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Definition: In this entry, trust in science is defined as the reliance, confidence, and dependence on science to understand scientific information. With the outbreak of, and the uncertainty surrounding the COVID-19 pandemic, turning towards science and trusting the specialized knowledge of experts is of particular importance during this period.

Keywords: trust; science; COVID-19

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1. Introduction

Trust is an important construct that influences the actions of individuals, organizations, and societies. Every day, people need to make decisions, and frequently, trust plays a critical role in the decisions they undertake. It is, therefore, imperative, especially in periods of crises, for individuals to know whom and what to trust.

From December 2019, a novel SARS-CoV-2 virus broke out in China and rapidly spread across the world. Along with the virus, the fear of uncertainty concerning the future spread. On 11th March 2020, after 118,000 cases in 114 countries, the World Health Organization (WHO) declared COVID-19 a pandemic [1]. The WHO's declaration prompted clinicians, scientists, and scientific organizations worldwide to provide valuable medical and epidemiological information to control the spread of the virus. This included information about the virus' transmissibility, the severity of the disease, and preventive public health behaviors and measures. The virus was considered highly contagious [2] and therefore demanded from the public a high level of compliance to the suggested prevention guidelines. Like with other viruses in the past that entailed uncertainty, people had to turn to science to stop the spread of the virus.

This entry aims to provide a more thorough understanding of the significant role of trust in science during the COVID-19 era. It begins by defining trust in science and then discusses some within-individual factors (religion, political orientation, education, socioeconomic status, and psychological factors) that influence trust in science. The role of this trust in the accuracy of information one receives is also discussed by examining the effect of social media, misinformation, and conspiracy theories. Next, the role of trust in science in public policy and its effect on preventive behaviors (compliance to public measures and vaccination) is explored. The entry closes with some general conclusions.

2. Importance of Trust in Science in Times of a Pandemic

Trust is a complicated concept that scholars from different disciplines have extensively researched. Generally, trust involves a willingness and belief of one person (the trustor) to place confidence and rely upon another party's (the trustee) honesty and sincerity in performing a particular action [3–5]. This action is essential for the trustor and, therefore, without controlling or monitoring the other party, is willing to take the risk and depend on the trustee. In other words, the trustor is in a vulnerable position when trusting the other

party. Trust is important in many respects. It is fundamental for the development of stability, inclusiveness, and economic progress in societies, as it translates to the trustworthiness of people [6,7], is essential to the functioning of the political system [8], vital for the survival and functioning of democratic institutions [9], inherent in intimate relationships [10], important in professional business relationships [11] and negotiations [12], and is essential for science.

The expression *trust in science* is twofold, referring to (a) trust for the "insiders," which refers to the scientists who are performing science and are expected to present accurate and non-manipulated or fake results, and (b) trust for the "outsiders," where outsiders are the general public who trust the scientific experts for information about science [5,13]. In other words, trust is essential both for science communication and scientific work.

Importantly, trust in science is related to the concept of *epistemic trust*; that is, the trust in the knowledge given by scientists [5,14,15]. Specifically, epistemic trust is the trustors' inclination (because of their limited resources) to depend on and defer to the experts (trustees) [14]. Epistemic trustworthiness has been found to have three interrelated yet distinct dimensions: (a) expertise (knowledge, intelligence, and training), (b) benevolence (ethicality and responsibility), and (c) integrity (honesty, fairness, and justice) [14]. These components are critical determinants of whether a trustor considers an expert trustworthy. Though it is beyond the scope of this entry, it is worth mentioning that epistemic trust comprises two related components, *default trust* and *vigilant trust*. The former refers to the minimal trust needed for successful communication, and the latter refers to the filtering of information as trustworthy [16,17].

A person will choose to trust in science based on the answer he/she will give to the question, "why should I trust science." If the epistemic trustworthiness and its dimensions are high, the person will be more likely to trust science [5,14,18]. If the person judges scientists as having expertise, benevolence, and integrity, they are more likely to show trust in science. It is worth noting that the degree of trust shown by an individual changes depending on the situation [18]. In other words, one person can show high trust towards specific scientists who meet the concept's dimensions but low to those who do not.

