

## Review of Biosecurity Perception in the COVID-19 Era

Alejandra Navarrete Quezada<sup>1\*</sup>, Cruz García Lirios<sup>1</sup>, Francisco Espinoza Morales<sup>1</sup>

<sup>1</sup>Department Social Work, Universidad Autónoma del Estado de México (UAEMex), Instituto Literario 100, Centro, 50000 Toluca de Lerdo, Méx., Mexico

**\*Corresponding Author:** Alejandra Navarrete Quezada

Department Social Work, Universidad Autónoma del Estado de México (UAEMex), Instituto Literario 100, Centro, 50000 Toluca de Lerdo, Méx., Mexico

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Biosafety, understood as a protocol to avoid contagion, illness and death of people, has established itself as a central topic for discussion on the public agenda. The objective of the present work was to explore the perceptual dimension of biosafety. A retrospective, exploratory and documentary work was carried out with a selection of sources indexed to regional repositories. The prevalence of the informative and speculative dimension of biosafety was established, suggesting to extend the project to other risk scenarios.

**Keywords:** Instrument's reliability, Instruments validity, Security perception.

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### INTRODUCTION

At the time of writing, the pandemic caused by the SARS-COV-2 coronavirus and the COVID-19 disease has infected 10 million, sickened 5 million and killed 500,000 people worldwide. In Mexico, it has infected 200,000, sickened 150,000 and killed 25,000 people. In this scenario, the perception of security is a central issue on the citizen's agenda not only due to the health crisis, but also the economic crisis (Carreon, 2020).

Security have concern authorities and civil society during last years (Mendoza, Carreon, Mejia & Garcia, 2017). Different society's substrates have different perceptions on security. In this way, the escalation of violence against vulnerable groups such as children, women and the elderly has increased exponentially and added to the risks posed by the pandemic. Derived from this situation, the perception of security emerges, develops and consolidates as a central issue on the citizen's agenda. It is a phenomenon in which potential victims appreciate the pandemic as unpredictable in its effects, immeasurable in its consequences and uncontrollable by the authorities.

Such phenomena, the pandemic and security, converge in the violence against the vulnerable groups

as a result of the frustration of the heads of families in the face of unemployment, famine and unhealthiness (Garcia, Carreon & Hernandez, 2017). In this way, the areas at greatest risk are the most densely populated such as Mexico City, mainly in the Iztapalapa mayor's office.

Precisely, the objective of the present work is to specify a model for the study of the perceived security in the face of the pandemic, confinement and violence towards vulnerable groups such as the elderly, women and children with respect to the head of the family, civil and health authorities.

The contributions of the study to the discipline are 1) systematic review of the state of the art, 2) systematization of findings, 3) proposal of a theoretical and conceptual model, 4) methodological approach, 5) diagnosis of the problem, 6) discussion between the findings and literature reviewed, 7) design of pedagogical sequences.

Thus, the first section reviews the theoretical and conceptual approaches that explain the phenomenon. The second section presents the results of studies related to the subject. In the third section the axes, trajectories and relationships between the

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variables are proposed. In the fourth section, the decisions to approach the problem are presented. In the fifth section, the results are described. In the sixth section, these findings are discussed. The seventh section reflects on the contribution and application of study in the classroom.

### Theory of Security Perception

Security, in several countries, have been suffered a lack, or absence, particularly when it is talked about governmental participation. Public security can be understood it as the state labor to protect and safe its population from internal dangers or threats. In Latin-American countries, public safe keeping is perceived as absent, due to big amount of press coverages which exposes mentioned lack (Rincon, Juarez & Garcia, 2018).

In case of Mexico, day by day, they appear in the news, a bigger quantity of red notes' coverages, which shows a violent face of the country. The structure of perception of security in: Territorial security; National security; Public safety (State as general attorney); Human security; Public safety (Self-protection); Private security; and, internaut perception of safety, scopes (Bustos, Ganga, Llamas & Juarez, 2018).

Public safety events occur throughout the world, posing a threat to personal safety, property and national defense. Mexico's security problems are like the general context in Latin America in many ways. However, Mexico has an influence of organized crime due to the levels of consumption of illegal products in the US market. UU (Carreon, Blanes and García, 2018).

