

Validation Study of the Abbreviated Version of the Lubben Social Network Scale Spanish Translation among Mexican and Mexican-American Older Adults

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Abstract *Purpose:* To perform a face validity study of the Spanish version of the Lubben Social Network Scale (LSNS-6) among Mexican and Mexican-American older adults. *Design and Methods:* A cross-national qualitative descriptive approach, based on cognitive survey testing and cross-cultural equivalence analysis, was followed to assess the face validity of the Spanish version of the LSNS-6. Data were collected through 2 focus groups in Los Angeles (LA) and 4 in Mexico City (CDMX). Focus groups followed a semi-structured guide. Eligibility criteria included being 60 years and older, native Spanish speaking, and not suffering from significant cognitive impairments. Four initial focus groups were targeted at conducting a face validity assessment of the initial scale, which led to some modifications. The two remaining focus groups reassessed the face validity of the modified version of the Spanish LSNS-6. *Results:* 56 older adults participated in the focus groups yielding 152 pages of verbatim transcripts. Analysis of the transcripts identified relevant themes affecting how Mexican and Mexican American older adults understood the items from the LSNS-6 Spanish version, among them: labelling of family members and friends, notions of neighborhood, identifying and counting people, and understanding of “private matters”. This led to propose a modified Spanish version of the LSNS-6 following a name generating approach, as well as some language and instruction modifications. The face validity of the modified version suggested a better understanding. *Implications:* The study proposes that the LSNS-6 Spanish version needs to be adapted for its use among Mexican and Mexican American older adults, and we suggest a modified version. This potentially implies that social isolation may be more

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accurately measured in a vulnerable group of older adults. Further research is needed to ascertain the construct validity and psychometric properties of the modified version.

Keywords Social isolation · LSNS-6 · Mexican and Mexican-Americans · Older adults · Validation · Focus groups · Face validity

The United States (U.S.) and Mexico are undergoing major demographic changes, including a dramatic increase in the share of older adults in the population. The proportion of the Mexican population aged 65 and over is expected to increase from 6.3% in 2010 to 22.5% by 2050 (CONAPO 2011; Chande 2011). In the U.S., 19.5% of the population is projected to be 65 years of age or older by 2050. According to the US Census, Latinos accounted for 7% of the older population in 2011 and are projected to be 20% by 2050 (Older Americans 2012: Key Indicators of Well-Being 2012). This demographic transition will lead to an increase in the population of older Latino adults, of whom Mexican Americans are the largest subgroup.

The historical migratory process between these countries suggests that the demographic changes will have intertwined implications for social services and health care delivery in both countries. As labor related income decreases after retirement, the lack of pensions among a considerable share of older adults, would put them at increased risk of economic vulnerability and poverty. In Mexico, the National Evaluation Council (CONEVAL) estimated that 45.8% of older adults (65 and older) live in poverty (CONEVAL 2011). In the U.S., the Administration on Aging (AoA) reported that the poverty rate in 2008 for Latinos (65 and older) was 19.3%, more than twice the percent for non-Latino whites (AoA 2010).

Previous research has shown that community conditions and social factors influence health outcomes as much as individual lifestyles, genetic factors and access to health care (Federal Interagency Forum on Aging-Related Statistics 2012). In the U.S., it has been estimated that “health behaviors, social and economic factors, and physical environment, account for 80% of health production, whereas clinical care accounts for 20%.” (USC Roybal Institute on Aging 2016).

Research has shown that social support improves physical and mental health among older adults (Lubben et al. 2006b). By contrast, social isolation has been identified to be particularly deleterious. Older adults who experience social isolation have a greater risk for all-cause mortality (Holt-Lunstad et al. 2010; Lyyra and Heikkinen 2006; Steptoe et al. 2013), increased morbidity (Cacioppo and Hawkey 2003; Tomaka et al. 2006), depression (Alpass and Neville 2003), and cognitive decline (Seeman et al. 2001).

Prior research suggests that among older adults, the impact of social isolation on the risk of mortality is similar to other well established risk factors such as smoking and alcohol intake, and it is larger than the effects of sedentary lifestyles and obesity (Dickens et al. 2011). Social isolation has also been associated with an increased risk of cardiovascular disease, increased blood pressure, inflammation, depression, and chronic conditions (Cacioppo et al. 2006; Cornwell and Waite 2009; Hawkey et al. 2010). In addition, social isolation has been linked with disability, poor recovery from illness and early death (Berkman et al. 2000; Michael et al. 2001).

Given this combined evidence, targeting social isolation has been highlighted as an important public health issue with key policy lessons for the future (Dickens et al. 2011). The development of reliable instruments that detect isolated older adults could be an important step to identify vulnerable individuals. Different instruments have been developed and used in

social and medical research, the Lubben Social Network Scale (LSNS-6) among them. The LSNS-6, was a pioneer instrument in applying social support theory to aging studies and has been used extensively in the literature (Lubben et al. 2006b). It is a brief instrument designed to capture social isolation in older adults by measuring perceived social support from family, friends, and neighbors in terms of the size, closeness and frequency of contacts of a respondent's social network (Chen 2012). Through this instrument health care practitioners and gerontology scholars have been able to identify vulnerable individuals who experience or are at-risk of becoming socially isolated. Because the abbreviated version (LSNS-6) does not specify a space factor that might dictate living arrangements or care settings, this makes it attractive to be used in other countries. Hence, this scale has been translated and validated to multiple languages such as German (Lubben et al. 2006a, b), Korean (Hong et al. 2011), and Mongolian (Burnette and Myagmarjav 2013)h. The Spanish translation, however, has not been validated.

Few studies have focused on social isolation among Mexican and Mexican American older adults. Measurement instruments vary across these studies, but few studies have validated them. Most scales, however, measure economic, emotional and instrumental support, number support sources, role of family, and satisfaction with the actual support (Campos et al. 2014; Moreno-Tamayo et al. 2017; Pelcastre-Villafuerte et al. 2011; Robles et al. 2000).

