

2023

## Factor Analysis of the Financial Strain Index from the Welfare, Children and Families: A Three-City Study, Wave 3

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### Recommended Citation

Hageman, S. A., & Cheon, J. (2023). Factor Analysis of the Financial Strain Index from the Welfare, Children and Families: A Three-City Study, Wave 3. *Journal of Financial Therapy*, 14 (1) 3. <https://doi.org/10.4148/1944-9771.1278>

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## Factor Analysis of the Financial Strain Index from the Welfare, Children and Families: A Three-City Study, Wave 3

### Cover Page Footnote

We thank Dr. Paul Sacco for his exceptional expertise and guidance with the Exploratory and Confirmatory Factor Analyses conducted in this study.

## Factor Analysis of the Financial Strain Index from the Welfare, Children, and Families: A Three-City Study, Wave 3

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*This paper uses the Welfare, Children, and Families: A Three-City Study data. The three cities included are Boston, Chicago, and San Antonio. The total sample size was  $n = 1,773$ , and almost all respondents were female caregivers (99%). An Exploratory Factor Analysis (EFA) on the financial strain index was conducted because previous research reporting an EFA is limited. The financial strain construct was examined using a Principal Component Analysis (PCA) in two Structural Equation Models (SEMs) and a recursive path analysis estimated by ordinary least squares regression. These previous articles provide the theoretical basis for the EFA reported in this paper. Results of the EFA indicate a one-factor model (RMSEA (.064), CFI (.975), TLI (.958),  $\chi^2 = 74.995$ ,  $df = 9$ ,  $p < .001$ ), and a two-factor model (RMSEA (.035), CFI (.997), TLI (.988),  $\chi^2 = 12.722$ ,  $df = 4$ ,  $p = .0127$ ) are both good fits to the Three-City Study data. However, the one-factor model is more appropriate than the two-factor model based on Eigenvalues and a scree plot. Additional research using the financial strain index from the Three-City Study with samples from different populations is needed to further support retaining a one-factor model. The financial strain index is a valuable composite measure summarizing responses for several rank-ordered items measuring the concept of financial strain. We recommend that financial therapy practitioners use the financial strain index as a one-factor measurement tool to assess client financial strain.*

*Keywords: financial strain; exploratory factor analysis; Three-City Study*

More than three decades ago, researchers assumed the experience of stress resulted from the conflict between change and homeostasis (Pearlin et al., 1981). In 1981, however, Pearlin and associates challenged this assumption and examined life strains. To better understand the connection between an event and stress, Pearlin and associates (1981) proposed that rather than assuming events have a single direct impact on one area of an individual's life, events may have a broader life strain. Applying *role strains* to represent the connection from an event to stress broadly, Pearlin et al. (1981) claimed that an increase in *life strain* increases the risk for negative consequences in more than one area of life. For

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example, an individual who unexpectedly loses employment experiences several *role strains* beyond the job loss, including strain in finances, marriage, and parenting (Pearlin et al., 1981). From this perspective, we define financial strain as anxiety, worry, or feelings of not coping due to a job loss or other significant financial event where a loss of income or wealth results (French & Vigne, 2019). Our definition of financial strain is synonymous with “financial/economic hardship,” “financial/economic stress,” “financial difficulties,” or “inability to cope financially” (French & Vigne, 2019, p. 2).

Financial strain differs from general types of strain, such as life strain, role strain, or psychological strain, to focus on the connection of anxiety or worry with personal finances. The consequences of financial strain include poor physical and mental health outcomes (including depression) (Sweet et al., 2013), food insecurity (Balistreri, 2019), an increased rate of mortality (Karanikolos et al., 2013), engaging in illegal activities (Monte, 2015), and political unrest (Becker et al., 2017; Funke et al., 2016). One possible definition of Financial strain within the last 30 years is the subjective perception of one's financial situation (Asebedo & Wilmarth, 2017; Bartholomae & Fox, 2017; Conger et al., 1994; Hanratty et al., 2007; McLoyd et al., 1994; Vinokur & Price, 1996; Winarta & Pamungkas, 2021). If ignored, a client's perception of financial strain could negatively affect their health (Asebedo & Wilmarth, 2017).

