APR Financial Stress Scale: Development and Validation of a Multidimensional Measurement

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People usually experience financial stress in managing their financial resources. Despite financial stress' importance in life outcomes and the need for a comprehensive and theory-based measurement of the construct, few studies have addressed the conceptual issues of financial stress and its measurement. Hence, by borrowing from theories of general stress, this study attempts to fill this gap. Using an expert panel and two separate online survey samples, we developed and validated a novel financial stress scale. A total of 688 responses were used in an exploratory factor analysis and 1,115 responses were used in a confirmatory factor analysis. This multidimensional financial stress scale consists of 24 items and represents affective (A), physiological (P), and relational (R) aspects of financial stress. Researchers and practitioners can use this scale to understand the complex nature of financial stress and tailor their intervention efforts accordingly.

Keywords: stress; financial stress; scale development; measurement; money management

INTRODUCTION

According to the American Psychological Association (APA, 2010), nearly three-quarters of Americans experience anxiety because of money management issues. Financial stress and related constructs (i.e., financial anxiety and worry, money worries) have been shown to have a significant influence on a person's quality of life (Kamberi, Martinovic, & Verkuyten, 2015; Yeung & Xu, 2012) and general life satisfaction (Kahn & Pearlin, 2006; Northern, O'Brien, & Goetz, 2010; Park, Heo, Ruiz-Menjivar, & Grable, 2017). Further, their close relation with psychological factors, such as depressive symptoms or negative affect, has also been reported (Chou, Chi, & Chow, 2004; Ennis, Hobfoll, & Schröder, 2000; O'Neill, Prawitz, Sorhaindo, Kim, & Garman, 2006; Skinner, Zautra, & Reich., 2004).

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Because of scholars' and practitioners' growing interest in financial stress, these effects have been documented well throughout the population. In the college student population, financial stress has been associated with several outcomes, ranging from academic performance (Joo, Durband, & Grable, 2008), attrition (Borden, Lee., Serido, & Collins, 2008), and general health together with wellbeing (Northern et al., 2016). Further, financial stress has been associated with work and/or academic performance among young adults (Gutman & Eccles, 1999; Guo, Wang, & Johnson, 2011; Roberts et al., 2000), while workers' financial worries and stress that derive from money issues are sometimes manifested as direct health symptoms, such as headaches, backaches, ulcers, and/or high blood pressure (Choi, 2009). Indirectly, money issues have been attributed previously to employee (dis)engagement and performance, turnover, productivity, and healthcare costs.

Given the importance of financial stress, it is necessary to conceptualize this construct based on a theoretical framework and to lay the foundation for empirical testing. However, there have been few attempts to address financial stress' conceptual issues and its measurement, despite its implications (Sinclair & Cheung, 2015). Therefore, the purpose of this research is to define theory-based financial stress and create a psychometric tool to capture its multidimensional aspects. This research has particular implications for the field of financial therapy, an intersection between personal finance and counseling, as a better understanding of the complex nature of financial stress can lead to more tailored and effective interventions.

LITERATURE REVIEW

The response to a financially stressful situation can assume many forms: emotional, relational, physiological, or a combination of these (Grable, Heo, & Rabbani, 2014), as theories of general stress have supported (Everly & Sobelman, 1987; Sapolsky, 1994). However, existing research on financial stress often focuses on its definition and measurement on one (psychological) or two (objective and subjective) constructs. For example, financial stress has been conceptualized as the subjective perception of one's personal finances (Kim, Garman, & Sorhaindo, 2003) or inability to meet one's economic responsibilities (Northern et al., 2010). Similarly, financial distress has been defined as feelings about, and reactions to, one's financial condition (Kim & Garman, 2003; Prawitz, Garman, Sorhaindo, O'Neill, Kim, & Drentea, 2006). Voydanoff (1984) coined the term "economic distress" as a combination of economic deprivation and economic strain. Other definitions can be found, such as stressful situations in financial management (Sumarwan & Hira, 1992), dissatisfaction with financial wellbeing (Garman, Kim, Kratzer, Brunson, & Joo, 1999), and money worries (Starrin, Åslund, & Nilsson, 2009).

Prawitz and colleagues (2006) developed a measurement for assessing affective financial distress with eight items on a 10-point Likert scale. The scale includes such items as, "What do you feel is the level of your financial stress today?" and "How often do you worry about being able to meet normal monthly living expenses?" Another concept used widely is financial anxiety, defined as an anxious attitude toward managing one's personal finances effectively (Shapiro & Burchell, 2012), or general symptoms of anxiety associated with one's financial situation (Archuleta, Britt, Tonn, & Grable, 2011;

Archuleta, Dale, & Spann, 2013). Archuleta et al.'s (2011) FAS scale rates the respondents' reaction to seven items measured on a 7-point Likert scale, including: "I feel anxious about my financial situation" and "I have difficulty sleeping because of my financial situation." Shapiro and Burchell's (2012) measurement of financial anxiety contains ten items measured on a 4-point Likert scale, including: "Thinking about my personal finances can make me feel guilty" and "I find opening my bank statements unpleasant."

In this study, financial stress is proposed to encompass three aspects: (a) affective; (b) relational; and (c) physiological. The affective perspective emphasizes the role stressors play in shaping the way people feel about their current financial situation. The relational perspective examines the effect of stress on cognitive and behavioral phenomena within a social context, while the physiological perspective focuses on the way in which the human body reacts (i.e., stress phenomena) when coping with stressors. This is one of the first attempts to combine these three perspectives into a single framework with respect to financial stress.

THEORETICAL BACKGROUND

The Origins and Extension of the Definition of Stress

Selye (1936, 1956) was one of the first researchers to define stress as a physiological state. Initially, he defined stress as the body's nonspecific neuroendocrine response to an external stressor (i.e., a stimulus that triggers a physiological response). The term neuroendocrine was dropped from the definition later because other systems also play a role in a person's stress response. In his first studies, Selye did not distinguish between stressors and strain, and referred to both cause and effect as "stress." This definitional paradigm remained unchanged until the late 1960s, when, after subsequent research, Selye began to distinguish the two.

