

TEACHERS' RESILIENCE SCALE: AN INTEGRATED INSTRUMENT FOR ASSESSING PROTECTIVE FACTORS OF TEACHERS' RESILIENCE

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Abstract: The aim of the present study was to create a reliable scale that assesses both the internal and the external protective factors that affect teachers' levels of resilience. Participants were 136 Greek secondary education teachers. The Connor-Davidson Resilience Scale (CD-Risc) and Resilience Scale for Adults (RSA) were used to collect the data. The results of the exploratory factor analysis indicated that none of the two measures could evaluate effectively the internal and the external protective factors of resilience. A new scale was then created, the Teachers' Resilience Scale (TRS) that combined the best fitting subscales of the CD-Risc and the RSA. The structure of TRS is supported by the relevant literature on resilience and has the advantage of assessing both the internal and the external protective factors of resilience in a brief yet comprehensive way.

Key words: Protective factors, Resilience, Teachers

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INTRODUCTION

Resilience in the field of education has emerged as an important area of research, especially in countries where high resignation rates have been observed in the teaching profession (Hong, 2012; Scheopner, 2010). Internationally, there are numerous studies that evaluate the levels of, and the risk and protective factors of teachers' resilience, with the relevant instruments varying in the number and the kind of protective factors they tap. By contrast, the Greek literature is rather limited and most of the studies focus on children and adolescents' resilience (e.g., Kourkoutas, Vitalaki, & Fowler, 2014; Leontopoulou, 2013; Motti-Stefanidi & Pavlopoulos, 2008; Nearchou, Stogiannidou, & Kiosseoglou, 2013). Only recently did studies focus on protective factors that affect the resilience levels in teachers (e.g., Botou, Mylonakou-Keke, Kalouri, & Tsergas, 2017; Froehlich-Gildhoff & Roennau-Boese, 2012). To fill this gap, we designed the present research aiming to produce a measure of protective factors of resilience in Greek teachers. To this end, two studies were carried out: in Study 1 we began with testing two of the most widely used instruments internationally, namely the Connor-Davidson Resilience Scale (CD-Risc, Connor & Davidson, 2003) and the Resilience Scale for Adults (RSA, Friborg, Barlaug, Martinussen, Rosenvinge, & Hjemdal, 2005) as to whether they could be used in the Greek context. Since the results were not satisfying for either of them, Study 2 was carried out. In this study, the best-fitting subscales of the above instruments were combined to form an integrated new scale for measuring the internal and the external protective factors of teachers' resilience.

The conceptualization of teachers' resilience

The term "resilience" was first used by Holling (1973) to describe the ability of ecosystems to recover after a disaster. Since then it has been used in various contexts, particularly in the social sciences, to describe the adaptive capacities of individuals (e.g., Bonanno, 2004; Campbell-Sills, Cohan, & Stein, 2006; White, Driver, & Warren, 2008), communities (e.g., Bonnano, Brewin, Kaniasty, & La Greca, 2010; Magis, 2010) and societies (e.g., Adger, 2000; Godschalk, 2003). In the recent literature, resilience is conceptualized as the successful, positive adaptation and/or recovery after a traumatic event (Luthar, Cicchetti, & Becker, 2000; Werner, 1995) and in spite of the challenges, high risk or threatening conditions (Benard, 1991; Masten, Best, & Garmezy, 1990). Individuals able to cope with difficult life situations and successfully adapt to them are assumed to be able to avoid developing problematic behaviors in the future.

Teachers' resilience has been described as a «quality that allows teachers to maintain their commitment at teaching» (Brunetti, 2006, p. 813), as «a series of specific strategies that teachers employ when they experience an adverse situation at school» (Castro, Kelly, & Shih, 2010, p. 263) and as «the teacher's ability to successfully overcome personal vulnerabilities and environmental stressors» (Oswald, Johnson, & Howard, 2003, p. 50). Teachers' resilience refers to the extent to which teachers are capable to maintain positive attributes in face of a range of challenges, pressures and demands associated to their work. Various protective and risk factors empower or disable teachers' resilient behavior.