Financial strain is operationalized and analyzed differently throughout the literature resulting in a wide variety of results and interpretations (Conger et al., 1994; French & Vigne, 2019; Hanratty et al., 2007; Kahn & Pearlin, 2006; McLoyd et al., 1994; Pearlin et al., 1981; Vinokur et al., 1996). Subjective and objective measures of financial strain exist and may impact client outcomes differently. Asebedo and Wilmarth (2017) found that subjective financial strain was a stronger predictor of mental health status than objective financial measures. Bartholomae and Fox (2017) recommend that financial therapy practitioners consider the subjective and objective financial strain and help clients distinguish between the two. A client suffering from depression and anxiety may perceive their financial situation more negatively than the objective reality (Falconnier & Elkin, 2008).

Currently, limited research conducting an Exploratory Factor Analysis (EFA) on the financial strain index used in the Welfare, Children, and Families: A Three-City Study (Three-City Study) exists (Angel et al., 2009). The financial strain index was created using items drawn from Conger and associates (1994) and McLoyd and colleagues (1994) to measure an individual's perception of their lack of ability to meet current financial needs (Hamby et al., 2011). The financial strain index may assist financial practitioners in assessing a client's level of anxiety or worry with personal finances as well as exploring possible consequences, including the impact of financial strain on negative behaviors and health status (Karanikolos et al., 2013; Monte, 2015; Sweet et al., 2013).

Levine and Chase-Lansdale (2000) standardized the financial strain index and created an average summary score yielding a Cronbach's alpha of .81. The results of four articles examining financial strain are presented to provide a theoretical basis for the EFA conducted in this study. One conducted a Principal Component Analysis (PCA), two used a

## Factor Analysis of the Financial Strain Index

Structural Equation Model (SEM), and one used a recursive path analysis estimated by ordinary least squares regression.

### **Literature Review - Study One**

In the first study, Aldana and Liljenquist (1998) conducted a literature review, interviewed finance professionals, and used a modified Delphi Technique to define and operationalize financial strain into survey questions (Parker, 1980). The final survey included 28 questions spread among six factors (inability to meet obligations, relationship problems, physical stress, financial education, extensive credit card use, and purchasing wants before needs). The researchers conducted a PCA to determine whether 28 questions and factors were significantly associated with the financial strain construct. An item was considered associated with a factor if the factor loading was more than .40 or less than -.40 for that factor and between -.40 and .40 for other factors (Aldana & Liljenquist, 1998). The researchers indicated three or more items needed to load on a factor to retain the factor (Aldana & Liljenquist, 1998). The final Financial Strain Survey included five factors and 18 items assessed on a 5-point Likert scale as *never* (1), *rarely* (2), *sometimes* (3), *often* (4), or *always* (5) (Aldana & Liljenquist, 1998). The five factors that make up the financial strain construct are education (“I know how interest works on my current debts”), relationships (“There are disagreements about money in my home”), physical (“Are you ever unable to sleep well because of financial worry”), credit card use (“I take on more debt to get nicer things”), and meeting obligations (“I pay my bills on time”) (Aldana & Liljenquist, 1998, p.18). The Cronbach alpha for the Financial Strain Survey fell between .62 and .80 (Aldana & Liljenquist, 1998). Tavakol and Dennick (2011) caution that an alpha value below .70 may indicate too few questions, poor inter-relation, or heterogeneous factors. However, Aldana and Liljenquist (1998) note that while the education factor had a Cronbach alpha of .62, compared to .80 and above for the other four factors, the education factor is statistically reliable. The final Financial Strain Survey items retained to represent the financial strain construct are presented in Appendix A.

Aldana and Liljenquist’s (1998) work on the Financial Strain Survey provides a starting point for the EFA conducted in this study because several questions are very similar to those included in the financial strain index (Angel et al., 2009). One question listed on the financial strain index is, “During the past 12 months, how much difficulty did your household have paying bills? Would you say...” rated from *no difficulty at all* (1) to *a great deal of difficulty* (5) (Angel et al., 2009, p.18). It is similar to items included in the Financial Strain Survey, such as “I find it difficult to pay my bills” and “I don’t have enough money to pay my bills,” rated from *never* (1) to *always* (5) (Aldana & Liljenquist, 1998, p.18). Three additional studies presented below provide further support for the analyses conducted on the financial strain index.