In addition to physical and chemical stressors, researchers in a broad range of social science contexts began to identify others. For example, adverse life events, such as the death of a household member, are now considered stressors, and economic constraints can also be considered stressors (Selye 1936, 1956). Today, researchers in a variety of disciplines use the broader definition of stressors that includes social and behavioral sources. Based on this framework, it is reasonable to hypothesize that stress that results from one or more stressors is not only a feeling, but a physiological response as well. In short, the stress response is a combination of emotional and physiological reactions.

A Comprehensive Definition of Stress

Stress can be divided into two stages—stressors and strain—and researchers have identified and defined each element over the years. Some have defined stress as synonymous with a particular stressor. For example, in some economic literature, economic constraints are considered to be equivalent to stress. If a person is struggling with economic hardship, the situation is considered to be a trigger that results in "stress." Other researchers have stated that stress and strain are equivalent. For example, the

reaction to the status of one's personal financial situation is considered the same as financial stress occasionally.

However, there is a more comprehensive definition of stress (Butler, 1993). Specifically, stress can be defined as the combination of stressors and strain, an approach that robust models of stress have supported. For instance, the transactional stress model emphasizes the relation between the person and his/her environment (Lazarus & Folkman, 1984). This stress model was used originally to focus on cognitive appraisals in a specific stressful situation. The theory implies that a specific stressful environment includes stressors (events) and consequent strain (outcomes).

As described earlier, there is a specific problem in linking coping responses to individuals and households, although it may be possible to adopt a comprehensive definitional framework to evaluate stress reactions. Specifically, financial stress is a phenomenon in which a particular environment (e.g., financial constraint) causes a person's individual response. This relation is established well in the medical, psychosocial, and mental health fields. However, surprisingly little empirical work has been conducted to examine household-level financial stressors and strain.

Definition of Financial Stress

Adopting a comprehensive definition to conceptualize financial stress is a new line of study, although the family financial management literature has provided several operational hypotheses over the years (e.g., Garman et al., 1999; Kim & Garman, 2003; Kim et al., 2003; Northern et al., 2010; Prawitz et al., 2006; Sumarwan & Hira, 1992). Consider a typical situation in which one or more family members engage in problematic financial behavior. This behavior can elicit a stress-induced response on the part of another member, including imbalance, uncertainty, and the perception of risk. The problem manifests as relationship outcomes, such as family conflict and problematic communication (Hubler, Burr, Gardner, Larzelere, & Busby, 2015). Problematic behavior can cause someone who desires to reach a specific financial goal to realize that the goal is unattainable. This can prompt a stress reaction, or what is thought of as a financial stress imbalance. Another example is the case in which a person has a positive net worth, yet fails to plan for the future. As a result, the person may live with financial uncertainty every day and experience chronic stress. Another individual may exhibit symptoms of stress because they are unable to identify and manage risk, which can result in suboptimal financial decisions (e.g., failing to purchase adequate life insurance). These stress-induced reactions are interpreted according to the three perspectives explained in the introduction: psychological, physiological, and social relationships.

In summary, this study proposes the following definition of financial stress: Financial stress is a psychophysiological response to the perception of imbalance, uncertainty, and risk in the realm of financial resource management and decision making. As Selye (1956) maintained, a psychophysiological response should be denoted as a measurable response of stress. In addition, financial stress stems from the possible mismanagement of financial resources at the household level.

MEASURES: DEVELOPMENT OF CONSTRUCTS

We developed a measurement scale based on a three-dimensional conceptual framework of financial stress: (a) affective reactions; (b) relational/interpersonal behavior, and (c) physiological responses. Stress symptoms manifest as two responses, emotional and physiological (APA, 2017a), and are related robustly (Smith & Ascough, 2016). Smith and Ascough explained that emotional responses can be divided into two elements: introversion and extroversion. The former is an innate action, such as exhibiting surprise and crying, and the latter is a cultural display rule, including the common "fight or flight" response. Therefore, it is conceivable that an introverted response represents an affective domain, while an extroverted response constitutes a(n) relational/interpersonal or social domain. Taken together, financial stress can be measured using these three dimensions.

With respect to affective reactions, three subcategories can be used to measure financial stress. According to Barlow et al. (2014), problematic responses include depression, anxiety, and anger. Typically, anger results in the consumption of energy, which is associated with emotional exhaustion. Thus, the measurement of an affective reaction can be assessed according to three subcategories: (a) depression, (b) anxiety, and (c) emotional exhaustion.

The relational response can be assessed in two domains: Work-related and non-work-related relational/interpersonal behavior. Because maintaining social relationships often requires financial effort, financial issues may be the cause of disrupted social interaction. In the work setting, intentional avoidance of any social interaction with colleagues or co-workers may denote signs of financial stress. Similarly, financial stress can manifest itself in difficulty or lack of discussion about money matters within relationships.

A biophysiological response constitutes physical evidence of financial stress (Everly & Sobelman, 1987). Regardless of a person's conscious awareness, biophysiological responses manifest throughout the body and are generally evaluated using six systemic responses: musculoskeletal, respiratory, cardiovascular, endocrine, gastrointestinal, and nervous system responses (APA, 2017b). Based on these biophysiological systemic responses, questions about biophysiological responses can be evaluated using two methodologies: physiological and sensory responses.

In summary, the three perspectives on financial stress are associated with the three constructs of financial stress, as shown in Figure 1 below, in which each construct includes sub-constructs that measure the different dimensions of financial stress.

Figure 1

The Linkage between Conceptual Framework and the Constructs
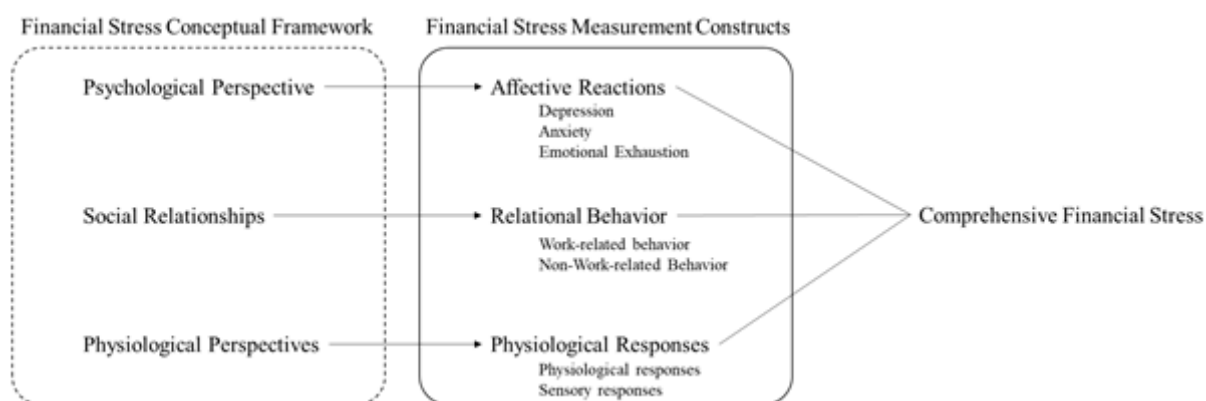
METHODS