Public security has traditionally been understood as the function of the State that consists in protecting its citizens from illegal attacks on (or crimes against) their property, physical integrity, sexual freedom, etc. The meaning of public safety is inferred as security of persons: inherence, inseparability, breadth and focus on justice (Aldana, Rosas & Garcia, 2018).

It is stated that our reality's perception is subjective and that our world's perception depends of our life conditions. Perception of reality operates from a superior order, from a mesosystem that would include both (perception and reality), and in which each appear like elements and not like closed and independent units. The notion that: what we see, might not be what is truly there, has troubled and tantalized, all the population in every sector, class, or roll of our society. Different population's sector would have different perception of security (Carreon, Garcia & Blanes, 2018).

It can also be mentioned that cultural stigma in the country, also affects and promotes a lack of public safe keeping, due to the general manner of Mexican population's thinking, which in comparison with other

cultures, appear to be like sluggish and with a short interest to develop in academic, professional, social, among other aspects. The administration of public security is the implementation of public policies that justify the guidance of the State in the prevention of crime and the administration of justice, but only the citizens' distrust of government action is evidenced by a growing perception of insecurity reported in the literature in seven dimensions: territorial, national, public (government), human, public (self-protection), private and internaut (Martínez, Anguiano & García, 2018).

Mexico can be seen from diverse scopes like economic, historic, or social. In that sense, there exist other sub-scopes (or sub-scales in the social scope) like health, public security, education, environmental consciousness, among others. As mentioned before, different population's sectors have different perception of social sub-scopes (or sub-scales). In case of bachelor's students, as its scholar formation gives the chance to generate critic manner of thinking, that population's sector can generate a solid perception of factor that affects society's context (Garcia, Carreon & Hernandez, 2017).

In this section we review the models for the study of security in its cognitive levels such as beliefs, attitudes and perceptions, centered on self-control of emotions (Sandoval *et al.*, 2021). Individualist proposals are distinguished from collectivists in order to be able to delimit the biosafety observation area. Confinement and social distancing policies are discussed as mitigation and containment strategies for the pandemic.

Cognitive models of security assume that people tend to manifest emotional and altered states of their consciousness in the face of imminent risks and latent threats (Sanchez *et al.*, 2021). This is the case of the pandemic in which the victims generated anxiety due to the shortage of masks, tests, treatments and vaccines. These are approaches to stimulus and cognitive mediation such as beliefs, attitudes, motives, perceptions or intentions that predict stigma or acceptance of the disease, distrust or empathy towards those who suffer from Covid-19 and the intensive use of technologies, devices or networks electronic.

In this way, models focused on beliefs, attitudes and motives as predictors of intentions and behaviors related to the scarcity or abundance of resources to face Covid-19, sustain that people deliberate, plan and systematize their strategies in the face of the pandemic (Garcia, 2021). This is the case of health professionals who take extreme preventive measures and self-care in an epidemic outbreak. Or, traders who take care of their business environment by following biosafety standards.

In contrast, normative models based on uses, customs, traditions, norms and values consider people as part of a collective and social response to risk events (Aguilar *et al.*, 2021). This is the case of moral leaders who explain the emergence of a coronavirus from religion, climate change or any activity related to the preservation of civil institutions.

Both models, the cognitive and the normative, have been merged to generate models of rejection or acceptance of technology (Bustos *et al.*, 2021). These are proposals that seek to merge the availability of resources from the data that a technology processes and disseminates with an impact on the decision-making of social leaders.

The three models associated with the decision-making and execution of a task based on common objectives and goals are opposed to the postulates of models that seek to reduce the process stated in the capacities and resources of a person, group or institution (Verstappen, 2021). These are informational models in which the added value of the information is in the actionable data. These models anticipate information traffic scenarios, opinion trends, and decisions to reject or support leading actors.

In sum, the exposed models account for the diversity of information, the established agendas and the capacities for discussion and dissemination of trends or prevalence of data related to a risk such as the pandemic; masks, tests, treatments and vaccines.

