Acceptance of COVID-19 preventive measures as a tradeoff between health and social outcomes

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Abstract

Background: A better understanding of the factors underlying their acceptance may contribute greatly to the design of more effective public health programs during the current and future pandemics. The objectives of the present study were to assess their acceptance after populations experienced their negative effects, and their relationships with COVID-19 perceptions.

Methods: Data were collected from 2004 individuals through an online survey conducted 6 to 8 weeks after the first lockdown in France. Participants were asked whether they supported eight COVID-19 preventive measures. COVID-19-related perceptions were also assessed using an adapted version of Witte's Extended Parallel Process Model, together with sociodemographic and environmental variables.

Results: Acceptance rate reached 86.1 % for individual protective measures, such as make mask mandatory in public open space, and 70.0% for collective restrictions, such as isolating the most vulnerable people (80%) or forbidding public gatherings (79.3%). The least popular restrictions were closing all schools/universities and non-essential commerce such as bars and restaurants (57.2%). Acceptance of collective restrictions was positively associated with their perceived efficacy, fear, and perceived severity of COVID-19, and negatively with age older than 60 years. Acceptance of individual protective measures was associated with their perceived efficacy, fear, and perceived severity of COVID-19.

Discussion: Acceptance rates of COVID-19 preventive measures were rather high, but varied according to their perceived social cost, and were more related to collective than personal protection. Preventive measures that minimize social costs while controlling the spread of the disease are more likely to be accepted during pandemics.

Keywords: Extended Parallel Process Model, Covid-19, lockdown, acceptance; preventive measures.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has affected many countries, with more than ten million cases worldwide and more than 500,000 deaths by July 1st 2020 (ECDC, 2020). Several restrictions were implemented in order to prevent further spread of the disease in the early stages of the pandemic. Confinement, the restriction of individuals to their homes, was one of the restrictions enforced in many countries, including France beginning on March 17th, where surveillance of COVID-19 cases was implemented on January 10, 2020 (Stoecklin et al., 2020). In addition, global and local health authorities used media campaigns to inform individuals about the virus spreads, number of daily cases and deaths, and to promote recommended actions to prevent infections in mass populations (Lasbeur et al., 2020; Raude et al., 2020). The preventive measures include regular handwashing, social distancing, avoiding crowded places, covering mouth and nose, among others.

The lockdown was lifted in France on May 11th 2020, after a dramatic decrease in the number of cases and deaths, but mobility restrictions had some major adverse consequences (McKee and Stuckler, 2020). The ensuing reductions in social (collective training sessions or sport events) and physical (barred access to exercise facilities, or parks) opportunities to exercise had a direct negative effect on health behaviours and well-being (Arora and Grey, 2020; Constant et al., 2020; Matias et al., 2020). The lockdown also had a detrimental impact on various aspects of psychological health, mostly post-traumatic stress disorders, anxiety and depression (Arora et al., 2020; Odriozola-Gonzalez et al., 2020), especially in high-density and socially deprived neighborhoods (Okubo et al., 2021) and among people suffering from pre-existing chronic conditions (Castellano-Tejedor et al., 2021). Social distancing, self-isolation and travel restrictions have led to a reduced workforce across all economic sectors and caused many jobs to be lost. Schools were closed and the need for commodities and manufactured products has

decreased (Nicola et al., 2020). As a result, protests against restrictions emerged and rules violations increased, provoking peaks in new positive cases (Ruiu and Ruiu, 2020), forcing authorities to impose fines to slow down the spread of COVID-19 (Chae and Park, 2020). Due to these challenges, subsequent implementations of preventive measures in response to COVID-19 recurrences, or other pandemics could present difficulties for decision-makers. A study examining acceptance of different scenario showed that lockdown length affected respondents' reactions much more strongly than intensity or flexibility (Gollwitzer et al., 2020). Additional analyses showed that half of the respondents rejected any further extensions or intensifications, while 20% would endorse long-term strategies if necessary.