Additionally, it has also been suggested that trust in science varies depending on personal stances about specific topics [5]. More analytically, when an individual decides to trust a scientist or not for a specific scientific topic, the person's decision is associated with his/her stance towards that specific topic. Knowledge about a topic is produced not solely based on trust in science but also on the individual's personal position regarding that topic [5]. Scientific topics, especially in the early stages where not much is known, may produce discussions that appear to be "controversial" since the topic is discussed from different viewpoints. Awareness of such controversies might influence the person's stance, which will eventually "modify" their trust in science [5].

It is not a surprise that trust in science has a vital role during a critical period such as a pandemic. With the uncertainty surrounding an unknown virus, people need to judge and decide what is true and false. Turning to science and trusting the knowledge given by scientists plays a crucial role in one's decision and, ultimately, one's response towards novel situations [18]. Political decisions regarding how a country should battle the spread of a virus are made based on the available scientific knowledge [19]. Moreover, for the public to follow political decisions or form an informed opinion, it is critical to trust science in terms of scientific knowledge and scientists and scientific institutions [19]. Trust in science also appears to protect society from major public health crises, such as a pandemic [20], because it is among the many factors that explain adherence to public measures to stop the spread of the virus. Multiple studies have identified that trust in science is one of the factors associated with better adherence to prevention measures [20–28]. These studies have suggested that trust in science promotes adherence and that the lower the trust in science, the lower the adherence to the prevention measures [20–28]. Additionally, it was found that trust in scientists encourages more favorable attitudes towards vaccination. [21,29].

Moreover, during a pandemic, the public needs to have accurate information regarding the virus and its protection. Research has shown that prevention behaviors of spreading the COVID-19 virus (i.e., washing hands and social distancing) are related to beliefs about the virus [21,30]. Specifically, belief formation was affected by the individual's trust in science, with those trusting scientists being more likely to believe more accurate statements about the pandemic [21,30]. This is an important finding showing the importance of trust in science for disregarding inaccurate information.

The largest global survey to date that examined people's views about science included 113 countries and territories [31]. Specifically, this survey compared participants' responses during two different periods, 2018 and 2020, and found that in comparison to 2018, there was a global nine-percentage-point increase in trust levels in science and scientists during the period of the COVID-19 pandemic. However, some significant differences can be observed when examining the regions in more detail. That is, in Russia/Caucasus/Central Asia, the trust in science level remained the same; there was an increase for East Asia, Latin America, Eastern Europe, and Southeast Asia, and a decrease for Sub-Saharan Africa, which had the lowest level of trust in science in the world [31]. Regarding trust in scientists, the results generally showed a similar pattern. The survey also examined the changes in trust levels based on people's level of scientific knowledge. The results showed an overall increase in trust in science and scientists based on their knowledge [31]. This increase was significantly higher for people who reported "some," "not much," or "nothing at all" knowledge about science, with data showing at least a 10-percentage-point increase between the two periods [31]. This indicates that trust in science during a pandemic both changes and varies across countries.

During times of crises, trust in science is often linked to political trust. This is because the political authorities are those responsible for delivering and implementing the recommendations from scientists and scientific institutions. Political trust refers to how confident people feel about their governments and the extent to which they consider their government to be fair, competent, and credible [32]. It depends on the individual's overall evaluation of his or her political institution, and therefore several components contribute to whether a person will experience trust toward the political system or agents [33]. Political trust and trust in science both play their role in a person's decision about an unknown phenomenon. People who trust scientists and scientific institutions are more likely to view their suggestions as credible and legitimate and therefore more likely to accept the political decisions, and those who trust their government are more likely to support and comply with its regulations and policies [32,34,35].

3. Within Individual Factors That Influence Trust in Science

Trust in science is influenced by many variables, such as a group's previous experience, belief system, worldview, and many others [36,37]. This part of the entry discusses five individual factors that affect trust in science. These factors are extensively discussed in the literature and have been generally found to apply to most societies.

