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ABSTRACT

Introduction: In March 2020, the government of Senegal introduced a curfew, a ban on travel between regions, the closure of markets, and a ban on attending places of worship to contain the spread of the COVID-19 pandemic. As part of research into the response to COVID-19, we developed a scale to measure the social acceptability of these measures.
Methods: We used Sekhon's theoretical framework of acceptability (TFA) to formulate the content of the scale items. We assessed the homogeneity of the scale using Cronbach's Alpha and average interitem correlations. We measured the dimensional properties of the scale using rating scale models. We tested the sensitivity of the scale to sociodemographic characteristics using mixed linear regressions and rating scale models.
Results: The final scale consisted of seven items corresponding to the constructs of acceptability. Analysis performed on data from 813 individuals showed that the scale has satisfactory statistical properties (Cronbach's $\alpha >$ 0.8, Loevinger's coefficient>0.3, intraclass correlation>0.4).
Conclusion: This scale was one of the first to test the TFA. The small number of items was advantageous for use under challenging data collection contexts. Measuring the acceptability of public health interventions with this tool can help in their design and implementation.

Introduction

In March 2020, the COVID-19 pandemic emergency led governments to adopt various containment and closure measures to combat the spread of the virus [29]. These measures, which aimed to limit contact between people by reducing movement and intermingling of individuals, have been broadly adopted. They have also been frequently debated, notably in various scientific studies. Among these studies, some have looked at the perceptions of the measures among various actors and the populations concerned [14,59,7]. Indeed, these measures can encounter misunderstanding and/or misinformation that hinder their implementation and effectiveness [35,38,5,60]. These issues are particularly important considering the restrictive nature of the measures mentioned and the population trust in public health decision in this context [11,19]. Thus, to effectively implement strategies to contain the pandemic, managing disease and intervention related communication that may affect the perceptions of the measures taken become a public health issue [18,46].

In many sub-Saharan African countries, the capacity of health systems and infrastructures to control the impact of the pandemic suggested potential detrimental effects on an already weakened health system [45,48,62]. Despite the fragility of some health systems observed, several countries organized an almost immediate response to the pandemic threat [8,39]. The rapid spread of the virus worldwide led several African states to anticipate and adopt some of the measures observed worldwide, sometimes even before the first cases of infection appeared [8]. The mobilization of the experience gained from previous epidemics, the preparedness geared towards different outbreaks on the continent, and the accumulated knowledge specific to COVID-19 should be sustained and improved when organizing and implementing these measures [33,39]. In parallel with this, understanding the acceptability determinants and obstacles at the population level is essential to support and adapt the implementation of interventions.

The notion of social acceptability has long been a key issue in the

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organization of public health interventions [51]. This implementation issue is a key concept that can help to better understand the social drivers of disease propagation. A better understanding of these drivers should help to design effective interventions that tackle the issues of social mechanism, inequalities and circumstances to improve population health [22,41,43]. Therefore, social acceptability may be an important tool for disease risk management and related health interventions. The theoretical framework of acceptability (TFA) of Sekhon *et al.* has been developed for this type of intervention [56]. The TFA has already shown relevance for public health interventions in several qualitative and mixed methods studies in sub-Saharan Africa [36,42,44,58,6]. However, it has not been mobilized in the few studies that have examined the social acceptability of measures taken by policymakers in Africa during the COVID-19 pandemic [12,27,53]. These studies demonstrated the relevance of taking this notion into account to adapt interventions. However, they showed the lack of validated statistical indicators allowing social acceptability to be assessed and results to be compared according to context.

In Senegal, the government instituted a curfew, a ban on travel between regions, the closure of markets, and a ban on attendance at places of worship at the onset of the pandemic in March 2020 to contain the spread of the pandemic [52]. In studying the response to the COVID-19 epidemic in Senegal, we developed a scale to assess the social acceptability of these measures. We created the scale using the TFA [56]. It highlighted the crucial role of communication and awareness-raising regarding the measures taken against the spread of the virus in understanding and adopting these measures by the population [17]. Indeed, the level of knowledge of the disease, the confidence in national media information sources, and the level of trust in the government in response to COVID-19 were shown to be related to the level of acceptability of government measures and partly explain the people's adherence. The use of this tool helped to highlight the relevance of the Senegalese authorities' communication strategies during this period. Therefore, this tool is useful to the analysis of social acceptability of population health intervention design and implementation in the context of epidemics. This paper aims to present the properties of this scale and its potential for the analysis of other public health interventions.