Beliefs and risk perceptions associated with the disease (perceived personal vulnerability, and severity of the disease) have a major influence on the acceptance, uptake and adherence to required restrictions (Christner et al., 2020; Siebenhaar et al., 2020; Siegrist et al., 2021; Vai et al., 2020; Wnuk et al., 2020). During the first lockdown in France, we investigated COVID-19 fear, risk perception and trust in recommended measures based on the Extended Parallel Process Model (EPPM) (Witte, 1992), which is one of the latest developments among theories that explain the role of fear in persuasion. The following constructs are central to the EPPM: fear, threat (with its two components: perceived severity of and perceived susceptibility to the illness), efficacy (comprising self-efficacy and response efficacy), and two types of responses (danger control and fear control). During the first lockdown, our respondents reported high scores of perceived severity, showing they were well aware of the seriousness of the COVID-19 consequences, but also a high “perceived efficacy appraisal”, indicating a sound adherence to recommended preventive measures (Constant et al., 2020).

As the duration and magnitude of the public engagement in preventive measures play a considerable role in the control and prevention of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, a better understanding of the factors underlying their acceptance may contribute greatly to the design of more effective public health programs and services during the current and future pandemics. The objectives of the present study were to assess their acceptance after populations have experienced their negative effects, and the associations between COVID-19 prevention measures acceptance and perceptions using the EPPM.

Materials and Methods

Participants and procedures

Our data was collected through an online survey conducted among 2004 adults residing in France. The respondents were recruited among the Arcade Research panelists (www.panelia.fr), who agreed to participate regularly to surveys of customer attitudes and experiences. The objective of the research was to assess the emotional, cognitive and behavioral responses of the French people to the COVID-19 epidemic during the full lockdown (wave 1) and thereafter (wave 2). The respondents to this survey were enrolled on the basis of a stratified sampling method to reflect the distribution of the French general population regarding sex, age, occupation, and region. For the present study, we analyzed data from a 2-weeks survey administered 6 to 8 weeks after the first lockdown between June 25th and July 5th, 2020. The research protocol was registered by the Ecole des Hautes Etudes en Sante Publique (EHESP) School of Public Health Office for Personal Data Protections and approved by the Institutional Review Board of the University Hospital Institute “Mediterranee Infection” (Marseille, France).

Measurements

Acceptance of preventive measures: the dependent variable for the analyses was support of the following eight restrictive measures implemented (or likely to be implemented) by national governments to contain the COVID-19 outbreak: 1) Make face mask mandatory in public closed space; 2) Make face mask mandatory in public open space; 3) Isolate vulnerable people (e.g. elderly..); 4) Forbid public gatherings (e.g. fairs; markets..); 5) Mobility restrictions for non-

essential workers; 6) Stay at home order for non-essential workers; 7) Close all Schools/universities; and 8) Close non-essential commerce (e.g. bar, restaurant) . For each of them, the participants were asked to rate on a Likert-type response scale ranging from 1 (“totally disagree”) to 4 (“totally agree”), and for which the meaning of each value was explicitly indicated. To facilitate the treatment of the data, agreements obtained from these eight items were added to generate a cumulative score that enabled the research team to assess participants’ acceptance of proposed preventive measures.

Sociocognitive factors: To assess participants’ beliefs and expectations related to the COVID-19 epidemic, we used a range of constructs and variables from the Witte’s EPPM. Items related to these constructs were drawn from the Risk Behavior Diagnosis Scale (<https://msu.edu/~wittek/rbd.htm>), adapted to the COVID-19, and translated to French. EPPM factors were estimated using an Unweighted Least-Square factorial analysis, followed by a Promax rotation, and five factors were extracted accordingly (Constant et al., 2020). Efficacy of preventive measures (*e.g. actions recommended by scientists are effective to prevent Covid-19*); Lack of fear control (*e.g. the risk of being infected is frightening me*); perceived severity of COVID-19 (*e.g. I believe that COVID-19 is extremely harmful*); perceived susceptibility to COVID-19 (*e.g. it is possible that I will get the COVID-19 in the next weeks*) and cognitive avoidance (*e.g. When I go shopping, I tend to avoid thinking about the risk of being infected*). The raw scale scores were transformed to a 0–100 scale. Higher scores in the respective scales are indicative of greater perceived efficacy, lack of fear control, severity, susceptibility or avoidance.