In this study, we examined the face validity and the cultural adequacy of the abbreviated version of the Lubben Social Network Scale (LSNS-6) Spanish translation among Mexican and Mexican-American older adults. A cross-national approach was implemented to compare cognitive testing similarities and differences of Mexican older adults in the U.S. and Mexico, and to assess equivalence of the instrument to its original form. Prior studies suggest that older immigrant adults in the U.S. are building social networks through non-traditional processes. For example, Asian elders – despite their reticence – are finding help outside the family (Dickens et al. 2011). Therefore, developing measurement instruments to understand how these subpopulations form social networks and how these networks prevent different forms of social isolation, could inform the types of interventions needed to prevent the pervasive effects of social isolation on health conditions in both countries.

Methods

A qualitative descriptive approach was performed to assess the face validity and cultural adequacy of the Spanish version of the LSNS-6, among Mexican and Mexican American older adults. Considering the nature of this work, it followed two methodological approaches: (i) cognitive survey testing and (ii) cross-cultural equivalence analysis. Cognitive survey testing presumes that in order to answer a question the respondent must comprehend it, retrieve the necessary information, make a judgment about the information needed to answer the question, and then respond to it (Collins 2003). In this sense, testing the LSNS-6 Spanish version for Mexican and Mexican-American older adults implied assessing the comprehension of each item and its related concepts, as well as the information management process that older adults needed to answer for each items of the scale. To develop the cognitive testing, a verbal probing approach was followed in which the respondents were asked specific questions about the items of the LSNS-6 such as “what this question means to you?” (Alaimo et al. 1999).

In parallel, the analysis also assessed the cross-cultural adequacy of the LSNS-6 Spanish version and its equivalence to the original form. This implied that during data collection and

analysis, facilitators and researchers recorded any identified issues related to the comprehensibility, acceptability, relevance and completeness of the items (Van Ommeren et al. 1999). This step helped determine if the scale needed any adaptations in language or process.

For both methodological approaches, we use a qualitative data collection approach that favored the description of events and concepts linked to the LSNS-6 as experienced and understood by individuals through everyday terms (Sandelowski 2000).

Procedures and Study Participants

Data were collected between March and May 2016 through 6 focus groups: 2 in Los Angeles (LA), and 4 in Mexico City (CDMX). Focus groups were preferred as a data collection mechanism as it was expected that interaction within each group would bring a more dynamic process through reactions or extended opinions from older adults (Barbour 2007). In addition, survey and measurement experts commonly prescribe the use of focus groups as a pretesting step for new or modified survey or measurement instruments (Ouimet et al. 2004).

The initial focus groups – 1 in LA and 3 in CDMX – aimed at discussing and gaining understanding on how Mexican and Mexican American older adults interpreted the concepts related to the Spanish version of the LSNS-6. For each scale item we inquired about the respondents understanding of what was being asked and whether there was information missing that would allow capturing how people (i.e. family or friends) help and care about them. Based on the findings of these initial focus groups, some instructions and items of the Spanish LSNS-6 version were rephrased, modified, and reassessed for face validity through additional focus groups (i.e. 1 in LA and 1 in CDMX). The number of focus groups was determined by “thematic saturation” (Creswell 2013), which considered richness and quality of recorded data. During the second stage focus groups, we evaluated the cultural adequacy of the scale and its equivalence with the original form.

Older adults participating in the focus groups were recruited through a purposeful sampling. Eligibility criteria included being 60 years and older, Spanish speaking (could be English speaker as well, but totally proficient in Spanish), and not suffering from significant cognitive impairments (i.e. being able to give informed consent and to participate during group interviews unassisted). For focus groups in Mexico, participants were recruited at three community centers from the National Institute of Older Adults (i.e. INAPAM for its Spanish acronym) located in different boroughs of the City. To facilitate ease of access, focus groups were conducted at the premises of the community centers. In the case of LA, older adults were recruited via Spanish language flyers posted at bus stops, farmer’s markets, senior and other community centers in East LA. Focus groups were held at the meetings room of a community organization (VELA – Volunteers of East Los Angeles), and participants received a \$40 gift card and snacks. Such procedural differences between focus groups in each city responded to cultural adaptations of how research is performed (i.e. adequateness in the use of incentives).

For all focus groups, we used a semi-structured guide of open-ended questions that emerged from LNSN-6 instructions, questions, and related concepts (i.e. what is a “private matter”, what is the meaning of “calling for help”). The original interview guide was intended to provide data informing both the cognitive survey testing and the cross-cultural equivalence of the scale. The guide was adapted for the last two focus groups according to the scale’s modifications. Focus groups had an experienced facilitator as well as a note-taker. Participants provided written informed consent and some basic socio-demographic information prior to starting the focus group. All sessions were digitally recorded and then transcribed verbatim for

posterior coding and analysis. Coding and analysis were performed in Spanish (i.e. original language of the focus groups) and only selected quotes were then translated into English.

Data Analysis

Computer-assisted data analysis (i.e. coding) was conducted using QSR International's NVivo Software for Mac 11 (NVivo 2016). Given that the primary purpose of the focus groups was to ascertain the face validity and cultural adequacy of the Spanish Version of the LSNS-6 among Mexican and Mexican American older adults, data from each focus group was individually coded and then compared, so that potential differences across cultures and subgroups could be documented. This process was repeated twice: (i) while assessing the understanding of the original LSNS-6 Spanish version, and (ii) in the exploration of the modified version in terms of comprehension and cross-cultural equivalence. The principal investigators and three research assistants participated in the systematic process of coding data.

Using the topics of the items of the LSNS-6 as the basic frame for coding data, one of the PIs and the research assistants independently coded the four initial focus groups, allowing for subnodes to emerge in each coding category. Then the PI reviewed the codes and jointly reconciled differences with the other team members in order to identify key themes and subthemes, which were limiting the face validity of the scale. Such analysis allowed generating a modified version. Consensus between researchers was used to decide which items or instructions needed to be rephrased or modified. In a second stage, a parallel qualitative analysis was followed to assess the cognitive testing of the modified version.

This research was reviewed and approved by the UCLA Institutional Review Board (IRB) and the Research Ethics Committee from Universidad Iberoamericana (i.e. an equivalent to IRB in Mexican institutions).

