# Cognitive biases in communication and prevention of COVID-19

Sesgos cognitivos en la comunicación y prevención de la COVID-19

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**ABSTRACT**
**Introduction**: For governments to promote public health effectively in the context of the COVID-19 pandemic, they must encourage measures and restrictions on the behavior of their citizens without falling into a police state. Behavioral science provides a number of explanations, such as cognitive bias, that can serve as a starting point for understanding non-compliance with health measures. **Methodology**: To do so, a review of cognitive biases that disrupt the decision-making process is carried out, including loss aversion, bandwagon effect, optimistic bias, or availability bias. Likewise, some measures such as the design of communications or nudge tools to face them are presented. **Results**: Despite the attempts to raise awareness through informative and educational campaigns, it is possible to include other tools that help solve the problems of attention or decision making of the population, based on the simplification, framing and adaptation of the content of the messages to the target audience, as well as the inclusion of elements that facilitate the adoption of new habits. The progressive return to habits that require social contact means that public agents are reinventing themselves in the process of promoting new lifestyles, including hand disinfection, wearing masks or interpersonal distance.

**KEYWORDS:** COVID-19; nudge; Spain; behavioral sciences; social psychology; public policy; choice architecture; cognitive biases.

**RESUMEN**
**Introducción**: Para que los gobiernos promuevan la salud pública de manera efectiva en el contexto de la pandemia del COVID-19, deben de fomentar medidas y restricciones en el comportamiento de sus ciudadanos sin caer en un estado policial. Las ciencias del comportamiento ofrecen una serie de explicaciones, como los sesgos cognitivos, que pueden servir como punto de partida para comprender el no cumplimiento de las medidas sanitarias. **Metodología:** Para ello, se realiza una revisión de los sesgos cognitivos que irrumpen en el proceso de toma de decisiones, incluyendo el de aversión a la pérdida, el efecto de arrastre, la autopercepción optimista o el de disponibilidad. Asimismo, se exponen algunas medidas como el diseño de comunicaciones o las herramientas *nudge*

para enfrentarse a ellos. **Resultados:** Pese a los intentos de concientizar a la población mediante campañas de divulgación y educación, es posible incluir otras herramientas que responden a los problemas de atención o de toma de decisiones de la población, basadas en simplificar, enmarcar y adecuar los contenidos de los mensajes al público objetivo, así como la inclusión de elementos que faciliten la adopción de nuevos hábitos. La progresiva vuelta a hábitos que requieren contacto social conlleva que los agentes públicos se reinventen en el proceso de promoción de nuevos estilos de vida, incluyendo la desinfección de manos, el uso de mascarilla o la distancia interpersonal.

**PALABRAS CLAVE:** COVID-19; nudge; España; ciencias de la conducta; psicología social; políticas públicas; arquitectura de elección; sesgos cognitivos.

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## 1. Introduction

At the end of January 2020, the Spanish media began to inform the population regularly of the presence of a novel coronavirus in China, called at that time the "Wuhan pneumonia". It was first detected in December 2019, but it did not take long to alarm the World Health Organization (WHO), declaring the global pandemic on March 11, 2020. The first COVID-19 case in Spain was confirmed on January 31 on *La Gomera* Island (RTVE, 2020a). On February 13, the first victim of the virus was recorded in Spain. To date, more than 30,000 deaths have been counted (Coordination Centre for Health Alerts and Emergencies, 2020a). On March 14, the Government decreed the State of Alarm in Spain (Royal Decree Law 463/2020, 2020), with the consequent measures to contain the pandemic: travel restrictions, business or educational centers shutdown, and a set of recommendations at an individual level to prevent the spread of the virus.

Governments across the world have mobilized to control and curb the spread of the virus, but their efforts are pointless if the behavior of the general public is not subjected to change. Massive public health campaigns to stop the pandemic have multiplied, especially emphasizing aspects such as hand washing, wearing masks or social distancing. In addition to the hectic pace of laboratories around the world to produce a vaccine, social and behavioral sciences are undertaking an invaluable role in slowing the spread of the virus.