Sociodemographic and environmental variables were also collected, such as age in years (18-39; 40 – 59; 60 and older), gender, occupational status (active; unemployed, or retired), persons in household (Three or more; two; one), living density (Urban; More than 100000; Urban; 20

000 -100 000; Urban; 2000- 20000; Rural zone), chronic disease (yes/no); perceived health (very poor; poor; good; very good).

Data analysis

Categorical data were expressed as numbers (N) and percentages (%), while numerical data were expressed as means $\pm$ standard deviations. Acceptance factors were estimated using an Unweighted Least-Square factorial analysis, followed by a Promax rotation, a non-orthogonal (oblique) solution in which the factors are allowed to be correlated. This method provides accurate and conservative parameter estimates when using ordinal data (Lee et al., 2012). This item reduction method established which of the eight items belonged to domains or conceptual areas and which items should be maintained. Items are deleted if they loaded on two or more factors, or if they exhibited a correlation coefficient of less than 0.40 with their own factor. Internal consistency reliability was assessed by computing Cronbach's alpha coefficient, considered satisfactory if higher than or equal to 0.70 (Bland and Altman, 1997). Interscale correlations were computed with the non-parametric Spearman's correlation test. Since the study outcomes were count variables (number of accepted measures), generalized linear Poisson regression models were used to estimate the rate ratios (RRs) of acceptance as a function of sociodemographic variables and scores of COVID-19 perceptions, as assessed by the EPPM. Estimates in univariate analysis (model 1) were expressed as RRs with 95% confidence intervals (RR [95% CI]). Significant estimates from model 1 were analyzed in a multivariate model (model 2). Statistical analyses were performed using the SPSS statistical package, version 19 (SPSS, Chicago, Illinois, United States).

Results

Of the 2004 individuals who completed the survey (Table 1), half of them were women (50.5%) 66% were professionally active) and 76% were living in urban environments. More than 1 in 5 participants (20.5%) reported financial difficulties related to the COVID-19, and 3 in 10 had a chronic disease (30.5%). More than 8 in 10 respondents perceived their health state as “good” or “very good”. Each of the eight proposed measures was approved by a majority of the study population, with highest approval rating for “Make mask mandatory in public closed space” (89.0%) and “make mask mandatory in public open space” (83.2%), and lowest for “closing all schools/universities” (64.2%) and “closing non-essential commerce such as bars and restaurant (57.2%) (Table 2).

Unweighted Least-Square exploratory factorial analysis, followed by a Promax rotation, was performed on the 8 items. Eigen values for the first three factors were 4.58, 1.05 and 0.63 suggesting a two-factor solution explaining 62.5% of the common variance of the data. Factor #1 included six items related to collective restrictions and was interpreted as expressing acceptance of collective restrictions; and Factor #2 included the two items related to mandatory mask wearing and was interpreted as expressing acceptance of individual protective measures. Factors showed satisfactory internal validity (Cronbach coefficient F1: 0.88; F2: 0.87). The interscale correlation coefficient ($r = 0.61$) showed that these factors were related but distinct. On average, more than 80.0% of the study population agreed with individual protective measures (Make mask mandatory in public closed space: 89.0%; make mask mandatory in public open space: 83.2%) and 74.0% with collective restrictions, with some variations - from 80% for “Isolate vulnerable people” to 57.2% for “close non-essential commences such as bar and restaurants. More than 80% of participants accepted the two proposed individual protective measures and 9.1% rejected them both (Figure 1A), while 41.1% accepted the six proposed collective restrictions and 6.1% rejected all of them (Figure 1B). Regarding COVID-19

perceptions, as assessed by the EPPM, efficacy (73.8 ± 17.4) and severity ($73.5.1 \pm 23.1$) reached highest scores on a 100-point response scale, followed by lack of fear control (54.5 ± 26.0), cognitive avoidance (48.8 ± 22.9), and perceived vulnerability (42.8 ± 22.4). Differences between T-scores were significant, except for efficacy and severity.