Procedure and Samples

This study used a psychometric method to develop a new, comprehensive financial stress measurement. The procedure included four stages: (a) creating the first draft of survey questions based on the definition of financial stress suggested; (b) soliciting reviews from a panel of experts to refine and validate the survey items; (c) executing an exploratory survey to check the reliability and finalize the scale; and (d) administering the confirmatory survey to evaluate the new scale's reliability and construct validity.

Initial questions and professional review. Based on the measurement developed above, 42 items were created and incorporated into the first draft of the survey (see Appendix A). To assess content validity, the 42 items were sent to a panel of three professionals in the financial therapy and financial planning fields. All three hold doctoral degrees in the fields of financial planning, financial therapy, and consumer economics, respectively, and have over 20 years of academic or professional experience. Two were men and one was a woman.

The panel was asked to evaluate each survey item based on four criteria: (a) accurate question to assess financial stress; (b) related strongly with the sub-section (e.g., affective reaction, relational behavior, and physiological responses); (c) easy to understand; and (d) non-duplicate of another question. In addition to these four criteria, they were asked to offer additional suggestions to revise the items. Based on the panel's review, the questions were rephrased and one item was eliminated (see Appendix B).

Exploratory Factor Analysis

After the professional review of the initial questions, an exploratory factor analysis was conducted to evaluate their reliability and validity. The 41-item questionnaire used responses measured on a 5-point Likert scale that ranged from 1=*Strongly Disagree* to 5=*Strongly Agree*.

An online survey company administered the questionnaire to 1,102 adults in May 2017. Among the 1,102 initial respondents, 688 participants (62.43%) answered all survey questions required, including the 41 items. The respondents were selected randomly across the United States and their ages ranged from 19 to 83. MPLUS v. 8.0 was used to perform the exploratory factor analysis. Five different factor models (i.e., from the 1-factor solution to the 5-factor solution) were fitted to the data. The GEOMIN, which is an oblique rotation method, was used for the rotation. The weighted least square mean and variance (WLSMV) was used to estimate the parameters because it is recommended for categorical data. To evaluate the factor structure, a scree plot, eigenvalues, model fits (e.g., RMSEA, CFI, TLI, and SRMR), and factor loading patterns were evaluated. The results of the exploratory factor analysis were used to select the best items from the initial 41-item pool.

Confirmatory Factor Analysis

Following the explanatory factor analysis, we conducted a confirmatory factor analysis using a new sample (n = 1,115). To collect the data, a new online survey was sent to 2,945 adults who were selected randomly in July 2017. Among them, 1,158 participants (39.32%) answered all of the survey questions required, including the financial stress items and socio-demographic questions. Table 1 shows the socio-demographic characteristics of the 1,158 respondents from the confirmatory survey. The respondents' average age was 32.78 and the majority (63.52%) were employed (i.e., full-time, part-time, and self-employed). Approximately half of the respondents (52.75%) had an income between $35,000 and $100,000, and most had at least a college education (77.36%).

Table 1

Socio-demographic Characteristics of Respondents to the Confirmatory Survey

	M	(SD)	n	(%)
Age	32.78	(15.37)		
Number of Children	.95	(1.58)		
Income				
<$15,000			112	(9.64)
$15,001-$25,000			105	(9.04)
$25,001-$35,000			139	(11.96)
$35,001-$50,000			207	(17.81)
$50,001-$75,000			246	(21.17)
$75,001-$100,000			160	(13.77)
$100,001-$150,000			137	(11.79)
$>150,001			56	(4.82)
Work Status				
Full-time			554	(47.68)
Part-time			110	(9.47)
Self-employed			74	(6.37)
Homemaker			117	(10.07)
Full-time student			25	(2.15)
Not working			282	(24.27)
Gender				
Male			366	(31.50)
Female			796	(68.50)
Marital Status				
Married			674	(58.00)
Single			488	(42.00)
Education				
<High School			31	(2.67)
High School			232	(19.97)
Some College			334	(28.74)
College Grad.			421	(36.23)
Post Graduate			144	(12.39)

To confirm the selected items' validity, the study used two analytic processes with the data from the confirmatory survey: confirmatory factor analysis and correlations with existing psychological scales. Again, MPLUS v. 8.0 was used for the analyses.

First, the three-factor confirmatory and higher-order confirmatory factor analyses were examined. As explained in the theoretical background section, financial stress was defined according to three dimensions: (a) affective reactions; (b) relational behavior; and (c) physiological responses. However, it was not confirmed whether the three dimensions constitute one element of financial stress or whether they should be considered independent sub-factors when assessing financial stress. Therefore, two types of confirmatory factor analyses were performed and compared: a three-factor

confirmatory factor analysis and higher-order confirmatory factor analysis. The Schmid-Leiman (S-L) Model was employed for the higher-order confirmatory factor analysis to evaluate the factor loadings of the higher-order factor (Schmid & Leiman, 1957; Wolff & Preising, 2005).

Second, correlations between existing psychological scales and the financial stress scale were examined to confirm their construct validity. As explained in the literature, financial stress is known to be associated with several psychological constructs: (a) depressive symptoms or negative affect; (b) financial anxiety; (c) job insecurity; (d) life satisfaction, and (e) financial well-being. Therefore, to assess the scale's content validity, the correlations included the following five constructs: (a) five questions that measure negative affect from the PANAS scales (Watson, Clark, & Tellegen, 1988); (b) seven questions from the Financial Anxiety Scale (FAS) (Archuleta et al., 2013); (c) seven questions related to job insecurity (Hellgren, Sverke, & Isaksson, 1999); (d) five life satisfaction questions (Diener, Emmons, Larsen, & Griffin, 1985), and (e) ten questions from the Consumer Financial Protection Bureau (2015) that measure Financial Well-Being. Details of the questions are shown in Appendix C.