Results

We conducted six focus groups, 56 older adults ($60 \geq$ years) participated – 41 older adults participated in the first round of focus groups (i.e. initial assessment of the Spanish version of the LSNS-6), and 15 participated in the second stage (i.e. assessment of the modified version). The focus groups ranged in size from 7 to 15 participants and lasted approximately 30–60 min (see Table 1). Together they yield 152 pages of verbatim transcripts. Participants were mainly women, mostly with low educational attainment (i.e. less than secondary education completed). Other reported characteristics (i.e. living alone, and mean household size) varied across groups, and there was no specific trend in difference between LA and CDMX.

Through the first stage focus groups analysis, we identified 6 themes. Although the themes fell generally in line with the items of the LSNS-6, our analysis revealed a range of subthemes, which are presented in Table 2. These subthemes inform challenges in terms of comprehension and completeness.

Labeling of Family Members

The questions for the three first items of the LSNS-6 are framed in a similar manner asking older adults “*How many relatives...?*” and in the Spanish version this was translated as “*¿Con cuántos parientes...?*”. The most important subtheme emerging was that labeling of family

Table 1 Demographic characteristics of participants in the focus groups

	First stage				Second stage	
	Group 1 (LA)	Group 2 (CDMX)	Group 3 (CDMX)	Group 4 (CDMX)	Group 5 (LA)	Group 6 (CDMX)
N	11	15	8	7	8	7
Duration (minutes), mean	48	26	35	60	63	34
Age (years), mean	69.4	74.5	69.7	74.8	65.4	74.3
Gender (females), %	100	100	100	100	87.5	100
Education, %						
None	9.0	13.3	0	0	25	0
Primary or some secondary	72.7	66.6	37.5	85.7	75	42.8
Completed secondary or more	18.1	20.0	62.5	14.2	0	57.1
Living children, mean	3.7	4.6	2.9	3.2	3.0	4.5
Living alone, %	63.6	13.3	0	42.8	25.0	33.0
Household size*, mean	1.7	5.5	3.2	1.6	2.0	2.2

*Includes older adult

members is complex in the Spanish version, as the notion of “relative” (*pariente*) does not encompass all family members. The main trend identified by respondents in both, the LA and CDMX focus groups, is that “relatives” (*parientes*) refer to distant family members like uncles, cousins, etc. Close family members such as sons, daughters, grandchildren, siblings or spouses receive a different label – the most common term used to refer to them was “*familia* or *familiar*”. For example, as stated in Table 2, when one of the older women was inquired whether a son was a relative (*pariente*) she boldly stated “*no, es hijo directo, es un familiar directo*” (*No [he is not a relative], he is a direct son-he is family*). This response can be a consequence of large familial relationships that are commonly established among individuals of Mexican origin, so that an internal differentiation is needed between close and more distant family ties. The main issue in terms of social networks measurement is that close family members could be excluded from the counting that presumes the three initial questions of the LSNS-6. When older adults were asked if the question would be better understood if instead of “relatives” (*parientes*) the word “family” (*familia*) was used, this opened a new set of subthemes referring to the notion of family as the members of a household, regardless of whether they were related to them through birth, adoption, marriage or not, hence, opening the possibility of counting non-family member twice in the scale, both as friends and relatives.

Notion of Friends

The last three questions of the LSNS-6 are posed as “*How many of your friends...?*”, or in Spanish as “*¿Con cuántos amigos...?*”. Three subthemes emerged. The first highlighted the existence of friends who are so close that they may be considered a family member. Older adults would mainly highlight a friend so close that was like sibling (Table 2). For example: “*Aunque ella no esté relacionada conmigo de sangre, es como mi hermana*” (*Even if she is*

Table 2 Issues emerging from face validity assessment of the LSNS-6 Spanish translation in focus groups with Mexican and Mexican American Older Adults

Themes	Subthemes	Original quotes in Spanish	Quotes translated to English
Labeling of family members	-Wording in Spanish version “pariente” (i.e. relative) versus “familia” (i.e. family)	(Older adult) “los parientes son los que son de la familia pero que no están tan cerca de uno” ... (Interviewer) “¿un hijo es un pariente?” (Older adult) “no, es hijo directo, es un familiar directo. un pariente es como el tío o el primo” “con los que vivimos, con los que convivimos”	(Older adult) ‘Relatives are those who belong to the family, but who are not close.’ (Interviewer) ‘A son is a relative.’ (Older adult) ‘No. He is a direct son, he is direct family; a relative is someone like your uncle or your cousin.’ ‘Those one lives with, those one spends most of the time with.’
	-Family as members of the household	“Aunque ella (a friend) no esté relacionada conmigo de sangre, es como mi hermana, estamos emocionalmente relacionadas. ¿Me entiendo?” “una amiga o amigo es pa siempre, pa todo tiempo y no solo pasajera ... conocidos como usted dice amistad pues tal vez, no sea pa toda la vida”; “si esta el cuate ahí también se desahoga uno con el cuate (referring to talking about private matters) y luego ya con más confianza con el amigo”	‘Even though she is not a relative by blood, we are emotionally related. Do you understand?’ A friend (male or female) is forever, all the time. It is not a passing relation like those you have with acquaintances. [That kind of] friendship may not last a lifetime’. ‘If a cuate is there, you can get it off of your chest too; but then, afterwards, you go with a close friend [to speak your own mind].’
Notion of friends	-Different categories of friends	(Older adult) “para mí un amigo es tenerle confianza y decirle lo que necesitas pero por ejemplo en este caso que yo que soy casada no puedo tener amigos...” (Interviewer) “¿y amigos?” (Older adult) “amigas si pero amigos no”	(Older adult) ‘To me, a friend is someone you trust and to whom you can say what you need. However, in this case, I can’t have male friends ...’ (Interviewer) ‘What about female friends?’ (Older adult) ‘Yes, female friends is all right, but male friends, no. Not men!’
	-Friends who are so close that are “family”	“bueno aquí en México era muy común la vecindad, ahorita ya no es tanto”; “vecindario ... que es la cuadra”	‘Well, tenement houses [vecindades] were very common here in Mexico, but they’re not so nowadays.’ ‘the tenement houses ... that is to say, the block.’
Notion of neighborhood	-Wording in the Spanish version “vecindario”	“a pesar de que se pueda contar con el apoyo de un vecino, ello no lo hace un amigo”;	‘Even if you have the support of a neighbor, that does not make him/her a friend.’
	-Neighbors, not friends	(Older adult) “Es mi hermana y mis sobrinos que están en México” (Interviewer) “Usted dice hermana y sobrinos. Entonces son más de dos o es un sobrino” (Older adult) “Si, es bueno...son más de dos porque tengo muchos” “que no los ve uno para nada y hasta al mes este eh, sabe uno de ellos”	(Older adult) ‘They are my sister and my nephews, who are in Mexico.’ (Interviewer) ‘You say sister and nephews. Then, are there two or more nephews? Or is it just one?’ (Older adult) ‘Yes, well... there are more than two because I have several.’ ‘One does not see them at all. Only a month later, one hears from them.’
Identifying and counting people	-Need of listing (assisted counting)	(When asked to count friends) “en lo personal soy muy selectiva con las amigas y de amigas nada más tengo dos desde hace treinta años”	‘Personally, I’m very selective regarding [female] friends. In thirty years, I have had only two [female] friends.’
	-Time notions of “at least once a month”		
Identifying and counting people	-Closeness of people listed		