Estimate of acceptance of collective restrictions in univariate analysis (Table 3) increased with household number and level of efficacy, fear, perceived severity, susceptibility and cognitive avoidance and decreased with age older than 60 years and retired occupational status. In multivariate analyses, this estimate increased with elevated level of efficacy, fear, and perceived severity and decreased with age older than 60 years. Estimate of acceptance of individual protective measures in univariate analysis (Table 4) increased with level of efficacy, fear, perceived severity, and susceptibility. In multivariate analyses, this estimate increased with higher level of efficacy, fear, and perceived severity.

Discussion

Acceptance rate in our study population reached, on average, 86.1 % for individual protective measures (such mandatory face mask wearing), and 74.0% for collective restrictions, such as isolate vulnerable people (80%); forbid public gatherings (79.3%) or mobility restrictions for non-essential worker (74.0%). The least popular restrictions were closing of non-essential commerce such as bars and restaurants (57.2%). Acceptance of collective restrictions was positively associated with the level of efficacy, fear, and perceived severity, and negatively with age older than 60 years. Acceptance of individual protective measures was associated with level of efficacy, fear, and perceived severity.

Data were collected after the first lockdown in France, in a period when COVID-19 cases and deaths were minimal. Most of the restrictions implemented to help combat the coronavirus have been lifted, and while strict hygiene and social distancing methods remained in place, life returned to some level of normality. However, global and local health authorities continued to use media to inform people about the epidemic and to promote a range of health protective behaviors to prevent infections (Lasbeur et al., 2020; Raude et al., 2020). In this in-between stage of the COVID-19 pandemic, our participants still perceived the COVID-19 as a severe disease, and the recommended measures as highly efficient to prevent infection. This indicates a “danger control” process, in which individuals are motivated to take action to lessen the threat. Additionally, the “lack of fear control” and vulnerability scores indicated a strong reaction to the ongoing fear appeal communication about COVID-19, without necessarily considering themselves as highly vulnerable (Constant et al., 2020).

While individual protective measures were rather consensual in our study population, collective restrictions had more mixed acceptance rates - ranging from 80% to 57%. One possible explanation is that these restrictions were assessed in the light of their socioeconomic consequences (e.g.: unemployment, businesses bankruptcy mobility restrictions) and/or psychological burden (e.g. anxiety, depression.). For instance, stay-at-home order for non-essential workers was linked to health anxiety, financial worry, decreased physical activity, isolation, and loneliness (Matias et al., 2020; Tull et al., 2020). Similarly, closing all educational settings (schools/universities) jeopardized students' education and well-being (De Man et al., 2021; Husky et al., 2021; Poulain et al., 2021), while closing bars and restaurants led to massive unemployment in the food and hospitality sector during the first lockdown. This would be in line with a European Union (EU) report documenting a substantial increase in people's economic anxiety in the months following the coronavirus outbreak, especially in those EU countries hit hardest in economic terms (Van der Wielen and Barrio, 2020), and with a survey conducted in the aftermath of the first quarantines showing that unemployment and poverty/social inequality were close behind the COVID-19 in the global concerns ranking (Boyon and Yi, 2020). Conversely, isolating vulnerable people (Govindarajan, 2020), forbidding mass gatherings, and mobility restrictions for non-essential workers reached higher acceptance rates, as these targeted restrictions may reduce COVID-19 spread and deaths at more limited social costs.