### **Studies of security perception**

The security perception theory alludes to dimensions that are convergent with respect to the trust between rulers and ruled. In this way, the central premise of the theory is that citizens have unfavorable or positive expectations of their authorities in charge of law enforcement and crime prevention, as well as social rehabilitation (Mejia, Carreon & Garcia, 2016). In this sense, security is a socio-political phenomenon, but reduced to media expectations of government action, as well as mistrust or empathy for its strategies, programs or policies in terms of safeguarding the integrity and dignity of its governed, as well as private property and public interests.

The dimensions of this perception of security have been structured in socio-spatial terms such as the territory or in social issues such as the nation, but with emphasis on the situation of sectors, strata or groups such as the so-called public and citizen security, as well as the interests individuals such as private and Internet security (Garcia, 2019).

Territorial and national security have traditionally been the most widely addressed from risk sociology to account for the impact of climate change on sea level and coasts, as well as risk events derived

from droughts, frosts, fires, floods or earthquakes in vulnerable areas, the trafficking of species or the appearance of epidemics due to the invasion of animal territories (Quiroz, 2019).

The so-called biosecurity focuses on food as the main indicator of health level in the face of a health or environmental crisis (Hernandez, 2019). In this sense, territorial or national security should have specialized in public because each sector or social stratum demanded different needs according to contingent situations. The citizenization of this security gave way to the individualization of expectations and resources, leading to both personal and virtual self-protection, with the emergence of cybersecurity.

There are more differences between biosecurity and cybersecurity, but both are essential for the rule of law, the administration of justice, the procurement of crime, social rehabilitation and collective pacification (Juarez, Carreon, Quintero, Espinoza, Bustos & Garcia, 2017). From a traditional perspective, both dimensions are observable as complementary, but from a progressive approach they are assumed as concomitants. In other words, the effects of climate change are increasingly linked to identity theft, extortion or cooptation, since niches of environmental and social deterioration that originate cybercrime are assumed. Or, based on cybersecurity, the data of robberies, kidnappings or homicides in situations of natural disaster or health contingencies are observed in real time.

### **Modelling of Security Perception**

From the theoretical, conceptual and empirical review, the relationships between the variables were modeled. In this way, territorial and national security are concomitant given their level of generality in the protection of the country, as well as the multilateralism involved in international or regional pacification measures (Garcia, Carreon & Hernandez, 2016). In the cases of public and citizen security, both share the imperatives of safeguarding common goods that, although they are public, can be established as socially and environmentally available to future generations. In this sense, private and digital security are also similar in terms of preventing crimes that threaten the dignity and integrity of the individual rather than of society.

The theoretical relationships between security perceptions are consistent with the observed data (Carreon, Hernandez & Garcia, 2017). This is so because it is presumed that the instrument measures the seven dimensions of security, as well as its consistency when applied to bulls, scenarios and samples. Furthermore, safety as a multidimensional phenomenon suggests measurement levels concomitant (HC) with each other, reflective (HR) and with errors (HE) attributed to variance of the responses.

The concomitant hypotheses allude to the covariances between the dimensions of the phenomenon, as well as to the explanation of its trajectory structure if a new specification or modeling arose by testing the null hypothesis (Garcia, 2020).

The reflecting hypotheses allude to the relationships between the factors with respect to the indicators, suggesting the structuring of the phenomenon, as well as the convergence of the responses to the reactive that measure each feature of the dimensions (Rivera, 2020).

The hypotheses of measurement errors refer to unexplained variances in estimating the structure of concomitant and reflective relationships. Furthermore, it suggests the probable incidence of other factors and indicators not included in the model (Amemiya, 2020).

**METHOD**

A documentary, retrospective and systematic study was carried out with a sample of 100 sources indexed to international repositories, considering the period from the pandemic from 2019 to 2021 (see Table 1).

**Table 1: Descriptive sample**

	Biosecurity		
	2019	2020	2021
Academia	1	3	4
Copernicus	2	0	3
Dialnet	3	1	1
Dimensions	0	1	2
Ebsco	4	1	4
Frontiers	3	1	3
Google	1	1	2
Latindex	1	3	1
Microsoft	1	2	4
Scielo	2	4	3
Scopus	3	3	3
Zenodo	2	2	0
Zotero	1	1	0

**Source:** Elaborated with data study

The Delphi inventory was used, which includes statements about the findings reported in the literature. The biosafety dimension was evaluated according to the definitions and relationships with other categories. The instrument is not governed by criteria of reliability and validity. Rather, due to an evaluative consistency of the expert judges on the subject. Thus, the inventory meets the criterion of convergence of criteria by expert peers.