3.1. Religion

Religion has always had a key role in societies as it is considered a cultural authority shaping perceptions and influencing the public's opinions and decisions [37]. For years, the relationship between reason (science) and faith (religion) has been debated. Traditionally, *faith* has been viewed as the opposite of *reason* [38], and therefore the two were viewed as incompatible [39]. Currently, this topic is still open for discussion. Some researchers still believe that the two are in conflict, yet others believe there will be no contradiction between the two [32] when faith is adequately understood and reason adequately employed. For instance, some argue that people who follow a religion do not do so because they are against science but instead because they interpret specific phenomena from a religious point of view [39]. Although the debate is ongoing, it appears that when people need to interpret an unknown subject, they form their opinions and decisions based on data from

either religion or science [40]. The choice that the person will eventually make largely depends on the experience he or she has had with each [41].

During the early stages of the COVID-19 outbreak, though it is unclear whether it was an underestimation of the risk or lack of trust in science, various religious leaders encouraged resistance to the preventive guidelines to contain the virus that were presented by the governments. Due to the contagious nature of the virus and the disregard towards the measures by followers, there were reports of virus spreading within places of worship. For instance, in South Korea, a church refused to follow the safety protocols (i.e., wearing masks, maintaining social distance), resulting in 5000 new cases, and was identified as contributing to the local epidemic [42]. Additionally, in Trinidad and Tobago [43] and in the State of Louisiana in the USA [44], the virus could not be contained as some churches refused to cease large gatherings. The former argued that believers who stopped attending the church lacked faith [43], whereas the latter stated that COVID-19 was politically motivated [44]. Consequently, public measures were not followed.

Importantly, religious people seem to be more skeptical towards science. For example, it has been noted that religious people do not view science epistemically but rather from a moral point of view, which leads them to be more skeptical [45]. Furthermore, it has been shown that religiosity negatively affects trust in science, regardless of other factors such as society or specific religion [37]. Moreover, concerning European countries, data are available from a recent Special Eurobarometer conducted between April and May 2021 entitled "European citizens' knowledge and attitudes towards science and technology." [46]. Overall, this analysis indicated that almost one-third of respondents agreed that there was too much dependence on science and not enough on faith. However, there were considerable differences at a country level; in six countries, at least half agreed on depending too much on science with the largest proportions seen in Cyprus (68%), Bulgaria (59%) and Greece (56%) [46]. Contrarily, 13% of those in Finland and Belgium and 15% in Sweden and Ireland thought this was the case [46]. These percentages were also affected by individual factors such as education level, gender, etc. [46]. Lastly, a novel study examined the role of trust in science towards compliance with prevention guidelines during the COVID-19 pandemic. The researchers found that although religion does not directly affect public compliance, it was correlated with less trust in science, which led to lower compliance with the public measures [27].

3.2. Political Orientation

Political orientation is an important factor that was found to influence trust in science in some countries. Though politics is very complicated, political orientation is divided between the left and right parties. Left supporters are considered liberal and democratic views, and right supporters are considered those who have conservative or republican views [47]. Research has shown that Democrats, as opposed to Republicans, demonstrate higher trust in science regarding its fundamental principles (confidence, decision making, judgment, and unbiased data) [48].

Specifically, research has shown that trust in science is declining among the supporters and members of conservative political orientations [49–51]. This was mostly observed regarding global climate change matters, but it seems that it has been exacerbated by the COVID-19 pandemic. In comparison to liberals, conservatives in general have less trust in science [50]. Nonetheless, the same research indicates that there is a difference when distinguishing among "impact" and "production" scientists, with the former focusing on understanding human health and people's impact on the environment, while the latter focuses on the effects on the economy. The findings suggest that conservatives, compared to liberals, demonstrate greater trust in production scientists than in impact scientists, thus illustrating that the economy plays a key role [50]. The measures enforced by governments worldwide to prevent the spread of the virus may be considered as impact-specific scientific endeavors, with measures such as social distancing.