The relationship observed between vulnerability and acceptance of collective and individual protective measures became non-significant when entered together with efficacy, lack of fear control and severity in the multivariate models. This indicates that the acceptance of collective restrictions was more related to collective than personal protection, probably in order to protect others (Christner et al., 2020), and restore the situation back to normal. The acceptance of

collective restrictions was nevertheless lower among participants aged >60 years, which are more likely than others to be targeted, and isolated from the rest of the society (Ho et al., 2020). Other indicators of vulnerability (chronic disease; perceived health) were unrelated to acceptance rates, perhaps because older age was the main identified factor linked to COVID-19 mortality during the first outbreak (Fouillet et al., 2020).

The results of this study must be viewed in light of its main limitations. Firstly, the cross-sectional design does not allow causal inferences about relationships between variables to be determined. Furthermore, missing data precluded the investigation of EPPM appraisal in the total study sample, and some novel measures such as “location tracking” (Wnuk et al., 2020) or “COVID-19 passport” were omitted. Secondly, personality variables such as anxiety trait and pessimism may have a pivotal influence on appraisals and were not assessed. Finally, data were collected in a cohort including a minority of individuals with deprived socio-economic backgrounds, which may limit the generalizability of our results. The large size of our cohort and the inclusion of diverse professions and socioeconomic groups nevertheless have offered an interesting opportunity to assess the acceptance of COVID-19 preventive measures in the general population.

Our findings suggest that acceptance rates of COVID-19 preventive measures were rather high, but varied according to their perceived social costs, and seemed to be more related to collective than personal protection. Altogether, it appears that the preventive measures that minimize social costs while controlling the spread of the disease are more likely to be accepted and therefore more sustainable during pandemics.

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Authors' contribution: AC, DC, KG-M, and JR contributed to the conception and design of the study and interpreted the data and drafted the final manuscript. KG-M suggested the theoretical framework. AC performed the statistical analysis and wrote the first draft of the manuscript. All authors read and approved the manuscript.

Data availability: The data underlying this article are available in open science framework, at <https://osf.io/jw86k>

References:

Arora, T., Grey, I., 2020. Health behaviour changes during COVID-19 and the potential consequences: A mini-review. *J Health Psychol* 25:1155-63.

Arora, T., Grey, I., Ostlundh, L., Lam, K.B.H., Omar, O.M., Arnone, D., 2020. The prevalence of psychological consequences of COVID-19: A systematic review and meta-analysis of observational studies. *J Health Psychol*:1359105320966639.

Bland, J.M., Altman, D.G., 1997. Statistics notes: Cronbach's alpha. *BMJ* 314:572.

Boyon, N., Yi, J., 2020. Coronavirus remains top concerning the U.S. and globally. IPSOS Public Affairs, Washington, DC.

Castellano-Tejedor, C., Torres-Serrano, M., Cencerrado, A., 2021. Psychological impact in the time of COVID-19: A cross-sectional population survey study during confinement. *J Health Psychol*:1359105320985580.

Chae, S.H., Park, H.J., 2020. Effectiveness of Penalties for Lockdown Violations During the COVID-19 Pandemic in Germany. *American Journal of Public Health* 110:1844-49.

Christner, N., Sticker, R.M., Soldner, L., Mammen, M., Paulus, M., 2020. Prevention for oneself or others? Psychological and social factors that explain social distancing during the COVID-19 pandemic. *J Health Psychol*:1359105320980793.

Constant, A., Conserve, D.F., Gallopel-Morvan, K., Raude, J., 2020. Socio-Cognitive Factors Associated With Lifestyle Changes in Response to the COVID-19 Epidemic in the General Population: Results From a Cross-Sectional Study in France. *Front Psychol* 11:579460.

De Man, J., Buffel, V., van de Velde, S., Bracke, P., Van Hal, G.F., Wouters, E., Belgian, C.-I.S.W.-b.S.t., 2021. Disentangling depression in Belgian higher education students amidst the first COVID-19 lockdown (April-May 2020). *Arch Public Health* 79:3.

ECDC, 2020. COVID-19 situation update worldwide, as of 2 July 2020. European Centre for Disease Prevention and Control Stockholm.

Fouillet, A., Pontais, I., Caserio-Schonemann, C., 2020. Excess all-cause mortality during the first wave of the COVID-19 epidemic in France, March to May 2020. *Euro Surveill* 25.

