artigo/34883/covid-19-inimigo-do-homem-amigo-do-ambiente.aspx.

Misra, K. (s.d.). Covid-19: 4 negative impacts and 4 opportunities created for education: The Covid-19 pandemic has had a major impact on education - both negative and positive. *What exactly are the risks and opportunities brought about by Coronavirus?* Indiatoday, Retrieved from: https://www.indiatoday.in/education-today/featurephilia/story/covid-19-4-negative-impacts-and-4-opportunities-created-for-education-1677206-2020-05-12.

Monserrate, M. A., Ruanob, M. A., & Sanchez-Alcalde, L.(2020). Indirect effects of COVID-19 on the environment. *Science of the Total Environment*, 728 (2020) 138813.

Nordea. Climate. *COVID-19: Climate friend or foe?* Retrieved from: https://insights.nordea.com/en/sustainable-finance/covid-19-climate/.

Paital, B. B., Das, K., & Parida, S. K. (2020) Internation social lockdown versus medical care against CO VID-19, a mild environmental insight with special reference to India. *Sci. Total Environ*. 138914 PII S0048-9697(20)32431-1.

Paital, B. (2020). Nurture to nature via COVID-19, a self-regenerating environmental strategy of environment in global context. *Science of the Total Environment*, 729 (2020) 139088.

Parodi, I. C., Poetal, M. G., Assinil, A. Schirinzil, E. & Sete, P. D. (2020). Impact of quarantine due to COVID infection on migraine: a survey in Genova, Italy. *Neurological Sciences*, 2020, 41:2025–2027. Retrieved from: DOI: https://doi.org/10.1007/s10072-020-04543-x.

Pereira, R. A. (2020). *A nacionalidade do coronavírus*. Opinião boca do inferno, 01 mai. 2020. Retrieved from: https://visao.sapo.pt/opiniao/cronicas/boca-do-inferno/2020-05-01-a-nacionalidade-do-coronavirus/.

Priberam Dicionário. *Dicionário de Língua Portuguesa online*. Retrieved from: https://dicionario.priberam.org/colateral.

Protocolo de tratamento do Novo Coronavírus (2019-nCoV). *Secretaria de Atenção Especializada à Saúde. Departamento de Atenção Hospitalar, Urgência e Domiciliar*. Brasília- DF, 2020. Retrieved from: http://das.prodegesp.ufsc.br/files/2020/02/protocolo- tratamento_coronavirus-individ-1-1.pdf

Rev. Governor Andrew Cuomo New York COVID-19. *Press Conference Transcript March 30*. Retrieved from: https://www.rev.com/blog/transcripts/governor-andrew-cuomo-new-york-covid-19-press-conference-transcript-march-30

Richman, D. D., Whitley, R. J., & Hayden, F. G. (2016). Clinical Virology, (4aed.), Washington: ASM Press.

Sabucedo, J. M., Alzate, M., & Hur, D. (2020). COVID-19 and the metaphor of war (COVID-19 y la metáfora de la guerra. International. *Journal of Social Psychology*, 35:3, 618-624, 2020. Retrieved from: DOI: 10.1080/02134748.2020.178.3840

Saude Debate. Notícias. (2020). *"Pandemia da Covid-19 é uma das mais complexas catástrofes de todos os tempos*", diz economista José Pio Martins. 2020. Retrieved from: https://saudedebate.com.br/noticias/pandemia-da-covid-19-e-uma-das-mais-complexas- catastrofes-de-todos-os-tempos-economista-jose-pio-martins

Sulaman, M., Long, X. & Salman, M. (2020). COVID-19 pandemic and environmental pollution: A blessing in disguise? *Science of the Total Environment*, 728 (2020) 138820. Retrieved from: https://doi.org/10.1016/j.scitotenv.2020.138820

Specktor, B. (2020). *Starving Monkey 'Gangs' Battle in Thailand as Coronavirus Keeps Tourist Away.* Retrieved from: https://www.livescience.com/macaque-fight-thailand-temple-coronavirus.html.

Un environment programme. *Trabalhar com o meio ambiente para proteger as pessoas:resposta do PNUMA à COVID-19.* Retrieved from: https://www.unenvironment.org/pt-br/resources/trabalhar-com-o-meio-ambiente-para-proteger-pessoas-resposta-do-pnuma-covid-19.

United Nations. (2020). COVID-19 Response. This war needs a war-time plan to fight it. Retrieved from: https://www.un.org/en/coronavirus/war-needs-war-time-plan-fight-it.

Vidican, G., Woon, W. L., & Madnick, S. (2009). Measuring innovation using bibliometric techiques: The case of solar photovoltaic industry. *Sloan School of Management*, MIT.

Walsh, B. (2020). Covid-19: The history of pandemics. *BBC.* Retrieved from: https://www.bbc.com/future/article/20200325-covid-19-the-history-of-pandemics.

Zowalaty, M. E. E., Young, S. G., & Järhult, J. D. (2020). Environmental impact of the COVID-19 pandemic – a lesson for the future. *Infection Ecology & Epidemiology*, 2020, 10, 17680023. Retrieved from DOI: https://doi.org/10.1080/20008686.2020.1768023.

Zhu, Y., Xie, J., Huang, F., & Cao, L. (2020). Association between short-term exposure to air pollution and COVID-19. *Science of the Total Environment*, 727, 138704.

Porcentagem de contribuição de cada autor no manuscrito

Priscilla Chantal Duarte Silva – 100%