

Developing a Measure of the Impact of COVID-19 Social Distancing on Household Conflict and Cohesion

VICTORIA BEHAR-ZUSMAN*

JENNIFER V. CHAVEZ*

KARINA GATTAMORTA*

This report introduces the COVID-19 Family Environment Scale (CHES), which aims to measure the impact of social distancing due to COVID-19 on household conflict and cohesion. Existing measures do not capture household experiences relevant to the pandemic, in which families are largely confined to their homes while sharing a life-threatening situation. Using best practice guidelines, we developed a pool of items and revised them with review by a panel of experts, and cognitive interviewing with community respondents. We administered the CHES by online survey to 3,965 adults. The CHES consists of 15 items for each of two subscales, household conflict ($\alpha = .847$) and household cohesion ($\alpha = .887$). Exploratory factor analysis yielded two factors, corresponding to the intended conflict and cohesion items, which accounted for 29% of variance. Confirmatory factor analysis partially supported the 2-factor model (RMSEA = .057; CFI = .729, TLI = .708, and SRMR = .098). The CHES also contains 25 optional items to describe respondent and household characteristics, and household-level COVID-19 exposure. The CHES, publicly available at <https://elcentro.sonhs.miami.edu/research/measures-library/covid-19/index.html>, provides a tool for measuring the impact of the COVID-19 pandemic on important determinants of resilience in the face of major stressful events. Further work is needed to address the factor structure and establish validity of the CHES.

Keywords: Family Cohesion; Family Conflict; Family Environment; Family Stress; COVID-19

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The pandemic of coronavirus disease 2019 (COVID-19) is a unique life-threatening worldwide event. In addition to the stress that comes from the risk of illness and death, families are suffering economic losses, insecurity about having adequate stores of food and supplies, separation from loved ones, a barrage of frightening news, and uncertainty about the future. While there are behaviors that can reduce risk of infection, many aspects of the pandemic are beyond the control of individuals, thus increasing the stressful nature of the event.

*University of Miami, Coral Gables, FL, USA.

Correspondence concerning this article should be addressed to Victoria Behar-Zusman, University of Miami, 5030 Brunson Dr, Coral Gables, FL, USA 33146. E-mail: vbehar-zusman@miami.edu.

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Social distancing, defined by the Centers for Disease Control and Prevention in reference to COVID-19 as the practice whereby individuals “maintain a distance of at least six feet (2 m) from others [and] stay out of crowded places,” has been widely adopted as a recommended, and sometimes government-mandated, means of containing the pandemic (Centers for Disease Control & Prevention, 2020). A recent review of the literature undertaken in response to the COVID-19 crisis revealed that the psychological effects of quarantine include anxiety, depression, and post-traumatic stress (Brooks, et al., 2020). Although social distancing is less restrictive of movement than a quarantine, both share the elements of life disruption, fear, uncertainty, and financial repercussions.

Social distancing requires household members to be together for extended time periods, often with limited personal space. Furthermore, the activities that individuals typically would do in other spaces are taking place in the home. With most schools closed, children are schooling at home, and parents are responsible for supervising the children’s education and recreation. Many adults are also working from home, often without designated quiet space. Others have been laid off from jobs, with corresponding financial strains, or are required to report to jobs that expose their households to risk of contagion. In short, the COVID-19 pandemic sets up a home situation with tremendous potential for generating conflict as household members spend nearly unlimited hours together in a limited physical space while confronting a stressful event. The situation also provides opportunities for increased cohesion, as members of the household share more time together, confront challenges together, and get up-close glimpses of each other’s roles normally conducted outside of the home.

The stress process model (Pearlin, 1999), which provides a framework for understanding the interplay of stress-related factors, contains four major categories of dynamically interrelated constructs: (1) sources of stress, including chronic or acute stressors, (2) proximal outcomes, (3) resources that can moderate the consequences of stress, and (4) outcomes or manifestations of stress. All of these processes can occur at the individual level or at a larger, social/contextual level. The role of family functioning in the stress process can be considered within any of the categories of constructs: as a source of stress, as is the case for overburdened family caregivers; as a proximal outcome, as in the case of marital conflict that arises from economic pressures; as a resource, such as family cohesion that stems from solving problems together; or as an outcome, such as is in divorce (Avison, 2010). Furthermore, although the stress process model is typically applied to individuals, we can conceptualize family-level stress as an extension of individual stress (Hobfoll & Spielberger, 1992).

