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# The State of Social Connections Methodology Report

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# Introduction

This document accompanies the *2022 State of Social Connections* report produced by Meta and Gallup. It provides a detailed overview of the survey methodology, including instrument development, fielding, data processing and data analysis.

## Survey Development

Meta and Gallup implemented a collaborative, iterative process, following best practices, to create the final survey instrument. The first step in the process was to complete a comprehensive review of existing literature on connections, loneliness and social support to identify theoretically relevant instruments and candidate question items, including those best suited to diverse cultural settings.

Informed by this literature review, Meta researchers incorporated input from Gallup and a group of expert academic advisors<sup>1</sup> to create an initial survey instrument. Gallup used this instrument to conduct cognitive interviews with 20 respondents in each major language from each of eight countries. The goal of cognitive interviewing was to assess the quality of translations and comprehensibility of survey language, interpretability, construct validity and cultural appropriateness of questions.

In parallel with the qualitative item assessment from cognitive interviews, researchers from Meta also fielded surveys on Facebook to allow a quantitative investigation of the construct validity of items intended to measure loneliness and social support across countries. Using the results of cognitive interviews — together with the results of the quantitative assessments from survey data collected on Facebook and feedback from the team of academic advisors — Meta and Gallup revised the survey instrument, prioritizing items to be included in the final survey instrument (see sections 2.1 -2.5 for a more detailed description of this process). Gallup then fielded the final survey instrument via telephone or face-to-face interviews in seven of the original eight countries where cognitive interviews were conducted. While initial cognitive interviews were carried out in Russia, Meta and Gallup agreed not to field the final survey there, given the potential risks posed by the war with Ukraine.

<sup>1</sup> Meta and Gallup sought expertise from a wide group of academics in early stages of study conceptualization. Academic advisors who provided consultation on a consistent basis for the study included Nicole Ellison, University of Michigan; John Helliwell, University of British Columbia; Julianne Holt-Lunstad, Brigham Young University; Sonja Lyubomirsky, University of California, Riverside; and William Tov, Singapore Management University. Academic advisors were not compensated financially for their time and expertise but were provided opportunities to access privacy-protected study data before it was publicly released and to collaborate with Meta and Gallup on publications.

## 2.1 IDENTIFYING ITEMS FOR TESTING

A revised 10-item version of the UCLA Loneliness Scale<sup>2</sup> was tested to measure loneliness as a construct. Eleven items from the Medical Outcomes Study (MOS) Social Support Survey (SSS)<sup>3</sup> — including multiple items from each specific dimension of social support included in the scale (e.g., emotional support, tangible support, affectionate support) — were also tested as part of the measure of feelings of social support. Five new items created by Meta and Gallup, inspired by the MOS-SSS, were also included in testing to help determine the extent to which they measured the same or distinct social support constructs across countries.

For all other measures included in the survey, Meta conducted a thorough review of the academic literature with the goal of developing a comprehensive view of what major surveys and validated instruments exist that try to capture an understanding of the state of social interactions, connectedness and social support. For example, this included identifying questions about the frequency and mode of interactions with family, friends, co-workers and strangers as well as questions about giving and receiving social support.

All individual items discovered during the review were categorized based on the relevant constructs they measured and were discussed internally among Meta researchers and with the Gallup team to develop the list of the initial items for consideration and cognitive testing.

## 2.2 SURVEY TRANSLATION

The initial survey instrument was translated into the major conversational language(s) for cognitive testing in each country (see [Table 1](#) for language(s) used in each country). Major conversational languages were chosen based on Gallup's experience conducting the World Poll over the last 16 years in these countries and with the aim to maximize coverage.

For each country, a translator translated the English version of the survey instrument into the target language. An independent third party with knowledge of survey methods then reviewed the translated versions and revised the translation as necessary.

2 Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): *Reliability, validity, and factor structure*. *Journal of personality assessment*, 66(1), 20-40.