### **Literature Review - Study Two**

Compared to Aldana and Linjenquist’s (1998) article, the researchers of the second and third studies operationalize financial strain slightly differently and use SEMs. In the second study, the researchers present a process model of family interactions that connect

perceived economic stress to youth behaviors using a sample of 205 families (Conger et al., 1992). Four observed economic stress variables include family per capita income ("total income from all sources"), unstable work ("being laid off or fired"), debt-to-asset ratio score ("estimated value of all debts divided by total family assets"), and income loss ("increase, decrease or stayed about the same during the past year") (Conger et al., 1992, p. 528). Indicators of the latent variable, family economic pressure, cannot make ends meet (whether they have difficulty paying bills each month rated as *no difficulty at all* (1) to *a great deal of difficulty* (5) and whether they have money left over at the end of the month rated as *more than enough money* (1) to *not enough to make ends meet* (4)), material needs (seven items rated on a 5-point Likert scale of *agreed* (1) to *disagreed* (5) answering whether the "family had the money needed for a home, clothing, household items, a car, food, medical care, and recreational activities"), and economic adjustments (whether changes were made in response to financial difficulties during the past year such as "giving up medical care" or "reducing utility costs" rated as *yes* (1) or *no* (2) (Conger et al., 1992, p. 531-535). The results indicated that economic hardship (observed), such as per capita income and unstable work, is associated with parental emotions and actions through family economic pressure (latent) (Conger et al., 1992). The economic hardship (observed) and perceived family economic pressure (latent) variables (Conger et al., 1992) are the same variables applied in a later study (Conger et al., 1994) and used to create the financial strain index (Levine & Chase-Lansdale, 2000). Conger and associates' (1994) later study is described below.

### Literature Review- Study Three

The researchers of the third study conducted an SEM defining and measuring adverse economic conditions and family economic pressure the same as Conger and colleagues (1992) but applied these variables to a different sample (378 families across three waves) (Conger et al., 1994). In addition, they examined a family conflict and coercion model linking economic stress in families to external feelings and actions observed in their adolescent children (Conger et al., 1994). The results indicated that economic hardship was significantly associated with economic pressure, and the "set of economic conditions accounted for 39% of the variance in economic pressure" (Conger et al., 1994, p.553). Further, Conger et al. (1994) report that the correlations for indicators of economic pressure range from .63 (economic adjustments correlated with material needs) to .79 (cannot make ends meet by material needs). Overall, study results reveal that parental economic pressure heightens financial disagreements between parents and youth, and hostile interactions increase the likelihood of youth acting out emotionally and behaviorally (Conger et al., 1994). As mentioned above, the economic hardship (observed) and perceived family economic pressure (latent) variables (Conger et al., 1994) were used to create the financial strain index (Levine & Chase-Lansdale, 2000). The previous study presented below introduces the final items added to the financial strain index (Levine & Chase-Lansdale, 2000).

### Previous Research Literature - Study Four

In the fourth study, McLoyd and colleagues (1994) interviewed 241 African American single mothers and one of their seventh or eighth-grade children to examine the impact of maternal unemployment and work interruption on children's socio-emotional status. The

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researchers measured financial strain using three items, including "how often in the past two years, to make ends meet, you borrowed money from friends or family to help pay bills" and "how often you decided not to buy something you really needed for yourself or your children because you couldn't afford it," rated from 1 (*not at all*) to 4 (*a lot*; McLoyd et al., 1994, p.568). The third item asked respondents, "how difficult has it been to pay the family bills lately," rated from 1 (*not difficult at all*) to 4 (*very difficult*). The Cronbach alpha for these three items is .62 (McLoyd et al., 1994, p.568). The recursive path analysis estimated by ordinary least squares regression reveals that unemployment and work interruption are significantly related to mothers' perception of financial strain (McLoyd et al., 1994). This result also predicted children's perception of economic hardship (McLoyd et al., 1994).

The three financial strain items McLoyd and associates (1994) used were combined with the economic hardship (observed) and perceived family economic pressure (latent) variables Conger and associates (1994) used to create the financial strain index (Levine & Chase-Lansdale, 2000). Taken together, these studies provide a starting point for conducting an EFA using data from the Three-City Study (Angel et al., 2009). Given that previous research on the financial strain index (Conger et al., 1992; Conger et al., 1994; McLoyd et al., 1994) appears to include two types of financial strain, we hypothesize that the EFA will yield two factors.

## **METHOD**

### **Data Source**

Secondary data analyses were conducted using data from the Three-City Study, wave 3 (2005-2006) (Angel et al., 2009). The authors of the Three-City Study aimed to examine the long-term well-being of families and children whose incomes are in lower income brackets following the Personal Responsibility and Work Opportunity Reconciliation Act in 1996 (PRWORA) (Angel et al., 1999). The target population for the Three-City Study was children (aged birth to 4 and 10 to 14) with a female primary caregiver. Demographic data were collected on all respondents, including (a) race and ethnicity (African-American, White, or Hispanic), (b) current residence (Boston, Chicago, or San Antonio), and (c) income level (whether a respondent reported income was 200% below the federal poverty line (FPL)) (Angel et al., 1999). Data for wave three were collected in interviews completed from February 2005 to January 2006 with approximately 2,056 caregivers and 1,944 children (Angel et al., 1999). For continuing and new caregivers, 1,773 in-person and 62 telephone interviews were completed (Angel et al., 2009). Question topics for caregivers were related to employment and public assistance experiences, family experiences, utilization of social services, and health and well-being status (Angel et al., 1999).