Risk and protective factors of teachers' resilience

As risk factor is considered any observable (measurable) attribute of the individual (Gerstein & Green, 1993) or the environment (Kumpfer, 1999), which has been found to correlate significantly (in population or case studies) with a specific unfavorable for the person behavior or outcome. Risk factor is a possible cause or precursor of an attitude but not a direct or indirect outcome or symptom of behavior. As regards the teaching profession risk factors can be related to both individual and environmental attributes. At the individual level, the most important risk factors are low self-esteem (Day, 2008), difficulties in seeking help (Flores, 2006), the conflict between personal beliefs and practices used (Beltman, Mansfield, & Price, 2011; Flores, 2006), anxiety and emotional exhaustion (Schlichte, Yssel, & Merbler, 2005) and inadequate preparation for the reality of work (Demetriou, Wilson, & Winterbottom, 2009). At the environmental level, risk factors are the adversities that teachers may face due to constant changes in the educational system that increase their levels of uncertainty, pressure and workload (Gu & Day, 2007; Howard & Johnson, 2004).

Protective factors affect resilience by mitigating the impact of risk factors. They are conceived in at least two ways in the relevant literature: The first pertains to individual or environmental characteristics that reflect absence of risk factors or the presence of factors that promote self-improvement. The second refers to those factors that mitigate the effects of risk factors or enhance the positive outcomes and the successful adjustment of the individual (Johnson & Howard, 2007). Over the years, the second conception of protective factors prevailed in relevant research (Kumpfer, 2002). Most instruments for the measurement of resilience assess a varying number of protective factors that enhance an individual's resilience.

Mansfield, Beltman, Price, and McConney (2012) categorized the protective factors of teacher resilience along four dimensions: professional, emotional, social and motivational. The *professional* dimension refers to the teaching skills that help

the teacher overcome the adversities and challenges that arise within the school environment, such as the use of different teaching practices (Bobek, 2002; Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008), the acquaintance with students and the response to their needs (Flores, 2006; Kaldi, 2009), the commitment for continuous vocational training (Patterson, Collins, & Abbott, 2004; Sumsion, 2004), flexibility (Le Cornu, 2009), and teaching effectiveness (Brunetti, 2006; Woolfolk & Spero, 2005). The emotional dimension includes teacher attributes such as altruism (Brunetti, 2006; Chong & Low, 2009), persistence (Fleet, Kitson, Cassady, & Hughes, 2007; Sinclair, 2008), emotional intelligence (Chan, Lau, Nie, Lim, & Hogan, 2007; Sinclair, 2008) and sense of humor (Bobek, 2002; Jarzabkowski, 2002). The dimension of motivation includes factors such as self-efficacy and trust in one's own strengths (Gu & Day, 2007; Tait, 2008; Tschannen-Moran & Woolfolk Hoy, 2007), deliberate career decision making (Sumsion, 2004) and willingness to take risks (Sumsion, 2003). Finally, in the social dimension, strong interpersonal skills have been identified that allow the development of social support networks (Froehlich-Gildhoff & Roennau-Boese, 2012; Howard & Johnson, 2004; Tait, 2008). Stanford (2001) proposes that teachers' resilience originates from an extensive support network that includes colleagues, family, friends and spiritual groups.

It is worth noting that the same (internal or external) factor may act as risk or protective factor, depending on whether it intensifies or moderates the impact of stressful and challenging events. External factors relate to the environmental context in which a person operates and develops, such as the community, family, culture, school, colleagues/peers that influence the development of resilience. Temperament, skills and personality constitute the core of internal risk and protective factors (Garmezy, 1985; Kaldi, 2009; Wagnild, 2016). According to Kumpfer's Resilience Framework (1999), these personality traits and abilities can fall into five categories: (1) spiritual characteristics and incentives, (2) cognitive abilities, (3) behavioral/social skills, (4) emotional stability and management of emotions, and (5) physical well-being and physical abilities. In other words, in this framework resilience is captured as a multidimensional construct, which is better understood as a dynamic process within a social system of interactions. The same approach of resilience is taken by other researchers (e.g., Boyd & Eckert, 2002), who propose that resilience is an interaction between the person characteristics and environmental protectors that helps individuals overcome adversity and have a healthy reintegration after exposure to stressors and challenges.

Measurement of resilience

For studying resilience, different research methods and instruments have been used. A literature review has revealed at least 14 instruments for assessing resilience levels of adult populations (e.g., Windle, 2011). Two of the most popular instruments (due to their satisfactory psychometric properties) are the Connor-Davidson Resilience Scale (CD-Risc, Connor & Davidson, 2003) and the Resilience Scale for Adults (RSA, Friborg et al., 2005), both of which have been used in the present study.