3 Sherbourne, C. D., & Stewart, A. L. (1991). The MOS social support survey. *Social Science & Medicine* 32(6), 705-714.

## 2.3 COGNITIVE INTERVIEWS

Cognitive interviews were conducted to ensure an added measure of reliability and validity of the survey questions. These in-depth, structured interviews were conducted in eight countries during October and November of 2021.

Twenty participants from each country with a mix of demographic characteristics, including a balanced breakdown of gender, age, geography, level of education, income and social media use were interviewed in Brazil, Egypt, France, Indonesia, Mexico, Russia and the United States. In India, Gallup interviewed 40 participants to better represent the linguistic diversity within the country (20 interviews were conducted in Hindi and 20 in Bengali). To mirror the modes of data collection used for final survey implementation and maximize coverage in each country, interviews in the United States and France were conducted by phone, and interviews in Brazil, Egypt, India, Indonesia, Mexico and Russia were conducted face-to-face (modes of data collection for the final survey are explained in more detail in [Section 3 – Fielding.](#))

Trained qualitative interviewers administered the cognitive interviews to respondents across key demographics, including gender, age (minimum age requirement of 15 years), geography (urban and rural), education, income and social media use. Interviewers were instructed to follow the interview script and asked not to deviate from the translated language. The main purpose of the interviews was to explore whether people understood and interpreted questions as they were intended and whether the questions accurately captured the intended constructs (e.g., feelings of connection). The interviews also helped to ensure translations were accurate and conveyed the same meaning across languages.

During the cognitive interviews, Gallup employed a think-aloud, concurrent probing methodology. Detailed probes, developed with Meta, were included after most questions or question scales in the instrument. Interviewers also utilized question-specific probes to elicit additional information from participants. These probes included questions about how participants thought about the question, initial reactions when they heard the question or a particular phrase or word, and whether they could answer the question with the scale provided. Interviewers did not explain questions to participants, allowing Gallup to gather real-time evidence of how each participant processed each question.

Local teams from each country developed interview notes with item-level synthesis and recommendations. Gallup researchers then analyzed the recommendations and results across questions and by country. Based on these recommendations, Gallup and Meta revised and streamlined the survey instrument. In addition to minor changes to question wording and recommended changes to translations, a few major changes were made to facilitate comprehension and consistency across the survey. Specifically, questions that measured similar constructs or focused on topics that were not central to understanding people's social connections were eliminated from the final survey. Changes were also made to provide consistency in response options across frequency questions.

## 2.4 FACEBOOK SURVEYS

Two surveys were fielded on Facebook in November 2021. One survey included the 10-item version of the UCLA Loneliness Scale; the other included the 11 items from the MOS-SSS and MOS-SSS-6<sup>4</sup> scales and the five new social support items created by Meta and Gallup.

Each survey was written in English and then translated into 24 additional languages, aligning translations with those used in cognitive testing where relevant and to the extent possible. Sampling was stratified across 23 countries, including the eight countries from cognitive testing. A random sample of people in each country was invited to participate in the survey with an invitation that appeared at the top of their Facebook feed. An average of 968 people per country responded to at least one item in the scales described above in each survey and were included in the analyses.

The analyses for each survey involved both exploratory and confirmatory approaches, each using a distinct random subset of the data. First, parallel analysis and exploratory factor analysis (EFA) were used to explore the dimensionality and structure of the scales. Results from the EFA were then used to identify the strongest candidate items and structure to test in confirmatory analyses.

Specifically, results from confirmatory factor analyses (CFA) and item response theory (IRT) analyses, including assessments of construct structure and measurement invariance across countries, were used to help identify the best items to use to measure each construct.

Results from these quantitative analyses of the loneliness and social support scales helped inform — but did not by themselves determine — which items were prioritized for inclusion in the final survey instrument. Given that participants were surveyed on Facebook, the results were not necessarily generalizable to the broader target populations of interest for the final survey instrument (i.e., social media users and non-users alike). Moreover, these quantitative analyses relied on a data collection mode (online survey) that was different from the modes that would be used for final data collection (face-to-face or telephone interviews). However, the quantitative assessments of construct validity across countries served as a valuable complement to the cognitive testing results.