Table 2 (continued)

Themes	Subthemes	Original quotes in Spanish	Quotes translated to English
Understanding of "private matters"	-Aspects related to demographics, lifestyles, or self-determination	" <i>pues yo pienso que a como vivimos en nuestro hogar, eso</i> "; " <i>mi nombre, mi edad</i> "; " <i>que yo pueda salir, decidir mi vida, decidir si quiero ir o no quiero ir. Sin tener que pedir permiso</i> "	"Well, I think that [is related to the way] we live in our home, that"; 'my name, my age'; 'that I may be allowed to go out, to decide my own life, to decide if I want to go or not. Without having to ask permission.'
Understanding of "call for help"	-Expected meanings	" <i>un peligro de algo.... o el gas, se escapo el gas</i> "; " <i>que me llevaran al médico porque me siento mal</i> "; " <i>si me tienen que acompañar para ir al super porque ya no, ya no puedo</i> "	'a danger about something ... an earthquake ... the gas, a gas leak'; 'being taken to the doctor because I'm not feeling well'; 'if they need to go with me to the supermarket since I can't, I can't go by myself'.

not related to me by blood, she is like my sister'). This trend was reported both in LA and CDMX focus groups, and as in the case of the labeling of family members, it led to pose questions about potential-double counting issues of individuals, both as friends and relatives.

Another subtheme in the notion of friends emerged from the vast spectrum of how a friend is defined and classified. The focus groups revealed that there are differences in friendship statuses. At least six different terms emerged when inquiring about the notion of friends, most of which do not have accurate translations to English (i.e. *carnal*, *cuate*, *conocido*, *compañero*, *amistad*). While this opens venues for relevant sociological research, the main concern for the purposes of our investigation, is that the word used in the LSNS-6 framing – “amigo” – entails the highest status and the closest friendship, hence, potentially excluding the social networks provided by other friends with a lower “status” within these implicit social norms. This is exemplified in the following quote when an older adult was explaining the sort of support you can get from “*cuates*” (i.e. friend in the more basic status of friendship): “*si está el cuate ahí también se desahoga uno con el cuate y luego ya con más confianza con el amigo*” (‘If a cuate is there, you can get it off of your chest too; but then, afterwards, you go with a close friend [to speak your own mind]’).

Lastly, a rather linguistic subtheme emerged with the word “*amigo*”; in Spanish words have a gender adaptation, for example, in this case “*amigo*” refers to a male friend while “*amiga*” refers to the female equivalent. If used in general statements, the male version can encompass both (as in this case the word “*amigo*”), but some older adults took the explicit meaning and were just counting male acquaintances. The following transcription from one of focus groups in CDMX exemplifies this:

<p>Older adult 1: <i>Para mi un amigo es tenerle confianza y decirle lo que necesitas pero por ejemplo en este caso que yo que soy casada no puedo tener amigos</i></p>	<p>Older adult 1: <i>‘To me, a friend is someone you trust and to whom you can say what you need. However, in this case, I can’t have male friends. I’m a married woman.’</i></p>
<p>Older adult 2: <i>¡No y menos amigos!</i></p>	<p>Older adult 2: <i>‘No way! Especially male friends—no way!’</i></p>
<p>Interviewer: <i>¿Y amigas?</i></p>	<p>Interviewer: <i>‘What about female friends?’</i></p>
<p>Older adult 1: <i>Amigas sí, pero amigos no. ¡Hombres no!</i></p>	<p>Older adult 1: <i>‘Yes, female friends are all right, but male friends, no. Not men!’</i></p>

The main concern from the standpoint of the face validity testing is that female friends may not be considered in the LSNS-6 items, thus potentially affecting the classification of older adults’ social networks and isolation status.

Notion of Neighborhood

The notion of neighborhood also led to some interpretation problems. The framing of the three questions related to friendship in the LSNS-6 started with the following sentence “*Considering all of your friends including those who live in your neighborhood...*”. The Spanish version translates the word neighborhood as “*vecindario*”. Such wording led to two relevant sub-themes (Table 2). The first one refers to a language issue, as in Mexican Spanish this is an uncommon word. A neighborhood is more commonly understood by the word “*colonia*”. In addition, the word “*vecindario*” resembles the notion of “*vecindad*” which is a low socio-economic type of dwelling that is uncommon nowadays, this is exemplified by the following quote: “*bueno aquí en México era muy común la vecindad, ahorita ya no es tanto*” (‘Well,

tenement houses [vecindades] were very common here in Mexico, but they're not so nowadays). This is linked to the second subtheme, as the word “*vecindario*” generated confusion on who should be included – friends versus neighbors. Older adults commonly stated that neighbors were not friends. Interestingly, some older adults stated that even neighbors who are always willing to help, and whom had established long term relationship are not friends. This brings issues in terms of whether neighbors and friends whom actually provide social support are being considered when answering the three LSNS-6 questions, regardless of their labels.