The COVID-19 pandemic and the public measures taken to slow down the spread of the virus have again underlined the differences between conservatives and liberals. According to recent research, conservatives tend to defy the protective measures and are less concerned about the virus than liberals [51]. Literature supports that conservatives tend to have a conspiratorial way of thinking, believing that presented facts are not, in actuality, the truth [52]. This seems to be magnified when it comes to conspiracies about COVID-19 in particular [51]. Research from the United States has shown that trust in President Trump and the state governors impacted the levels of concern about the virus in the USA, with conservatives trusting the president and federal government more and liberals trusting state governors [51]. Notably, at the same time, conservatives showed less trust in science than liberals, thus illustrating how trust in science can turn into a political issue [51].

Significantly, what seems to have affected trust in science when combined with political orientation is that, although the information about the virus comes from sources of science, governments enforce measures on a political level. In this respect trust in science interplays with trust in the political system and trust in the political authorities. One can have high trust in science, yet low trust in the political institution, which will eventually influence one's response. Results from the Special Eurobarometer show that respondents tend to agree that scientists should intervene in political debate to ensure that decisions take into account scientific evidence (68%), with fewer agreeing with the opposite statement that scientists should not intervene in political debate when decisions ignore scientific evidence (39%) [46].

Political orientation was also found to significantly impact susceptibility to misinformation, with greater susceptibility observed in conservatives than in liberals in Spain, Ireland, and Mexico [53]. Moreover, a longitudinal survey study has shown that political orientation is related to the accuracy of information people believe. Specifically, liberals were more likely to believe more accurate statements about the pandemic than conservatives [30].

It is important to note that the association of political orientation with trust in science is complicated and is much less apparent in some countries. For instance, in some countries, opposition to the elite, often found in political stances such as populism, is what influences the level of trust in science [54]. The followers of this stance hold that true knowledge comes from ordinary people and not from the elite, which are usually considered to be the ones that are wealthy or well educated [55]. A study conducted in Switzerland during the COVID-19 pandemic found that science-related populist attitudes decreased after the pandemic [55], thus indicating that the pandemic minimized the strong ideas they held about science.

3.3. Education

Education has been shown to influence general trust [56] and trust in science [57]. Education has been viewed as an essential factor for trust in science. This is largely because more educated people are arguably more able to access scientific information and understand their findings than their less-educated counterparts. Research has shown that education, in terms of traditional education and in terms of scientific knowledge, are both predictive factors of trust in science [58,59]. Moreover, in terms of analytical thinking and cognitive reflection, education is a critical factor in processing information, therefore leading people towards trust in science and the ability to distinguish it from misinformation [60,61].

There is also the suggestion that trust in science is influenced not by the level of schooling one received but rather by the education one achieved. For instance, some argue that highly educated individuals in the humanities or social sciences have lower confidence in science and even decreased trust in science [58,62]. This shows that it is not a simple causal relationship. For instance, studies found a weak association between education level and trust in science [27,63], and there is also support from research that higher education

may lead to less trust in science [58]. One possible reason behind this finding is that highly educated individuals demonstrate more critical thinking and search for information before deciding whom to trust.

Importantly, there appears to be a so-called *science confidence gap* that is influenced by the person's education. This term refers to people who place great trust in scientific principles and methods but at the same time do not trust scientific institutions. Research has shown that this gap is smaller among more educated than among less educated individuals [57].

3.4. Socioeconomic Status—Poverty

To our knowledge there has been no study that directly examined the relationship between socioeconomic status and trust in science specifically. Nevertheless, numerous studies have explored trust in general and socioeconomic status. For instance, the financial status of a person, and specifically the income, appears to affect trust attitudes. It has been found that having lower income and education, as well as belonging to a minority group, is associated with low trust [64]. Moreover, a recent study has shown that people who identify themselves as members of a minority group are more likely to be susceptible to misinformation [53]. Minorities who have been discriminated against by the governments show greater distrust in institutions, which may, in turn, affect trust in science [53]. Research also indicates that the higher the household income the higher the trust of individuals and the higher the income inequality the lower the level of social trust [65]. In contrast, there have been studies showing that individuals from poorer backgrounds may be more trusting than those from higher socioeconomic backgrounds [66].