The judges evaluated the findings related to biosafety in three phases: i) qualification of the definitions and both reflective and formative relationships, assigning a value of 1 to the absence of concepts, 2 to definitions, 3 to reflective relationships and 4 to formative relationships; II) feedback of the individual ratings compared to the average, iii) reconsideration of the initial rating, or, reiteration of the assigned number.

The data were captured in Excel and processed in SPSS and CytoScape version 9.0 considering the parameters of normal distribution, contingency, profusion and connectivity. In order to contrast the null hypothesis regarding the significant differences between the theoretical structure with respect to the observations made. Values close to unity were interpreted as evidence of normality, contingency, profusion and connectivity.

**RESULTS**

Table 2 shows the initial qualifications of the judges, the feedback or differences between the qualifications and the averages, as well as the reiteration and qualifying reconsideration. These values show that the judges' scores tend to be normally distributed, making contingency analysis possible, as well as profusion and connectivity. This means that biosafety will revolve around probability relationships that can anticipate future risk scenarios. As biosafety is a central axis and issue on the public agenda, it is expected to contribute to risk communication and management.

**Table 2: Descriptive of instrument**

	M	SD	χ2	df	p	1	2	3	4	5	6	7
R1												
1	2.14	1.32	12.13	13	.05	1.00						
2	2.54	1.45	14.35	14	.03	.324***	1.00					
3	2.57	1.09	16.57	12	.08	.394*	.453**	1.00				
4	2.01	1.45	13.21	15	.09	.394**	.421*	.546*	1.00			
5	2.17	1.32	12.15	11	.01	.658*	.521*	.430*	.490***	1.00		
6	2.90	1.56	15.47	13	.08	.432**	.345*	.540**	.436*	.650*	1.00	
7	2.43	1.89	10.43	16	.09	.325*	.412**	.657*	.543*	.546*	.430*	1.00
R2												
1	2.31	1.32	10.56	10	.05	1.00						
2	2.80	1.23	19.21	12	.04	.435*	1.00					
3	2.65	1.43	14.31	14	.08	.325***	.547*	1.00				
4	2.93	1.01	14.32	13	.03	.567***	.543*	.547*	1.00			

5	2.46	1.32	10.54	12	.07	.321**	.324*	.543**	.545***	1.00		
6	2.13	1.24	19.56	11	.09	.437*	.546**	.430*	.654*	.478*	1.00	
7	2.43	1.21	10.67	19	.06	.542*	.657*	.546**	.546**	.432**	.436**	1.00
R3												
1	2.43	1.67	14.36	10	.03	1.00						
2	2.03	1.89	17.68	13	.02	.432***	1.00					
3	2.43	1.54	19.56	12	.01	.347*	.546*	1.00				
4	2.67	1.02	10.68	14	.04	.430**	.686*	.435*	1.00			
5	2.31	1.43	11.21	16	.09	.541*	.546**	.324*	.543*	1.00		
6	2.40	1.36	13.42	15	.03	.437**	.532*	.540**	.445*	.430*	1.00	
7	2.93	1.89	15.46	12	.06	.430**	.302*	.304*	.587**	.541*	.438**	1.00

Source: Elaborated with data study. M = Mean, SD = Standard Deviation, \* p < .01; \*\* p < .001; \*\*\* p < .0001

Once the contingent relationships were established between the qualifications of the seven judges, their correlations were estimated to show their dependency relationships. This allowed the estimation

of the complex network of profusion and connectivity between the evaluations of the judges. Each of the three phases was modeled, considering the biosafety criteria (see Figure 1).