Gollwitzer, M., Platzer, C., Zwarg, C., Goritz, A.S., 2020. Public acceptance of Covid-19 lockdown scenarios. *Int J Psychol*.

Govindarajan, R., 2020. Targeted Prevention of COVID-19, a Strategy to Focus on Protecting Potential Victims, Instead of Focusing on Viral Transmission. *Risk Manag Healthc Policy* 13:1413-18.

Ho, F.K., Petermann-Rocha, F., Gray, S.R., Jani, B.D., Katikireddi, S.V., Niedzwiedz, C.L., Foster, H., Hastie, C.E., Mackay, D.F., et al., 2020. Is older age associated with COVID-19 mortality in the absence of other risk factors? General population cohort study of 470,034 participants. *PLoS One* 15:e0241824.

Husky, M.M., Kovess-Masfety, V., Gobin-Bourdet, C., Swendsen, J., 2021. Prior depression predicts greater stress during Covid-19 mandatory lockdown among college students in France. *Compr Psychiatry* 107:152234.

Lasbeur, L., Lecrique, J.M., Raude, J., Léon, C., Bonmarin, I., E., d.R., Arwidson, P., 2020. Adoption of preventive measures recommended by the public authorities in response to the Covid-19 pandemic during the lockdown in metropolitan France. *CoviPrev Survey 2020. Bull Epidemiol Hebd.* 16:324-33.

Lee, C.T., Zhang, G., Edwards, M.C., 2012. Ordinary Least Squares Estimation of Parameters in Exploratory Factor Analysis With Ordinal Data. *Multivariate Behav Res* 47:314-39.

Matias, T., Dominski, F.H., Marks, D.F., 2020. Human needs in COVID-19 isolation. *J Health Psychol* 25:871-82.

McKee, M., Stuckler, D., 2020. If the world fails to protect the economy, COVID-19 will damage health not just now but also in the future. *Nature Medicine* 26:640-42.

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., Agha, R., 2020. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *Int J Surg* 78:185-93.

Odriozola-Gonzalez, P., Planchuelo-Gomez, A., Iruiria, M.J., de Luis-Garcia, R., 2020. Psychological symptoms of the outbreak of the COVID-19 confinement in Spain. *J Health Psychol*:1359105320967086.

Okubo, R., Yoshioka, T., Nakaya, T., Hanibuchi, T., Okano, H., Ikezawa, S., Tsuno, K., Murayama, H., Tabuchi, T., 2021. Urbanization level and neighborhood deprivation, not COVID-19 case numbers by residence area, are associated with severe psychological distress and new-onset suicidal ideation during the COVID-19 pandemic. *J Affect Disord* 287:89-95.

Poulain, T., Meigen, C., Sobek, C., Ober, P., Igel, U., Korner, A., Kiess, W., Vogel, M., 2021. Loss of childcare and classroom teaching during the Covid-19-related lockdown in spring 2020: A longitudinal study on consequences on leisure behavior and schoolwork at home. *PLoS One* 16:e0247949.

Raude, J., Lecrique, J.M., Lasbeur, L., Leon, C., Guignard, R., du Roscoät, E., Arwidson, P., 2020. Determinants of preventive behaviors in response to the COVID-19 pandemic in France: comparing the sociocultural, psychosocial and social cognitive explanations.

Ruii, G., Ruii, M.L., 2020. Violation of lockdown norms and peaks in daily number of positive cases to COVID-19 in Italy. *Emerald Open Research* 2:25.

Siebenhaar, K.U., Köther, A.K., Alpers, G.W., 2020. Dealing With the COVID-19 Infodemic: Distress by Information, Information Avoidance, and Compliance With Preventive Measures. *Frontiers in Psychology* 11.