Family Conflict and Cohesion

Numerous studies have reported the extent to which family conflict is associated with negative outcomes, particularly among children and adolescents, including poor emotional development (Amir, 2017; Borst, 2015), greater physical symptomatology (Chen, Brody, & Miller, 2017), psychological distress (Constantine & Flores, 2006), problem behaviors (Cummings, Koss, & Davies, 2015), obesity (Frontini, Canavarro, & Moreira, 2018), chronic pain (Voerman, et al., 2015), substance abuse (Cano, et al., 2018; Foxcroft & Lowe, 1995), anxiety disorders (Priest & Denton, 2012), post-traumatic stress disorder (Norris & Uhl, 1993) (North & Pfefferbaum, 2013), and depression (Cummings, Koss, & Davies, 2015; Essau, 2004). In general, children and adolescents exposed to increased family conflict carry a disproportionate burden of chronic disease into adulthood and report poorer health status and quality of life (Borst, 2015; Chen, Brody, & Miller, 2017; Driscoll, et al., 2015; Repetti, Taylor, & Seeman, 2002; Shonkoff, Boyce, & McEwen, 2009).

In contrast, family cohesion is a protective factor that can mitigate negative outcomes associated with life stress (Hobfoll & Spielberger, 1992). Among youth, family cohesion has been associated with lower levels of substance abuse and sexual risk behavior (Cano, et al., 2018), positive psychological development (Perrino, et al., 2015; Uruk, Sayger, & Cogdal, 2007) more favorable self-esteem and well-being (Leidy, Guerra, & Toro, 2010), and more successful relationships in adulthood (Constantine & Flores, 2006). Family cohesion has also been found to be protective among adults facing stress from family caregiving (Francesco, Barsanti, Bongioanni, Bogliolo, & Rossi, 2014; Magaña & Smith, 2006; Yi, 2009), acculturative stress (Joel Wong, Uhm, & Li, 2012; Leong, Park, & Kalibatseva, 2013; Zapata Roblyer, Carlos, Merten, & Gallus, 2017), and living with HIV (Sauceda, Wiebe, Chan, Kutner, & Simoni, 2018).

There is evidence for family conflict and cohesion as important determinants of physical and mental health outcomes for family members that have experienced acute and/or persistent stressful situations, such as financial strains. Numerous studies examined family functioning in the context of the Great Recession of 2007–2009, which, like the current pandemic, was experienced globally, leaving millions unemployed, and disproportionately affected racial and ethnic minorities, and people with lower levels of education and income (Currie, Duque, & Garfinkel, 2015; Grusky, Western, & Wilmer, 2011; Hoynes, Miller, & Schaller, 2012). Forbes and Krueger (2019) analyzed longitudinal surveys before and after the Great Recession and found that individuals who had experienced a greater number of recession impacts (i.e., job loss, increased debt, bankruptcy, housing loss) were at higher odds of reporting increased rates of marital disputes and family conflict, which have been associated with greater incidence of child neglect and abuse (Schneider, Waldfogel, & Brooks-Gunn, 2017), psychological distress, suicidal behavior, and problematic parental substance abuse (Margerison-Zilko, Goldman-Mellor, Falconi, & Downing, 2016). On the other hand, stable and cohesive familial relationships have been seen as protective to child development by contributing to the development of familial resilience (Conger & Conger, 2002; Orthner, Jones-Sanpei, & Williamson, 2004). After the recession, children that came from cohesive families were less likely to develop externalizing behaviors or to have substance abuse problems (Giuliano & Spilimbergo, 2013; Meadows, Sell, Blinkoff, Williams, & Repcheck, 2015).