This study used data from the Three-City Study, wave 3 because the sample size available was larger than 500 (Angel et al., 2009). It is recommended that a sample size of 500 or more is appropriate to conduct an EFA successfully (Dimitrov, 2012). In addition, this study selected the Three-City Study, wave 3 data because it is one of the few studies to include a measure of financial strain, which directly informs our research question.

## Sample

Data from Wave 3, 1,773 in-person interviews, and 62 telephone interviews with continuing/new caregivers (N = 1,835) are used for this study (Angel et al., 2009). Table 1 lists the demographic characteristics of the study sample. Respondents were roughly equally distributed between the three cities (Boston (36%), Chicago (35%), and San Antonio (30%)). Almost all respondents were female (99%), and the majority reported their race and ethnicity as either African American (43%) or Hispanic (47%). Approximately 35% were never married, and almost 25% reported a household of four members. The majority (72%) did not live in public housing, and more than 42% reported an income below the FPL. Table 1 presents the demographic characteristics of the study sample.



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**Table 1.**

*Sample Demographics*

Demographic	<i>n</i>	(%)
City <sup>a</sup>		
Boston	655	(35.7)
Chicago	638	(34.8)
San Antonio	542	(29.5)
Gender <sup>a</sup>		
Female	1816	(99.0)
Male	19	(1.0)
Race & Ethnicity <sup>a</sup>		
White	147	(8.0)
African American	784	(42.7)
Hispanic	868	(47.3)
Other	36	(2.0)
Relationship Status		
Divorced	286	(15.6)
Separated	209	(11.4)
Widowed	61	(3.3)
Never Married	642	(35.0)
Married	426	(23.2)
Cohabiting	188	(10.2)
Missing	23	(2.6)
Number in Household <sup>a</sup>		
Two	192	(10.5)
Three	409	(22.3)
Four	457	(24.9)
Five	381	(20.8)
Six or more	396	(21.5)
Live in Public Housing		
Yes	509	(27.7)
No	1319	(71.9)
Missing	7	(0.4)
Below Poverty Level		
Yes	778	(42.4)
No	850	(46.3)
Missing	207	(11.3)

*Note.* *N* = 1,835. <sup>a</sup>No cases are missing data for this item.

## Measure

The financial strain index in this study includes six items (Angel et al., 2009), yielding a reliability (Cronbach's alpha) score of .81 (Levine & Chase-Lansdale, 2000). The sample used in this study yielded a Cronbach's alpha of .999. The high-reliability score may indicate

redundancy among several items in each measure (Tavakol & Dennick, 2011). Table 2 includes the details of the Financial Strain index items.

**Table 2.**

*The Financial Strain Index*

Item	Question	Response Categories
RST1A.	How often does your household have to borrow money to pay bills? Would you say... <sup>a</sup>	
RST2A.	How often does your household put off buying something you need because you don't have money? Would you say... <sup>a</sup>	
RST3A.	How often can your household afford to do things just for fun like going to movies or eating out? Would you say... <sup>a</sup>	
RST4A.	During the past 12 months, how much difficulty did your household have paying bills? Would you say...	1: <i>no difficulty at all</i> 2: <i>a little difficulty</i> 3: <i>some difficulty</i> 4: <i>quite a bit of difficulty</i> 5: <i>a great deal of difficulty</i>
RST5A.	Does your household have enough money to afford the kind of housing, food, and clothing you feel you should have? Would you say...	1: <i>definitely no</i> 2: <i>not quite</i> 3: <i>mostly</i> 4: <i>definitely yes</i>
RST6A.	Thinking about the end of the month over the past 12 months, did your household generally end up with...	1: <i>more than enough money left over</i> 2: <i>some money left over</i> 3: <i>just enough to make ends meet</i> 4: <i>not enough to make ends meet</i>

*Note.* The full reference for the Financial Strain Index is Angel, R., Burton, L., Chase-Lansdale, P. L., Cherlin, A., & Moffitt, R. (2009). *Welfare, children, and families: A three-city study ICPSR04701-v7* [Data file].