RESULTS

Exploratory Factor Analysis

As shown in the scree plot (Figure 2), the three-factor solution was supported, and after which the decrement became very minimal. The eigenvalues also supported the three-factor solution: eigenvalues of the first factor (26.80), second factor (3.06), and third factor (1.24). However, the fourth factor's eigenvalue was slightly less than the criterion of 1.0 and provided a very minimal incremental contribution to the total variance. We found that the three factors accounted for 75.86% of the total variance. Based on these findings, the three-factor solution appeared to be the most optimal and parsimonious. Next, the model fits across the five different factor solutions that were examined (see Table 2). Although the model fits improved as the number of factors increased, the three-factor model solution yielded a satisfactory model fit (CFI = 0.97, TLI = 0.96, RMSEA = 0.09, SRMR = 0.03).

Table 2

Model Fits: Up to Five-Factors Solutions

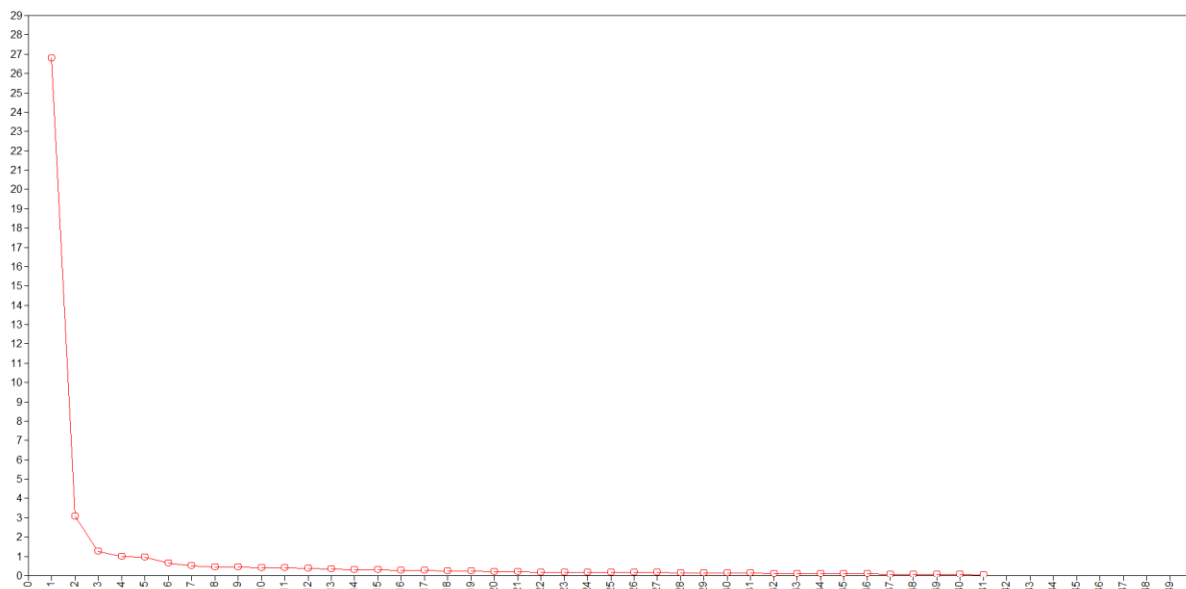|	CFI	TIL	RMSEA	SRMR
1-Factor	0.913	0.908	0.131	0.091
2-Factor	0.95	0.945	0.102	0.04
3-Factor	**0.965**	**0.959**	**0.088**	**0.034**
4-Factor	0.973	0.966	0.079	0.028
5-Factor	0.982	0.976	0.067	0.021

Figure 2

The Scree Plot of EFA Analysis

Table 3 reports the factor loadings after items with low factor loadings and cross-loadings were removed from the EFA analysis, which supported the three-factor model with 24 items. The first eight items loaded strongly on the first factor (i.e., Affective Reaction), which ranged from 0.54 to 0.81. The next eight items loaded strongly on the second factor (i.e., Relational Behavior), except for the second item (i.e., "I frequently pass on social events at work due to my financial situation"). The second item loaded relatively weakly on the second factor compared to other items (e.g., 0.27 for the first factor, 0.47 for the second, 0.15 for the third). However, it remained in the Relational Behavior factor because it exceeded our criterion of a 0.40 factor loading. The factor loadings ranged from 0.47 to 1.04. Finally, the last eight items strongly loaded on the third factor (i.e., Physiological Response). The factor loadings ranged from 0.67 to 0.93, which supported our theoretical taxonomy (see Figure 1). The GEOMIN factor correlations were 0.57 (between factors 1 and 2), 0.46 (between factors 1 and 3), and 0.83 (between factors 2 and 3).

Table 3

The Rotated Factor Loadings of EFA analysis (n = 688)

Category	Item	AR	RB	PR
Affective Reaction (AR)	1. I feel depressed because of my financial situation.	**.717***	.269*	-.038
	2. I feel sad because of my financial situation.	**.763***	.268*	-.057
	3. I am fearful because of my financial situation.	**.697***	.114*	.170*
	4. I feel anxious because of my financial situation.	**.799***	-.035	.237*
	5. I worry a lot because of my financial situation.	**.813***	-.009	.195*
	6. I am easily irritated because of my financial situation.	**.544***	.120*	.359*
	7. I feel emotionally drained because of my financial situation.	**.641***	.040	.411*
	8. I feel frustrated because of my financial situation.	**.791***	-.107*	.334*
Relational/ Interpersonal Behavior (RB)	1. My financial situation interferes with my daily job performance.	.065	**.591***	.272*
	2. I frequently pass on social events at work due to my financial situation.	.274*	**.474***	.153*
	3. I often get into trouble at work because of my financial situation.	-.327	**1.086***	-.001
	4. My financial situation frequently interferes with my relationship with co-workers/colleagues.	-.290*	**1.035***	.016
	5. I often argue with my spouse/significant other because of financial matters.	.027	**.947***	-.199*
	6. I find it difficult to talk about money with my spouse/significant other.	-.020	**.963***	-.189*
	7. I frequently avoid attending family events because of my financial situation.	.169*	**.754***	-.008
	8. My financial situation frequently interferes with my family relationship.	.160*	**.763***	.018
Physiological Responses (PR)	1. I have stomach aches frequently because of my financial situation.	.150*	.033	**.772***
	2. My heartbeat increases because of my financial situation.	.212*	-.040	**.787***
	3. I feel cold because of my financial situation.	-.001	.161*	**.749***
	4. I have more sweat because of my financial situation.	-.047	.024	**.934***
	5. I have more frequent muscle pain because of my financial situation.	.051	.002	**.864***
	6. I have fatigue frequently because of my financial situation.	.375*	-.025	**.681***
	7. I am sensitive to noise because of my financial situation.	.033	.020	**.823***
	8. I find flaws/cracks/chips of general objects more frequently than before because of my financial situation.	-.060*	.220*	**.671***