In terms of the pandemic, because public measures are mandated by politicians (governments or states), minorities tend to have lower trust, which in turn affects trust in science [67]. Finally, in the time of the COVID-19 pandemic, research shows that socioeconomic status, particularly poverty, negatively affects the implementation of restrictive measures during a pandemic [25]. Due to the work travel requirements, there is greater mobility demonstrated by these groups, and therefore this in turn increases the risk of people being exposed to the virus [25].

3.5. Personality Traits

The Big Five personality traits have been traditionally considered in psychology to influence a person's behavior. The term does not refer to five single traits, but rather to five broad categories of traits, with each including many personality characteristics [56,68]. The Big Five traits are: neuroticism (emotionally unstable, tensed, anxious), openness (insightful, intellectually curious), agreeableness (helpful, trustful, sympathetic), conscientiousness (responsible, reliable), and extraversion (talkative, outgoing, active) [68]. Research has shown that there seems to be a correlation between trust and certain personality traits. Extraversion has been found to be positively correlated with trust, as extraverted people seem to show cooperative behaviors towards other people [69,70]. Moreover, trust in strangers and friends has been found to have a positive correlation with both agreeableness and openness [68,71].

On the other hand, high levels of neuroticism are linked to lower levels of trust in others [68]. Though the research identifies the personality mentioned above traits as predictors of trust in general, no such link is noted regarding trust in science specifically. However, it can be argued that personality traits such as extraversion, openness, and agreeableness could also play an important role in trust in science.

Furthermore, according to research, people's sense of personal control over their lives positively correlates with trust [72]. This means that people who believe that they are the masters of their fate tend to show more trusting attitudes towards others than those who have a more resigned view of their lives [72]. Recent research has also shown a positive correlation between trust and social intelligence, as people who appear to exhibit high social intelligence tend to be better judges of the trustworthiness of others [73,74].

4. Accuracy of Information and Trust in Science

With the growth of digital technology, information is readily available to the public, allowing people to access scientific information like never before [14]. For instance, via the internet, people can find a lot of information within seconds [14]. On the other hand, having a lot of information available does not necessarily mean that the information is credible. During periods of pandemic, people are bombarded with enormous amounts of information. There is a lot of conflicting scientific information available, which poses a challenge to people who need to filter out the information that is not accurate. Research has shown that the information people consider accurate or not is strongly related to their level of trust in science [30]. Results from the Special Eurobarometer [46] mentioned previously showed that, overall, 86% of the respondents perceive the influence of science and technology on society as positive, a finding that is nine percentage points higher than in 2013. Even in within-country comparison, more than seven in ten respondents in every country think the influence is positive [46]. At the same time, though, when looking at individual questions, one will notice that significant variability in levels of trust in science exists from country to country. More specifically, when asked about agreeing that science and technology could improve everyone's lives but primarily improves the lives of people who are already better off, Cyprus (75%), Hungary (71%), and Bulgaria (70%) had the highest rates whereas Finland, Estonia, and the Netherlands had 9% agreeing with this statement [46]. Concerning the truthfulness of scientists, the Special Eurobarometer [46] data showed that 70% of Germans and Slovenians think scientists are truthful, but only 45% of Slovaks and 36% of Irish think this. Once again, these percentages were also affected by individual factors such as education level, gender, etc. [46]. Thus, the following section describes the relationship between trust in science and the accuracy of information by looking specifically at social media, misinformation, and conspiracy theories.

4.1. Social Media

Nowadays, people tend to rely on the internet to educate themselves on science, technology, politics or even the news around the world. Specifically, it has been noted that social media, rather than webpages or online searches, are now the main source of information for many people [75]. It has also been found that social media (such as Facebook, Instagram, Twitter, YouTube etc.) appear to relate more with trust in science when compared to traditional media or online news [19]. Research shows a positive correlation between trust in science and social media news, as long as the information extracted comes from sources, even scientists, they trust [19,76]. At the same time, however, social media can be a source of misinformation depending on the sources accessed.

The main issue with being informed via social media is the lack of verification or control over what is being published and the possibility of such sources of information being unofficial [53,77] and therefore not scientifically based. A key element of social media is that the more a post is liked, shared, or commented on, the greater its popularity and the more influential it appears to the public. Consequently, with no verification of the accuracy of the information, or the source, misinformation can be widely and continually spread.