4 Holden, L., Lee, C., Hockey, R., Ware, R. S., & Dobson, A. J. (2014). Validation of the MOS Social Support Survey 6-item (MOS-SSS-6) measure with two large population-based samples of Australian women. *Quality of Life Research*, 23(10), 2849-2853.

## 2.5 FINAL ITEM SELECTION

Overall, items were included in the final survey instrument based on the following considerations:

- 1) input from Gallup experts and academic advisors
- 2) cognitive testing results
- 3) interview length constraints
- 4) availability of validated academic scales for measuring constructs of interest
- 5) quantitative assessments of loneliness and social support scale items

When selecting the final items to include for a multi-item measure (scale) of loneliness, an explicit decision was made to keep the loneliness scale balanced using three items with positive valence and three items with negative valence (see section 5.1 below for more on the analysis of the loneliness scale after data was collected).

When selecting the final items for a multi-item measure (scale) of social support, an explicit decision was made to select one item from each subscale rather than multiple items for each subscale. Therefore, the social support items together are intended as a single overall measure of support rather than a measure of any specific dimension of support.

# Fielding

Gallup fielded the final survey in seven countries via local partners. In each country, Gallup's local partners trained interviewers to administer the survey using Gallup's standard training guide. Gallup also provided oversight to ensure local partners used consistent sampling and fielding methodology across countries, which are summarized in [Table 1](#).

## 3.1 SAMPLING METHODS AND SAMPLING DESIGN

All samples were probability-based and nationally representative of the population aged 15 years or older and living in a household within each country. Trained interviewers administered the survey instrument either face-to-face or via telephone.

Mode of data collection was decided based on Gallup's historical insight on ways to maximize coverage in each country.

In countries where phone penetration was not wide-reaching enough to provide maximum coverage (approximately <80% of the population), data collection happened face-to-face; otherwise, collection was over the phone. In countries where the survey instrument was administered via telephone (i.e., France and the United States), recruitment utilized random digit dialing or a nationally representative list of phone numbers. Gallup used a dual sampling frame that included both landline and mobile telephone numbers. The expected number of complete interviews in each format (landline and mobile) depended on information Gallup has on landline and mobile use in each country. Samples of telephone numbers for each frame were drawn from an official list of valid telephone prefixes assigned by telecom authorities in each country. In the case of landline frame, the list was stratified by geography and, in the case of mobile frame implicitly, by service provider to ensure complete representation.

In countries where the survey instrument was administered face-to-face (i.e., Brazil, Egypt, India, Indonesia and Mexico), Gallup employed stratification and cluster sampling methods. Per Gallup's standard sample selection methods, sampling units were first stratified by population size and/or geography, and then clusters of each stratified sample were surveyed. The sampled ultimate clusters were clusters of households. Random route procedures were used to select households. In each ultimate cluster, a starting point was determined, and the interviewer followed a procedure to select every third household. After the selected household was contacted, a person 15 years of age or older living in that household was randomly selected to be interviewed. To accomplish this, the interviewer listed each household member aged 15 or older, and the computer-assisted personal interview (CAPI) program randomly selected the household member to be interviewed.

### 3.2 SAMPLE COVERAGE

Although Gallup's recruitment methods ensured national representation within each country, small percentages of the population in each country were excluded due to geographical constraints and/or issues related to the safety of the interviewers. Detailed information about coverage and exclusions in each country is presented in Table 1.