There is also evidence for family conflict and cohesion as important determinants of mental health outcomes for children and adults who have experienced natural disasters. Exposure to disaster events can inflate levels of stress and instability, can challenge family functioning, and, as a result, increase family conflict (McDermott & Cobham, 2012). In 2008, Bokszczanin studied a group of 533 schoolchildren and high school students 28 months after a devastating flood in Poland. She found that increased family conflict predicted levels of post-traumatic stress disorder among the adolescents (Bokszczanin, 2008). However, family cohesion, which plays an important role in a family's ability to recover and cope with disasters, is often seen as a buffer to family conflict (McDermott & Cobham, 2012). Sprague et al. (2015) found that in the face of disaster, stronger family connectedness and cohesion were associated with positive outcomes in youth. In China, after the Wenchuan earthquake, Cao, Jiang, Li, Lo, and Li (2013) found that family cohesion was significantly correlated with less emotional distress among bereaved adults. Some studies have also found that in the face of disaster, families may initially experience a period of cohesiveness, but chronic stress, poor coping mechanisms, and disaster-driven displacement can significantly increase family conflict after a disaster (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Le, Tracy, Norris, & Galea, 2013). Such findings highlight the need for longitudinal studies that can track changes in conflict and cohesion at different stages during and after a disaster.

Purpose of the Report

The goal of this report is to describe the development of the COVID-19 Household Environment Scale (CHES). There are existing and widely used measures of family conflict and cohesion, such as the Family Environment Scale (Moos & Moos, 1994) and Family Life Questionnaire (Foxcroft & Lowe, 1995). However, these measures do not address the unique family and household circumstances that are inherent in the context of social distancing in the COVID-19 pandemic. Our aspiration with the CHES was to capture the discord and the unity that can result from every-day experiences in the home within the social distancing context. We sought to measure how the COVID-19 context would introduce or elevate household-level conflict, as an indicator of household stress, as well as increase available household-level cohesion that could mitigate stress. Our intention is to provide a means of measuring change in the social and emotional climate of the home, as a source of family stress (Kazak, 1992), and resources, important determinants of the mental health effects of the pandemic.

METHODS

We followed the process outlined by Boateng and colleagues which described best practices for scale development in the behavioral sciences, consisting of three phases: Item Development, Scale Development, and Scale Evaluation, each with various steps (Boateng, Neilands, Frongillo, Melgar-Quinonez, & Young, 2018). The project was approved by the University of Miami Social and Behavioral Sciences Institutional Review Board. Participants were not compensated.

Phase 1. Item Development

Step 1. Identification of the domains and item generation

The domains of interest for the measure were conflict and cohesion, specifically the extent to which these domains had either increased or decreased in the household due to social distancing during the COVID-19 pandemic. We defined household conflict as “active opposition between family members that can take a wide variety of forms (i.e., verbal, physical, and psychological)” (Marta & Alfieri, 2014), and cohesion as having a “close connected relationship” (Olson, Russel, & Sprenkle, 1983). We used the CDC definition of social distancing described above.

We developed an initial pool of 14 conflict and 14 cohesion items by listing home activities or circumstances likely to be relevant in the context of social distancing. We sought to include content domains and processes established in the research literature as sources of family strain, such as parenting (Creasey & Reese, 1996), work–family balance (Afifi, et al., 2019; French, Dumani, Allen, & Shockley, 2018; Nohe, Meier, Sonntag, & Michel, 2015), caregiving (Brown, Whiting, Kahumoku-Fessler, Witting, & Jensen, 2020; Cousino & Hazen, 2013), and finances (Camacho-Thompson, Gillen-O’Neel, Gonzales, & Fuligni, 2016). We also sought to include sources of family support in the context of stressful life circumstances such as communication and mutuality (Brown, Whiting, Kahumoku-Fessler, Witting, & Jensen, 2020; Landers, Dimitropoulos, Mendenhall, Kennedy, & Zemanek, 2019), religion and spirituality (Olson, 2018), recreation (Buswell, Zabriskie, Lundberg, & Hawkins, 2012), and family meals (Skeer & Ballard, 2013; Utter, et al., 2013). The specific items in these domains were developed based on family social distancing experiences that were widely described in social media postings and news reports.

In addition to the conflict and cohesion items, we also generated a list of 20 descriptive items including demographic information about individual respondents (e.g., age,

country), household characteristics (e.g., number of and age categories of household members), and household-level COVID-19 experiences (e.g., whether anyone in the home had been diagnosed or ill from COVID-19, lost their job, or worked in a job with risk for exposure to the virus). We included these items to provide context for interpreting responses to the conflict and cohesion scales.