<http://doi.org/10.3886/ICPSR04701.v7>

<sup>a</sup>Response categories include *never* (1), *rarely* (2), *occasionally* (3), *frequently* (4), and *all the time* (5)

## Data Analysis

Following determination as non-human subjects research from the institutional review board of the researcher's university, the Statistical Package for Social Science (SPSS) version 22.0 (IBM Corp, 2013) was used to clean and analyze descriptive data of the sample. The final sample is 1,763. An EFA and a Confirmatory Factor Analysis (CFA) were conducted using MPlus version 8.3 (Muthen & Muthen, 2019) as recommended by Worthington and Whittaker (2006). Stata-MP version 17.0 was used to conduct multiple imputations and

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create a scree plot (StataCorp LLC., 2021). The frequency results of the financial strain index yielded an adequate number of responses in each cell for the EFA.

Before conducting an EFA, missing cases and patterns were analyzed, and then multiple imputations were conducted to remove cases with missing values. Next, the correlation was conducted to check how each item strongly correlated with each other before conducting an EFA. Finally, an EFA was conducted to “assess the underlying factor structure and refine the item pool” to determine if all six items of the Three-City Study financial strain index represent the financial strain construct (Cabrera-Nguyen, 2010, p. 99). Data were analyzed as ordered-categorical because questions on the financial strain index contained a maximum of five answer choices (items one to four contained five answer choices, and items five and six contained four answer choices; Kline, 2011).

The data were analyzed using the WLSMV estimator, which is appropriate and recommended for ordered categorical data (Flora & Curran, 2004; Kline, 2011). Each construct was analyzed, and fit indices were examined to determine if the model fits the data from the EFA results. The chi-square test of model fit was used to determine the goodness of fit between the sample covariance matrix and the restricted covariance matrix. As well as the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA; Byrne, 2012; Kline, 2011). A chi-square result of non-significance indicates a good model fit (Byrne, 2012; Kline, 2016). The recommendations include CFI and TLI values greater than .90 to .95 interpreted as good/very good fit, RMSEA values lower than .05 interpreted as close fit including values reaching .08 interpreted as a good fit with tighter confidence intervals interpreted as reasonable estimates of the RMSEA value. In addition, the score difference of a chi-square test between models and prior literature on financial strain was used to determine whether the model adequately fit the data. To confirm the number of factors of the EFA, a scree plot was created based on eigenvalues. In addition, a CFA was conducted, and standardized factor loadings and standard errors of the CFA were presented. Finally, the content validity of the financial strain index was tested using the correlation between financial strain and illegal activities.

## **RESULTS**

### **Exploratory Factor Analysis (EFA)**

The original number of samples in the Three-City Study, wave 3, was 1,835. Missing cases and missing patterns for financial strain items were identified, and each item had 68-70 missing cases, and 4% of cases had missing values for all financial strain items.

Before conducting an EFA, the correlation between financial strain items and Bartlett and Kaiser-Meyer-Olkin tests were conducted. As shown in Table 3, the correlations between items were all statistically significant. Bartlett test of sphericity is significant (Chi-square = 2652.67, DF = 15,  $p < .001$ ), and Kaiser-Meyer-Olkin Measure of Sampling Adequacy was  $KMO = .84$ , which is above .50. These results indicate there are sufficient intercorrelations between financial strain items.

**Table 3.***Correlation between Financial Strain Index Factors*

	RST1A	RST1A	RST1A	RST1A	RST1A	RST1A
RST1A	1.000					
RST1A	.458***	1.000				
RST1A	-.228***	-.240***	1.000			
RST1A	.497***	.545***	-.285***	1.000		
RST1A	-.315***	-.416***	.332***	-.405***	1.000	
RST1A	.365***	.452***	-.296***	.483***	-.394***	1.000

Note. \*\*\*  $p < .001$ .

Table 4 includes the details of the factor analysis results of the Financial Strain index. Table 5 provides the results of the EFA for the Financial Strain Index. Maximum Likelihood (ML) was used as an estimator to deal with missing cases. Mplus uses Full Information Maximum likelihood estimation (FIML) as default, and FIML is ML estimation under the MAR (missing at random) assumption. MCAR (missing completely at random) was tested on the Financial Strain Index, and the missing pattern of the Financial Strain Index was MCAR (Chi-square = 109.458, DF = 6096,  $p = 1.0$ ). Sixty-eight cases were reported as missing and removed from EFA and CFA. Accordingly, 1,767 cases were used to implement EFA and CFA.