Behavioral sciences applied to the current health management can be very useful when informing and modifying citizens' behavior (Thaler & Sunstein, 2008). Thus, they can be used to create measures to control infection rates and develop new behavior patterns in the face of future pandemics (West *et al.,* 2020). Despite the tremendous efforts authorities are making to train and inform citizens about the habits they should form during these times aimed at mitigating the pandemic, it is necessary to take other types of measures that also appeal to collective motivation and to risk perceptions grounded in the circumstances. According to WHO (2005), under an epidemic outbreak situation, the main objective of communication is to maintain public confidence. Therefore, public authorities face a twofold challenge. Their messages and measures must motivate the citizenry for it to trust in results that will not be realized in the short term. In this sense, the State can focus its efforts on the decision-making processes of the population to benefit society in general and citizens in particular (Oliver, 2017). This attitude does not force or impose a behavior, the final decision is

always made by the citizen and their freedom of choice is not violated, but it can help in the face of decision-making processes that are not always rational (Cerezo, 2020). Of course, it does not mean this is the only strategy that must be adopted in the context of the pandemic. However, it is useful as a measure that entails a socially responsible behavior of citizens without resorting to imposing regulations.

This article's objective is to explain the imperfect individual decision-making processes of the population, which entail putting the community at risk, and to review a series of tools that in other health emergency contexts have mitigated and redirected unhealthy behaviors of different groups of the population. The starting point is the published knowledge to date of the use of behavioral sciences to address cognitive biases applied to managing the SARS-CoV-2 pandemic. The review articles try to explore the published literature and put it in perspective around a topic (Ramos, Ramos & Romero, 2003), in order to provide an overview of the state of the art. To prepare this review, a search of the publications containing the terms "cognitive biases", "behavioral sciences", and "COVID-19" or "pandemic" was conducted. Since it is a very recent issue, the number of publications addressing these topics was still scarce. To obtain more information, the institutional websites of the international behavioral science research centers or institutes were visited. These entities regularly published information about tools or strategies that could help face cognitive biases around the pandemic, hence including them was considered appropriate. In addition, online media and resources elaborated by the Government to obtain information about the measures established by it to overcome these biases were consulted. As a result of this review, this article consists of two parts. The first one focuses on the theory of cognitive biases to explain the imperfect behavior of the population. The second part addresses the use of nudge tools and the design of communications in the media to deal with these biases.

## 2. Development and discussion

### 2.1. Imperfect decisions in critical situations

Why do human beings not always adopt the correct measures for themselves and for the general public even when they know these are? Many theories in the field of philosophy, psychology, neuroscience or economics have tried to provide answers about the imperfect human behavior. Down below, a response to the not always correct social behavior in the face of the COVID-19 will be given based on the theories developed by Tversky and Kahneman (1979) who presented human rationality as being interfered with heuristics or cognitive biases. These cognitive biases are shortcuts our brain uses when processing information, however, they can hinder decision-making and cause irrational or incorrect behavior (Kahneman, 2011). In the pandemic context, knowing how to detect these biases and respond with mechanisms that promote socially responsible behaviors is essential. The uncertainty in which we are immersed causes our brain to resort even more to these biases to give quick and impulsive responses to decisions or behaviors that we have to assess and that we have never faced before. Hereunder, a set of cognitive biases contextualized in the pandemic are presented, and the responses designed by the authorities to mitigate them are mentioned as well.

#### 2.1.1. Loss Aversion

Loss aversion bias is part of the prospect theory (Kahneman & Tversky, 1979) and states that humans attach more importance to losses than to equivalent gains, that is, we prefer avoiding losses to acquiring gains. Currently, this bias makes people think much more about what they are losing with this health crisis than about what they are gaining by complying with the health measures. In

response to this, those responsible for public and health policies must mitigate this overvaluation of the negative consequences or losses, also appealing to the positive ones, within this difficult context in which they emerge.