We had some additional considerations in designing the items. First, the unit of measurement was an important consideration. We decided to use the term “household” rather than “family” in order to be inclusive of nontraditional household arrangements, and to set a boundary around the relational unit being rated. Further, since we sought to measure household-level functioning, we decided to ask respondents to describe conflict and cohesion experiences of the household overall, rather than limiting the questions to interactions that the respondent was personally involved in. Second, given the global nature of the pandemic, we intended the CHES to be used beyond the United States and aimed to design indicators that could be universally relevant. For example, rather than ask about household income, which would not provide a common metric across different countries, we included home ownership as an indicator of household socioeconomic status (Johnson, et al., 2013). Third, because our research group has a strong focus on Latinx families, we intended to develop English and Spanish versions simultaneously. Therefore, while we started with an English version, we phrased the items and instructions so that they could be equivalent in both English and Spanish. The measure content was translated to Spanish and back-translated to English, and then the two English versions (original and back-translation) were compared for equivalence of meaning.

Step 2. Content validity

We sent the initial item pool to a panel of expert judges to determine content relevance and representation. The panel consisted of 13 doctoral level researchers, representing the disciplines of psychology, nursing, social work, and epidemiology. Areas of research expertise included family process and interventions, stress, chronic illness, family caregiving, mental and substance use disorders, and psychometrics. The members of the expert panel were active in domestic and international research with racial/ethnic and sexual/gender minorities and with populations across the age spectrum.

Communicating via email, we asked the experts to rate the relevance of each item with respect to (1) the specific construct of interest, and (2) the COVID-19 social distancing experience. Additionally, we asked the experts whether each item was clear, to suggest alternate wording, and to suggest additional items that were important to fully represent the constructs in the context of COVID-19.

Phase 2: Scale Development

Step 3. Pretesting questions through cognitive interviews

Next, we revised the measure based on the expert feedback and added it to Research Electronic Data Capture (REDCap) in English and Spanish. We then conducted pretests and cognitive interviews to ensure that the CHES could be easily completed via the online interface, and to receive feedback from a small sample intended to represent the target audience. We planned the method for the cognitive interviews to address clarity and relevance that could inform item refinement and English/Spanish equivalence. Interviews were conducted by phone or through a telecommunication platform.

Participation in the cognitive interviews was limited to adults practicing social distancing and living with at least one other person. Participants were emailed informed consent and a link to the survey prior to the interview. Basic demographic information was collected at the start of the interview. Ten cognitive interviews were conducted, seven in

English and three in Spanish. Participants included six women and four men, including four who identified as Latinx, three American Indian, one Black, one Asian/Pacific Islander, and one White/non-Latinx. Mean age of participants was 36.8 ($SD = 12.7$), educational level ranged from associate degree to doctoral degree, and number in the household ranged from two to six people.

After participants completed each section of the CHES, the interviewer asked probing questions about that section. For example, in the first section, participants were asked whether they or any members of their household were working in a job that they considered to be high risk for contracting COVID-19. The interviewer asked respondents to define “high risk” and to provide an example of a job that they considered to be high risk. The interviewer also probed based on participant answer choices and asked participants to define, in their own words, some of the conflict and cohesion items. For example, the interviewer asked questions like “We asked you about showing concern or emotional support. In your own words, what does this mean, and what does that look like in your household?” Each cognitive interview lasted approximately 40 minutes and ended with a request for general comments.

Step 4. Survey administration

We administered the CHES via an anonymous survey on REDCap from April 21 to May 5, 2020. Recruitment for the survey was conducted through social media, including ads in Facebook and Instagram and postings in LinkedIn and Twitter. We also asked our professional networks to disseminate announcements about the survey. The recruitment materials, which were in English or Spanish, included a link to the consent document and survey, in which respondents could select the language. Eligibility criteria for the survey were the same as for the cognitive interview, that is, adults who were currently practicing or who had practiced social distancing, and living with at least one other person.

Step 5. Item reduction analysis

Using a classical test theory (CTT) approach, we examined item difficulty and discrimination parameters to determine whether it was necessary to remove any items from the measure. Item-total correlations were also examined.