The CD-Risc was designed by Connor and Davidson (2003) as a self-report scale to measure resilience and as a clinical instrument to evaluate the response of people who are in treatment of anxiety, depression or stress (Connor, Davidson, & Lee, 2003). The authors constructed the scale based on the idea that resilience is a personal quality that reflects the person's ability to cope with stress. The CD-Risc evaluates five dimensions of resilience: a) personal competence, high standards, and tenacity; b) trust in one's feelings, tolerance of negative affect, and strengthening effects of stress; c) positive acceptance of change and secure relationships; d) control, and e) spiritual influences.

The psychometric properties of the CD-RISC have been found to be good in almost all studies that used it. The scale has been reported as reliable ($\alpha = .89$) and valid by several researchers (Connor, Davidson, & Lee, 2003; Davidson et al., 2005) and it has been used in studies worldwide (Singh & Xiao-nan Yu, 2010). As reported in the relevant website (<http://www.cd-risc.com/>), the CD-Risc has been translated into 52 languages, including Greek (Dimitriadou & Stalikas, 2012), and has been tested in various populations (teenagers, elderly, patients with Alzheimer's, people suffering from post-traumatic stress disorder, and in selected professional groups such as students, teachers, nurses, social workers, doctors). The scale has also been used to test Greek adults, and army cadets (e.g., Karampas, Michael, & Stalikas, 2016; Pezirkianidis, Galanakis, Karakasidou, & Stalikas, 2016) and the reliability of the total scale was found satisfactory ($\alpha = .90$). In all studies, the internal consistency of the scale was confirmed. However, its factorial structure varied depending on the cultural context and the sample characteristics of the study. For example, the five-factor structure proposed by its constructors was confirmed in an Australian study of nurses (Gillespie, Chaboyer, Wallis, & Grimbeck, 2007), but a study of older women in USA revealed four factors (Lamond, Depp, Allison, Langer, Reichstadt, Moore ... Jeste, 2008). The Greek version of the CD-Risc is in the process of adaptation and standardization in Greek sample by Stalikas, Galanakis, Lakioti, Pezirkianidis, and Karakasidou (Dimitriadou & Stalikas, 2012).

Regarding to the factorial structure of the Greek version, the studies conducted using the CD-Risc scale do not provide its factorial solution. The constructors of the scale do not recommend separate scoring of the subscales, as originally proposed, although in some cases interesting findings were reported. For example, after remodeling the scale and dropping several items, Campbell-Stills and Stein (2007) found a two-factor structure which described hardiness and persistence.

Another very popular instrument for measuring resilience is the RSA constructed by Friberg, Barlaug, Martinusse, Rosenvinge, and Hjemdal (2003). It is a multidimensional scale that includes six subscales assessing the general characteristics of resilience in adults. Unlike most scales, the RSA assesses both the interpersonal and the intrapersonal protective factors that are considered to facilitate the adaptation of the individual to emotional and social challenges (Friberg et al., 2003). This double function of the scale is consistent with the nature of resilience as a multidimensional construct. RSA has been translated into several languages (Spanish, Persian, French, Turkish, etc.) and has been widely used. Research has confirmed its factorial structure and internal reliability and validity (Cronbach's α varied from .73 to .83 for the factors) (Hjemdal, Friberg, Braun, Kempnaers, Linkowski, & Fission, 2011; Hjemdal, Roazzi, Dias, & Vikan, 2009; Jowkar, Friberg, & Hjemdal, 2010). To our knowledge, RSA has not been used in a Greek study thus far.

Aim and hypotheses of Study 1

The initial aim of the study was to identify instruments that could effectively evaluate the internal and the external resilience factors in Greek teachers. Two studies were carried out. Study 1 included two scales measuring resilience to get a more comprehensive picture of protective factors of teachers' resilience: the CD-Risc, which assesses solely internal protective factors, and the RSA, which assesses internal protective factors and, in addition, external ones.

Specifically, Study 1 aimed to investigate (a) the factorial structure of CD-Risc and RSA and (b) the reliability of the total scales and their subscales. Based on the literature reviewed earlier, four research hypotheses were formulated: (a) The reliability of the total CD-Risc scale and its subscales is expected to be good as previous studies have shown (Hypothesis 1) and (b) its factorial structure be organized into five factors as in the original (Connor & Davidson, 2003) (Hypothesis 2). (c) Regarding the RSA, the reliability of the total scale and subscales is expected to be satisfactory (Hypothesis 3) and (d) the factorial structure is expected to be consistent to what was found in earlier studies, that is, six factors.