Note. * $p < .05$. ** $p < .01$ *** $p < .001$. AR = affective reaction; RB = relational/interpersonal behavior; PR = physiological responses. Rotation is GEOMIN rotation by using MPLUS 8.0.

Internal consistency reliability. In addition, each dimension's reliability was evaluated. The Cronbach's Alpha values for affective reaction, relational behavior, and physiological responses were 0.95, 0.91, and 0.94, respectively. Therefore, the items in each category showed high reliability.

Confirmatory Factor Analysis (CFA)

Table 4 shows the model fit results from both the three-factor confirmatory and higher-order confirmatory factor analyses based on the criteria that are generally accepted in academic reports (Kline, 2011). Further, the factor loadings of the three-factor CFA solution are reported in Table 5 and the factor structure matrix in Table 6. The factor correlations of the three-factor CFA model were 0.73 (factors 1 and 2), 0.72 (factors 1 and 3), and 0.89 (factors 2 and 3). Although the higher-order CFA model fit slightly better than did the three-factors CFA model (i.e., CFI = 0.91, TLI = 0.90, RMSEA = 0.10, SRMR = 0.06 in CFA; CFI = 0.91, TLI = 0.90, RMSEA = 0.08. SRMR = 0.06 in the higher-order CFA model), high factor correlations among the CFA model's factors favored the higher-order factor structure strongly, which accounted for the information shared among the first-order factors.

Table 4

Model Fits of Confirmatory Factor Analysis and Higher-order Confirmatory Factor Analysis

	Chi-square	SRMR	CFI	TLI	RMSEA
CFA	2913.34 ***	.060	.909	.900	.096
Higher-order CFA	1,862.6 * 9	.058	.911	.901	.075

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. CFA = confirmatory factor analysis; SRMR = standardized root mean of residual; CFI = comparative fit index; TLI = Tucker-Lewis index; and RMSEA = root-mean-square error of approximation.

Table 5

Standardized Factor Loadings of Confirmatory Factor Analysis

Category	Item	Loadings
Affective Reaction (AR)	1. I feel depressed because of my financial situation.	0.871
	2. I feel sad because of my financial situation.	0.880
	3. I am fearful because of my financial situation.	0.865
	4. I feel anxious because of my financial situation.	0.885
	5. I worry a lot because of my financial situation.	0.903
	6. I am easily irritated because of my financial situation.	0.852
	7. I feel emotionally drained because of my financial situation.	0.895
	8. I feel frustrated because of my financial situation.	0.909
Relational/ Interpersonal Behavior (RB)	1. My financial situation interferes with my daily job performance.	0.812
	2. I frequently pass on social events at work due to my financial situation.	0.742
	3. I often get into trouble at work because of my financial situation.	0.759
	4. My financial situation frequently interferes with my relationship with co-workers/colleagues.	0.811
	5. I often argue with my spouse/significant other because of financial matters.	0.704
	6. I find it difficult to talk about money with my spouse/significant other.	0.712
	7. I frequently avoid attending family events because of my financial situation.	0.840
	8. My financial situation frequently interferes with my family relationship.	0.859
Physiological Responses (PR)	1. I have stomach aches frequently because of my financial situation.	0.857
	2. My heartbeat increases because of my financial situation.	0.865
	3. I feel cold because of my financial situation.	0.872
	4. I have more sweat because of my financial situation.	0.883
	5. I have more frequent muscle pain because of my financial situation.	0.882
	6. I have fatigue frequently because of my financial situation.	0.813
	7. I am sensitive to noise because of my financial situation.	0.828
	8. I find flaws/cracks/chips of general objects more frequently than before because of my financial situation.	0.821

Table 6

Factor Structure Matrix

| Category	Item	AR	RB	PR
Affective Reaction (AR)	1. I feel depressed because of my financial situation.	0.853	0.647	0.515
	2. I feel sad because of my financial situation.	0.890	0.656	0.516
	3. I am fearful because of my financial situation.	0.840	0.653	0.585
	4. I feel anxious because of my financial situation.	0.888	0.619	0.576
	5. I worry a lot because of my financial situation.	0.898	0.617	0.562
	6. I am easily irritated because of my financial situation.	0.777	0.728	0.708
	7. I feel emotionally drained because of my financial situation.	0.853	0.748	0.739
	8. I feel frustrated because of my financial situation.	0.884	0.622	0.609
Relational/ Interpersonal Behavior (RB)	1. My financial situation interferes with my daily job performance.	0.528	0.854	0.793
	2. I frequently pass on social events at work due to my financial situation.	0.615	0.758	0.673
	3. I often get into trouble at work because of my financial situation.	0.293	0.899	0.751
	4. My financial situation frequently interferes with my relationship with co-workers/colleagues.	0.309	0.883	0.742
	5. I often argue with my spouse/significant other because of financial matters.	0.476	0.797	0.600
	6. I find it difficult to talk about money with my spouse/significant other.	0.443	0.795	0.602
	7. I frequently avoid attending family events because of my financial situation.	0.596	0.844	0.696
	8. My financial situation frequently interferes with my family relationship.	0.604	0.869	0.726
Physiological Responses (PR)	1. I have stomach aches frequently because of my financial situation.	0.524	0.76	0.868
	2. My heartbeat increases because of my financial situation.	0.551	0.735	0.851
	3. I feel cold because of my financial situation.	0.435	0.782	0.882
	4. I have more sweat because of my financial situation.	0.397	0.773	0.933
	5. I have more frequent muscle pain because of my financial situation.	0.450	0.749	0.889
	6. I have fatigue frequently because of my financial situation.	0.674	0.755	0.833
	7. I am sensitive to noise because of my financial situation.	0.423	0.722	0.855
	8. I find flaws/cracks/chips of general objects more frequently than before because of my financial situation.	0.375	0.743	0.826