Step 6. Extraction of factors

The factorability of the CHES was evaluated using an exploratory factor analysis using maximum likelihood factoring and oblimin rotation with Kaiser normalization using SPSS Version 25 (IBM Corp, 2017). Eigenvalues, scree plots, and rotated factor loadings were evaluated to interpret the results of the analysis.

Phase 3: Scale Evaluation

Step 7. Tests of dimensionality

Confirmatory factor analysis (CFA) was conducted using Mplus (Muthén & Muthén, 2017). Model fit indices evaluated included chi-square test of model fit, root mean-squared error of approximation (RMSEA), Tucker–Lewis index (TLI), comparative fit index (CFI), and the standardized root mean square residual (SRMR). These fit indices were evaluated using the interpretation parameters summarized by Boateng et al., (2018).

Step 8. Tests of reliability

Cronbach’s alpha was used to evaluate the reliability of the subscales identified by the factor analysis. In addition, item-total correlations were evaluated as well as Cronbach’s

alpha if item is deleted to determine whether subscales could be improved if any items were eliminated.

Step 9. Tests of validity

As a preliminary test of validity, we examined the extent to which family functioning was related to various items from Section 1 of the CHES describing respondent and household characteristics and COVID-19 experience variables. We used appropriate statistical tests based upon level of measurement of the Section 1 variables (Kruskal–Wallis, Mann–Whitney *U* test, and Pearson correlations).

RESULTS

Phase 1. Item Development

Content validity

Mean, standard deviations, and percent agreement of ratings on relevance and word clarity by the 13 experts were calculated using SPSS. Relevance ratings could range from 1 to 3 points, with higher ratings denoting higher relevance. There were no mean relevance ratings below 2.57 for any section. Ratings of word clarity could range from 1 to 2 points, with lower ratings denoting better clarity. The highest (worst) mean word clarity rating was 1.10. The lowest percent agreement among expert raters was .5.

The experts provided suggestions for revisions to clarify meaning and provide examples of behaviors under some items, for collapsing some of the items with overlapping meaning, and to add items with respect to severity of exposure (e.g., whether any family members died from COVID-19), conflict (e.g., personal hygiene and use of social media), and cohesion (e.g., physical affection).

Phase 2. Scale Development

Pretesting/cognitive interviewing

Overall, the CHES was well received by those who were interviewed. Participants reported that sections of personal information, household information, and COVID-19-specific information were generally clear. Two of our participants came from a background in disability services and suggested that we rephrase our item about children with special needs to “children with a disability or special health care needs.” Every participant interviewed said that the examples provided in the conflict and cohesion items contributed to their understanding.

Participants from both languages indicated that word clarity was satisfactory, but made suggestions for improving some items, resulting in several items being revised. For example, some English speakers told us that they struggled with the definition of the word “argument”; which they interpreted as an “increase of discussion around a subject” rather than its intended definition, which is that of active opposition. As a result, we decided to change the word from “argument” to “conflict.” Based on participant suggestions, we added four items to the section on background information, one item to the conflict subscale, and one item to the cohesion subscale.

The CHES as it emerged from the development process includes two sections. Section 1 contains 25 descriptive items to characterize individual (e.g., age, gender) and household characteristics (e.g., number of people in the home), and household exposure to COVID-19 (e.g., whether anyone in the home had a positive test for the virus; and job loss due to the pandemic). This section is optional and not scored, and we did not subject it to psychometric analysis. Section 2 contains the family functioning subscales: household conflict and

household cohesion, each containing 15 items, asking the respondent about change in conflict, or “togetherness” (cohesion), related to specific household activities during social distancing as compared to the period before social distancing. Items are rated on a scale of 1 (“much less than before social distancing”) to 5 (“much more than before. . .”).

Scores on the family functioning scales could range from 1 to 5 on each item, with five indicating much more [conflict or cohesion] than before the COVID-19 pandemic. Possible scores on each subscale range from 15 to 75. To derive a total family functioning score, we reverse-scored the items on the household conflict subscale and summed the conflict and cohesion subscales. This method of scoring is similar to the Family Environment Scale where scales are combined to create a single-family interpersonal relationships scale score (Moos & Moos, 1994). Possible scores on family functioning range from 30 to 150, with higher scores indicating better family functioning.