STUDY 1

Method

Participants

Study 1 comprised 136 secondary education teachers from public high schools of urban and semi-urban areas of Northern Greece. Their age ranged from 24-63 years, with an average age of 45.69 years ($SD = 8.35$). The sample consisted of 89 women (65.4%) and 47 men (34.6%). The majority of participants ($n = 99$) were married (72.8%) and had a total teaching experience of 1-34 years with a mean of 16.17 years ($SD = 8.34$).

Measures

Connor-Davidson Resilience Scale (CD-Risc)

The Greek version of the CD-Risc scale was used (Dimitriadou & Stalikas, 2012). It includes 25 items and assesses five dimensions of protective resilience factors: a) *personal competence, high standards, and tenacity* (items 10, 11, 12, 16, 17, 23, 24, 25; e.g., I am proud of my achievements); b) *trust in one's gut feelings, tolerance of negative affect, and strengthening effects of stress* (items 6, 7, 14, 15, 18, 19, 20; e.g., I can see the humorous side of things); c) *positive acceptance of change and secure relationships* (items 1, 2, 4, 5, 8; e.g., I tend to bounce back after illness or hardship); d) *control* (items 13, 21, 22; e.g., I know where to turn to for help), and e) *spiritual influences* (items 3, 9; e.g., Sometimes fate or God can help) (Connor & Davidson, 2003). Participants were invited to give their answers on a 5-point Likert scale ranging from 0 (not true at all) to 4 (almost always true). The reliability of the original version was $\alpha = .89$ and in the Greek version $\alpha = .90$.

Resilience Scale for Adults (RSA)

The revised version of the RSA (Friborg et al., 2005) was used which includes 33 questions. Participants are asked to give their responses on a 5-point scale of semantic differential varying from 1 to 5 and 3 as neutral point, where every item has a positive and a negative characteristic in each end, respectively. The RSA scale assesses 6 dimensions of resilience: (1) *Personal strength*, with two subscales: (1a) *Perception of self* (items 1-6; e.g., My personal problems are unsolvable / I know how to solve them), and (1b) *Perception of the professional future* (items 7-10; e.g., I feel my future looks very promising / uncertain); (2) *Structured style* (items 11-14; e.g., I am good at organizing my time/wasting my time); (3) *Social competence*

(items 15-20; e.g., I enjoy being together with other people/ by myself); (4) *Family cohesion* (items 21-26; e.g., My family is characterized by disconnection/healthy coherence), and (5) *Social resources* (items 27-33; e.g., I can discuss personal issues with no one/friends).

This scale has not been used in Greek in the past, so it was translated from English to Greek and backwards. In this study, a modification was made to the scale in order to assess teachers' resilience rather than resilience in a general context. The word "work" or "professional" was added to the first three dimensions, where appropriate (e.g., the statement "When something unforeseen happens" was changed to "When something unforeseen happens at the workplace"). Also, the word "colleague/colleagues" was added to the fifth dimension to clarify that the questions refer to peer relations within the school environment and not to relationships with friends out of the workplace (e.g., "When I am with others" was changed to "When I am with my colleagues"). In the original scale the internal consistency reliability ranged from .73 to .83 for the factors.

Procedure

Study 1 was conducted in May 2016. After obtaining permission from the authors and the Greek Ministry of Education, Research and Religious Affairs, the questionnaires were administered to the participants. Teachers were invited to participate voluntarily to the study in two ways. The first involved the distribution of the questionnaires to secondary schools with the permission of the school administrator. The questionnaires were completed by the teachers either during the school break or at their personal time with the request to return them within a week. The completed questionnaires were returned to the first author after the designated time. The second way included the distribution of the questionnaires via e-mail, using the Typeform web application. In both ways, two different forms of the research instrument were created, in which the order of the scales was counterbalanced. Of the 136 questionnaires, 65 (47.8%) were completed in paper-and-pencil form and 71 (52.2%) electronically.

Results

Factorial validity and reliability of the CD-Risc and the RSA scales

Before presenting the factor analyses, a methodological issue needs to be addressed. Study 1 did not fully comply with the established criteria of sample size for performing

factor analysis, especially on the 33 items of the RSA. Suggested minimums of the sample size include from 3 to 20 times the number of items and, in absolute numbers, it ranges from 100 to over 1000 (Mundfrom, Shaw, & Lu Ke, 2009). Taking a more lenient stand, Kline (1979) proposed that there should be at least twice as many participants as items in factor-analytic investigations. This means that “in any large study on this account alone, one should have to use more than the minimum 100 subjects” (Kline, 1979, p. 40). Since our sample size fulfilled the above criterion (136 participants, 25 and 33 items for the CD-Risc and the RSA, respectively) factor analysis was applied.