Figure 3 shows the results of the higher-order confirmatory factor analysis using three dimensions of the 24 items. In the higher-order factor model, the second-order general factor accounted for the correlations among the first-order factors, such that the non-first-order factors were uncorrelated. Items that loaded directly on the first-order

factors loaded on the second-order general factor. The factors were identified by setting the variances equal to 1 so that all loadings could be estimated. Whenever a higher-order factor analysis is performed, the S-L transformation can be applied to obtain additional insights into the association between factors and items (Wolff & Preising, 2005). The S-L transformation allows us to evaluate not only the higher-order factors' direct effect on individual items (hence, the proportion of the item variance for which the higher-order factor accounts), but also each first-order factor's unique contribution (Loehlin, 2004). As the S-L is based on the higher-order factor (g) analysis, it was necessary to calculate the higher-order factor analysis in the first step. The results from the higher-order factor analysis are then used to calculate the S-L in a second step. The total effects of g on each item are the sum of the direct and indirect effects. Because there are no direct paths from g to the items in the higher-order model, the direct effects are all zero. The indirect effects of g are found by multiplying the second-order factor loading and first-order factor loadings. "The S-L transformation treats the first-order factor as residualized factors; that is, second-order factors explain as much variance as possible, and the variance in the indicators that cannot be accounted for by second-order factors is ascribed to the first-order factors" (Brown, 2015, p. 299). Thus, the S-L model had direct paths from the general factor (g) to the items, while the higher-order model did not. The S-L representation showed clearly how much variance in the indicators the general and specific factors explained.

Figure 3 shows the factor loadings of the first-order factors and the higher-order factor, and Table 7 shows each item's S-L transformed parameters. The results show clearly that the higher-order factor accounted for a substantial amount of the total variance after the first-order was residualized (e.g., 0.67 to 0.86). Accordingly, the higher-order factors explained 67% to 86% of each item's total variance after the first-order factors were controlled. Hence, the data collected demonstrated that the three-dimensional sub-factors loaded onto a single higher-order factor (i.e., the financial stress construct). As a result, the data provided empirical support for the conceptual framework of a three-dimensional understanding of financial stress with a higher-order factor.

Figure 3

Higher-order Confirmatory Factor Analysis for Financial Stress
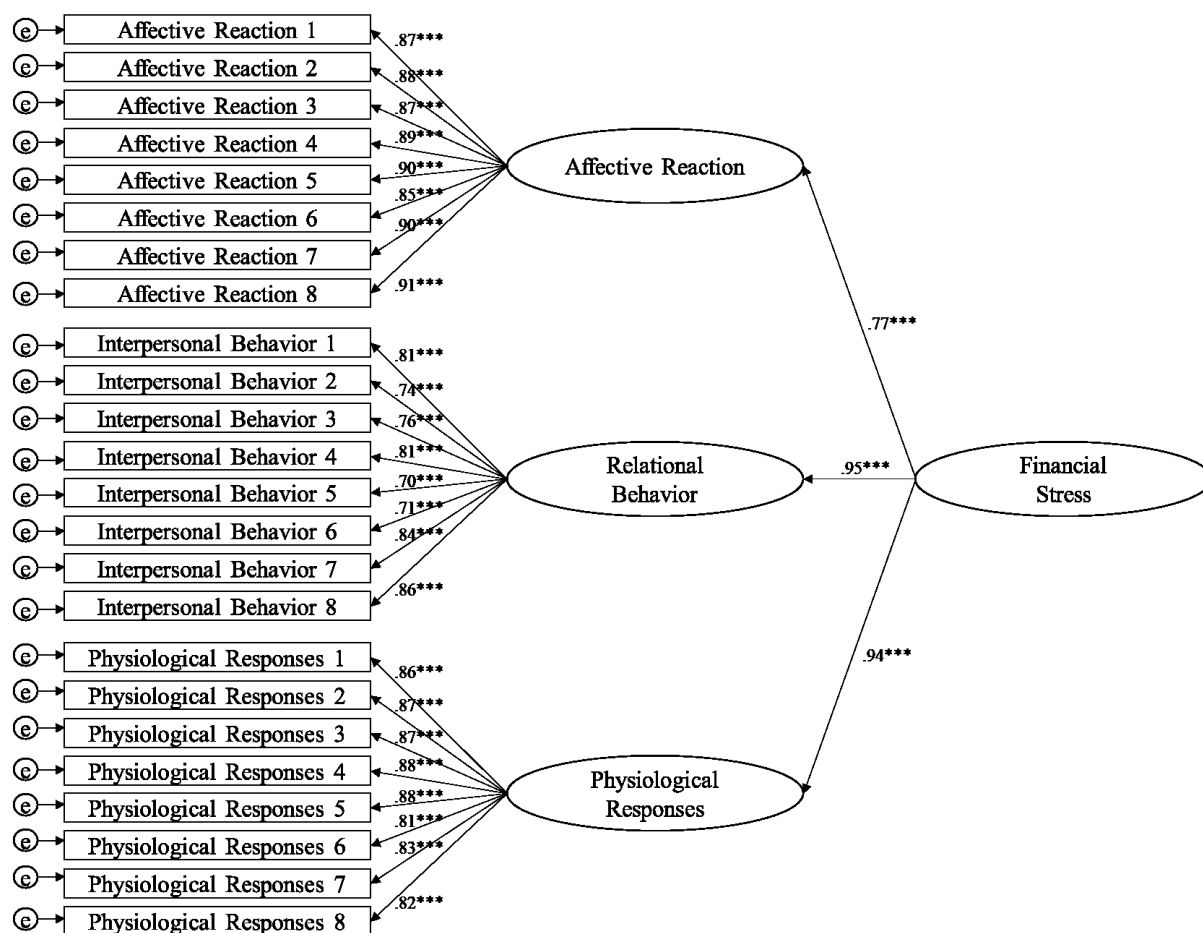
Criterion-related validity

Based on the previous literature and theories, the following related scales were included in the confirmatory survey: (a) depressive symptoms or negative affect; (b) financial anxiety; (c) job insecurity; (d) life satisfaction; and (e) financial well-being. The first three characteristics were expected to be correlated positively with financial stress, and the last two were expected to demonstrate a negative correlation with financial stress. As shown in Table 8, the correlations between the financial stress scale and the criteria indicated significant associations. In addition, the directions of all coefficients were consistent with those suggested in the previous literature and stress theories (e.g., Archuleta et al., 2011; Archuleta et al., 2013; Chou et al., 2004; Ennis et al., 2000; Kahn &

Pearlin, 2006; Northern et al., 2010; O'Neill et al., 2006; Park et al., 2017; Skinner et al., 2004; Weller, 2012; Zimmerman, 1995).