Survey administration

The sample for the survey included 3,965 adults. Respondent demographic information, household characteristics, and household COVID-19 exposure information are presented in Table 1. Respondents were from 81 different countries in the continents of Africa, Asia, Australia, Europe, North America, and South America.

Item reduction analysis

Examination of item difficulty, discrimination parameters, and item-total correlation showed that item reduction was not necessary. Item-total correlations are presented in Table 2. While few items were found to have item-total correlations that fell below .40, removal of these items would have resulted in a decrease in reliability. As a result, these items were retained.

Extraction of factors

An exploratory factor analysis (EFA) of the 30 conflict and cohesion items extracted three factors with eigenvalues greater than one. These eigenvalues were 4.92, 3.79, and 1.34, respectively. However, factor 3 did not have a sufficient number of items with loadings $>.4$ to justify retaining it as a factor. The rotated factor loadings accounted for 29% of the total variance. The rotated factor loadings and the item-total correlations for factors 1 and 2 are displayed in Table 2. The first 15 items loaded onto factor 2 (conflict), while the next 15 items loaded onto factor 1 (cohesion).

Phase 3: Scale Evaluation

Confirmatory factor analysis

A confirmatory factor analysis was conducted in MPlus with items 1–15 loading onto the conflict scale and items 6–30 loading onto the cohesion scale. When examining fit indices, the RMSEA was indicative of fair fit (RMSEA = .057). However, all other fit indices did not show acceptable fit without model modifications. Specifically, CFI = .729, TLI = .708, and SRMR = .098. Modification indices to improve model fit included the recommendation for three cohesion items to load onto the conflict subscale and two conflict items to load onto the cohesion subscale. Additionally, interitem correlations both within subscales and across subscales were also suggested.

Reliability analysis

The 15 items that measure conflict showed good reliability (Cronbach’s = .842). Item-total correlations were between .333 and .542. For the 15 items that measure cohesion, good reliability was also established (Cronbach’s = .884) with item-total correlations ranging

TABLE 1

Personal, Household and COVID-19 Characteristics, and Family Functioning Scores from Survey Administration

Item	n (%)	Mean family functioning score (SD)	p
Respondent information			
Full sample	3,965 (100)	81.4 (14.0)	
Gender (n = 3,934)			
Male	286 (7.3)	80.8 (14.5)	<.0001 ^a
Female	3,603 (91.6)	81.6 (14.0)	
Nonbinary	45 (1.1)	71.8 (10.6)	
Language (n = 3,957)			
English	2,405 (60.8)	80.4 (13.2)	<.0001 ^b
Spanish	1,552 (39.2)	82.9 (15.0)	
Age (n = 3,965)			
Median age (range)	35 (18–85)		<.0001 ^c
Education (n = 3,784)			
Less than high school completion	109 (2.9)	78.4 (13.4)	<.0001 ^a
High school graduate	551 (14.6)	79.4 (15.3)	
Some college	958 (25.3)	79.6 (14.0)	
College graduate	2,166 (57.2)	82.7 (13.3)	
Household information			
Household composition (n = 3,965)			
Mean (SD)	4.0 (2.1)		<.0001 ^c
Households with children			
Yes	2,550 (65.5)	83.8 (14.2)	<.0001 ^b
No	1,346 (34.5)	77.2 (12.6)	
Households with adults aged 65+			
Yes	818 (21.5)	79.7 (14.0)	.0001 ^b
No	2,988 (78.5)	81.8 (14.0)	
Household COVID-19 information			
Time social distancing (n = 3,965)			
One month or less	1,108 (27.9)	82.0 (13.8)	.064 ^b
More than one month	2,857 (72.1)	81.2 (14.1)	
Employment affected by COVID-19			
Stopped working			
Yes	2,161 (56.5)	81.1 (14.2)	.182 ^b
No	1,661 (43.5)	81.7 (13.7)	
Working from home			
Yes	2,800 (71.5)	82.2 (13.7)	<.0001 ^b
No	1,115 (28.5)	79.3 (14.6)	
Working in a job with high risk for COVID-19 exposure			
Yes	1,458 (36.9)	80.3 (14.4)	<.0001 ^b
No	2,488 (63.1)	82.1 (13.7)	
Working in health care with direct patient contact			
Yes	437 (11.1)	80.4 (13.9)	.174 ^b
No	3,510 (88.9)	81.5 (14.0)	

^aKruskal–Wallis.