Even though social media make science more accessible to everyone, it is hard to put a brake on the spread of misinformation on these platforms. According to research, people who want to influence others about certain scientific matters, such as vaccination, tend to use social media as a platform to be heard by the public [19]. Recent research has shown that people who are informed about COVID-19 via social media are more susceptible to misinformation than those who are informed via other sources [53]. On the other hand, via social media, it is more likely that scientific information will be spread faster and more effectively, as it allows the public to be informed directly from the source, whether it is a scientific institution or a university [19]. Fortunately, the use of social media allows scientists or scientific institutions to correct the misinformation that is being spread [78].

4.2. Misinformation

First and foremost, what needs to be highlighted is that according to cross-cultural research, trust in science is negatively correlated with susceptibility to misinformation [53]. This shows the importance of trusting scientific institutions and scientists for accurate information during a pandemic [53]. As mentioned above, social media are the main source of information for people nowadays. More often than not, people tend to trust what they read online if they believe it comes from a trustworthy source. Although a positive correlation between trust in science and social media has been found, people do not always know the difference between scientific information and misinformation [19]. Therefore, social media can be used to promote both sides. During COVID-19, people have been bombarded with information from mainstream media, online websites, and social media. The difference between mainstream media and social media (or websites) is the accuracy of published information. For example, recent data concerning the most viewed YouTube videos about COVID-19 shows that more than 25% of them had misleading content [79]. Research has shown that more than 40% of British social media users came across misinformation about COVID-19, most of them daily [80]. This would not be a problem if it was not repeated exposure, increasing the belief in such misinformation [81]. It has been shown that people who believe in fake news tend to show lower trust in science and scientists [82]. Moreover, distrust towards the government and mainstream media were predictive factors of believing misinformation as accurate [83,84].

Recent research has shown that people who score higher in numeracy tasks and show more trust in scientists are most likely not to believe misinformation about COVID-19 [53]. In addition, as mentioned above, political orientation seems to have a significant impact on susceptibility to misinformation, with conservatives being more susceptible than liberals. Finally, the same research indicates that people who believe that politicians rather than scientists can deal with the virus are most likely to believe in misinformation [53]. At this point, it has to be noted that although the majority of people consider COVID-19 misinformation as not credible, a significant amount of others do not share the same belief [53].

4.3. Conspiracy Theories

From the early stages of the pandemic, conspiracy theories have been circulating. With the rapid progression of the virus, a lot of unknown variables were at play, and as such, people needed an explanation to make sense of the events. Therefore, conspiracy theories became popular because they provided a context within which people could understand what was happening while simultaneously placing the situation's responsibility on an identifiable party.

Conspiracy theories regarding COVID-19 cover a wide range of information about the pandemic. The most common suggests that the virus was manufactured in a laboratory, is connected to the 5G network, and the governments use it to manipulate people [53,85]. Another conspiracy theory concerning vaccination claims that a microchip is contained in the vaccine to control the population [86]. A recent study has shown that people who believe in conspiracy theories about the pandemic and the virus tend to reject scientific information, affecting their compliance with public measures taken to minimize contagion [87]. Furthermore, the literature indicates that people who believe in one conspiracy theory are more vulnerable to believe in other conspiracy theories [88]. In a recent cross-cultural study, about 16% of the participants supported the trustworthiness of the 5G theory [53].

Furthermore, in the Special Eurobarometer mentioned above [46], Cyprus and Greece had the highest scores (58% and 52%, respectively) on agreeing that there is a cure for cancer and is hidden from the world, compared to Sweden's 4% and Denmark's 5%. A similar picture can be seen when asked about viruses being created in labs to control our freedom, with Cyprus, Romania, and Bulgaria having the highest scores of agreeing to this statement (53% and 52%, respectively) compared to 6% of Denmark and 7% of the Netherlands [46].

These percentages were also affected by individual factors such as education level and gender, thus further supporting the complexity of the issue [46].