The rotation strategy was Geomin which is an oblique rotation that was used. Cabrera-Nguyen (2010) recommends using an oblique rotation to determine the correlations between factors. It is acceptable to use the oblique rotation because factor intercorrelations are appropriate for social science research. The orthogonal and oblique rotations each produce the same results for uncorrelated factors (Costello & Osborne, 2005). All six items of the financial strain index were included in the EFA, and no items were deleted. The factor items loaded in the expected direction. The fit indices for the financial strain index with one factor reveal a good fit as indicated by the RMSEA, SRMR, CFI, and TLI values but possible misfits based on the significant chi-square test. Results indicate an RMSEA value of .064 lower than the set .08 cutoff value. The SRMR was .027, below the recommended value of .06. The CFI (.975) and TLI (.958) fell within the cutoff range of  $> .95$  but the chi-square test results were significant ( $\chi^2 = 74.995$ ,  $df = 9$ ,  $p < .001$ ), indicating possible model misfit. According to Byrne (2012) and Kline (2016), the model should be tentatively rejected because the chi-square result was significant, and failing to reject may lead to potential bias.

The fit indices for the financial strain index with two factors reveal a good fit in terms of a significant chi-square test and favorable RMSEA, SRMR, CFI, and TLI values. Factor items loaded in the expected direction. Results indicate an RMSEA value of .035, less than the .05 near fit value. The SRMR was .009, well under the .06 cutoff value. The CFI (.997) and TLI (.988) fell within the cutoff range of  $> .95$  and the chi-square test results were significant ( $\chi^2 = 12.702$ ,  $df = 4$ ,  $p = .0127$ ). Results indicate that the difference between the one-factor model and the two-factor model is significant.

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The chi-square test comparison result indicates the two-factor model is a better fit than the one-factor model ( $\chi^2 = 62.273$ ,  $df = 5$ ,  $p < .001$ ). However, as shown in Table 6, the eigenvalue of factor 1 is over 1 (Kaiser, 1960, as cited in An & Pearce, 2013), and the rest of the eigenvalues are under 1. Also, as shown in Figure 1, the scree plot showed the plot vent at factor 2 (Cattell, 1978, as cited in An & Pearce, 2013). So, the one-factor model is a better fit than the two-factor model. Factor 1 explained 49% of the variance with the absolute value of factor loadings from .403 to .757.

**Table 4.**

*Results From a Factor Analysis of the Financial Strain Index*

Financial Strain Index item	Factor loading ( <i>SE</i> )	
	1	2
RST1A. How often does your household have to borrow money to pay bills?	.618* (.018)	.696* (.064) .080 (.074)
RST2A. How often does your household put off buying something you need because you don't have money?	.715* (.015)	.674* (.078) -.056 (.088)
RST3A. How often can your household afford to do things just for fun like going to movies or eating out?	-.403* (.023)	.010 (.029) .511* (.034)
RST4A. During the past 12 months, how much difficulty did your household have paying bills?	.757* (.014)	.771* (.017) -.001 (.004)
RST5A. Does your household have enough money to afford the kind of housing, food, and clothing you feel you should have?	-.572* (.019)	-.126 (.200) .565* (.193)
RST6A. Thinking about the end of the month over the past 12 months, did your household generally end up with...	.640* (.017)	.416* (.077) -.275* (.071)

*Note.*  $N = 1,767$ , \*  $p < .05$

**Table 5.**

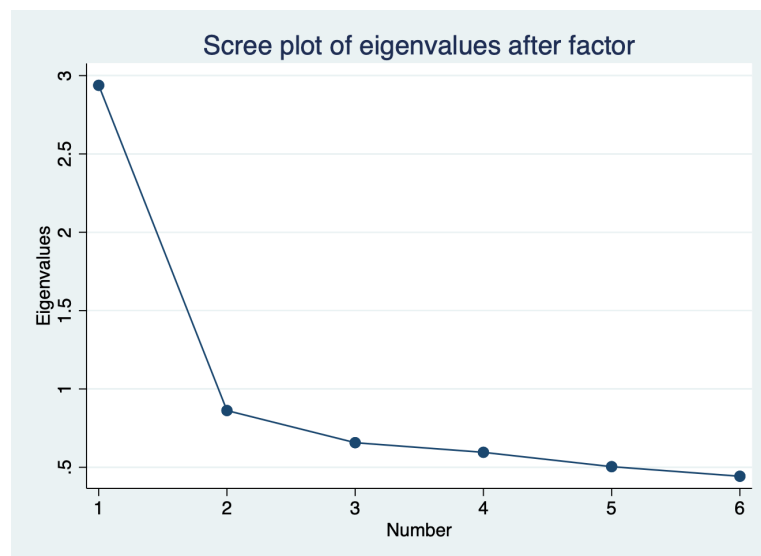
*Results of Exploratory Factor Analyses for the Financial Strain Index*