^bMann–Whitney *U* test.

^cPearson correlation: *r* = .152, and .056 for age and household composition, respectively.

from .307 to .702. Additionally, since two-factor model was only partially supported, we examined the reliability of the full scale with all 30 items included. The reliability for all 30 items from the conflict and cohesion together was Cronbach’s = .808, demonstrating good reliability for the overall measure of household functioning.

TABLE 2
Factor Loadings and Item-total Correlations

Item	<i>M (SD)</i>	Factor 1 Loading	Factor 2 Loading	Item-total Correlation Factor 1	Item-total Correlation Factor 2
Compared to before the COVID-19 pandemic, during social distancing, were/are there more conflicts in your household about:					
How to spend leisure time	2.67 (1.16)	.012	.465		.497
Parenting or childcare	2.60 (1.13)	.074	.502		.470
Children's schoolwork	2.44 (1.23)	-.091	.316		.386
Decisions about how people should take care of their health	2.45 (1.07)	-.010	.520		.522
Decisions about going out	2.57 (1.38)	-.020	.291		.525
Decisions about visitors to the home	2.75 (1.48)	-.045	.279		.460
Home maintenance	2.30 (1.11)	-.003	.647		.527
Personal hygiene	2.60 (1.08)	.052	.675		.468
Food	2.48 (1.09)	-.016	.596		.542
Work or employment	2.60 (1.21)	-.101	.239		.478
Finances	2.57 (1.15)	.000	.329		.487
Privacy or personal space	2.63 (1.20)	-.101	.157		.428
News or social media	2.27 (1.10)	-.026	.487		.529
Alcohol, tobacco, or drug use	3.07 (1.04)	.006	.155		.333
Politics	2.90 (1.05)	-.050	.275		.394
Compared to before the COVID-19 pandemic, during social distancing, was/is there more togetherness in your household because of:					
Spending leisure time together	3.86 (1.13)	.810	.033	.602	
Engaging in conversation	3.81 (1.09)	.880	.020	.695	
Doing exercise or fitness activities together	3.27 (1.22)	.429	.111	.462	
Getting involved in the children's education	3.71 (1.08)	.388	-.061	.521	
Facing challenges/solving problems together	3.59 (1.04)	.601	.010	.702	
Helping each other	3.71 (1.04)	.576	-.086	.701	
Sharing household tasks	3.65 (1.08)	.514	-.101	.624	
Going on errands together	2.51 (1.37)	.155	.052	.307	
Eating together	3.77 (1.09)	.532	-.110	.590	
Showing concern/emotional support	3.62 (1.08)	.551	-.097	.673	
Showing affection	3.18 (1.20)	.454	.084	.589	
Physical intimacy	2.64 (1.17)	.191	.188	.375	
Sharing religious or spiritual activities	3.21 (1.07)	.275	-.018	.475	
Sharing material resources	3.25 (0.96)	.349	-.033	.561	
Helping others together	3.03 (1.10)	.215	-.023	.425	

Tests of validity

The relationships between the single dimension family functioning score and select items from Section 1 of the CHES are shown in Table 1. Respondent age, language, and education were related to family functioning. Household characteristics and COVID-19 experiences related to family functioning included household composition (children in the home, persons age 65 or above living in the home), working from home, and working in a high-exposure job.

DISCUSSION

We have presented the development of the COVID-19 Household Environment Scale (CHES) which we developed in response to the global pandemic that is endangering and disrupting the lives of millions of people around the world. The household experience of social distancing, in the context of threats to physical and economic survival, sets up a home environment unlike anything the world has experienced, and therefore merits an assessment tool custom-made for this event. Through our psychometric analysis, with a large sample of people around the world, we found evidence to support reliability of the conflict and cohesion subscales of the CHES as well of the overall family functioning measure.