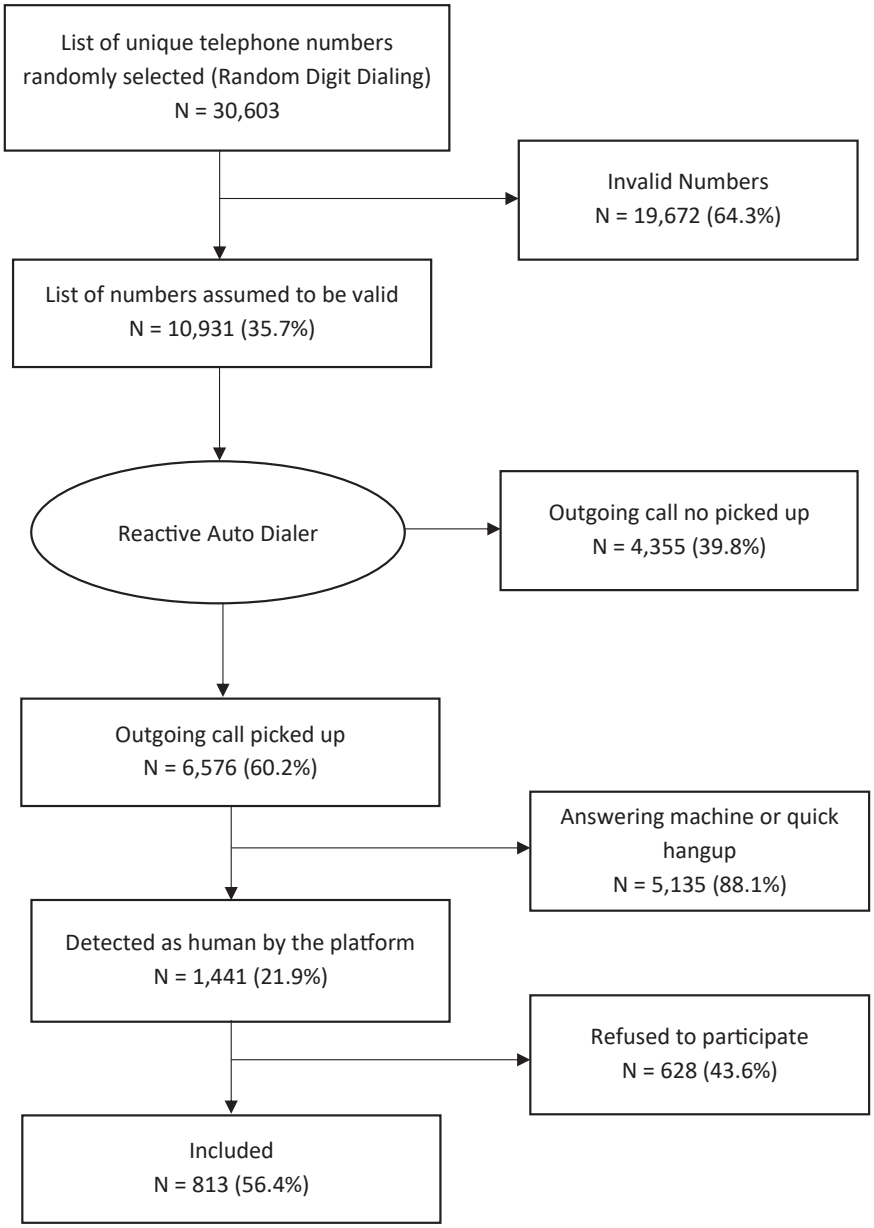

Fig. 1. Flowchart.

Methods

Data

The data come from a cross-sectional telephone survey conducted in Senegal in June 2020. A marginal quota sampling strategy was used [17,3,55]. We used the last population census of 2013 to define the quotas according to age, gender, and region distribution [1]. We used the Schwartz formula [15] to determine that a maximum sample size of 1000 distributed proportionally in each quota would assume 80% power and alpha error of 5%. We used the *Random Digit Dialing* (RDD) method to generate and collect a list of unique phone numbers (n = 30603). Then, we used a computer program to send an SMS to the previous list to identify valid numbers according to the SMS delivery status (n = 10931), to provide information about the project (including ethical issues) and warn subscribers that they would be likely to be called. At this stage, an automatic procedure was adopted to call and detect whether the respondent was human and to put the person in touch with an interviewer who explained how and by who the research project was conducted and asked for consent to participate (n = 1441). Finally, 813 individuals participated to the survey (Fig. 1). Five interviewers collected data in French, Wolof, Diola, Serer, Pulaar, or Soninke. We collected information on the sociodemographic characteristics of the individuals and the social acceptability of the four measures taken to contain the spread of COVID-19: curfews, the ban on travel between regions, closure of markets, and the ban on visiting places of worship. Since the amount of missing data was below 5%, complete case analysis was carried out using STATA SE 16 software.

Psychometric properties

Validity of content

We formulated the questions for measuring social acceptability in accordance with the TFA [56]. The TFA was developed using inductive and deductive approaches based on a literature review on the definition, mobilization, and evaluation of acceptability in health interventions. Although different theoretical frameworks have been proposed to study acceptability, the TFA is specific to health interventions. In this framework, acceptability was defined as "a multifaceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention" [56]. According to the TFA, acceptability is composed of seven constructs: affective attitude, burden, ethicality, intervention coherence, opportunity costs, perceived effectiveness, and self-efficacy.

We embedded the questions for assessing social acceptability within a questionnaire conceptualized in accordance with Bruchon-Schweitzer's integrative and multifactorial model [10]. The questions were formulated in French and then translated into the dominant national language (Wolof). We pre-tested the questions during simulations within the research team and the data collection team (including the interviewers) to understand the administration of the questionnaire. During this stage, the questions were translated into five other national languages (Diola, Malinke, Pular, Serer, Soninke). A consensus between the research and the data collection team concerning the words that were difficult to translate was reached after three days of training on the survey process and content. In the survey, each question was formulated to correspond to each construct of the TFA and the context of the COVID pandemic in Senegal. Every question was formulated as a Likert item giving a choice of five possible answers scored from 1 to 5 (1. Strongly disagree, 2. Disagree, 3. Neither disagree nor agree, 4. Agree, 5. Strongly agree). The final scale was composed of seven questions from which we computed the level of acceptability as a score of 5 to 35 by summing the values from each Likert item. The resulting scale was used to assess the acceptability of four government measures introduced at the onset of the COVID-19 pandemic: curfews, inter-regional travel, market closures, and the closure of places of worship.

Homogeneity

We assessed the homogeneity of the scale according to each government measure. The overall correlation between the scale items and the scale's internal consistency were estimated using average inter-item correlations (AIC) and Cronbach's α for each considered measure. A Cronbach's alpha with a value above 0.7 and an average inter-item correlation (AIC) between 0.15 and 0.50 were considered satisfactory [13,28]. The "floor" and "ceiling" effects estimated, respectively, the proportion of individuals in the sample with a score equal to the minimum and maximum possible value obtained on the scale [23]. These indices ensured that the computed score captured the full range of responses variation using a maximum threshold of 15% for floor and ceiling effects [61].