- Siegrist, M., Luchsinger, L., Bearth, A., 2021. The Impact of Trust and Risk Perception on the Acceptance of Measures to Reduce COVID-19 Cases. *Risk Anal.*
- Stoecklin, S.B., Rolland, P., Silue, Y., Mailles, A., Campese, C., Simondon, A., Mechain, M., Meurice, L., Nguyen, M., et al., 2020. First cases of coronavirus disease 2019 (COVID-19) in France: surveillance, investigations and control measures, January 2020. *Eurosurveillance* 25:2000094.
- Tull, M.T., Edmonds, K.A., Scamaldo, K.M., Richmond, J.R., Rose, J.P., Gratz, K.L., 2020. Psychological Outcomes Associated with Stay-at-Home Orders and the Perceived Impact of COVID-19 on Daily Life. *Psychiatry Research* 289:113098.
- Vai, B., Cazzetta, S., Ghiglini, D., Parenti, L., Saibene, G., Toti, M., Verga, C., Wykowska, A., Benedetti, F., 2020. Risk Perception and Media in Shaping Protective Behaviors: Insights From the Early Phase of COVID-19 Italian Outbreak. *Frontiers in Psychology* 11.
- Van der Wielen, W., Barrio, S., 2020. Fear and Employment During the COVID Pandemic: Evidence from Search Behaviour in the EU, JRC Working Papers on Taxation and Structural Reforms. European Commission, Seville.
- Witte, K., 1992. Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs* 59:329-49.
- Wnuk, A., Oleksy, T., Maison, D., 2020. The acceptance of Covid-19 tracking technologies: The role of perceived threat, lack of control, and ideological beliefs. *PLoS One* 15:e0238973.

Table 1: Participants' characteristics (N= 2004)

Variables		N (%)
Female Sex		1012 (50.5)
Age in years	60 and older	518 (25.8)
	40 - 59	750 (37.1)
	18-39	736 (36.7)
Professional status	Active	1329 (66.3)
	Retired	427 (21.3)
	unemployed	248 (12.4)
People in the household	Three or more	825 (41.2)
	Two	723 (36.1)
	One	456 (22.8)
Population density	Urban; More than	385 (19.2)
	Urban; 20 000 -100 000	520 (25.9)
	Urban; 2000- 20000	627 (31.3)
	Rural zone	472 (23.6)
Chronic disease		615 (30.7)
Perceived health	Poor/very poor	208 (10.4)
	Good/very good	1796 (89.6)
Financial difficulties	Yes, related to covid	404 (20.2)
	Yes, Unrelated to covid	480 (24.0)
	None	1120 (55.9)
EPPM scores	Efficacy	73.8 (17.4)
	Fear control	54.5 (26.0)
	Severity	73.5 (23.1)
	Vulnerability	42.7 (22.4)
	Avoidance	48.9 (22.9)
EPPM= Extended Parallel Process Model		

Table 2: Numbers (N), Percentages (%) and factor loadings for the two-factor solution of the acceptance of eight COVID-19 preventive measures (N=2004)

Item	Totally agree/ Agree	Totally disagree/ Disagree	Factors	
	N (%)	N (%)	F 1	F 2
Make mask mandatory in public closed space	1783 (89.0)	221 (11.0)		0.95
Make mask mandatory in public open space	1667 (83.2)	337 (16.8)		0.81
Isolate vulnerable people (e.g. elderly..)	1604 (80.0)	400 (20.0)	0.56	
Forbid mass gatherings (e.g. fairs; markets..)	1590 (79.3)	414 (20.7)	0.59	
Mobility restrictions for non-essential workers	1482 (74.0)	522 (26.0)	0.74	
Stay at home order for non-essential workers	1314 (65.6)	690 (34.4)	0.85	
Close all schools/universities	1286 (64.2)	718 (35.8)	0.80	
Close non-essential commerce (e.g. bar, restaurant)	1146 (57.2)	858 (42.8)	0.82	
Eigenvalue			4.58	1.05
% of explained variance			52.6	9.9
Cronbach alpha			0.88	0.87

Table 3: Rate Ratios and 95% Confidence Intervals (RR [95% CI]) of the acceptance of collective restrictions (N= 2004); Poisson regression