Regarding the CD-Risc scale, principal component analysis with Varimax rotation revealed four factors. In this model, items 4, 7, 8, 11, 12, 21, 22 and 25 did not load on the originally factors proposed by the constructors. These items were removed and the factor analysis was repeated on the 17 remaining. In the final model, four factors were abstracted explaining 53.14% of the total variance (see Table 1). The first factor, *Personal Competencies and Persistence* (9 items, $\alpha = .83$), describes the personal qualities that affect resilience and tenacity. The second factor, *Spiritual*

Table 1. Principal component analysis of the CD-Risc

Items	Factors			
	Personal Competencies and Persistence	Spiritual Influences	Positive Crisis Management	Stress Management
CDRISC-17	.803			
CDRISC-16	.761			
CDRISC-24	.707			
CDRISC-19	.673			
CDRISC-18	.629			
CDRISC-23	.627			
CDRISC-15	.615			
CDRISC-14	.598			
CDRISC-1	.526			
CDRISC-20		.755		
CDRISC-9		.714		
CDRISC-3		.629		
CDRISC-6			.691	
CDRISC-5			.653	
CDRISC-10			.607	
CDRISC-2				.735
CDRISC-13				.700
Expl. Variance (%)	24.171	10.465	9.556	8.949
Eigen value	26.747	11.396	7.807	7.190
Cronbach's α	.83	.58	.46	.49

Note: Only loadings above .40 are included.

Influences (3 items, $\alpha = .58$), refers to the need of the individual to seek help from God or other spiritual forces to deal with the challenges. The third factor, *Positive Crisis Management* (3 items, $\alpha = .46$), describes the effective way in which a person handles the various challenges that may come up. Finally, the fourth factor, *Stress Management* (2 items, $\alpha = .49$) refers to how the individual handles the stress derived from crises and challenges. Internal consistency was satisfactory only in the first factor and the reliability of the subscales was low except for the *Personal Competencies and Persistence*.

Principal component analysis with Varimax rotation of the RSA revealed four factors which explained 44.757% of the total variance. The items 2, 4, 5, 8, 13, 14, 15, 16, 20, 22, 28, 30 and 33 were removed because of poor loading, and the analysis was rerun on the 20 remaining. A four-factor solution emerged accounting for the 49.67% of the total variance (see Table 2). Specifically, *Family Cohesion* (6 items, $\alpha = .81$), refers to the relationship of the individuals to their family, which can act

Table 2. Principal component analysis of the RSA

Items	Factors			
	Family Cohesion	Social Skills/ Peer Support	Personal Strength	Personal Style
RSA-1	.766			
RSA-26	.739			
RSA-21	.735			
RSA-23	.725			
RSA-25	.550			
RSA-24	.513			
RSA-15	.440			
RSA-18		.762		
RSA-29		.738		
RSA-27		.626		
RSA-32		.599		
RSA-17		.551		
RSA-19		.509		
RSA-31		.507		
RSA-11			.726	
RSA-9			.631	
RSA-3			.604	
RSA-6			.471	
RSA-12				.741
RSA-10				.727
RSA-7				.601
Expl. Variance (%)	15.831	15.187	10.273	8.377
Eigen values	26.717	9.187	7.395	6.371
Cronbach's α	.81	.78	.60	.58

Note: Only loadings above .40 are included.

as a protective factor of resilience. The second factor, *Social Skills and Peer Support* (7 items, $\alpha = .78$), refers to the relationship of the individuals with their colleagues in the school context and the ability to form new relationships in their professional environment. *Personal Strength* (4 items, $\alpha = .60$) describes how individuals perceive themselves in the workplace and whether they consider their character and beliefs as adequate to overcome adversities. Finally, the fourth factor, *Personal Style* (3 items, $\alpha = .62$), describes how persons act and behave in the working environment.

The results showed that our data did not confirm the six-factor solution of the previous studies (Friborg et al., 2003). The six-factor solution of the RSA was tested and confirmed in various studies carried out in Norway, Iran and Italy (e.g., Capanna, Stratta, Hjemdal, Collazzoni, & Rossi, 2015; Friborg, Hjemdal, Martinussen, & Rosevinge, 2009; Jowkar et al., 2010). In the present study, however, only four factors emerged. Reliability was adequate in all four factors.