### 2.1.2. Bandwagon effect

The above bias leads to the bandwagon bias, which consists in doing what most people do, regardless of whether it is the right thing to do or not. For example, the first weeks of the state of alarm were marked by huge groups of people going to supermarkets to buy a lot more than what they actually needed (*20minutos*, 2020). Due to the dread of running out of products and in the face of the panic behavior of some people, this "hop on the bandwagon" phenomenon occurred and this behavior was imitated.

To mitigate this bias, we must resort to rationality, which is complicated but not impossible in the context of a global pandemic. Even so, in response to the supermarkets overcrowding, the political authorities and the employees themselves appeared in different national media reporting that there was not going to be any supply shortages and calling for serenity (El Mundo, 2020). The effective response of the supermarkets constantly replenishing the shelves and calling for calm eased the pressure of the influx in the following weeks.

### 2.1.3. Little worth in long-term consequences

The hectic pace to which we are being subjected in our daily tasks has caused us to consume time as if it were fast food, expecting consequences and results of our actions in a very short term. As soon as our behavior entails a series of rewards that will only be realized in the long term, the motivation to perform them decreases considerably (Frederick, Loewenstein, & O'donoghue, 2002). In the current context, this implies that we will only take protection and containment measures if we see short-term results. We see the future in a more optimistic way than what it can be because we perceive that the time we have to solve problems is longer. Thus, one might think that "nothing will happen if I skip lockdown for one day, there are plenty of days to do it right". The bias surrounding this type of behavior is known as present bias, whereby our decisions and preferences focus on enjoying the present more than the future. In this case, the role of authorities is also to show hopeful messages that demonstrate short-term results of the measures that are being implemented.

### 2.1.4. Optimism bias

Optimism bias is the belief that we are unlikely to experience negative events. People often overestimate the probability of positive events and underestimate the probability of negative ones occurring in the future (Sharot, 2011). There are several factors that explain this unrealistic optimism, including perceived control and good mood (Helweg-Larsen & Shepperd, 2001). This type of bias can be observed in people who smoke despite the health warnings. They feel it will not affect them (because that surely only happens to those who smoke more than them) and they feel optimistic about the threat (Stretcher, Kreuter & Kobrin, 1995; Arnett, 2000). As for the management of the disease, this bias can make us feel less vulnerable than other people. For example, at the beginning of the pandemic, it was said that it mainly affected the elderly, so all the young and middle-aged people did not feel threatened, and, consequently, underestimated the security measures. This bias has lessened in cases in which a family member has become seriously ill or has died because the risk is perceived closer (Dryhurst *et al.,* 2020). This can help shape the messages shared by health policy makers. Health authorities and the media, in the face of this situation, must show a clear message.

Although vulnerable groups are statistically at higher risk for severe illness, the fact that a person outside this group shows these symptoms can be very dangerous. It is dangerous both for oneself (there are young and middle-aged people who have died from the COVID-19) and for others (be carriers and infect a vulnerable person). Additionally, they must draw on feelings bringing cases of real patients closer to those people who perceive less risk. For example, appealing to empathy and to confront this bias, the Italian Government launched a campaign in mid-March that directly resorted to fear and individual responsibility (*El País*, 2020). It featured images of intubated patients in serious condition lying in hospital beds, captioned: "how was the appetizer?" "Did you like Milan?" "Your personal responsibility today can determine the physical, economic, and psychological health of the country. No order or mandate, only the greatest form of consciousness about your own life will change the fate of this horrible disease", in addition to including the hashtag "Stay At Home", also implemented in Spain. In August, the Peruvian Government launched a similar campaign with the hashtag "*El COVID no mata solo. #NoSeamosCómplices*" [The COVID does not kill alone. Let's not be accomplices.] (*Presidencia del Consejo de Ministros*, 2020). One of the dangers of resorting to emotions such as fear in the face of a threat is that it can have adverse effects. If people do not know how to handle that fear-based message that resorts to defense, they can feel more frustrated and vulnerable (Baron, 2000; Loewenstein, Weber, Hsee, & Welch, 2001). On the contrary, showing the danger of a threat can make society behave in a more conscious and responsible way if it feels capable of coping with it (Slovic & Peters, 2006; Bavel *et al.*, 2020).