Variables		Univariate RR [95% CI]	Multivariate RR [95% CI]
Male Sex		0.97 [0.93 – 1.02]	
Age in years	60 and older	0.89 [0.84 – 0.94]	0.89 [0.81 – 0.98]
	40 - 59	0.97 [0.92 – 1.02]	0.96 [0.91 – 1.01]
	18-39	1	1
Professional status	Active	1.01 [0.94 – 1.07]	1.02 [0.96 – 1.09]
	Retired	0.91 [0.85 – 0.99]	0.98 [0.88 - 1.09]
	Unemployed	1	
Population density	Urban; More than	1.00 [0.94 – 1.07]	
	Urban; 20 000 -100 000	1.04 [0.98 – 1.10]	
	Urban; 2000- 20000	1.04 [0.98 – 1.10]	
	Rural zone	1	
Number of household	Three or more	1.11 [1.05 – 1.18]	1.04 [0.99 – 1.11]
	Two	1.03 [0.97 – 1.09]	1.03 [0.97 – 1.09]
	One	1	1
Chronic disease		1.00 [0.95 – 1.05]	
Perceived health	Poor/very poor	0.96 [0.89 -1.03]	
	Good/very good	1	
Financial difficulties	Yes, related to covid	1.07 [1.02 – 1.13]	
	Yes, unrelated to covid	1.01 [0.96 – 1.07]	
	None	1	
EPPM scores	Efficacy	1.03 [1.02 – 1.04]	1.02 [1.01 – 1.03]
	Lack of Fear control	1.06 [1.05 – 1.07]	1.04 [1.03 – 1.05]
	Severity	1.08 [1.07 - 1.09]	1.04 [1.03 - 1.06]
	Vulnerability	1.05 [1.04 – 1.06]	1.01 [0.99 – 1.02]
	Avoidance	1.02 [1.01 -1.03]	1.00 [0.99 – 1.02]

Note : significant results are marked in bold; EPPM= Extended Parallel Process Model

Table 4: Rate Ratios and 95% Confidence Intervals (RR [95% CI]) of the acceptance of individual protection (N= 2004); Poisson regression

Variables		Univariate RR [95% CI]	Multivariate RR [95% CI]
Male Sex		0.96 [0.90 – 1.03]	
Age in years	60 and older	1.08 [0.99 – 1.17]	
	40 - 59	1.04 [0.96 – 1.12]	
	18-39	1	
Professional status	Active	1.02 [0.92 – 1.13]	
	Retired	1.09 [0.97 – 1.23]	
	Unemployed	1	
Population density	Urban; More than	0.95 [0.86 – 1.06]	
	Urban; 20 000 -100 000	0.99 [0.90 – 1.09]	
	Urban; 2000- 20000	1.01 [0.92 – 1.10]	
	Rural zone	1	
Number of household	Three or more	1.04 [0.95 – 1.14]	
	Two	1.04 [0.95 – 1.14]	
	One	1	
Chronic disease		1.07 [0.99 – 1.15]	
Perceived health	Poor/very poor	0.96 [0.86 -1.07]	
	Good/very good	1	
Financial difficulties	Yes, related to covid	0.98 [0.90 – 1.07]	
	Yes, unrelated to covid	1.01 [0.963 – 1.09]	
	None	1	
EPPM scores	Efficacy	1.04 [1.03 – 1.05]	1.03 [1.03 – 1.04]
	Lack of Fear control	1.04 [1.03 – 1.05]	1.02 [1.01 – 1.03]
	Severity	1.07 [1.05 - 1.08]	1.03 [1.01 - 1.05]
	Vulnerability	1.03 [1.01 – 1.04]	1.00 [0.98 – 1.02]
	Avoidance	1.00 [0.98 -1.02]	

Note : significant results are marked in bold; EPPM= Extended Parallel Process Model

Figure legend:

Figure 1: Percentage of respondents (N=2004) agreeing with proposed preventive measures, by numbers

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