Discussion

Study 1 did not confirm Hypotheses 1 and 3 on the factorial structure of the CD-Risc and RSA, as the factorial structure differed in number and content of subscales from the factorial model proposed by the constructors. However, the four-factor solution that emerged for the CD-Risc scale in the present study was found in other studies as well (e.g., Campbell-Sills et al., 2006; Jorgensen & Seedat, 2008; Khoshouei, 2009; Yu & Zhang, 2007). Moreover, the reliability of the factors abstracted was satisfactory only for the first factor of CD-Risc, unlike RSA that had satisfactory reliability. Therefore Hypothesis 2 was partially confirmed whereas Hypothesis 4 was confirmed.

Furthermore, Study 1 revealed that none of the two scales adequately assessed both kinds of resilience factors, that is, internal and external factors, in the sample of Greek teachers. The CD-Risc scale evaluated four internal protective factors *Personal Competencies and Persistence, Spiritual Influences, Positive Crisis Management, and Stress Management*, but only the first subscale had adequate reliability. The RSA evaluated two external (*Family Cohesion and Social Skills, and Peer Support*) and two internal protective factors of resilience (*Personal Strength, and Personal Style*) but it leaves out important protective factors, such as persistence, spiritual influences, positive acceptance of change, and stress management.

Following the above we decided to combine the factors with sufficient reliability that emerged from the principal component analysis of the CD-Risc and the RSA to

build a new scale to measure teacher resilience. Specifically, the new scale included the items from the CD-Risc factors *Personal Competencies and Persistence* and *Spiritual Influences*, which had marginally acceptable reliability, and the *Family Cohesion* and *the Social Skills and Peers Support* of the RSA. The factors *Personal Strength* and *Personal Style* of the RSA were not included in the new scale, as their component items are similar to those included in the *Personal Competencies and Persistence* factor of the CD-Risc.

Despite the relatively low reliability, the *Spiritual Influences* factor was included in the new scale because it captures one of the most significant protectors of resilience

Table 3. Principal component analysis of the TRS

Items	Factors			
	Personal Competencies and Persistence	Family Cohesion	Social Skills and Peer Support	Spiritual Influences
CD1	.587			
CD14	.651			
CD15	.577			
CD16	.758			
CD17	.796			
CD18	.615			
CD19	.679			
CD23	.635			
CD24	.683			
CD3				.671
CD9				.758
CD20				.625
RSA15		.440		
RSA21		.701		
RSA22		.758		
RSA23		.779		
RSA24		.549		
RSA25		.531		
RSA26		.752		
RSA17			.583	
RSA18			.707	
RSA19			.505	
RSA27			.566	
RSA29			.716	
RSA31			.622	
RSA32			.678	
Expl. Variance (%)	16.321	13.620	12.352	7.204
Eigen values	21.935	13.669	7.610	6.284
Cronbach's a	.83	.80	.78	.68

Note: Only loadings above .40 are included.

(Connor et al., 2003; Crawford, Wright, & Masten, 2006; Fleming & Ledogar, 2008). As Yu and Zhang (2007) argue, since this factor refers to religious beliefs, its reliability may range at low levels. In a culture where religion and spirituality are not well defined, the spiritual dimension of resilience cannot be fully explained by a few

Table 4. Confirmatory factor analysis of the TRS in Study 1

Items	Factors				E	R ²
	Personal Competencies and Persistence (F1)	Spiritual Influences (F2)	Family Cohesion (F3)	Social Skills and Peer Support (F4)		
CD1	.510				.860	.260
CD14	.537				.844	.288
CD15	.514				.858	.264
CD16	.720				.594	.618
CD17	.816				.578	.666
CD18	.510				.860	.260
CD19	.624				.791	.390
CD23	.621				.784	.386
CD24	.688				.726	.473
CD3		.491			.871	.241
CD9		.551			.835	.305
CD20		.631			.776	.398
RSA15			.434		.901	.189
RSA21			.653		.758	.426
RSA22			.674		.739	.454
RSA23			.725		.689	.526
RSA24			.591		.828	.349
RSA25			.499		.866	.249
RSA26			.742		.670	.551
RSA17				.577	.817	.333
RSA18				.705	.710	.496
RSA19				.493	.870	.243
RSA27				.514	.858	.265
RSA29				.690	.724	.476
RSA31				.578	.816	.334
RSA32				.565	.825	.319
CR	.83	.58	.82	.80		
AVE	.40	.32	.39	.35		
Factor Correlations						
		F1 - F2	-			
		F1 - F3	-			
		F1 - F4	.350**			
		F2 - F3	.370**			
		F2 - F4	.330**			
		F3 - F4	.435**			

Note: All item loadings are statistically significant. ** $p < .001$

items. Therefore, we included this factor in the new scale to obtain a more comprehensive assessment of the protective factors of resilience. In this way, the Teachers' Resilience Scale (TRS) comprised 26 items.