**TABLE 1: Sampling details in each country**

Country	Data Collection Date	Number of Interviews	Design Effect <sup>a</sup>	Margin of Error <sup>b</sup>	Mode of Interviewing	Languages	Exclusions (Samples are nationally representative unless noted otherwise)
Brazil	April 7 – May 17, 2022	2,000	1.31	2.5	Face-to-Face (HH)*	Portuguese	People living in indigenous lands and dangerous areas where the safety of interviewers was threatened were excluded. The excluded areas represent approximately 1% of the adult population.
Egypt	May 13 – June 1, 2022	2,002	1.48	2.7	Face-to-Face (HH)*	Arabic	Frontier governorates (Matruh, Red Sea, New Valley, North Sinai and South Sinai) were excluded, as they are remote and represent a small proportion of the population of the country. The excluded areas represent less than 2% of the total population.
France	April 5 – May 27, 2022	2,000	1.55	2.7	Landline and Mobile Telephone	French	The coverage error (percentage of target population not accessible for sampling) is expected to be less than 1%.
India	May 12 – June 13, 2022	2,000	1.28	2.5	Face-to-Face (HH)*	Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Odia, Punjabi, Tamil, Telugu	Excluded population living in Northeast states, remote islands and districts excluded due to security reasons. The excluded areas represent around 8% of the population.
Indonesia	May 9 – June 8, 2022	2,077	1.36	2.5	Face-to-Face (HH)*	Bahasa, Indonesia	No exclusions.
Mexico	April 6 – May 29, 2022	2,001	1.35	2.5	Face-to-Face (HH)*	Spanish	Approximately 1,000 electoral sections were excluded from the sampling frame prior to sampling due to violence or insecurity, accounting for less than 2% of the population.
United States	April 4 – June 2, 2022	2,016	1.35	2.5	Landline and Mobile Telephone	English, Spanish	The coverage error (percentage of target population not accessible for sampling) is expected to be less than 3%.

**Notes:**

<sup>a</sup> The design effect calculation reflects the weights and does not incorporate the intraclass correlation coefficients.

Design effect calculation:  $n \cdot (\text{sum of squared weights}) / [(\text{sum of weights}) \cdot (\text{sum of weights})]$

<sup>b</sup> Margin of error is calculated around a proportion at the 95% confidence level.

The maximum margin of error was calculated assuming a reported percentage of 50% and takes into account the design effect.

Margin of error calculation:  $\sqrt{(0.25/N) \cdot 1.96 \cdot \text{DE}}$

\*Handheld data collection

### 3.3 INTERVIEWER TRAINING AND QUALITY CONTROL

Gallup selected local partners based on previous experience with national survey research studies. Gallup also conducted in-depth training sessions with local field staff prior to the start of data collection. To assist the local fieldwork team with training and to ensure consistency and structure, Gallup provided a standardized training manual. Topics covered in training included:

- 1) Standards for conducting a quality interview
  - closed-ended questions
  - open-ended questions
  - read and rotate
  - skip patterns
  - probing
- 2) Random route procedures
  - selecting a starting point
  - household selection and substitution
  - within household selection
  - Kish grid
  - tracking sheets

# Data Preparation

This section includes a complete description of data processing, weighting procedures, and a user guide for how to take the weights and complex sampling design into account in descriptive and analytic inference.

### 4.1 DATA PROCESSING AND QUALITY CONTROL

Gallup followed strict quality control procedures to ensure high-quality data. An independent quality assurance team at Gallup reviewed the survey data with a focus on the following data characteristics:

- GPS data and time data from each interview collected in person were reviewed to check that interviews were conducted in the correct location, where applicable, and at the correct time.
- Interviewer productivity measures were reviewed to rule out concerns about interviewer over-productivity.
- Interview length, section length and item length at the interviewer level were checked to identify any interviewers who may not be following procedures.
- Screener data at the interviewer level, including percent of single-adult households, number in enumeration list, comparison of data between enumeration list and respondent demographics were checked.
- Overall response rate for the study and response rate and disposition codes at the interviewer level were checked.

Interviews/Interviewers that were flagged in quality checking were reviewed by the local data collection partner. Additional validations were performed for those interviews/interviewers and, if necessary, interviews were replaced.