Construct validity

We assessed the dimensional structure of the scale for each government measure. Given that each item reflected the level of an underlying construct of the TFA, we implemented rating scale models (RSM) based on item response theory [13]. This type of model allowed to verify the items framing quality by assuming that each question can be understood differently but contributes to discriminating the level of acceptability among individuals in the same way. To that end, we estimated two parameters to assess the items' characteristics: the difficulty parameter and the discrimination parameter. The difficulty parameter estimated for each item stood for the acceptability effort and decreased as the probability of giving a positive answer (acceptability level) increased. An item was considered "very easy", "easy", "moderate", "difficult" or "very difficult" respectively for values "less than or equal to − 2", "between − 2 and − 0.5", "between − 0.5 and 0.5", "between 0.5 and 2", or "greater than or equal to 2" [30]. The discrimination index, common to all questions, made it possible to check the extent to which the questions correctly distinguished between individuals according to the level of acceptability. A high probability of positive response for people with a high level of acceptability and a low probability for people with a low level of acceptability reflected a good discrimination. A value of the discrimination index between 0.65 and 1.34 was considered acceptable and a value above 1.35 was considered high [4].

The overall quality of the scale dimensional structure was assessed through the models' scalability and goodness of fit. The entire scale as well as each item Loevinger's *H* coefficients [40] were computed to ensure that the models' scalability conditions (the scale unidimensionality, the independence between the items, and the monotonicity of the responses to the items) were met. A value greater than 0.3 was required for the validity of the items and the scale [37,49]. The models assumed that the item response functions were parallel and monotonic functions. Chi-square tests were used to assess these assumptions [31]. A p-value lower than 5% meant that the prediction from the models deviate significantly from the data and invalidated the fit of the models.

Sensitivity analyses

The invariance of the dimensional structure was performed by comparing the results of the RSMs applied to the four government measures. We tested scale homogeneity invariance by calculating the intra-class correlation coefficients (ICC) of the items and the scale applied to the four governmental measures using an absolute agreement, two-way random effects model [34]. An ICC greater than 0.4 ensured good homogeneity invariance [20]. To check whether the distribution of the scale score varied according to sociodemographic characteristics, we performed a mixed-effects linear regression taking the individual score on each government measure as the dependent variable and the sociodemographic characteristics (age, gender, education level, and economic well-being quintile) as the independent variables. A random effect on the intercept allowed the responses of the same individual to different government measures to be correlated. We obtained the

quintile of economic well-being by dividing the distribution of the economic well-being index into five equal categories. The latter was calculated according to the number and type of durable goods owned [1]. We used the significant sociodemographic variables in the regression to test whether the scale had differential item functioning (DIF) on these variables. To do this, we used RSMs to compare the properties of the scale by stratifying according to the different categories of the considered variable.

Results

The sampling method led to a sample with defined quotas close to that is observed in the last census, with a slight overrepresentation of men and people who live in Dakar (Appendix A). The sample consisted of 813 people who represented 56.4% of those contacted (Fig. 1), 444 of whom were men (54.6%), 42.6% had not attended school and 71.8% had at least a medium level of wealth. The median age was 31 years (IQR: 31 [24− 42]). The amount of missing values related to the four government measures was low: 2% for the curfew, 1% for the ban on inter-regional travel, 2% for the closure of markets, and 3% for the closure of places of worship.

Table 1 presents the seven items of the scale and their correspondence with the TFA constructs.

Table 2 describes the homogeneity of the scale. The internal consistency was satisfactory regardless of the government measure ($\alpha > 0.70$). The average correlation between items was satisfactory (AIC>0.30). The floor and ceiling effect proportions did not exceed the 15% threshold.

Table 3 presents the value of the Loevinger coefficient, which was satisfactory for each item and the scale as a whole, regardless of the government measure. All Loevinger coefficients values were above 0.3, warranting the scalability of each item (the amount of correlation between each item and the sum score based on the remaining set of items [49]) and the complete set of items (the extent to which the total score accurately rank the level of acceptability [49]). The goodness-of-fit tests showed that the models correctly captured the information contained in the data. The values of the discrimination parameters ranged from 0.95 to 1.35, demonstrating the scale's capacity to distinguish accurately between individuals according to the level of acceptability. The values taken by the difficulty parameters (Appendix B) allowed a homogenous interpretation of each item for each measure. A low level of acceptability effort was sufficient to move from strong disagreement to disagreement (difficulty index ranging from −2.09 to −0.24). A moderate to difficult acceptability effort was required to move from disagreement to neutrality (difficulty index ranging from −0.51 to 1.21). A low level of acceptability effort was sufficient to move from neutrality to agreement (difficulty index ranging from −4.55 to −1.19). Easy to difficult acceptability effort was required to move from agreement to strong agreement (difficulty index ranging from −0.75 to 1.24). No category of the scale items was perceived as very difficult.

Table 1
Description of the items according to the TFA domains.

TFA Constructs [56]	Definition of the construct [56]	Research item
Affective attitude	How an individual feels about the intervention	About the measure, my feeling is positive
Burden	The perceived amount of effort that is required to participate in the intervention	I make a lot of effort to be able to comply with the measure
Ethicality	The extent to which the intervention has good fit with an individual's value system	The measure fits with my values
Intervention coherence	The extent to which the participant understands the intervention and how it works	I understood the importance of measure
Opportunity costs	The extent to which benefits, profits or values must be given up to engage in the intervention	I think the benefits of the measure are worth the investment I will have to make to comply with it
Perceived effectiveness	The extent to which the intervention is likely to achieve its purpose	I think the measure helps to reduce coronavirus-related illness
Self-efficacy	The participant's confidence that they can perform the behaviour(s) required to participate in the intervention	I am confident in my ability to comply with the measure to the maximum

As shown in Table 3, the scale's dimensional structure was satisfactory across all the government measures, supporting a good measurement invariance. Table 4 summarizes the values of the ICC at both the population and the individual level. The homogeneity invariance at the population level was satisfactory (ICC>0.4). The low ICC values at the individual level show that the acceptability levels were rated differently by individuals according to the measures. However, there was a residual correlation which implies that the results were not independent within the same individual.