Factorial validity and reliability of the TRS

The principal component analysis with Varimax rotation applied to the 26 items of the new scale revealed four factors, which fully corresponded to the component factors of the CD-Risk and the RSA (see Table 3). This factor solution explained 49.50% of the total variance of the data.

At the next step, a confirmatory factor analysis was applied (using the AMOS statistical software, Version 22.0) to confirm the four-factor solution of the new scale. The measurement model (presented at Table 4) confirmed the hypothesized four-factor structure of the TRS. The model fit the data well, $\chi^2/289 = 1.237$, CFI = .932, GFI = .842, SRMR = .074, CI_{90%} .025 - .056, RMSEA = 0.42. Moreover, low but statistically significant correlations between the factors *Social Skills and Peer Support and Personal Competencies* ($r = .350, p < .05$), *Spiritual Influences* ($r = .330, p < .05$) and *Family Cohesion* ($r = .435, p < .05$) and, moreover, between *Spiritual Influences* and *Family Cohesion* ($r = .370, p < .05$).

In the next step, the psychometric properties of this new scale of measuring resilience factors ought to be tested in a new sample. For this purpose, Study 2 was carried out.

STUDY 2

Aim and hypotheses of Study 2

Study 2 aimed to investigate whether the TRS can assess the internal and external resilience factors in a sample of Greek teachers. Based on the results of Study 1, we assumed that the TRS consists of four subscales (Hypothesis 1), which will present satisfactory reliability (Hypothesis 2).

Method

Participants

In Study 2, 146 primary school teachers employed in public elementary schools participated. Their age ranged from 24-60 years, with a mean of 38.42 ($SD = 9.57$). The sample consisted of 121 women (82.9%) and 25 men (17.1%); 84 of the participants were married (57.5%). Their teaching experience ranged from 1 to 32 years with a mean of 12.67 ($SD = 7.76$).

Measures

Teachers' Resilience Scale (TRS)

The TRS comprises 26 items and assesses four dimensions of teachers' resilience: (a) *Personal Competencies and Persistence* (9 items), (b) *Spiritual Influences* (3 items), (c) *Family Cohesion* (7 items) and (d) *Social Skills and Peer Support* (7 items). Responses on the first two subscales, which were derived from the CD-Risc scale, were on a 5-point Likert scale ranging from 0 (not true at all) to 4 (almost always true); on the two subscales derived from the RSA semantic differential was used, in which responses range from 1 to 5 with 3 as neutral point.

Procedure

After permission was granted by the Greek Ministry of Education, Research and Religious, Study 2 was conducted in November 2016 following the procedure described in Study 1. A total of 146 questionnaires were completed, 71 (48.6%) in paper form and 75 (51.4%) by electronic completion.

Results

Factorial validity and reliability of the TRC

Principal component analysis with Varimax rotation revealed the hypothesized four-factor solution. It explained 48.561% of the total variance. The factors and their reliability were: *Personal Competencies and Persistence* ($\alpha = .82$), *Family Cohesion* ($\alpha = .74$), *Social Skills and Peer Support* ($\alpha = .81$), and *Spiritual Influences* ($\alpha = .67$). Overall, these results confirmed both research hypotheses.

At the final step, the factorial structure of the TRS was validated by confirmatory factor analysis run using the AMOS statistical software. The model presented at Table 6 confirmed the hypothesized four-factor structure of the TRS and its fit to the data was acceptable, $\chi^2(317) = 1.345$ $p = .001$, CFI = .915, GFI = .857, SRMR = .073, CI_{90%} = .033 - .063, RMSEA = .049. Also, low but