### 2.1.5. Availability bias

This bias consists in overestimating the information that we perceive as more available and accessible, considering that what comes to our minds must be common or important (Freudenburg, 1993; Tversky & Kahneman, 1974). In this sense, if people perceive that most of society is breaking the rules, it may be either due to the excessive exposure to this type of information in the media or because their acquaintances do so. To prevent negative emotions or people feeling that their isolation and responsibility are being violated by others, it is also important to emphasize that most citizens are being responsible and are complying with the rules. On another note, if a person constantly receives information on acquaintances or relatives who got infected and are in a critical condition, in addition to being informed only about the number of deaths, it is more likely for this person to act based on fear and to feel more vulnerable.

### 2.1.6. Confirmation bias

Related to the one above, it is the tendency to search for and interpret information that confirms our perceptions or beliefs. Thus, more importance is placed on the arguments that reinforce our preconceived ideas than on those that contradict them (Jonas *et al.,* 2001). Therefore, we tend to ignore information that contradicts or damages our preconditions. In many circumstances, we do not even realize that we are stuck in a confirmation cycle, only searching for supportive information rather than refuting it, a tendency that Kahneman (2011) interpreted as "what you see is all there is". This is seen, for example, in fake or conspiracy news. Pieces of information of all kinds have been heard about the virus' origin, that it was created by a laboratory or that it was brought by aliens. If we add to the latter theory the fact that the United States Department of Defense disclosed images of possible UFOs soaring the sky (BBC, 2020) it seems easier to underpin it. Faced with these theories and fake news, regarding both the origin and the remedies or handling of the virus, it is necessary for authorities, the media, and opinion leaders to neutralize them. For example, in Spain, the National Police have launched a guide against hoaxes and fake news about the coronavirus (Ministry of the

Interior, 2020). *Radio Televisión Española* has also launched the "*Stop Bulos*" campaign, by which information received concerning the COVID-19 is verified and refuted (RTVE, 2020c).

### 2.1.7. The good image

One of the biases that have emerged in response to the control measures exerted by the State, is the *status quo* bias (Samuelson & Zeckhauser, 1988), consisting in a preference for the current state of affairs rather than an alternative of change. That is, not to accept a situation of change, and, therefore, to stick with the current default option. When an external agent somehow modifies a person's freedom of action, he/she responds by calling for the normality and freedom he/she had before. This is dangerous for public health if this rebellious attitude is also considered as an appealing trait by others, especially among the youngest groups or those who take advantage of the political situation to show their disagreement with the measures taken by the Government. By playing around with the limitations and strengths of this bias, it is possible to make others imitate people considered opinion leaders or gatekeepers and to reproach those people or groups who break the rules, changing those who comply with the rules to a higher status. This technique was used by Fernando Simón (director of the Coordination Center for Health Alerts and Emergencies) in one of his appearances in August (*La Vanguardia*, 2020), in which he appealed to influencers to motivate people to wear masks on their social networks. The use of hashtags such as *#YoMeQuedoEnCasa* [I stay at home], which encouraged the public to show their compliance with public health measures on their social media, has also been very useful, also creating a sense of unity.

In the following section a set of measures that can help mitigate the pandemic will be mentioned, such as the design of interventions based on the Nudge Theory and the design of communication campaigns in the media.

## 2.2. How to mitigate the pandemic?

### 2.2.1. Design of interventions: the *nudges*

According to Sunstein (Wofford, 2020), the most common bias during the pandemic is the excessive optimism, since people normally believe they are at lower risk than other people, although haste to obtain tangible and favorable results has also influenced on people's lack of responsibility.

Behavioral sciences have several useful pieces of evidence regarding this health crisis. Hereunder, a set of tools that have been effective internationally or in other contexts concerning personal hygiene and interpersonal distancing are presented. In the context of behavioral studies, these tools are known as nudges, which are used to promote healthy or responsible habits. The nudge concept bases on the theory that our decisions or thoughts are not always rational and conscious, but rather interfered by biases. This term became popular after Thaler and Sunstein published their book in 2008, where they defined it as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not." (Thaler & Sunstein, 2008: 20).