Model	$\chi^2$	<i>df</i>	TLI	SRMR	CFI	RMSEA
1 Factor	74.995***	9	.958	.027	.975	.064
2 Factor	12.722*	4	.988	.009	.997	.035

*Note.*  $N = 1,767$ . EFA = Exploratory Factor Analysis. \*  $p < .05$ . \*\*\*  $p < .001$ .

**Table 6***Eigenvalues for the Financial Strain Index Correlation*

	Eigenvalues	Variance (Cumulative)
Factor 1	2.938	0.490
Factor 2	0.862	0.633
Factor 3	0.657	0.743
Factor 4	0.596	0.842
Factor 5	0.504	0.926
Factor 6	0.443	1.000

**Figure 1.***Scree Plot of Exploratory Factor Analyses for the Financial Strain Index*

### Reliability and Validity

Cronbach's alpha test was used to test internal consistency reliability. The coefficient is .78, which is acceptable. The correlation test between the sum of financial strain items and anxiety was conducted to test content validity. Based on the conservation of resources (COR) theory, financial difficulties cause anxiety, leading to delinquent behavior (Hobfoll, 1998, as cited in Merolla, 2017). Consistent with this COR theory, financial strain and anxiety had a moderate level of correlation ( $r = .295$ ). Therefore, the financial strain index has reliability and validity.

### Confirmatory Factor Analysis (CFA)

Using the results of the EFA as a guide, 1,767 respondents were used to conduct one-factor CFA on the financial strain index. Similar to the EFA, the rotation strategy was Geomin

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which is an oblique rotation that was used. The six items of the financial strain index assessed in the EFA were included in the CFAs, and no items were deleted. The factor items loaded in the expected direction. Results testing the one-factor financial strain index in the CFA indicated an RMSEA of .078, less than the set .08 cutoff value, which is favorable. The CFI (.983) and TLI (.971) were above the .95 cutoff value indicating a positive result. However, the chi-square result was significant ( $\chi^2 = 105.828$ ,  $df = 9$ ,  $p < .001$ ), revealing that the model should be rejected to avoid possible bias (Kline, 2016).

Cabrera-Nguyen (2010) recommends assessing for an estimate of local areas of strain by reviewing standardized residuals. The benchmark used for comparing standardized residuals was 1.96 ( $p < .05$ ), as suggested by Harrington (2009). No localized strain was found in CFA standardized residuals. The unstandardized and standardized parameter estimates and standard errors for the factor loading are presented in Table 7. The p-values for all unstandardized and standardized parameter estimates were less than .001.

To assess the validity of the factor solution for the factor loadings, the convergent and discriminant validity reveals factor correlations ranging from .228 to .545 that, according to Garson (2010), indicate a range of weak ( $< .40$ ) to moderate ( $\geq .60$  are strong) factor loadings. However, no modification indices above the minimum value were found; thus, post-hoc adjustments to improve the model fit were not pursued (Cabrera-Nguyen, 2010).

Although the chi-square test of both CFAs was significant, indicating the model should be rejected according to Kline (2016). the other fit indices reveal that the factor loadings of the financial strain index models are a good fit for this sample ( $p < .001$ ), and no modifications were made to the CFAs.

**Table 7.**

*Standardized and Unstandardized Factor Loadings for Confirmatory Factor Analysis One-Factor Model of the Financial Strain Index*

Financial Strain Index item	Factor loading ( <i>SE</i> )	
	Standardized	Unstandardized
RST1A	.686*** (.018)	1.000*** (.000)
RST2A	.745*** (.014)	1.087*** (.034)
RST3A	-.444*** (.022)	-0.648*** (.035)
RST4A	.797*** (.013)	1.163*** (.035)
RST5A	-.633*** (.018)	-0.923*** (.035)
RST6A	.702*** (.017)	1.023*** (.036)

*Note.*  $N = 1,767$ . *SE* = Standard Error. \*\*\*  $p < .001$ .