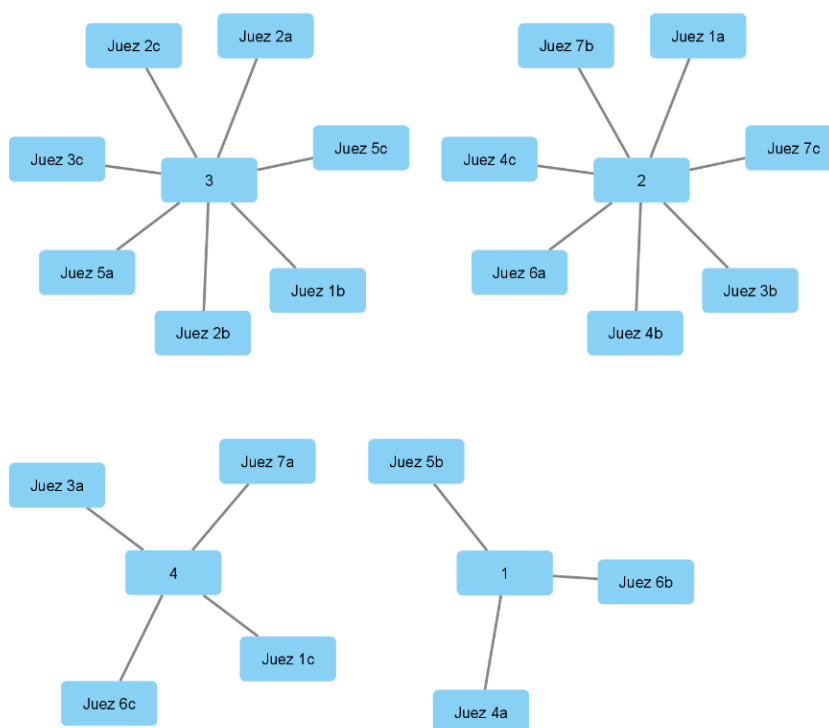


Figure 1: Network of profusion and connectivity on biosafety

Source: Elaborated with data study; 1 to the absence of concepts, 2 to definitions, 3 to reflective relationships and 4 to formative relationships

The network structure of profusion and connectivity is circumscribed to the determinants of biosafety. In this sense, the expert judges establish a discussion agenda on the factors that affect biosecurity in the context of the pandemic. associated with this network, another emerges that reflects biosecurity. These are indicators related to the prevention of risks of contagion, illness and death.

## DISCUSSION

In relation to the theory of the perception of security, which raises nine dimensions related to territory, nation, citizenship, public, private, human and

internet, this work demonstrated that human security is the factor that most reflects the perceptual security structure. Lines of study referring to the dimensions of human security will allow us to notice conflict scenarios between rulers and ruled, as well as the emergence of citizen and private security.

Regarding security studies where a continuous coercive and persuasive state in its relationship with citizens stands out, this work has shown that human security is a dimension that explains the differences and similarities between rulers and ruled. The development of this dimension will allow us to notice the transition from a coercive system to another persuasive one. That

is, the security attributed to the legitimate violence of a democratic government will be observed up to the security that demarcates the regime from all responsibility and recharges the citizen with the attribution of prevention by confining their expression and their property.

Research lines concerning the emergence of this common factor will allow evaluating, accrediting, and certifying the relations between rulers and governors in matters of multidimensional security.

In summary, perceived security is a multidimensional psychological phenomenon since it derives from the relations between authorities and citizens with respect to crime prevention, the administration of justice and social rehabilitation, although other dimensions such as sectoral or media security to explain the impact of policies, strategies and programs on civil decisions and actions.

## CONCLUSION

In Mexico, a common interpretation or idea of which country is lacking in security prevails. The absence of custody is influenced by the presence of organized crime, the illegal sale of drugs and weapons, and the corruption available in each branch of the government, among the main aspects.

The correlations of reliability and validity when the unit far show that there are other dimensions linked to construct. In this sense, the inclusion of self-control explains the effects of state propaganda regarding crime prevention, law enforcement and peace education on lifestyles of civilian sectors.

The contribution of this study is concerned about the reliability and validity of an instrument which measured seven dimensions of security: territorial, national, human, public, public, private and digital.

The studies on public safety identify in the government's expectations the predominant factor that explains the phenomenon as an efficient, effective and effective institution, but in the present work the emergence of this phenomenon has been demonstrated from a structure of perceptions around the personal, citizen, public, human, national and territorial agenda.

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