Additionally, Gallup conducted the following basic data and methodology checks:

- no missing questions or extra questions
- no items with invalid codes
- no invalid skip patterns (i.e., ensuring that each item had the correct number of responses per the skip pattern of the survey)
- confirming that interviews were spread out across days of the week and conducted at appropriate times of day
- confirming that interviews represented the country geographically and checking for the correct number of interviews per region/urbanicity
- confirming that interviews represent the country demographically (e.g., age, gender, education)
- confirming the dataset matched the sampling plan

## 4.2 CREATING SURVEY WEIGHTS

Data weighting was used to minimize bias in survey-based estimates to ensure samples were nationally representative for each country. Weights are intended to be used for generating estimates within each country. The weighting procedure was formulated based on the sample design in each country and performed in multiple stages.

In countries where data were collected face-to-face, Gallup first constructed sampling weights to account for any disproportionality in the selection of primary and subsequent levels of sampling within each stratum. Sampling weights were calculated to account for any disproportionalities in allocation; selection probabilities of the primary and secondary sampling units (PSUs, SSUs); and households within the ultimate cluster. Next, within selected households, weighting by household size (number of residents aged 15 and older) was used to adjust for the probability of selecting a single adult in each selected household, as residents in larger households had a disproportionately lower probability of being selected for the sample. The product of these two steps constituted the base weight.

In countries where data were collected via telephone, Gallup constructed a probability weight factor (base weight) to account for the selection of telephone numbers from the respective sampling frames. This ensured correcting for unequal selection probabilities as a result of selecting one adult in landline households and for dual users coming from both the landline and mobile frame.

Next, the base weights were post-stratified to adjust for nonresponse and to match the weighted sample totals to known target population totals obtained from country-level census data. Gallup made nonresponse adjustments to gender, age and, where reliable data were available, education or socioeconomic status.

Finally, approximate study design effect and margin of error were calculated (calculations are presented in [Table 1 notes](#)). The design effect calculation reflects the influence of data weighting.

### 4.3 USER GUIDE FOR THE SURVEY WEIGHTS

When working with the individual-level dataset available through Data For Good, the following information will be necessary to specify survey design features. Gallup employed a complex sampling design within each country for this study (details are explained above). Analyzing data from complex sampling designs requires statistical methods that take the design into account. Otherwise, naive analyses of the data that do not consider the complex sampling design are expected to result in biased estimates, including point estimates and confidence intervals.

In Brazil, Egypt, India, Indonesia and Mexico, where interviews were conducted face-to-face, a stratified multistage cluster sampling design was used. In France and the United States, where interviews were conducted via phone, there was no cluster sampling (i.e., participants were the primary sampling units) and a stratified random sampling design was used. All this information is incorporated into the ‘psu’ (primary sampling unit) variable in the dataset.

That is, in countries with cluster sampling, the ‘psu’ variable represents the randomly sampled first-stage clusters, while in countries without cluster sampling, the ‘psu’ variable represents randomly sampled individuals. This is consistent with the approach Gallup takes when conducting and analyzing its annual World Poll.

Together, the ‘psu,’ ‘strata’ and ‘weight’ variables in the dataset should be used to specify the complex sampling design within each country. In turn, the specified survey designs can be used for descriptive inference (e.g., proportions or means with confidence intervals) or analytic inference (e.g., statistical testing and modeling) within each country.

An example of specifying the survey design in R using the ‘survey’ and ‘srvyr’ packages is provided below, along with examples of executing some basic descriptive and analytic inference:

```
### install packages, if not already installed
# install.packages(c("survey", "srvyr", "tidyverse"))

### load packages
library(survey)
library(srvyr)
library(tidyverse)

### set survey options
options(survey.lonely.psu = "adjust")

### load data
df <- read_csv(file = "<path_to_state_of_social_connections_dataset>.csv")
```

```
### specify the survey design in BR
survey_design_br <- df %>%
  filter(country == "BR") %>%
  as_survey_design(
    id = psu,
    strata = strata,
    weight = weight,
    nest = TRUE
  )

### example of descriptive inference
# in BR, estimate the weighted proportion of each
# response option for the following question ('general_connected'):
# "In general, how connected do you feel to people?
# By connected, I mean how close you feel to people emotionally."
survey_design_br %>%
  group_by(general_connected) %>%
  summarise(
    estimate_weighted = survey_prop(
      vartype = c('se', 'ci'),
      proportion = TRUE,
      prop_method = 'logit'
    )
  )

### example of analytic inference
# in BR, estimate the difference between men and women ('gender')
# in their reported feelings of loneliness using the 3-item loneliness
# scale ('loneliness_neg_composite')?
model <- svyglm(
  loneliness_neg_composite ~ gender,
  design = survey_design_br
)

tidy(model, conf.int = TRUE) # get model coefficients with 95% confidence intervals
```