Nudges' functionality is based on promoting positive behaviors in the population through educational campaigns, by modifying elements in the environment, etc. Therefore, they are very useful and interesting in the context at hand, in which our habits have to change radically. Their

effectiveness is such that they are present in international reports that promote public health habits (WHO, 2012; Institute of Government, 2010; Halpern, 2015).

The use of nudges helps motivate healthy and socially responsible behaviors. They promote the creation of new routines (contributing to bridging the gap between our intentions and actions) and facilitate the acquisition of new behaviors. This is achieved with regular reminders and caveats about the measures to be adopted (Sunstein, 2014; Aggarwal, Davies & Sullivan, 2016) or turning behavior into social norms (Galle, 2014). Here are some examples that have worked in changing the most representative habits in the face of the COVID-19.

### 2.2.1.1. Hand hygiene

One of the first tips disseminated to curb the spread of the virus was frequent hand washing with soap and water. Why has it not become a habit yet if it is easy to do it? In line with the aforementioned ideas in the previous section, one of the reasons may simply be that it is something we are not used to doing (availability bias). Other reasons are that people around us have not acquired the habit either (hence the bandwagon effect does not occur) or that we take it for granted that "we have not touched anything; we have recently applied hand sanitizer; the surface I touched was clean…" so "we are not contaminated" (optimism bias). This habit has been decisive in the management of other pandemics in many societies.

Heijnen and Greenland (2015), and Huis (*et al*., 2012) have documented the use of nudges to promote this habit before the advent of the COVID-19. They used mechanisms such as simplifying information and including emotional and graphic elements to attract citizens' attention. Hereunder, some success cases are presented. For example, in schools in Bangladesh, to encourage this habit among school students, they promoted a series of nudges that drew their attention (Dreibelbis *et al*., 2016). The sinks were decorated with handprints, the floor was painted with footprint paths leading to them and, in addition, drawings of eyes were stuck on the mirrors to "keep an eye on" the actions of the little ones. The very use of mirrors in public restrooms is efficient since we feel that other people are observing our behavior, which encourages us to behave in the most socially accepted way.

A study conducted in Denmark (Birnbach *et al., 2012*) to promote the use of alcohol-based hand sanitizer in hospitals concluded that including a red sign directly next to the dispenser increased the probability of its use. Culturally, in the West, red is used in signs to draw attention, as warning or as stop; hence this visual cue quickly captures our attention (Heller & Mielke, 2004; Kuniecki *et al., 2015*). This study also analyzed the effectiveness level of a message written in this sign stating: "Here we use sanitizer to protect your family", which produced very positive results compared to placing a transparent sanitizer bottle in an inconspicuous place. Additionally, if hand sanitizers are offered in an automatic freestanding dispenser instead of a bottle that users must hold, turn, and squeeze to get the fluid out, its use can also be increased, since the task to obtain it is greatly facilitated (also avoiding direct contact of hands by holding the bottle). Another nudge that was used in schools in the United States in 2017 to promote hand hygiene in children, consisted in placing a graphic of germs on restroom doorknobs. This way, the children inevitably touched it when opening the door and were aware of its presence, increasing the possibility of them washing their hands (Mehta, 2017). Therefore, drawing on the unconscious and designing eye-catching cues can promote habits such as hand hygiene.

To increase the length of time for handwashing, habits around it can be created, like singing happy birthday twice instead of counting the recommended seconds (ABD, 2020a). Something similar has

been proposed so that children brush their teeth for an adequate length of time, since it is a task that is usually boring or useless to them. To keep them entertained, nudges such as an hourglass to keep track of the time they should spend on brushing have been used, or, to go further, there are campaigns that, with the help of an app and a Smartphone or tablet, show tooth brushing as a game with a timer, and as time passes an animated character begins appears on the screen. By the end of the brushing, the child wins a prize (a virtual sticker) (Nudging for good, 2015). Extrapolating it into the handwashing habit, especially in young children, it would be interesting to promote it as a game or an entertaining activity and not as an imposition, with the help of nudges. In the Spanish context, the measures taken to promote this habit have been limited to encouraging the population to do it through the media (*LaSexta*, 2020) and to providing explanatory posters and videos on its website (Coordination Center for Health Alerts and Emergencies, 2020b). It has been proven that infographics and posters with less text are more effective (The Behavioral Insights Team, 2020), which is why the quality and effectiveness of the messages in Spain ought to be studied.