Table 5 describes the association between the sociodemographic factors and the scale applied to the four government measures. The acceptability levels were significantly different according to age and education level but did not vary significantly according to sex and levels of wealth. The analysis of the items differential functioning (Appendix C) on the significant variables showed that the distributions of these sociodemographic characteristics did not invalidate the dimensional structure of the scale. Therefore, the significant p-values demonstrated that the level of acceptability was higher among older and more educated people.

Discussion and lessons learned

This study is one of the first to provide psychometric validation of a scale for measuring the social acceptability of public health interventions based on the TFA proposals. To our knowledge, only one other scale has been developed using this theoretical framework [57] but has not yet been used to assess the acceptability of a public health intervention. Although this tool may be an alternative to the scale we developed, the study focused on the content validity of the scale items and further work is needed to establish its full psychometric properties.

Several items from our scale presented scalability coefficients that may be considered weak as their values ranged between 0.3 and 0.4 [37, 49]. These weak values remind that the items' formulation is sensitive to contexts and that a supplementary translation effort may be needed when adapting the scale to new interventions. Nonetheless, the values of the scalability coefficients are still in the acceptable range. Furthermore, the dimensional properties and the homogeneity of the scale, especially the invariance of these properties according to the studied health measures are in favor of its adaptability to other contexts. The items have been formulated so they can easily be adapted to different interventions: in our case, they were used to measure the social acceptability of four different public health measures and were formulated accordingly (e.g.: "I understood the importance of the curfew" or "The curfew fits with my values"). When necessary, it may be useful to reframe the items so as to capture the intervention context without departing from the TFA. With regard to the items, a five-level assessment ("Strongly disagree", "Disagree", "Neither disagree nor agree", "Agree", "Strongly agree") was adopted, but the values of the difficulty parameters suggest the possibility of grouping certain categories. Thus, a three-level assessment ("Disagree", "Neither Disagree nor Agree" and "Agree") may enhance the validity and the scalability of the scale and the items (Appendix D). These results are likely to be generalizable to the Senegalese population since our quota sampling method targeted the representativeness of the population. Indeed, the resulting quotas were close to that is observed in the last census according to the population age group, gender, and region distribution. Additionally, our response rate was reasonable compared to other surveys, especially those which took place in sub-Saharan countries during health crisis [24,32]. The quota sampling

Table 2
Description of the homogeneity of the scale.

Government measure	Response rate	Cronbach's Alpha	Inter-item correlations	Floor effect	Ceiling effect
Curfew	797 (98%)	0.76	0.33	12.1%	0.1%
Prohibition of travel between regions	805 (99%)	0.82	0.41	14.3%	0.4%
Closing of markets for several days a week	794 (98%)	0.82	0.42	9.2%	0.9%
Closure of places of worship (mosques and churches)	789 (97%)	0.86	0.48	9.6%	0.4%

Table 3
Quality of the dimensional structure of the scale (Loevinger H coefficients) applied to different governmental measures.

Item	Curfew (N = 797)	Prohibition of travel between regions (N = 805)	Closure of markets for several days a week (N = 794)	Closure of places of worship (mosques and churches) (N = 789)
About the measure, my feeling is positive	0.488	0.535	0.536	0.659
I make a lot of effort to be able to comply with the measure	0.300	0.434	0.515	0.461
The measure fits with my personal values	0.303	0.461	0.443	0.570
I understood the importance of measurement	0.455	0.509	0.481	0.623
I think the benefits of the measure are worth the investment I will have to make to comply with it	0.481	0.572	0.563	0.650
I think the measure helps to reduce coronavirus-related illness	0.327	0.421	0.417	0.512
I am confident in my ability to comply with the measure to the maximum	0.393	0.531	0.529	0.567
Global scale	0.398	0.495	0.493	0.587
p-value (model fitting)	0.999	0.999	0.999	0.999

Table 4
Intra-class correlation coefficients (ICC) of items and scale applied to the four government measures (N = 767).

	icc	
Items	**Individual**	**Population**
I understood the importance of measurement	0.20	0.51
I make a lot of effort to be able to comply with the measure	0.27	0.59
About the measure, my feeling is positive	0.25	0.57
I think the measure helps to reduce coronavirus-related illness	0.48	0.79
I think the benefits of the measure are worth the investment I will have to make to comply with it	0.37	0.70
I am confident in my ability to comply with the measure to the maximum	0.29	0.61
The measure fits with my personal values	0.29	0.62
Global scale	0.37	0.71

Table 5
Factors associated with the level of acceptability (mixed linear regression).

	N (%)	β [IC95%]	Wald test p-value
Gender			
Male	444 (54.6%)	Reference	0.074
Woman	369 (45.4%)	0.55 [− 0.05;1.15]	
Age			
18-24 years	228 (28.0%)	Reference	< 0.001
25-59 years	515 (63.4%)	0.89 * [0.20;1.58]	
60-88 years	70 (8.6%)	2.57 * ** [1.38;3.75]	
Level of education			
Without instruction	346 (42.6%)	Reference	0.034
Primary	154 (18.9%)	0.35 [− 0.47;1.18]	
Secondary	213 (26.2%)	0.44 [− 0.33;1.21]	
Academic	100 (12.3%)	1.49 * * [0.49;2.48]	
Wealth quintile			
Poorer	116 (14.3%)	Reference	0.571
Poor	113 (13.9%)	-0.48 [− 1.61;0.64]	
Medium	165 (20.3%)	-0.82 [− 1.86;0.22]	
Rich	210 (25.8%)	-0.75 [− 1.75;0.25]	
Richer	209 (25.7%)	-0.68 [− 1.71;0.35]	