# Data Analysis

Aggregate data including country-level weighted estimates with standard errors, 95% confidence intervals and question wording is publicly available [here](#).<sup>5</sup>

## 5.1 SOCIAL SUPPORT AND LONELINESS SCALES

The social support and loneliness scales were each intended as continuous measures, created by averaging across people's responses to the appropriate survey items related to the construct. Before creating these outcome measures for use in analyses, each scale was assessed within each country to determine the extent to which it was measuring a single underlying construct and then reliability was assessed.

In a confirmatory factor analysis, the five items<sup>6</sup> comprising the social support scale showed good evidence of measuring a single underlying construct, and the scale had a moderately high level of reliability within each country (see [Table 2](#) for Cronbach's alphas). Given these results, the average of the five social support items was used as an overall measure of feelings of social support in subsequent analyses.

5 All confidence intervals incorporate the effect of weighting, stratification and clustering at the primary sampling unit. This approach is consistent with that Gallup takes for its annual World Poll.

6 1. Suppose that you needed someone to take care of you if you were sick or injured. How often would this type of support or help be available to you?  
2. Suppose that you needed someone to loan you money. How often would this type of support or help be available to you?  
3. Suppose that you needed someone you can count on to listen to you when you need to talk. How often would this type of support or help be available to you?  
4. Suppose that you needed someone who makes you feel loved and cared for. How often would this type of support or help be available to you?  
5. Suppose that you needed someone to do something fun with. How often would this type of support or help be available to you?

Although the original intention was to treat the six items<sup>7</sup> in the loneliness scale (i.e., three reverse scored positively valenced items and three negatively valenced items) as a measure of a single underlying construct of loneliness, confirmatory factor analysis did not support this structure. Given these results, and after discussions with academic advisors, the decision was made to use the average of only the three negatively valenced items as the measure of loneliness in all subsequent analyses (see also Hughes et al., 2004 for a validated three-item loneliness scale using the same items).<sup>8</sup>

This three-item measure of loneliness showed good evidence of measuring a single underlying construct and had modest estimates of reliability within each country (see Table 2 for Cronbach's alphas). Further understanding the dimensionality of the construct of loneliness, and how method effects may impact its measurement, is a topic ripe for future investigation, but falls outside of the scope of this report.

## 5.2 CORRELATION ANALYSES

Correlations among the single-item (literal)<sup>9</sup> and multi-item (scale) measures of social support, loneliness and connectedness were conducted within each country to better understand how these measures are related (see Table 2).

- 
- 7
1. How often do you feel that you lack companionship?
  2. How often do you feel left out?
  3. How often do you feel isolated from others?
  4. How often do you feel that there are people who really understand you?
  5. How often do you feel that there are people you can talk to?
  6. How often do you feel that there are people you can turn to?

- 8 Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on aging*, 26(6), 655-672.

- 9 Social support: In general, how supported do you feel by people? By supported, I mean how much you feel cared for by people.  
Loneliness: In general, how lonely do you feel? By lonely, I mean how much you feel emotionally isolated from people.  
Connectedness: In general, how connected do you feel to people? By connected, I mean how close you feel to people emotionally.