Identifying and Counting People

Older adults, both in LA and in CDMX, commonly needed assistance in counting the individuals who provided social support. For example, they would count one sister and three nephews, and report two. However, when asked about the number of nephews lead to report a more extended network, potentially affecting the classification of the older adult isolation status (Table 2).

A more specific issue was identified with questions 1 and 4 of the LSNS-6 in which older adults were asked: “*how many relatives/friends do you see or hear from at least once a month?*”. The face validity assessment revealed that some older adults understood “at least once a month” (i.e. “*por lo menos una vez por mes*” in the Spanish translation), as only once a month. For example, an older adult stated: “*que no los ve uno para nada y hasta al mes este eh, sabe uno de ellos*” (*One does not see them at all. Only a month later, one hears from them*). Such miscalculation can bring important measurement errors as it may imply the exclusion of people with whom they have seen or heard more frequently than once a month.

“Private Matters”

Items 2 and 5 of the LSNS-6 inquire about the number of relatives/friends to whom you feel comfortable enough to talk about your private matters (i.e. “*asuntos personales*” in the Spanish version). Such concept refers to aspects such as economic, health, legal or family problems (see Table 2). About half of the time older adults would report such aspects when inquired about what they understood about the meaning of these questions. However, the other cases reported that they thought were being asked about aspects such as: (i) demographics (i.e. name, age, marital status), (ii) how they lived and how they treated their family (i.e. “*como trata uno al marido, los hijos...*” [*how do you treat your husband, your kids...*]), or (iii) self-determination issues such as the ones stated in the following quote: “*que yo pueda salir, decidir mi vida, decidir si quiero ir o no quiero ir*” ([*I mean*] that I may be allowed to go out, to decide my own life, to decide if I want to go or not’). The main concern here is not itself in the definition, but how such different interpretation may bias how older adults report their social networks in items 2 and 5 of the scale.

“Call for Help”

In contrast to the questions referring to “private matters”, those referring to “calling for help” (i.e. LSNS-6 items 3 and 6) were generally well understood. Older adults described circumstances such as medical situations, threats, emergencies, etc. when they needed to call for support, and how many people they would actually provide such help (Table 2). In occasional circumstances, some older adults reported different meanings.

Modifications to the Spanish Version of the LSNS-6

Based on the themes and subthemes previously identified, researchers agreed that with the necessary linguistic adaptations it was likely that the Mexican and Mexican American older adults would better understand and accept the inquiries made by each item. With appropriate modifications, items would measure the desired constructs.

Five main modifications to the LSNS-6 Spanish version were agreed between researchers: (1) to avoid labeling and categorization issues linked to the concepts of relatives and friends, as well as to reduce the difficulties observed among older adults in counting and identifying individuals, a name generating approach would be followed. This implied that older adults would be asked to list all people whom they have contact with (i.e. see or hear) at least once a month. Modifications would also help controlling for gender bias wording issues previously stated, as the Spanish word for “people” (*personas*) has no gender connotation. (2) To avoid time frame issues linked to the notion of “once a month”, an explicit phrase would be added stating that once a month implied daily, weekly, etc. (3) For each person identified in the list, we would ask for the type of relationship, and the interviewer would tag the person as family or friend. This would be expected to reduce measurement errors related to questions 1 and 4 from the LSNS-6. (4) In addition, for each of the individuals identified in the list, the interviewer would question if the older adult would be sufficiently conformable to talk about private matters, hence, leading to score items 2 and 5. Furthermore, a phrase exemplifying what “private matters” entailed would be added to reduce interpretations of such concept. And (5) a parallel approach would be followed for items 3 and 6 related to “call for help”. The proposed modified Spanish version LSNS-6 is presented in Table 3.

Face Validity Assessment of the Modified Spanish Version LSNS-6

Based on the modified Spanish version of the LSNS-6, a new round of focus groups was conducted both in LA and in CDMX. The goal was to assess if older adults better understood what they were being asked (i.e. reassess its face validity). Analysis suggested a better understanding, but as a result of the modifications additional themes and subthemes emerged, which are presented in Table 4. Theme 1 refers to identifying and counting people; a subtheme refers to the challenges posed by the modified version in terms of how to manage individuals with very large networks. For example, in the LA focus group the following situation emerged:

Interviewer: “Y ¿cuántos primos?”

Older adult: “Son como unos 8 o 10”

Interviewer: “Y ¿cuántos hermanos de iglesia?”

Older adult: “Esos son como unos 20”

Interviewer: “Bueno, y ¿tiene contacto con todos esos primos y hermanos de la iglesia por lo menos una vez al mes?”

Older adult: “Sí, algunos todos los días”

Interviewer: ‘And how many cousins?’

Older adult: ‘They are about 8 or 10.’

Interviewer: ‘And how many church brothers?’

Older adult: ‘They are about 20.’

Interviewer: ‘Well, and are you in touch with all these cousins and church brothers at least once a month?’

Older adult: ‘Yes. I’m in touch with some of them everyday.’

To deal with such potential issues, it was useful to limit the list up to 12 individuals, as the goal of the scale is to identify isolated individuals and not necessarily to document how dense their networks are.

Table 3 Modified Spanish version of the LSNS-6

¿Me puede indicar con qué personas tiene contacto por lo menos una vez al mes?	¿Qué relación / vínculo tiene con (-----)?	¿Con (-----) se encuentra lo suficientemente cómodo como para hablar de sus asuntos personales como por ejemplo problemas económicos, tristezas, problemas legales, problemas de salud, problemas de alimentación, sentimientos, confidencialidades, etc.	¿Siente lo suficientemente cercano/a a (-----) como para llamarlo/a cuando necesita ayuda? (por ejemplo, en alguna emergencia, accidente, problema de salud, ir al súper, ir al médico, servicios de asistencia, problemas económicos, etc.
Incluya a todos los parientes, familiares, amigos, vecinos y compañeros con los que habla, se encuentra o tiene noticias de ellos diariamente, semanalmente, quincenalmente o por lo menos una vez al mes. (nombre de las personas)	1. Familiar-Pariente 2. Vecino 3. Amigo 4. Compañero (el entrevistador irá nombrando a cada una de las personas listadas en la primer columna)	(el entrevistador irá nombrando a cada una de las personas listadas en la primera columna y marcara con una palomita si la respuesta es afirmativa)	(el entrevistador irá nombrando a cada una de las personas listadas en la primera columna y marcara con una palomita si la respuesta es afirmativa)
Entrevistador: sumar el número de familiares/parientes y amigos/vecinos/compañeros que contestaron afirmativamente y anotar el resultado:	familiares/parientes: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____ amigos/vecinos/compañeros: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____	familiares/parientes: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____ amigos/vecinos/compañeros: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____	familiares/parientes: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____ amigos/vecinos/compañeros: 0. Ninguno _____ 1. Uno _____ 2. Dos _____ 3. Tres o cuatro _____ 4. De cinco a ocho _____ 5. Nueve o más _____