Table 7

Standardized Factor Loadings for Schmid-Leiman Parameterization

	First-order Loading			Higher-order Loading			Schmid-Leiman Parameterization ("g")
	AR	RB	PB	AR	RB	PB	
AR 1	.87			.77			.67
AR 2	.88			.77			.68
AR 3	.87			.77			.66
AR 4	.89			.77			.68
AR 5	.90			.77			.69
AR 6	.85			.77			.65
AR 7	.90			.77			.69
RB 1		.91			.95		.86
RB 2		.81			.95		.77
RB 3		.74			.95		.70
RB 4		.76			.95		.72
RB 5		.81			.95		.77
RB 6		.70			.95		.67
RB 7		.71			.95		.68
RB 8		.84			.95		.80
PR 1			.86			.94	.82
PR 2			.86			.94	.80
PR 3			.87			.94	.81
PR 4			.87			.94	.82
PR 5			.88			.94	.83
PR 6			.88			.94	.82
PR 7			.81			.94	.76
PR 8			.83			.94	.77

Note. AR = affective reaction; RB = relational/interpersonal behavior; and PR= physiological responses.

Table 8

Correlations between Scores on the Financial Stress Scale and Relevant Criteria

	FS	NA	FA	JI	LS	FWB
FS	α: .97					
NA	.71***	α: .93				
FA	.86***	.74***	α: .95			
JI	.36***	.39***	.39***	α: .76		
LS	-.28***	-.29***	-.35***	-.38***	α: .91	
FWB	-.51***	-.40***	-.58***	-.38***	.51***	α: .87
M	62.36	11.01	19.29	18.90	21.82	29.63
SD	24.09	5.74	8.12	4.94	7.59	7.03

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. FS = financial stress scale; NA = negative affect; FA = financial anxiety; JI = job insecurity; LS = life satisfaction; and FWB = financial well-being. α shows the Chronbach Alpha for reliability of each scale.

CONCLUSION

This study contributes to the field of psychological assessment in three ways. First, it advances previous attempts to define and measure financial stress with a single dimension. As Grable and colleagues (2014) noted, economic and financial behaviors can be explained more thoroughly if behavioral, cognitive, and physiological characteristics are combined. To capture the comprehensive nature of financial stress, three dimensions were proposed: affective, relational, and physiological. This new definition and measurement scale may be useful to understand further the way financial stress manifests in various ways.

Secondly, this new multidimensional measure of financial stress can be beneficial for the financial services industry, specifically for financial therapists. As explained earlier, financial stress extends beyond simple emotional worry about money. It is a combined process of financial stressors and behavioral responses that include psychological and physiological reactions. The measurement that assesses the combined process is highly consistent with professionals' practices, as noted in the association's mission, "Financial therapists are equipped to help people reach their financial goals by thoughtfully addressing financial challenges, while at the same time, attending to the emotional, psychological, behavioral, and relational hurdles that are intertwined" (Financial Therapy Association, 2020). By understanding the complexity of financial stress, financial therapists can be better equipped with tools to assess the various elements of financial stress that their clients experience. An understanding of financial stress reactions, in turn, will allow financial therapists to devise more effective interventions they can tailor to their clients' stress responses.

Several limitations of the study should be noted. First, the two surveys were cross-sectional. External factors, such as job loss, poor health, or the macroeconomic situation, may influence one's level of financial stress dynamically. Therefore, future studies could explore time-variant responses on the scale using longitudinal data. Second, females (68.50%) and those with a higher education level were over-represented in the survey sample for the confirmatory analysis. For example, the total sample only included approximately 22% of those who graduated from high school or less. Given that women tend to report a higher level of anxiety than men, and that income and education are correlated highly, the lack of representativeness in our samples warrants caution in the interpretation. A further study that replicates this scale with a probability-based sample could enhance the ability to generalize our results.

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APPENDIX A

First Draft of Survey Items

The following items are the first 42 items that were hypothesized to measure financial stress. All questions should be answered on a five-point scale, with 1 = Strongly Disagree and 5 = Strongly Agree. After having professional reviewing (i.e., validity check) and exploratory survey (reliability and validity), questions in Table 1 (i.e., 24 items) are selected as final survey items for measuring the comprehensive financial stress.

Affective Reaction: Depression
1. I feel depressed because of my financial situation.
2. I feel hopeless because of my financial situation.
3. I feel sad because of my financial situation.
4. I feel less self-confident because of my financial situation.
5. I feel lonely because of my financial situation.
6. I lose interest in my daily activities because of my financial situation.

Affective Reaction: Anxiety
1. I am fearful because of my financial situation.
2. I feel anxious because of my financial situation.
3. I worry a lot because of my financial situation.
4. I am easily irritated because of my financial situation.
5. I have difficulty in concentrating my work because of my financial situation.
6. I feel nervous because of my financial situation.

Affective Reaction: Emotional Exhaustion
1. I feel emotionally drained because of my financial situation.
2. I feel burned out because of my financial situation.
3. I feel frustrated because of my financial situation.
4. I feel tired because of my financial situation.

Relational/Interpersonal behavior: Work related
1. My financial situation interferes with my daily job performance.
2. I frequently pass on social events at work due to my financial situation.
3. I often get into trouble at work because of my financial situation.
4. My financial situation frequently interferes with my relationship with co-workers/colleagues.

Relational/Interpersonal Behavior: Non-work related
1. I often argue with my spouse/significant other because of financial matters.
2. I find it difficult to talk about money with my spouse/significant other.
3. I frequently avoid attending family events because of my financial situation.
4. My financial situation frequently interferes with my family relationship.
5. I find myself avoiding interaction with friends due to my financial situation.