### 2.2.1.2. Social distancing

As stated by Bavel *et al.* (2020), the very concept of social distancing can aggravate the feeling of loneliness or stress. In response to the *status quo* and loss aversion biases, the alternative for change must be as attractive as possible; not presented as a loss of freedom, but as an opportunity to combat the threat of the virus. If we define ourselves as social beings (Aronson, 2000), the moment we speak of social isolation the psychic implications for our self-concept are altered. The alternative term proposed by Bavel *et al.* (2020) is physical distancing, which implicitly maintains the concept of social connection as possible. We can stay connected in other ways despite being physically apart.

Regarding public spaces, in addition to controlling their capacity, nudges to remind people of social distancing can be implemented. For example, over the last months stickers in the shape of footprints have already been placed on floors to facilitate calculating the two security meters. Something similar can be used in bars, where irregularities have recently occurred due to the difficulty in calculating the distance between people. Even including a sticker on the table indicating the centimeters from one side to the other can help consumers understand the true distance in which they are.

During the summer, the media have denounced meetings and parties of young people without abiding by the security measures (especially distancing), which has caused a decrease in the mean age of the people infected (ABC, 2020b). This is due to the optimistic bias in the younger portion of society, the image of success they associate with breaking the rules, and the little importance they place on the consequences this attitude can provoke in the long term.

Producing a "bandwagon effect" is one of the possible strategies against this attitude. Messages such as "most of the youths have not attended parties this summer", reinforcing positive attitudes, and the use of socially shared norms (not necessarily legal) can reduce the harmful behavior (Sunstein, 2014).

### 2.2.1.3. Touching the face and wearing masks

Behavioral sciences can also help us adopt new habits such as avoiding touching our faces. This habit is particularly more difficult to adopt given our unawareness of how often we do it. This action can be substituted, for example, by touching our face with our wrist or creating barriers that prevent us from touching our faces with our hands, such as keeping them occupied with something, putting

them in our pockets, tying our hair so it does not bother us, or placing reminders in public places. The habit that health authorities have tried to establish is coughing or sneezing into the elbows. Wearing masks also prevents direct contact of hands with our nose and mouth, so wearing them regularly does not seem unreasonable.

The obligation to wear a mask at all times (Coordination Center for Health Alerts and Emergencies, 2020) has entailed a set of problems for the population. For example, the increase in household spending (OCU, 2020), the limited useful life placed on it, and the very fact of including it as another accessory in our daily lives. As with the use of hand sanitizer, a solution based on the Nudge Theory (Wofford, 2020) can be to include reminders about wearing a mask or, in a similar way as social distancing, to create communications about what most people do.

### 2.2.2. Design of messages

In the process of designing communication campaigns, it can also be relativized which part of the message will be more or less relevant. With the framing effect (Goffman, 1974; Buelna, 2015), communicators can emphasize (frame) one explanation of the events and downplay others. In other words, how information is received depends on the interpretative frame and the categorizations by which the media explain the facts. For example, it is not the same to say that 5% of the Spanish population has been immunized to the virus than to say that 95% are still vulnerable to it. The source information is the same, but the way it is presented changes completely. Positive framing (showing the information as gains and not losses) is linked to a lower perception of the damage. For example, a sense of liberty can be given by including statements such as, "we want our community to be free from fear of contagion", "the quicker we beat this situation, the quicker we recover and return to normal" (The Network for Public Health Law, 2020).