Table 4 Additional issues emerging from face validity reassessment of the modified version of the LSNS-6 Spanish translation in focus groups with Mexican and Mexican American Older Adults

Themes	Subthemes	Original quotes in Spanish	Quotes translated to English
Identifying and counting people	-Very dense and large networks (i.e. church groups, large families, community center, etc.)	(Interviewer) “Y ¿cuántos primos?” (Older adult) “Son como unos 8 o 10” (Interviewer) “y ¿cuántos hermanos de iglesia?” (Older adult) “Eso son como unos 20” (Interviewer) “Bueno, y ¿tiene contacto con todos esos primos y hermanos de la iglesia por lo menos una vez al mes?” (Older adult) “Si, algunos todos los días”	(Older adult) ‘They are about 8 or 10.’ (Interviewer) ‘And how many church brothers?’ (Older adult) ‘About twenty.’ (Interviewer) ‘Well, and are you in touch with all these cousins and church brothers at least once a month?’ (Older adult) ‘Yes, I’m in touch with some of them everyday.’
	-Considerations of who initiated contact	(Older adults) “A mi se me olvidó mi hija” (Interviewer) “Entonces le faltó su hija. Y dígame ¿qué le hizo recordarla?” (Older adult) “Bueno es que usted preguntó con quién se comunica, pero yo soy la que le habla, porque ella no me habla. Yo le hablo 2 veces a la semana. Ella no me llama. Yo tengo que hablarle a ella”	(Older adults) ‘I forgot my daughter.’ (Interviewer) ‘Ok, you forgot your daughter. Tell me, what made you remember her?’ (Older adult) ‘Well, you asked me who do I communicate with, but I’m the one who calls her, because she doesn’t call me. I call her twice a week. She doesn’t call me. I have to call her.’
	-Exclusion of very close family members	“Bueno todos los días y como todo el tiempo estamos juntos (referring to her spouse) yo creí que quería otras personas que no viven en mi casa”. “Pues pienso yo que no era necesario incluirlo. Porque se supone que si estoy casada, yo tengo contacto con mi esposo, le hablo de mis asuntos personales, me siento segura con él”	‘Well, we are together every day, all the time. I thought you meant other people who don’t live in my house. Well, I think that it wasn’t necessary to include him. Because it is expected from me to be in touch with my husband if I’m married. I talk to him about my personal affairs. I feel safe with him.’
Talking about “private matters”	-Talking to strangers or to religious icons	“me salgo a la Iglesia y platico ahí, con la Virgen, si porque es lo unico consueto que tengo” (Older adult) “No, yo pues me subo en el bus (autobús) y voy y les cuento, mire esto, mire lo otro, pero de mi familia o mis conocidos no” (Interviewer) “Entonces ¿habla con desconocidos?” (Older adult) “Si, desconocidos. Si, porque la familia, los hijos si le cuento a uno y no a otro, pues hay problemas”	‘I go out to the church and I talk there, to the Virgin, yeah, because that’s the only comfort I get.’ (Older adult) ‘Well, I get on the bus and I talk to people about this and that, but not about my family or my acquaintances.’ (Interviewer) ‘Then, do you talk to strangers?’ (Older adult) ‘Yes, to strangers. That’s because in my family I tell certain things to one of my sons, but not to the other because there are some family issues.’

A second subtheme related to considerations of contact initiation. Some older adults were unsure to include relatives or friends whom they were in touch but it was always the older adult who initiated contact. While this may seem a trivial question, it can reveal important perceptions about the ability of such individuals to provide support. A third subtheme was related to the exclusion of very close family members in the list. Some older adults stated that support from close family members is an “obvious” assumption. For example, when questioning an older woman about why she had not included her husband in the list she specified: “*Bueno todos los días y como todo el tiempo estamos juntos (referring to her spouse) yo creí que quería otras personas que no viven en mi casa*” (‘Well, we are together every day, all the time. I thought you meant other people who don’t live in my house’). Such statements highlight that there is room for improvement in the name generating instructions, for example, by stating that close family members such a spouse, should also be considered. From a cross-cultural perspective, such issues seem to highlight the importance of adapting instructions, questions and data collection mechanisms to the specific needs of a subpopulation (i.e. large social networks, close family ties, etc.), but do not seem to suggest any threat in terms of content equivalence.

With respect to the second theme, it referred back to “personal matters”. A new subtheme emerged as some older adults – both in LA and in CDMX – referred to talking about private matters either with strangers or with religious icons (see Table 4). This may probably suggest high levels of isolation, as the quotes suggest that it was the “only option” of sharing their concerns.

Discussion

Despite the fact that several surveys in Mexico and also studies among Mexican Americans in the US use the Spanish translated version of the LSNS-6, the face validity performed in such subpopulations highlight opportunities for improved measurement. Improving the metrics on social isolation among such at risk populations is a key element not only for research, but also for clinical guidance and social interventions. While the LSNS-6 has widely been validated in terms of its psychometric properties, this research provides windows of improving such valuable scale among rapidly aging populations such as Mexican Americans and Mexican older adults through face validity, using approaches of cognitive survey testing and cross-cultural equivalence analysis.

Social isolation is a culturally embedded construct as it presumes the societal networks and norms of caring and support. Accounting for such cultural differences in the metrics will allow the correct identification of the phenomena – in this case among the aging – and will potentially aid in identifying preventive actions. In population subgroups like Mexican Americans, for which large family ties are commonly presumed, promoting the measurement of social isolation through a culturally adapted scale could disentangle whether family ties are indeed working to minimize the risks of social isolation among older adults.