Biophysiological Response: Physiological response
1. I can't fall asleep well because of my financial situation.
2. I wake up frequently overnight because of my financial situation.
3. I eat too much food because of my financial situation.
4. I have stomach aches frequently because of my financial situation.
5. I have frequent feeling of vomiting because of my financial situation.
6. My heartbeat increases because of my financial situation.
7. I feel cold because of my financial situation.
8. I sweat often because of my financial situation.
9. I feel hot frequently because of my financial situation.
10. I have a dry mouth frequently because of my financial situation.

11. I breathe faster because of my financial situation.

12. I have more frequent muscle pain because of my financial situation.

Biophysiological Response: Sensory response

1. I feel fatigued frequently because of my financial situation.

2. I feel more sensitive to noise because of my financial situation.

3. I frequently break/crack/chip objects because of my financial situation.

4. I am more sensitive overall because of my financial situation.

5. It is hard to listen to music because of my financial situation.

APPENDIX B

Refined Survey Items Reviewed by Professionals

The following items are the first 41 items that were hypothesized to measure financial stress. All questions should be answered on a five-point scale, with 1 = Strongly Disagree and 5 = Strongly Agree. After having professional reviewing (i.e., validity check) and exploratory survey (reliability and validity), questions in Table 1 (i.e., 24 items) are selected as final survey items for measuring the comprehensive financial stress.

Affective Reaction: Depression
1. I feel depressed because of my financial situation.
2. I feel hopeless because of my financial situation.
3. I feel sad because of my financial situation.
4. I am not confident about myself because of my financial situation.
5. I feel lonely because of my financial situation.
6. I lose interest in my daily activities because of my financial situation.

Affective Reaction: Anxiety
1. I am fearful because of my financial situation.
2. I feel anxious because of my financial situation.
3. I worry a lot because of my financial situation.
4. I am easily irritated because of my financial situation.
5. I have difficulty in concentrating my work because of my financial situation.
6. I feel nervous because of my financial situation.

Affective Reaction: Emotional Exhaustion
1. I feel emotionally drained because of my financial situation.
2. I feel burned out because of my financial situation.
3. I feel frustrated because of my financial situation.
4. I feel tired because of my financial situation.

Relational/Interpersonal behavior: Work related
1. My financial situation interferes with my daily job performance.
2. I frequently pass on social events at work due to my financial situation.
3. I often get into trouble at work because of my financial situation.
4. My financial situation frequently interferes with my relationship with co-workers/colleagues.
5. I work too much to improve financial situation.
6. Working too much causes problems with family and friends.

Relational/Interpersonal Behavior: Non-work related
1. I often argue with my spouse/significant other because of financial matters.
2. I find it difficult to talk about money with my spouse/significant other.
3. I frequently avoid attending family events because of my financial situation.
4. My financial situation frequently interferes with my family relationship.
5. I find myself avoiding interaction with friends due to my financial situation.

Biophysiological Response: Physiological response
1. I lose sleep at night because of my financial situation.
2. I eat too much food because of my financial situation.
3. I have stomach aches frequently because of my financial situation.
4. My heartbeat increases because of my financial situation.
5. I feel cold because of my financial situation.
6. I feel more sweat because of my financial situation.
7. My faces flushes frequently because of my financial situation.
8. I have a dry mouth frequently because of my financial situation.

9. I breathe faster because of my financial situation.

10. I have more frequent muscle pain because of my financial situation.

Biophysiological Response: Sensory response

1. I feel fatigued frequently because of my financial situation.

2. I am sensitive to noise because of my financial situation.

3. I find flaws/cracks/chips of general objects more frequently than before because of my financial situation.

4. I am irritable because of my financial situation.

APPENDIX C

Questionnaires Included in Confirmatory Survey

PANAS Negative Affect:
　　　　This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer next to that word. Indicate to what extent of your feelings in the Past Few Days.
　　　　1. Afraid.
　　　　2. Distressed.
　　　　3. Nervous.
　　　　4. Sacred.
　　　　5. Upset.

Financial Anxiety:
　　　　How strongly do you agree or disagree with the following statements? Please give your answer on a scale of 1 to 5, where 1 = "Strongly Disagree," 5 = "Strongly Agree."
　　　　1. I feel anxious about my financial situation.
　　　　2. I have difficulty sleeping because of my financial situation.
　　　　3. I have difficulty concentrating on my school/or work because of my financial situation.
　　　　4. I am irritable because of my financial situation.
　　　　5. I have difficulty controlling worrying about my financial situation.
　　　　6. My muscles feel tense because of worries about my financial situation.
　　　　7. I feel fatigued because I worry about my financial situation.

Job Insecurity:
　　　　How strongly do you agree or disagree with the following statements? Please give your answer on a scale of 1 to 5, where 1 = "Strongly Disagree," and 5 = "Strongly Agree."
　　　　1. I am worried about having to leave my job before I would like to.
　　　　2. There is a risk that I will have to leave my present job in the year to come.
　　　　3. I feel uneasy about losing my job in the near future.
　　　　4. My future career opportunities in my employer are favorable.
　　　　5. I feel that my employer can provide me with a stimulating job content in the near future.
　　　　6. I believe that my employer will need my competence also in the future.
　　　　7. My pay development in this organization is promising.

Life Satisfaction:
　　　　How strongly do you agree or disagree with the following statements? Please give your answer on a scale of 1 to 7, where 1 = "Strongly Disagree," and 7 = "Strongly Agree."
　　　　1. In most ways my life is close to my ideal.
　　　　2. The conditions of my life are excellent.
　　　　3. I am satisfied with my life.
　　　　4. So far I have gotten the important things I want in life.
　　　　5. If I could live my life over, I would change almost nothing.

Financial Well-Being:
　　　　How well does this statement describe you or your situation? Please give your answer on a scale of 1 to 5, where 1 = "Completely," 2 = "Very well," 3 = "Somewhat," 4 = "Very little," and 5 = "Strongly Disagree."
　　　　1. I could handle a major unexpected expense.
　　　　2. I am securing my financial future.

3. Because of my money situation, I feel like I will never have the things I want in life.
4. I can enjoy life because of the way I am managing my money.
5. I am just getting by financially.
6. I am concerned that the money I have or will have won't last.
7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month.
8. I have money left over at the end of the month.
9. I am behind with my finances.
10. My finances control my life.