For their part, the role of political parties, whether they are related to the Government or not, has often caused gaps in that sense of togetherness in the Spanish population, speaking of "they" and "we", confronting groups with opposing political ideologies directly, questioning the health management in the country, and, therefore, creating distrust in sectors of the population, which can relax the feeling of insecurity in the face of the pandemic, make people believe more fake news or discredit health authorities, relying on labels and prejudices. Under these circumstances of political polarization, we must understand that the threat of the virus is the same for all voters, that it is all of us against the virus. Opinion leaders and the media must dilute this political division in the context of a global health emergency. The sense of togetherness, of community, of belonging to a team, has brought the Spanish society closer to join at all scales. Cooperation rather than competition, acting for the sake of the common good is also one of the characteristics that distinguish humans from other animals. In the long term, in a democratic society, citizen's behavior in the face of the pandemic can only continue voluntarily if governments focus on legitimacy. People are more willing to comply with the rules if they believe that these are implemented legitimately (Van Rooij & Fine, 2020). Legitimacy goes hand in hand with honesty, transparency, and agreement between all parties.

Hereunder, we present how simplifying content, appealing to emotions, and togetherness can work as basic tools in the design of institutional communications.

Given the numerous stimuli and the amount of information received throughout the day and given its limited rationality, the brain tends to create mental shortcuts to simplify them. If a piece of information is provided in a complex form, it is very probable that the information perceived will be little useful. However, if the messages are simple and eye-catching, their effectiveness increases.

When a threat is perceived and one is vigilant, internalizing and processing the information that is received daily and in dribs and drabs about the pandemic is more difficult. Hence, it is necessary for the messages of the authorities to be simple, clear, and precise, so they can reduce uncertainty, leaving unnecessary or bombastic information aside. For example, in the Spanish context, on March 11, Fernando Simón explained in a video what the famous epidemic curve was to all Spaniards (RTVE, 2020b); he graphically and didactically simplified the transmission process of the pandemic.

To raise awareness on social responsibility, another example is a video from the Washington Post newspaper showing a simulation of how travel restrictions can help reduce the number of infections represented with colored balls (Stevens, 2020). Optimism bias emerges when people are faced with an invisible threat, since it is difficult to deal with something we cannot perceive physically. To make this threat visible, there are communication campaigns aimed at showing visually how easily this virus spreads. In the face of an invisible danger, the sense of alarm decreases, so it is important to make the process of infection visible. There are numerous examples (Johnson, 2020) in which the virus is represented with a luminescent color and how, by touching any element, sharing spaces, speaking, etc., all the characters get infected.

On another note, what messages are more effective, those drawing on emotions or the impartial ones? Drawing on feelings, positive or negative, affects how events or situations are perceived. The content appealing to empathy (to feelings such as hope or longing) makes messages more persuasive and also more memorable in the long term (Andreasen, 1995). Let's think about Christmas advertising campaigns, where solidarity and the message of unity and togetherness are so successful. Using realistic narratives in which characters tell their experiences in the first person about a painful situation is very effective to promote that empathy and, consequently, making us feel closer to others (Bakker *et al.,* 2018; Shen, 2010). In the COVID-19 context, showing the stories of healthcare workers or sick people can help show the most visceral and human side of the pandemic. It is also true that drawing too much on emotions can overshadow the factual information about the danger (Loewenstein, Weber, Hsee, & Welch, 2001). For this reason, in addition to informing about the deaths and people infected, it is necessary to inform about the people who have recovered. Obsessive fixation with the famous death toll and epidemic curve can result in people feeling such negative emotions that they could ignore positive figures. This is one of the big challenges for health communicators, both political representatives and the media: to address the pandemic objectively, underscoring the number of deaths and people infected, as well as those who have recovered, maintaining a balance between pessimism and optimism. If the media show young people gathering and breaking the state of alarm rules on a daily basis, it could cause others to imitate this behavior, especially if the process of authorities arresting them of fining them is not shown. It is necessary to focus on those citizens who do comply with the rules.