5. Trust in Science and Public Policy

Aiming to reduce social interaction and limit the contagion of COVID-19, public health and social measures have been implemented worldwide. On 10th January 2020, following the outbreak of COVID-19, the WHO issued a comprehensive package addressing the management of the unknown virus and encouraged governments globally to follow the guidelines provided [89]. The guidelines were based on the transmissibility of respiratory viruses such as MERS and SARS, as not much was known about the SARS-CoV-2 virus at the time [89]. With a focus on reducing contagion of acute respiratory infections, the guidelines included: avoiding close contact with infected persons, frequent handwashing, avoiding unprotected contact with farm or wildlife animals, the practice of cough etiquette, and enhancement of standard infection prevention and control practices in health care settings. With the development of the pandemic, new data became available to scientists, and as such, new guidelines emerged.

Overall, health protection guidelines are based on scientific research, clinical trials, and experiments. Scientists and scientific institutions propose them because their research shows that they are more effective in containing the spread of the virus. Governments then follow these research-based guidelines and issue mandatory policies for the public to slow down the spread of the virus. Compliance with public measures—whether people follow and adhere to the recommended guidelines provided by governments—is related to various factors, including trust in science [20–28].

At the beginning of the COVID-19 outbreak, most governments decided that people needed to limit their face-to-face contacts to manage this situation better, so they implemented lockdowns and/or curfews. This policy led people who lived or worked in big cities to massively return to their homes in other areas of the city or villages. India was a great example of the effects of such a decision, as the curfew policy forced many workers to return to their villages, even on foot (as public transportation was over capacity), risking the spread of the virus outside the cities in areas which were not medically prepared for the COVID-19 outbreak [90].

As mentioned above, part of the public policies implemented in many countries were the lockdowns and the curfews. Therefore, public policies affected people's freedom and limited their social life. On the other hand, the success in handling this pandemic depends on the implementation of these mandates, and that requires people to trust science and have faith that their government is making the right choices, which will be applied for a limited amount of time. Research suggests that applying the government's measures is affected by people's trust in public institutions, with people trusting the institutions that they consider as more credible sources of information [22]. Subsequently, people's perception of how the government is handling a pandemic such as COVID-19 greatly affects institutional trust, as observed in the previous pandemic of Ebola [25].

6. Trust in Science and Preventive Behaviors

A theoretical model that explains how people behave and cope during extreme stressful and threatening situations is the Protection Motivation Theory [PMT] [91–93]. This model is essential since it effectively determines the individuals who will follow the recommended preventive practices in previous pandemics, such as SARs and H1N1 Influenza [94,95]. According to this model, people are guided by extrinsic and intrinsic factors when performing the desired behavior. This framework suggests two multidimensional determinants of motivation: (a) threat appraisal and (b) coping appraisal. *Threat appraisal* refers to the personal belief and perception of the individual regarding the degree of harm in contracting a disease (perceived severity) and the personal perception of one's possibility to experience harm (perceived vulnerability). *A coping appraisal* is one's belief of the effectiveness of a recommended behavior in preventing or removing the possible

harm (response efficacy) and the actual costs associated with performing the recommended behavior (self-efficacy) [91–93]. Studies have shown that the PMT is effective in predicting COVID-19 preventive behavior intentions [96–98].

During periods of crisis, people need to make choices regarding unknown events, such as following public measures or getting vaccinated. Such decisions are often challenging, as people need reassurance that they are making the right choice. The current section examines how trust in science can influence the behavior of individuals by reviewing compliance to the public measures and vaccination decisiveness.

6.1. Compliance with Public Measures

Literature suggests that a complex interplay of factors influences the desire of people to undertake the recommended actions during a crisis, such as the sociodemographic characteristics, knowledge, personal responsibility, perception of personal risk or threat [99], and one's personal stance towards a scientific topic [5], among others. The above factors are tied to trust since information that is coming from trusted sources is more likely to be considered accurate and can influence one's willingness to adhere to the recommended measures [99]. Importantly, trust has been also found to be a predictor of compliance to protective measures [20–28]. Political trust, trust in government, epistemic trust, and trust in science can play a role in an individual's decision and skepticism.