The proposed modified version yield by our qualitative study suggests a name generating approach, but in a manner that minimizes modifications to the structure and scoring of the LSNS-6. In our perspective, such approach reduces issues linked to cultural constructs of family and friendship, hence, leading to more accurate proxy measures of the phenomena. Following the perspective of other studies that assess the cross-cultural comparability of measurement scales (Jayawickreme et al. 2012; Van Ommeren et al. 1999), our analysis

suggests that the new version of the LSNS-6 has content, semantic and conceptual equivalence with the original one. The new version allows identifying friends and family members who provide different levels of support by removing labels (i.e. naming of relationships) attached to diverse friendship and family ties which are culturally defined but that all contribute to older adults' social networks. In terms of technical equivalence, the use of the name generating approach implies a variation in the method of assessment from the original scale, but it intends to yield comparable data to the original form (i.e. counting of friend and family members per item is equal but through a different mechanisms of data collection). Such adaptation will need to be followed by a quantitative analysis assessing if such modification affects the time length of the data collecting process, as one of the virtues the LSNS-6 is its brevity – which is highly appreciated in clinical settings.

We acknowledge that present analyses focused on assessing cultural understanding and linguistic adaptations to the LSNS-6. Hence futures steps should prove that the psychometric properties of the modified Spanish version are similar to those already reported for the scale (Lubben et al. 2006b). It may allow a more profound discussion about the criterion equivalence of this new version of the LSNS-6 (Van Ommeren et al. 1999). Considering that Spanish is the second more widely spoken language in the world and in the U.S., we believe this highlights the relevance of such proposed validated version.

In addition, our study had some limitations; the most relevant one is that the testing and face validity was only performed among urban older adults and predominantly from low socio-economic status. However, such limitation stems from the fact that in Mexico about 68.2% of the older adults live in cities and that about half of them have financial hardships (SEDESOL 2013), and that in the US the Mexican American population is more likely to be lower-income and to experience higher access to care barriers compared to the U.S. white population (Federal Interagency Forum on Aging-Related Statistics 2012; USC Roybal Institute on Aging 2016). It should also be noted, that the analysis does not generalize to other Latino/Hispanic groups, as language and cultural issues may be different. In addition, the participants were mainly women; hence it is difficult to ascertain if there are any gender differences in the interpretation of the scale items.

Future studies should target specific efforts in including male participants to complement the usefulness of the corrected version of the scale. In addition, one-on-one interviews could complement the qualitative assessment of the face validity and cross-cultural equivalence of the modified Spanish version of the LSNS-6 to gain more understanding of the thought process followed by older adults in comprehending questions and retrieving of information to answer the items.

This research acknowledges the usefulness and strong properties of the LSNS-6, and builds from the lack of validation of the Spanish version. We suggest that it needs to be adapted for its use among Mexican and Mexican American older adults, and we propose a modified version steaming form a cognitive validation performed cross-culturally in Mexico and among Mexican Americans in the US. The retest of the modified version suggest that older adults understand better what they are being ask, hence, this potentially implies that social isolation may be more accurately measured. Further research is needed to inform about the construct validity and psychometric properties of the modified version.

References

- Alaimo, K., Olson, C. M., & Frongillo, E. A. (1999). Importance of cognitive testing for survey items: an example from food security questionnaires. *Journal of Nutrition Education, 31*(5), 269–275. [https://doi.org/10.1016/S0022-3182\(99\)70463-2](https://doi.org/10.1016/S0022-3182(99)70463-2).
- Alpass, F. M., & Neville, S. (2003). Loneliness, health and depression in older males. *Aging & Mental Health, 7*(3), 212–216. <https://doi.org/10.1080/1360786031000101193>.
- AoA. (2010). A statistical profile of hispanic older Americans aged 65+. Retrieved from http://www.aoa.acl.gov/Aging_Statistics/minority_aging/Facts-on-Hispanic-Elderly.aspx. Accessed 13 Jan 2015.
- Barbour, R. (2007). *Doing focus groups*. Los Angeles: Sage. <https://doi.org/10.4135/9781849208956>.
- Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science & Medicine, 51*(6), 843–857. [https://doi.org/10.1016/S0277-9536\(00\)00065-4](https://doi.org/10.1016/S0277-9536(00)00065-4).
- Burnette, D., & Myagmarjav, S. (2013). Translation and validation of the 18-item Lubben social network scale with older adults in Mongolia. *International Psychogeriatrics, 25*(9), 1493–1502. <https://doi.org/10.1017/S104161021300080X>.
- Cacioppo, J. T., & Hawkley, L. C. (2003). Social isolation and health, with an emphasis on underlying mechanisms. *Perspectives in Biology and Medicine, 46*(3), S39–S52. <https://doi.org/10.1353/pbm.2003.0049>.
- Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and Aging, 21*(1), 140. <https://doi.org/10.1037/0882-7974.21.1.140>.
- Campos, W., Martínez, A., Estrada, H., & Castro-Sánchez, N. A. (2014). *Measuring Social Isolation in Older Adults through Ambient Intelligence and Social Networking Sites*. In *Intelligent Environments (Workshops)* (pp. 48–59). <https://doi.org/10.3233/978161499411448>.
- Chande, R. H. (2011). Diagnóstico socio-demográfico del envejecimiento en México. *Conapo. La situación demográfica de México*.
- Chen, S. (2012). Historical and global perspectives on social policy and “aging in community”. *Ageing International, 37*(1), 1–15. <https://doi.org/10.1007/s12126-011-9136-x>.
- Collins, D. (2003). Pretesting survey instruments: an overview of cognitive methods. *Quality of Life Research, 12*(3), 229–238. <https://doi.org/10.1023/A:1023254226592>.
- CONAPO. (2011). *Diagnóstico Socio-Demográfico del Envejecimiento en México*. Retrieved from <http://www.conapo.gob.mx/publicaciones/sdm/sdm2011/C8.pdf>.
- CONEVAL. (2011). *Pobreza en México y en las Entidades Federativas 2008–2010*. Mexico: CONEVAL.
- Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior, 50*(1), 31–48. <https://doi.org/10.1177/002214650905000103>.
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Los Angeles: Sage.
- Dickens, A. P., Richards, S. H., Greaves, C. J., & Campbell, J. L. (2011). Interventions targeting social isolation in older people: a systematic review. *BMC Public Health, 11*(1), 647. <https://doi.org/10.1186/1471-2458-11-647>.
- Federal Interagency Forum on Aging-Related Statistics (2012). *Older Americans 2012: Key Indicators of Well-Being*. Federal Interagency Forum on Aging-Related Statistics. Washington, DC: U.S. Government Printing Office.
- Hawkley, L. C., Thisted, R. A., Masi, C. M., & Cacioppo, J. T. (2010). Loneliness predicts increased blood pressure: 5-year cross-lagged analyses in middle-aged and older adults. *Psychology and Aging, 25*(1), 132. <https://doi.org/10.1037/a0017805>.
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS Medicine, 7*(7), e1000316. <https://doi.org/10.1371/journal.pmed.1000316>.
- Hong, M., Casado, B. L., & Harrington, D. (2011). Validation of Korean versions of the Lubben social network scales in Korean Americans. *Clinical Gerontologist, 34*(4), 319–334. <https://doi.org/10.1080/07317115.2011.572534>.
- Jayawickreme, E., Jayawickreme, N., & Goonasekera, M. A. (2012). Using focus group methodology to adapt measurement scales and explore questions of wellbeing and mental health: the case of Sri Lanka. *Intervention, 10*(2), 156–167. <https://doi.org/10.1097/WTF.0b013e328356f3c4>.
- Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., Kruse, W. V., Beck, J. C., & Stuck, A. E. (2006a). Performance of an abbreviated version of the Lubben social network scale among three European community-dwelling older adult populations. *Gerontologist, 46*(4), 503–513. <https://doi.org/10.1093/geront/46.4.503>.
- Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., von Renteln Kruse, W., Beck, J. C., & Stuck, A. E. (2006b). Performance of an abbreviated version of the Lubben social network scale among three