Family conflict and cohesion are important stress-related factors that impart risk or can serve as mitigating resources, respectively, for the psychological consequences of COVID-19 on youth and adults. High levels of conflictive interactions in the family contribute to a potentially toxic environment which serves as a stressor that interacts with, and exacerbates, the negative effects of major stressful life events (Avison, 2010). On the other hand, having close, connected interactions with family and other household members can offset the psychological consequences of major stressors (Conger & Conger, 2002; Gard, McLoyd, Mitchell, & Hyde, 2020).

Although there are established measures of family conflict and cohesion, in our estimation they would not be sensitive to the unique circumstances of the social distancing phenomenon. The magnitude of the COVID-19 pandemic and the profound impact that it is likely to have on societies around the world is not yet understood, but it will undoubtedly generate the need, and the opportunity, for new knowledge not only in the basic and clinical sciences, which are most directly involved in prevention, treatment and cure of the illness, but also in the social and behavioral science disciplines. The pandemic has led many researchers to develop measures of its social impact, several of which, along with the CHES, have been included in the NIH's PhenX Toolkit of common data elements for social determinants of health in the COVID-19 pandemic (NIH, 2020). However, we are not aware of any measures designed to specifically address family functioning in the context of the current pandemic. With the CHES, we sought to develop a tool that could be useful for ongoing family studies that were disrupted by the pandemic, and for new COVID-19 research and clinical initiatives aimed at informing or measuring the impact of family interventions.

Our process for developing the CHES has followed best practices as recommended by Boateng et al. (2018). However, the time sensitivity of facilitating on-the-ground research about the social and psychological impact of COVID-19 necessitated expedited dissemination. The fluidity of these family processes during the course of a disaster event and in the period following the event (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Le, Tracy, Norris, & Galea, 2013) raises the importance of assessing these family variables longitudinally and ideally starting during the early stages of the crisis. Our measure development process was therefore somewhat compressed and work remains to be done. For example,

although our analysis provides support for the content validity of the CHES and we have presented the relationship of family functioning with various descriptive indicators, further work is needed to assess the relationship of the CHES with measures of family functioning that can provide construct validation, and with measures of mental health outcomes for criterion validity. Moreover, given the disparities in physical and social impact of COVID-19, we recommend that future users of the CHES supplement the descriptive indicators included in the first section of the CHES to include ethnicity, and more extensive socioeconomic and cultural indicators.

Further work is also needed to address the factor structure of the family functioning scales. Specifically, while there is evidence of a two-factor model assessing conflict and cohesion based on the results of the EFA, this model was not confirmed using CFA. Model fit may have been improved by modeling correlations between items or cross-loading of items. Additional examination of the factor structure is needed in future studies with new respondent samples.

The COVID-19 pandemic will leave an indelible mark on individuals and families for years to come. In addition to illness and loss of loved ones, scholars have predicted that the economic turmoil following the COVID-19 pandemic will be significantly greater than that of the Great Recession; once again, disparately affecting racial and ethnic minorities, single parent households and families of low socioeconomic status (Artiga, Garfield, & Orgera, 2020). The imprint that the pandemic will leave on mental health will be colored, in part, by the emotional climate in the home during the practice of social distancing. Intervention strategies are needed to prevent and mitigate mental consequences of the pandemic, including family-based interventions that address relational stressors and build upon positive family structures that emerge from the shared experience.

The global nature of this crisis calls for a global response. We have seen unprecedented international collaboration to identify effective treatments and to develop a vaccine. We also need global initiatives to understand and intervene in the mental health repercussions for individuals and families. An example of a multinational effort is seen in the ECLB-COVID-19 Multicenter Study that sought to understand the mental health repercussions of COVID-19 home confinement. They have found that social distancing has exacerbated psychological strain, particularly in high-risk populations (Ammar, et al., 2020). We are hopeful that family researchers will also embark on multinational projects. To this end, we designed the CHES to be relevant for households around the world, and the reliability of the measure in our large international sample supports the universality of the social distancing experience in homes around the world. In the short time since we began this work, the CHES has been translated to Portuguese and Mandarin and a translation to Haitian Creole is in progress. In response to requests from researchers, we have also developed an adaptation for adolescents. The CHES is publicly available at <https://elcentro.sonhs.miami.edu/research/measure-library/covid-19/index.html>.

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