**TABLE 2: Correlations among the single-item (literal) vs. multi-item (scale) measures of social support, loneliness and connectedness within each country. Scale reliabilities (Cronbach’s alpha) within each country are indicated in bold on the diagonals.**

Country	Measure	1	2	3	4	5
Brazil	1 - Social support literal	--				
	2 - Social support scale	0.41	<b>0.74</b>			
	3 - Loneliness literal	-0.23	-0.30	--		
	4 - Loneliness scale	-0.3	-0.31	0.51	<b>0.69</b>	
	5 - Connected literal	0.35	0.34	-0.23	-0.28	--
Egypt	1 - Social support literal	--				
	2 - Social support scale	0.49	<b>0.74</b>			
	3 - Loneliness literal	-0.41	-0.38	--		
	4 - Loneliness scale	-0.40	-0.37	0.53	<b>0.59</b>	
	5 - Connected literal	0.52	0.42	-0.37	-0.30	--
France	1 - Social support literal	--				
	2 - Social support scale	0.23	<b>0.60</b>			
	3 - Loneliness literal	-0.19	-0.21	--		
	4 - Loneliness scale	-0.20	-0.23	0.35	<b>0.55</b>	
	5 - Connected literal	0.26	0.18	-0.24	-0.20	--
India	1 - Social support literal	--				
	2 - Social support scale	0.38	<b>0.73</b>			
	3 - Loneliness literal	-0.18	-0.23	--		
	4 - Loneliness scale	-0.08	-0.04+	0.27	<b>0.60</b>	
	5 - Connected literal	0.36	0.25	-0.17	-0.08	--
Indonesia	1 - Social support literal	--				
	2 - Social support scale	0.35	<b>0.80</b>			
	3 - Loneliness literal	-0.16	-0.14	--		
	4 - Loneliness scale	-0.12	-0.07	0.27	<b>0.53</b>	
	5 - Connected literal	0.37	0.34	-0.12	-0.09	--
Mexico	1 - Social support literal	--				
	2 - Social support scale	0.46	<b>0.83</b>			
	3 - Loneliness literal	-0.25	-0.24	--		
	4 - Loneliness scale	-0.25	-0.20	0.33	<b>0.64</b>	
	5 - Connected literal	0.49	0.40	-0.24	-0.24	--
United States	1 - Social support literal	--				
	2 - Social support scale	0.61	<b>0.82</b>			
	3 - Loneliness literal	-0.33	-0.47	--		
	4 - Loneliness scale	-0.39	-0.51	0.60	<b>0.74</b>	
	5 - Connected literal	0.51	0.50	-0.32	-0.37	--

+ Indicates a statistically non-significant correlation.

Note: All correlations are statistically significant at alpha = 0.05 unless specified otherwise.

### 5.3 MULTIPLE REGRESSION ANALYSES

Within each country, multiple regression was used to explore associations between the multi-item (scale) measures of social support and loneliness and a set of theoretically driven variables representing demographic characteristics and subjective attitudes of interest. The models were estimated using ordinary least squares (OLS) regression with variance estimates adjusted for the effect of weighting, stratification and clustering at the primary sampling unit.

As described in the main report, the primary motivation of these regression analyses is exploratory. To help guide the interpretation of results, the degree of certainty in specific estimates (i.e., 95% confidence intervals around each estimate) and model comparisons (i.e., likelihood ratio tests of whether all coefficients associated with a particular regression term are zero) were used. The magnitude of relationships is also important to consider, and interested readers are encouraged to leverage the point estimates along with corresponding uncertainty for a more holistic understanding of the effect size and meaningfulness of any given difference between groups, whether or not it is “statistically significant.”

Results from four regression models in each country can be found [here](#). For each outcome measure — social support and loneliness — the results of two models are presented. One model includes only demographic characteristics (Model 1) while the second model includes both demographic characteristics and subjective attitude variables (Model 2). Section 4 of the main report discusses the latter models only. The model including only demographic characteristics is additionally presented for interested readers.

In some cases, additional exploratory models were also run to help aid understanding of the initial models. Examples of additional analyses include an investigation of model coefficients using a different reference category for a given variable (e.g., treating the oldest age group as the reference category instead of the youngest age group) or a model that used a numeric version of a variable to more formally test for linear relationships (e.g., including the reported number of friends as a standardized numeric variable rather than a categorical variable).