- European community-dwelling older adult populations. *Gerontologist*, 46(4), 503–513. <https://doi.org/10.1093/geront/46.4.503>.
- Lyyra, T.-M., & Heikkinen, R.-L. (2006). Perceived social support and mortality in older people. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 61(3), S147–S152. <https://doi.org/10.1093/geronb/61.3.S147>.
- Michael, Y. L., Berkman, L. F., Colditz, G. A., & Kawachi, I. (2001). Living arrangements, social integration, and change in functional health status. *American Journal of Epidemiology*, 153(2), 123–131. <https://doi.org/10.1093/aje/153.2.123>.
- Moreno-Tamayo, K., Sánchez-García, S., & Doubova, S. V. (2017). Factores asociados con el aislamiento social en una muestra de adultos mayores con seguridad social. *Salud Pública de México*, 59(2), 119–120. <https://doi.org/10.21149/8078>.
- NVivo. (2016) NVivo qualitative data analysis Software; QSR International Pty Ltd. Version for Mac 11.4.0.
- Older Americans 2012: Key Indicators of Well-Being. (2012). Washington DC: Retrieved from http://www.agingstats.gov/agingstatsdotnet/Main_Site/Data/2012_Documents/Docs/EntireChartbook.pdf.
- Ouimet, J. A., Bunnage, J. C., Carini, R. M., Kuh, G. D., & Kennedy, J. (2004). Using focus groups, expert advice, and cognitive interviews to establish the validity of a college student survey. *Research in Higher Education*, 45(3), 233–250. <https://doi.org/10.1023/B:RIHE.0000019588.05470.78>.
- Pelcastre-Villafuerte, B. E., Treviño-Siller, S., González-Vázquez, T., & Márquez-Serrano, M. (2011). Apoyo social y condiciones de vida de adultos mayores que viven en la pobreza urbana en México. *Cad. Saúde Pública*, 27(3), 460–470. <https://doi.org/10.1590/S0102-311X2011000300007>.
- Robles, L., Curiel, G. R., García, L. M. C., Coles, L. C., Medrano, M. d. S. G., & González, M. S. (2000). Redes y apoyo social en ancianos enfermos de escasos recursos en Guadalajara, México Social network and social support among poor elderly ill in Guadalajara, Mexico. *Cad. Saúde Pública*, 16(2), 557–560. <https://doi.org/10.1590/S0102-311X2000000200026>.
- Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health*, 23, 334–340. [https://doi.org/10.1002/1098-240X\(200008\)23:4<334::AID-NUR9>3.0.CO;2-G](https://doi.org/10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G).
- SEDESOL. (2013). *Diagnóstico del Programa Pensión para Adultos Mayores*. Mexico: SEDESOL Retrieved from http://www.sedesol.gob.mx/work/models/SEDESOL/Sedesol/sppe/dgap/diagnostico/Diagnostico_PAM_2013.pdf.
- Seeman, T. E., Lusignolo, T. M., Albert, M., & Berkman, L. (2001). Social relationships, social support, and patterns of cognitive aging in healthy, high-functioning older adults: MacArthur studies of successful aging. *Health Psychology*, 20(4), 243–255. <https://doi.org/10.1037/0278-6133.20.4.243>.
- Stephoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, 110(15), 5797–5801. <https://doi.org/10.1073/pnas.1219686110>.
- Tomaka, J., Thompson, S., & Palacios, R. (2006). The relation of social isolation, loneliness, and social support to disease outcomes among the elderly. *Journal of Aging and Health*, 18(3), 359–384. <https://doi.org/10.1177/0898264305280993>.
- USC Roybal Institute on Aging. (2016). *Healthy aging in Los Angeles County*. Los Angeles: University of Southern California School of Social Work.
- Van Ommeren, M., Sharma, B., Thapa, S., Makaju, R., Prasain, D., Bhattarai, R., & de Jong, J. (1999). Preparing instruments for transcultural research: use of the translation monitoring form with Nepali-speaking Bhutanese refugees. *Transcultural Psychiatry*, 36(3), 285–301. <https://doi.org/10.1177/136346159903600304>.