People are more likely to act in accordance with the proposed guidelines if they consider COVID-19 to be a serious risk and if they exhibit trust in science. Plohl and Musil [27] found that though certain factors such as political conservatism, religiosity, conspiracy ideation, and intellectual curiosity did not directly affect compliance, they did affect trust in science, which subsequently affected compliance. Similarly, higher levels of intellectual curiosity indicated greater trust in science and greater compliance with COVID-19 prevention measures [27].

Literature has shown that trust in science is a predictor of following scientific guidelines regarding health issues [36]. Recent research regarding the COVID-19 pandemic indicates that people who have higher levels of trust in science, in terms of scientists and scientific institutions, tend to show more compliance with the public measures [53]. In a study that examined the willingness to engage in behaviors to prevent and contain the spread of the virus in 23 countries, it was found that trust in science, governments, and citizens, played a crucial role in favor of people's compliance and intention to engage in discretionary efforts, a role more significant than the threat of the virus itself [26].

6.2. Vaccination Decisiveness

Vaccination hesitancy has been a serious issue for the past few years, as it was considered a threat to public health worldwide [100]. Research about vaccination against SARS-CoV-2 estimates that if more than 10% of the population refuses to get vaccinated, it could undermine the benefits of vaccination for the whole population [101]. According to recent research, people who trust science in terms of scientists and scientific institutions are more willing to get vaccinated or advise a friend or a family member to do so [53]. As previously mentioned, the source of information is vital in how a person reacts to the COVID-19 guidelines, whether through vaccination or protective measures. Accordingly, studies have found that vaccination hesitancy is correlated with exposure to misinformation and conspiracy theories found mainly online [102,103]. Moreover, in addition to vaccination hesitancy, the prompting of others to refuse vaccination has been linked to conspiracy mentality [104].

Recent research about COVID-19 vaccinations has shown that there are two main factors, aside from trust in science, that have a more substantial causality relation with vaccination hesitancy: (a) the attitudes people have for vaccinations in general and (b) conspiracy mentality about COVID-19 [36]. Regarding the attitudes, a recent international survey with countries with low and middle income [105] showed that individuals who believed in the effectiveness of the vaccine, who had higher knowledge about COVID-19,

higher education, and greater worry/fear about the virus, were more likely to accept vaccination against COVID-19 virus. On the contrary, the lower the income, the higher medical issues/chronic disease, and the more the side-effects people perceived the vaccine had, the lower the acceptance of the COVID-19 vaccine. Interestingly, vaccine decisiveness varied according to region. Asian countries with an increased perception of fear regarding the side effects, such as Thailand, Malaysia, and Bangladesh, had less vaccine acceptance, whereas for African countries, their reasoning for less vaccine acceptance was the belief that it was created to harm others [105]. It is essential to consider the factors that affect vaccination hesitancy before developing campaigns for public vaccination. These campaigns should be created according to the target group and not be generic messages [106], accounting for each country's cultural setting [105].

7. Concluding Remarks

The main goal of this entry was to explain the significant role of trust in science during the COVID-19 pandemic. The main conclusions of this entry are the following:

- Trust is a complex concept that is important in many respects.
- A specific type of trust, trust in science, is critical for overcoming the ongoing health crisis. This is because it is associated with the source of information one considers accurate, and it could influence the behavior of individuals regarding unknown events, such as compliance with public measures and vaccination decisiveness. Science is the force that guides the future of societies and the basis of policies made by governments in times of crisis.
- Many factors influence science trust, including religion, political orientation, education, socioeconomic status, and personality traits.
- Since the pandemic is not over yet, and possibly future pandemics will occur again, finding ways to improve the public's trust in science is crucial.
- Scientists and scientific institutions, and consequently governments, should aim at finding ways to help the public comprehend the information presented by scientists. This approach will eventually increase the trust in science, which will be beneficial during the COVID-19 pandemic and future crises that might be encountered.
- Based on some of the cross-country comparisons mentioned in this entry, in addition to the individual factors, each country should look more closely at their individual/unique data and adjust their chosen interventions more targeted than doing so on a national level.

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