*p < 0.05,
* *p < 0.01,
* **p < 0.001

method can be a relevant alternative to random sampling for sample size below 3000 in emergency situations such as COVID-19 [16,2,54,9]. Nevertheless, the sampling procedure restricted the data collection to the participants, thus hindering any comparison to the non-participants and any adjustment for selection biases. Therefore, the phone survey may have excluded marginalized populations who did not have mobile phones. In addition, the information from those who were surveyed were not verifiable and may have been subject to social desirability bias. Although the phone survey and the quota sampling method have some limitations that potentially led to different biases, we believe that these biases would have been limited by the anonymity due to the remote nature of the interviews and the rigorous data collection procedures. In particular, the participation rate, the nature and the topic of the survey and the research purpose should have reduced nonresponse biases [26].

This scale has the advantage of having a limited number of items while considering all the constructs of acceptability according to the TFA. This characteristic makes it an interesting tool for evaluating and comparing public health interventions, especially as we used it in a telephone survey context. Indeed, the pandemic has slowed down the collection of surveillance data, particularly in the Global South [63], thus impacting the capacity to respond to COVID-19. In this context, telephone surveys are particularly useful [50]. Still, they are also subject to various methodological challenges, particularly with regard to the collection and use of data to decide on the strategies to be put in place [25]. The scale we developed has advantages due to its content and psychometric properties, which are suitable for measuring and understanding the acceptability of measures, and due to its ease of administration.

Many studies used knowledge, attitude, beliefs, and perceptions surveys to explore the social acceptability of the measures against COVID-19 in Africa [12,27,53]. While these surveys have the merit of highlighting the importance of perceptions when implementing the measures to limit the pandemic spread, the outcomes are not specifically related to the acceptability of these measures. A measurement scale ensures that the study results are specifically associated with acceptability. In our study, the differential item functioning analysis and the regression analysis showed that the level of acceptability differed according to sociodemographic characteristics. In contrast, the dimensional structure and the homogeneity of the scale were invariant according to these same characteristics. Therefore, the scale allows to identify the population sub-groups for whom the acceptability of the measures is different and to tailor the measures' implementation for better effectiveness. The variations in levels of acceptability by age and education may reveal social differences beyond demographic differences. Although further investigation is needed to link these variations to social inequalities, they remind the need for public health interventions that address inequalities in health. Indeed, such inequalities were often noted in the implementation of interventions during the pandemic, emphasizing the relevance of the principles of proportionate universalism in this context [47]. Adapting the implementation and even the design of interventions according to the needs and characteristics of individuals may be relevant to improving uptake and perception of measures [21].

Ethical approval

The research was approved by the National Health Research Ethics Committee of Senegal (SEN/20/23).

Author contributions

AR, AF and VR designed the study. VR, AF, AID and IG collected and prepared the data. AR conducted the analyses and first drafted the paper. VR, AF, AID and IG critically revised the paper. All authors have read and approved the manuscript.

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CRediT authorship contribution statement

Valéry Ridde: Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Funding acquisition, Conceptualization. **Ibrahima Gaye:** Writing – review & editing, Validation, Investigation, Formal analysis, Data curation. **Andrainolo Ravalihasy:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Methodology, Formal analysis, Conceptualization. **Amadou Ibra Diallo:** Writing – review & editing, Validation, Investigation, Formal analysis, Data curation. **Adama Faye:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Investigation, Funding acquisition, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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: Comparison between the analysis sample and the last census according to the variables defining quotas

	Analysis sample	Population census*
Age		
18-34	58.4%	54.0%
35-59	33.0%	35.1%
60 et +	8.6%	10.9%
Sex		
Men	54.6%	49.2%
Women	45.4%	50.8%
Region		
Dakar	30.4%	21.8%
Diourbel	11.3%	11.5%
Fatick	4.9%	5.0%
Kaffrine	3.1%	4.5%
Kaolack	7.1%	7.4%
Kedougou	0.5%	1.4%
Kolda	3.3%	5.1%
Louga	6.2%	6.2%
Matam	3.2%	4.6%
Saint-Louis	6.3%	6.7%
Sedhiou	1.6%	3.2%
Tambacounda	4.1%	5.5%
Thies	14.8%	13.7%
Ziguinchor	3.3%	3.4%

*https://senegal.opendataforafrica.org/uzptmtd/population-du-s%C3%A9n%C3%A9gal-par-r%C3%A9gion-age-et-sexe-2023