## DISCUSSION

Throughout the literature, financial strain is operationalized and analyzed differently (Conger et al., 1994; French & Vigne, 2019; Hanratty et al., 2007; McLoyd et al., 1994; Pearlin et al., 1981; Vinokur & Price, 1996), leading to challenges assessing financial strain. Four

groups of researchers that included financial strain variables in their articles provide the foundation for the EFA conducted in this study – one conducting a PCA, two using SEMs, and one using a recursive path analysis estimated by ordinary least squares regression (Aldana & Liljenquist, 1998; Conger et al., 1992; Conger et al., 1994; McLoyd et al., 1994). Some researchers define and measure the construct of financial strain similarly to how it was defined and measured in the Three-City Study financial strain index. Further, the financial strain items from the McLoyd and associates (1994) study and Conger and colleagues (1994) study were combined to create the financial strain index (Levine & Chase-Lansdale, 2000). Together, these studies indicate two factors of financial strain for the financial strain index; hence we hypothesized that the EFA would result in two factors.

This study presents the results of an EFA on the financial strain index using data from the Three-City Study. This study is one of the few to examine the factor structure of the Three-City Study financial strain index. Results are promising but should be interpreted and applied with caution. The EFA with one factor yielded a good fit based on all fit indices except for the chi-square significance test. The two-factor EFA results are also significant for the chi-square test. However, the one-factor model is a better fit for the data and is retained. The results of the EFA are a vital step towards identifying the factor structure of the financial strain index.

The sample was limited to predominantly African American (43%) or Hispanic (47%) female caregivers. Most (72%) lived in private housing, and more than 42% reported income below FPL. All respondents lived in urban areas (Boston (36%), Chicago (35%), and San Antonio (30%)), and the majority (65%) reported having a partner at some point in their life. Considering the context of the demographic profile of respondents, we suggest financial therapy practitioners use the financial strain index as a one-factor measurement tool when assessing the level of financial strain with clients who have a demographic profile similar to those included in this study's sample.

## **Limitations**

As mentioned in the literature review, an EFA was not previously conducted on the financial strain index. However, prior studies provide the background knowledge and understanding of how the financial strain index was created. These previous studies are the foundation for the EFA results we found. We hope this study increases interest and further exploration of the financial strain index among researchers. The results of this study are not generalizable because the sample was limited to female caregivers. Future research could include a more diverse sample of respondents.

## **Future Directions and Implications**

The Three-City Study financial strain index could be used with a different sample. An EFA was conducted to determine whether or not the factor structure results found in this study hold across different samples from different populations. Future analyses on the factor structure of the financial strain index could move researchers towards a more common measure and operationalization of the financial strain construct. A common measure of



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financial strain could be used to assess an individual's financial strain over the life course and its impact on health. Specifically, higher levels of financial strain may lead to poorer health outcomes, including the development of chronic diseases, such as cardiovascular disease and diabetes, worse mental health status, and premature death (Georgiades et al., 2009; Matthews et al., 2002; Puterman et al., 2012; Szanton et al., 2008). The financial strain index was developed to measure an individual's perception of their lack of ability to meet current financial needs (Hamby et al., 2011). Financial therapists can use the financial strain index as a one-factor assessment to measure a client's level of anxiety with personal finances and explore the consequences of the connection between anxiety and finances. For example, clients may experience negative health and behavior consequences stemming from anxiety about personal finances.

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### **Appendix A**

#### *Financial Strain Survey*

Measure	Item
Education <sup>a</sup>	I know how interest works on my current debts I feel financially educated I feel well informed about financial matters
Relationships <sup>a</sup>	There are disagreements about money in my home I tend to argue with others about money Financial problems hurt my relationships My relationship with others are affected by my financial problems
Physical <sup>a</sup>	Are you ever unable to sleep well because of financial worries? Do you ever get headaches from worry over money matters? Do your muscles get tense when you add up your bills? Does your financial situation cause you to feel heartburn or an upset stomach?
Credit card use <sup>a</sup>	I take on more debt to get nicer things I get new credit cards to pay off old ones I make purchases on credit cards hoping that I will have the money later
Meet obligations <sup>a</sup>	I pay my bills on time I find it difficult to pay my bills Many of my bills are past due I don't have enough money to pay my bills

*Note.* The reference for the Financial Strain Survey is Aldana, S. G., & Liljenquist, W. (1998). Validity and reliability of a financial strain survey. *Financial Counseling and Planning*, 9(2), 11-18. <https://www.afcpe.org/wp-content/uploads/2018/10/vol922.pdf>

<sup>a</sup>1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always.