Finally, group identity is an essential ingredient to understand and modify behavior. For example, in Texas, in order to prevent garbage from accumulating on the streets, a campaign with the slogan "don't mess with Texas" was launched, which managed to link regionalism with not tossing waste on the streets (Barton & Grüne-Yanoff, 2015). Our independent culture as opposed to the interdependent one should not be overlooked. For example, Asian or South American cultures have a stronger sense of community, both in family and social environments, while in Western European or North American communities the "I" is more prominent, supporting individualism (Triandis, 1995; Berry *et al.,* 2002). Therefore, depending on how our customs and our perception of society are, we will deal more or less easily with the pandemic. This entails a challenge for those responsible for public health, since it seems evident that, in an independent culture, due to the very interest in the "I", people would opt for individual benefits when abiding by the measures. Hence, communicators

must understand that a message stating "what benefits will I derive from complying with these rules" is going to be more easily internalized than one appealing to unity or community, such as "what can I do so that other people do not get infected". Collective responsibility, within this individualistic general self-concept, has to be accepted and internalized if the concept of care is to be enhanced. Since the state of alarm declaration, the Government has launched the campaign *#EsteVirusLoParamosUnidos* [We will stop this virus together] to unite the efforts of the entire country in the fight against the coronavirus and to promote social distancing measures. Who would have told Dúo Dinámico that their song "*Resistiré*" was going to be the anthem of a country 32 years after its release? (Blanco, 2020)

## 3. Discussions

Until an effective vaccine against the coronavirus is produced, global public actors must mitigate its transmission as much as possible. In spite of the time that has elapsed since the virus arrived, community transmission still continues due to the incorrect compliance with the proposed health measures. Cognitive biases constitute a problem at individual and community levels that has to be addressed. The work of Tversky and Kahneman (1979) was used to categorize, explain, and contextualize them around the current pandemic. Based on these it is concluded that individualistic behaviors are one of the most dangerous aspects when it comes to fighting the virus. Therefore, attaching more importance to losses than to equivalent gains during decision-making, downplaying long-term consequences, and the optimistic and invulnerable bias result in responsibility being diluted. On another note, it has been noted that information sources, such as opinion leaders or the media, are crucial to guide different sectors of the population towards a responsible behavior.

Understanding the behavioral limitations (cognitive biases) that human beings exhibit during critical decision-making moments, can efficiently define the measures to be taken when communicating and persuading in favor of community health.

To mitigate these biases, educational and awareness-raising measures on the disease are necessary. A change in habits and lifestyle are not easily attained, and even less if the unconscious side of our brain acts upon them.

This is why tools like nudges (Thaler & Sunstein, 2008) can help this unconscious side to convert health measures into habits, creating social norms, simplifying official information or redesigning elements of the environment. On the other hand, designing the messages in communication campaigns according to the sociocultural characteristics and to the social groups to which they are directed is essential for them to be effective. A review of these two aspects has been conducted based on the behaviors that have been discussed the most (Coordination Center for Health Alerts and Emergencies, 2020b), such as hand hygiene, interpersonal distance, and touching the face.

## 4. Conclusions

The documents reviewed corroborate the effectiveness of these elements when it comes to acquiring new habits, either because of their similarity with other previously studied contexts (Sunstein, 2014; Stretcher *et al.,* 1995; Shen, 2010; Samuelson & Zeckhauser, 1988; Nudging for Good, 2015; Dreibelbis *et al.,* 2016), or because of their examination during the coronavirus crisis (Bavel *et al.,* 2020; Goldberg *et al.,* 2020; Wofford, 2020; West *et al.,* 2020; The Network for Public Health Law, 2020; The Behavioral Insights Team, 2020; Stevens, 2020; Johnson, 2020).

This work provides a review of some key elements of behavioral sciences that can be used by public health policy makers to mitigate the COVID-19 pandemic.

As future lines of research, it would be advisable to collect new studies published in this regard, as well as to monitor the tools used by public actors to raise awareness on socially responsible behaviors in the population. Additionally, it could be extended to international contexts, with the purpose of comparing measures and analyzing their effectiveness.

In the face of an uncertain future, epistemic humility is a necessary virtue. This is based on the statement that our knowledge is always provisional and incomplete, and that it may require revision in light of new investigations (Angner, 2020); a relevant consideration for political and public health actors when dealing with the reality in which we live and its limitations.

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