: Difficulty and discrimination parameters of items estimated using RSM

	Curfew		Travel bans		Closing of the markets		Closure of places of worship	
	β	p-value	β	p-value	β	p-value	β	p-value
	Discrimination parameter							
	0.95	< 0.001	1.27	< 0.001	1.16	< 0.001	1.35	< 0.001
	Difficulty settings							
Attitude								
Strongly disagree vs. Disagree	-1.36	< 0.001	-1.11	< 0.001	-0.98	< 0.001	-0.57	< 0.001
Disagree vs. Neither Disagree nor Agree	0.47	0.002	0.27	0.006	0.44	< 0.001	0.40	< 0.001
Neither Disagree nor Agree vs Agree	-3.82	< 0.001	-2.51	< 0.001	-2.29	< 0.001	-1.52	< 0.001
Agree vs. Strongly agree	-0.02	0.716	0.27	< 0.001	0.82	< 0.001	0.91	< 0.001
Burden								
Strongly disagree vs. Disagree	-2.09	< 0.001	-1.89	< 0.001	-1.80	< 0.001	-1.47	< 0.001
Disagree vs. Neither Disagree nor Agree	-0.26	0.080	-0.50	< 0.001	-0.37	< 0.001	-0.51	< 0.001
Neither Disagree nor Agree vs. Agree	-4.55	< 0.001	-3.29	< 0.001	-3.11	< 0.001	-2.42	< 0.001
Agree vs. Strongly agree	-0.75	< 0.001	-0.51	< 0.001	0.01	0.893	-0.00	0.998
Ethicality								
Strongly disagree vs. Disagree	-1.28	< 0.001	-0.78	< 0.001	-0.61	< 0.001	-0.24	< 0.001
Disagree vs. Neither Disagree nor Agree	0.55	< 0.001	0.60	< 0.001	0.81	< 0.001	0.73	< 0.001
Neither Disagree nor Agree vs. Agree	-3.74	< 0.001	-2.18	< 0.001	-1.92	< 0.001	-1.19	< 0.001
Agree vs. Strongly agree	0.06	0.336	0.60	< 0.001	1.20	< 0.001	1.24	< 0.001
Coherence								
Strongly disagree vs. Disagree	-1.50	< 0.001	-1.38	< 0.001	-1.19	< 0.001	-0.56	< 0.001
Disagree vs. Neither Disagree nor Agree	0.33	0.029	0.01	0.960	0.23	0.015	0.40	< 0.001
Neither Disagree nor Agree vs. Agree	-3.96	< 0.001	-2.78	< 0.001	-2.50	< 0.001	-1.51	< 0.001
Agree vs. Strongly agree	-0.17	0.011	-0.00	0.982	0.61	< 0.001	0.91	< 0.001
Opportunity costs								
Strongly disagree vs. Disagree	-1.14	< 0.001	-1.39	< 0.001	-1.34	< 0.001	-0.97	< 0.001
Disagree vs. Neither Disagree nor Agree	0.69	< 0.001	-0.01	0.950	0.08	0.404	-0.01	0.920
Neither Disagree nor Agree vs. Agree	-3.60	< 0.001	-2.80	< 0.001	-2.66	< 0.001	-1.92	< 0.001
Agree vs. Strongly agree	0.20	0.002	-0.01	0.817	0.46	< 0.001	0.50	< 0.001
Perceived effectiveness								
Strongly disagree vs. Disagree	-0.62	< 0.001	-1.23	< 0.001	-1.18	< 0.001	-0.86	< 0.001
Disagree vs. Neither Disagree nor Agree	1.21	< 0.001	0.15	0.124	0.24	0.011	0.10	0.174
Neither Disagree nor Agree vs. Agree	-3.08	< 0.001	-2.64	< 0.001	-2.49	< 0.001	-1.81	< 0.001
Agree vs. Strongly agree	0.72	< 0.001	0.15	0.006	0.62	< 0.001	0.61	< 0.001
Self-efficacy								
Strongly disagree vs. Disagree	-1.83	< 0.001	-1.75	< 0.001	-1.72	< 0.001	-1.44	< 0.001
Disagree vs. Neither Disagree nor Agree	0.00	0.995	-0.36	< 0.001	-0.30	0.002	-0.47	< 0.001
Neither Disagree nor Agree vs. Agree	-4.29	< 0.001	-3.15	< 0.001	-3.04	< 0.001	-2.39	< 0.001
Agree vs. Strongly agree	-0.49	< 0.001	-0.37	< 0.001	0.08	0.168	0.03	0.525

: Analysis of item functioning by age and education level

Curfew by age.

Parameter	25 - 88 years old	18 - 24 years old
Affective attitude		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-.98133096	-1.3763936
3 vs 2	.26838047	.98502001
4 vs 3	-3.296854	-2.0879641
5 vs 4	-.74878755	-.14413278
Burden		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-4.0016666	-1.8398291
3 vs 2	1.0824471	
4 vs 2	-3.7543734	
4 vs 3	-5.920192	
5 vs 4	-.60626675	.32705335
Ethicality		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-1.607213	-.94300051
3 vs 2	.49051977	2.5072589
4 vs 3	-3.5318154	-3.8411966
5 vs 4	-.30871432	.81217015
Intervention coherence		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-.50657413	.52915208

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Parameter	25 - 88 years old	18 - 24 years old
3 vs 2	.44607307	1.1663413
4 vs 3	-2.310093	-1.4961897
5 vs 4	.37477762	1.1445547
Opportunity costs		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-1.3103794	-.40532143
3 vs 2	.37341186	.9940959
4 vs 3	-3.3824433	-2.5002441
5 vs 4	.31166633	1.0297813
Perceived effectiveness		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-2.1225841	-1.1206537
3 vs 2	-1.2387197	.62007005
4 vs 3	-5.0882854	-4.2078078
5 vs 4	-.06491839	.75897491
Self-efficacy		
Discrimination parameter	1.0355999	.93300821
Difficulty parameter		
2 vs 1	-1.6053578	-.70032746
3 vs 2	1.2812125	3.3945116
4 vs 3	-4.459051	-4.5527392
5 vs 4	.00097111	.92781031

Curfew by level of education.

Parameter	Without instruction/primary/secondary	Academic
Affective attitude		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-1.3725578	-.18883591
3 vs 2	.25808779	1.0014988
4 vs 3	-3.2579322	-1.6098621
5 vs 4	-.73041232	-.35078866
Burden		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-4.2485001	-1.6257964
3 vs 2	1.1604502	
4 vs 2	-2.595239	
4 vs 3	-6.3625119	
5 vs 4	-.53479614	.19352666
Ethicality		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-1.6230709	-.98559126
3 vs 2	.8618477	1.4290827
4 vs 3	-3.8850244	-2.4790033
5 vs 4	-.1345741	.18556509
Intervention coherence		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-.43707968	.4614927
3 vs 2	.6236599	.70155278
4 vs 3	-2.5608026	-.31211349
5 vs 4	.39031758	1.3163184
Opportunity costs		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-1.288601	-.40871094
3 vs 2	.28219052	1.3751654
4 vs 3	-3.4038762	-2.1890673
5 vs 4	.3322149	1.0623642
Perceived effectiveness		
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-2.2231911	-.7849157
3 vs 2	-.81155204	.26741095
4 vs 3	-5.1644719	-3.6450204
5 vs 4	.03424701	.33440734
Self-efficacy		

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Parameter	Without instruction/primary/secondary	Academic
Discrimination parameter	.99477381	1.0180118
Difficulty parameter		
2 vs 1	-1.5438333	-.840032
3 vs 2	2.1414698	.62244212
4 vs 3	-5.0623296	-2.7242143
5 vs 4	.16149226	.22997473

Prohibition of travel between regions by age.

Parameter	25 - 88 years old	18 - 24 years old
Affective attitude		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-1.1541485	-.6727234
3 vs 2	-.42277622	.40513503
4 vs 3	-2.151273	-.97683704
5 vs 4	-.48377472	.47781147
Burden		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-2.7228734	-1.0312828
3 vs 2	-.35825125	-.40684535
4 vs 3	-4.4675653	-2.6061638
5 vs 4	-.27458028	.67411281
Ethicality		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-1.2684006	-.58970208
3 vs 2	.18235405	.6440485
4 vs 3	-2.1843462	-.96642916
5 vs 4	.02991055	.74089623
Intervention coherence		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-.62442158	.42358193
3 vs 2	.1082377	.83368704
4 vs 3	-2.9961706	-1.74564
5 vs 4	-.09385425	.81442687
Opportunity costs		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-1.2727498	.23741356
3 vs 2	-.51126699	-.46254198
4 vs 3	-2.6389962	-1.5305616
5 vs 4	.06883608	1.007443
Perceived effectiveness		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-2.0976588	-.466119
3 vs 2	-.60034648	-.3138492
4 vs 3	-3.9558457	-2.5894791
5 vs 4	-.03066977	.752666
Self-efficacy		
Discrimination parameter	1.3153405	1.3485653
Difficulty parameter		
2 vs 1	-1.325138	-.36864975
3 vs 2	1.5919902	2.2365568
4 vs 3	-2.6599811	-1.8950687
5 vs 4	.26419157	1.0860276

Prohibition of travel between regions by level of education.

Parameter	Without instruction/primary/secondary	Academic
Affective attitude		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-1.2769952	-.95151502
3 vs 2	-.2270289	-1.2309104

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Parameter	Without instruction/primary/secondary	Academic
4 vs 3	-2.1680052	-2.0366206
5 vs 4	-.364012	.40526864
Burden		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-2.3516747	
3 vs 1	-2.8774904	
3 vs 2	-.38938751	
4 vs 3	-4.5009612	-5.8238656
5 vs 4	-.11975681	.45387823
Ethicality		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-1.3047001	-1.2744268
3 vs 2	.2243878	.25648333
4 vs 3	-2.068366	-3.7692407
5 vs 4	.08716252	1.8342402
Intervention coherence		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-.51106396	1.3821524
3 vs 2	.35733489	-1.3737208
4 vs 3	-3.0447943	-4.3904804
5 vs 4	.02958627	1.4479299
Opportunity costs		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-1.1470304	.68851448
3 vs 2	-.62192828	-1.4780267
4 vs 3	-2.6114547	-4.6945833
5 vs 4	.21389733	1.8650802
Perceived effectiveness		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-1.7618493	
3 vs 1	-2.8072835	
3 vs 2	-.52758625	
4 vs 3	-4.0839544	-6.1023883
5 vs 4	.06700588	1.3607455
Self-efficacy		
Discrimination parameter	1.244076	.51807563
Difficulty parameter		
2 vs 1	-1.2121662	-3.2862534
3 vs 2	1.8565768	3.779585
4 vs 3	-2.7954148	-4.7872583
5 vs 4	.35927079	2.6703311

Closure of markets for several days a week by age.

Parameter	25 - 88 years old	18 - 24 years old
Affective attitude		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-1.1596729	-.37290533
3 vs 2	-.1647349	.29706686
4 vs 3	-1.7638278	-.76953964
5 vs 4	-.01170208	.82896191
Burden		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-2.7861909	-1.0682434
3 vs 2	-.65218856	.930101
4 vs 3	-3.3587755	-3.3887838
5 vs 4	.30906864	.8833293
Ethicality		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-1.1769297	-.37976041
3 vs 2	.53494152	1.0198697
4 vs 3	-2.2149716	-1.0570087
5 vs 4	.52537141	.94022171
Intervention coherence		

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Parameter	25 - 88 years old	18 - 24 years old
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-.73069516	.36056
3 vs 2	.59466185	.02983331
4 vs 3	-2.9880547	-1.106766
5 vs 4	.29034087	1.065134
Opportunity costs		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-1.0549386	-.19087555
3 vs 2	-.52555092	-.2180462
4 vs 3	-2.4294669	-.92841532
5 vs 4	.50493331	.86303774
Perceived effectiveness		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-2.1252545	-.95385773
3 vs 2	-.35159014	.30806708
4 vs 3	-3.5540301	-2.8915148
5 vs 4	.51159197	.86336261
Self-efficacy		
Discrimination parameter	1.2376097	1.4219248
Difficulty parameter		
2 vs 1	-.88756171	-.55668752
3 vs 2	1.2976169	2.1190254
4 vs 3	-2.0219295	-1.5734828
5 vs 4	.90097981	.96307606

Closure of markets for several days a week by level of education.

Parameter	Without instruction/primary/secondary	Academic
Affective attitude		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-1.1427646	-.71222425
3 vs 2	-.04138117	-.26374966
4 vs 3	-1.8371515	-.77903772
5 vs 4	.17284742	.6800498
Burden		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-2.5111538	
3 vs 1	-1.2305408	
3 vs 2	-.17663257	
4 vs 3	-4.0420028	-2.3806092
5 vs 4	.46561311	.82491129
Ethicality		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-1.1507399	-.79637235
3 vs 2	.77349478	.53210465
4 vs 3	-2.2833324	-1.3275773
5 vs 4	.6625163	.97294684
Intervention coherence		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-.48783713	-.45993118
3 vs 2	.10655195	1.5473981
4 vs 3	-2.6147978	-2.7951374
5 vs 4	.50338174	.91830347
Opportunity costs		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-.9663901	-.70295025
3 vs 2	-.67435287	.08717593
4 vs 3	-2.3084011	-1.728598
5 vs 4	.62213522	.91782529
Perceived effectiveness		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-1.897305	
3 vs 1	.0947193	

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Parameter	Without instruction/primary/secondary	Academic
3 vs 2	-.26341757	
4 vs 3	-4.0637261	-2.5947301
5 vs 4	.63803935	.81530743
Self-efficacy		
Discrimination parameter	1.1142152	1.2188745
Difficulty parameter		
2 vs 1	-.98050701	-.73866495
3 vs 2	1.7579754	1.445923
4 vs 3	-2.2721513	-1.6321502
5 vs 4	.92783721	1.4423079

Closure of places of worship (mosques and churches) by age.

Parameter	25 - 88 years old	18 - 24 years old
Affective attitude		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-.3053609	.55657776
3 vs 2	.39020686	1.7588361
4 vs 3	-1.2463667	-1.5815438
5 vs 4	.11337519	.62690768
Burden		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-2.7514703	-2.7357891
3 vs 2	-1.3628711	-.53151257
4 vs 3	-2.2444641	-1.8309885
5 vs 4	.34758002	1.1046015
Ethicality		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-.79672171	-.58525644
3 vs 2	.7094129	1.9353959
4 vs 3	-1.4579964	-1.3149857
5 vs 4	.48040865	1.1248362
Intervention coherence		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-.45918537	-.15473562
3 vs 2	-.44192435	.69318682
4 vs 3	-1.4846023	-1.1805886
5 vs 4	.33711374	1.0731913
Opportunity costs		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-1.0048128	-.59737481
3 vs 2	-.54470741	.24144446
4 vs 3	-1.4309051	-1.2018569
5 vs 4	.48680282	1.17091
Perceived effectiveness		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-1.8830368	-.66583784
3 vs 2	-1.2380955	-.46412086
4 vs 3	-2.3076095	-2.7358994
5 vs 4	.49601531	1.1174089
Self-efficacy		
Discrimination parameter	1.5019642	1.1332946
Difficulty parameter		
2 vs 1	-.60361111	.07481965
3 vs 2	1.5925329	2.6896137
4 vs 3	-1.735404	-1.6686475
5 vs 4	.98494891	1.628594

Closure of places of worship (mosques and churches) by level of education.

Parameter	Without instruction/primary/secondary	Academic
Affective attitude		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-.11123941	-.29981324
3 vs 2	.8160185	.3569141
4 vs 3	-1.5459684	-.63045737
5 vs 4	.21304056	.36222929
Burden		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-2.8914591	
3 vs 1	-1.9284845	
3 vs 2	-1.1519144	
4 vs 3	-2.3519858	-1.7202198
5 vs 4	.50425987	.82757486
Ethicality		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-.78864087	-1.2740625
3 vs 2	1.11402	.76841053
4 vs 3	-1.6064847	-1.0893647
5 vs 4	.60347756	1.0240204
Intervention coherence		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-.49539142	.01323437
3 vs 2	-.16866299	-.14639191
4 vs 3	-1.5716033	-1.0474492
5 vs 4	.46060399	1.019744
Opportunity costs		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-1.0269469	-.51333817
3 vs 2	-.43400387	.0150471
4 vs 3	-1.4739773	-1.5440779
5 vs 4	.61822048	1.0590902
Perceived effectiveness		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-1.5200829	
3 vs 1	-.35429077	
3 vs 2	-1.2548142	
4 vs 3	-2.5670141	-2.4334747
5 vs 4	.61538927	1.0149638
Self-efficacy		
Discrimination parameter	1.3264809	1.2104094
Difficulty parameter		
2 vs 1	-.45433706	-.80521462
3 vs 2	1.8427999	2.8914065
4 vs 3	-1.8346521	-2.0190262
5 vs 4	1.2170127	1.0534627

Quality of the dimensional structure of the scale (Loevinger H coefficients) applied to different governmental measures using items with three-level assessment ("Disagree", "Neither Disagree nor Agree" and "Agree")

Item	Curfew (N = 797)	Prohibition of travel between regions (N = 805)	Closure of markets for several days a week (N = 794)	Closure of places of worship (mosques and churches) (N = 789)
About the measure, my feeling is positive	0.505	0.568	0.547	0.686
I make a lot of effort to be able to comply with the measure	0.402	0.501	0.533	0.560
The measure fits with my personal values	0.338	0.530	0.483	0.605
I understood the importance of measurement	0.485	0.571	0.531	0.647
I think the benefits of the measure are worth the investment I will have to make to comply with it	0.490	0.591	0.562	0.667
I think the measure helps to reduce coronavirus-related illness	0.320	0.446	0.411	0.530
I am confident in my ability to comply with the measure to the maximum	0.427	0.549	0.535	0.607
Global scale	0.424	0.536	0.513	0.620
p-value (model fitting)	0.988	0.985	0.997	0.997
Cronbach's α	0.79	0.85	0.84	0.88
Floor effect	12.1	14.3	9.2	9.6
Ceiling effect	0.1	0.5	1.0	1.1

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