Table 5. Confirmatory factor analysis of the TRS in Study 2

Items	Factors				E	R ²
	Personal Competencies and Persistence (F1)	Family Cohesion (F2)	Social Skills and Peer and Peer (F3)	Spiritual Influences (F4)		
CDRISC7	.736				.677	.542
CDRISC6	.682				.731	.466
CDRISC9	.614				.789	.377
CDRISC4	.531				.847	.282
CDRISC12	.574				.819	.330
CDRISC11	.575				.818	.331
CDRISC8	.579				.815	.336
CDRISC1	.455				.890	.207
CDRISC5	.430				.903	.185
RSA6		.740			.672	.548
RSA8		.671			.742	.450
RSA7		.578			.816	.335
RSA5		.508			.861	.258
RSA10		.472			.881	.223
RSA9		.402			.906	.162
RSA14			.725		.689	.526
RSA12			.721		.693	.519
RSA1			.668		.744	.446
RSA11			.611		.792	.374
RSA2			.594		.804	.353
RSA13			.578		.816	.334
RSA3			.442		.897	.195
CDRISC3				.841	.541	.708
CDRISC2				.617	.787	.381
CDRISC10				.406	.914	.165
CR	.82	.74	.82	.70		
AVE	.30	.33	.39	.42		
Factor Correlations						
		F1 – F2	-			
		F1 - F3	-			
		F1 – F4	-			
		F2 – F3	.319**			
		F2 – F4	-			
		F3 – F4	.347**			

Note: All item loadings are statistically significant. ** $p < .001$

statistically significant correlations in the factor *Social Skills and Peer Support* with *Family Cohesion* ($r = .319$) and *Spiritual Influences* ($r = .347$).

To evaluate reliability, the Composite Reliability (CR) and the Average Variance Extracted (AVE) were calculated for each subscale of the TRS (see Table 6). CR is an alternative index for evaluation the reliability of the subscales (Raykov, 1997), while AVE is the average amount of variance in indicator variables that a construct is managed to explain (Farrell, 2010). It was found that CR ranged from .70 to .82 in the four subscales; this indicates that the reliability of the subscales of the TRS is satisfactory. AVE was found to have rather low values in all subscales ranging from .30 to .42. Typically, to support the convergent validity of a scale, AVE values should be over .50. However, lower values are also acceptable when the CR values are higher than .60 (Fornel & Larcker, 1981), as in the current case¹.

GENERAL DISCUSSION

Although many scales have been proposed in the past to measure resilience of various populations or specific groups e.g., Adolescent Resilience Scale (Oshio, Nakaya, Kaneko, & Nagamine, 2002) or The Child and Youth Resilience Measure (Ungar & Liebenberg, 2009, 2013) no scale specifically addresses teacher resilience. The aim of the present research was to use existing resilience scales to assess the internal and external protective factors of resilience in Greek teachers.

Initially, we tested the structure and reliability of the CD-Risc and the RSA scales in a sample of teachers. The results of Study 1 showed that neither of the two measures by itself served the aim of our research. Firstly, the factorial structure of the CD-Risc and the RSA did not confirm the structure found in the original version of the scales or in other relevant studies. Moreover, unlike RSA, only one of the factors of the CD-Risc had satisfactory reliability. This led us to create a new scale, the Teachers Resilience Scale consisting of 25 items, in which two factors of the CD-Risc and RSA respectively were included. Specifically, 12 items came from the CD-Risc and 13 items from the RSA. Overall, the TRS assesses the most common protective factors of resilience in Greek teachers. The psychometric properties of the TRS were tested in another sample of Greek teachers in Study 2 and were found to be satisfactory.

¹ In the same line of thinking, Ping (2009) suggests that AVE values may be rather low but still acceptable (within the acceptable value of CR and Cronbach's α) in a scale that was tested for the first time. As Malhotra and Dash (2011, p. 702) notice, "AVE is a more conservative measure than CR. On the basis of CR alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error".

Kumpfer's Resilience Framework (1999) and Boyd and Eckert's (2002) model propose that the appropriate way of assessing resilience is by evaluating the protective factors that include, not only personal characteristics, but also external support systems such as family, friends and community structures. Both models suggest that individuals face, negotiate and overcome the adversities of life within a dynamic interaction of the internal and external factors (Richardson, Neiger, Jensen, & Kumpfer, 1990). Previous studies of stress coping strategies in teachers found that, when teachers experience an adverse or stressful situation in their workplace, they often cope with it either by deploying their own personal strengths and attributes or by seeking external support (Admiraal, Korthagen, & Wubbels, 2000; Antoniou, Ploumpi, & Ntalla, 2013; Austin, Shah, & Muncer, 2005). However, none of the existing scales assesses both the internal and the external factors that determine resilience in teachers. The new scale (TRS) has the advantage of doing this. Thus, it enables the assessment of the prevailing internal or external protective factors that can help teachers overcome the adversities in the school context.

Specifically, regarding the internal factors, persistence has been found to be one of the most significant factors that help the individual remain functional in difficult situations (Garmezy & Masten, 1986; Rutter, 2006). Spirituality has also been recently acknowledged as a significant factor of resilience, because it is strongly based on the personal quest for understanding issues about life and meaning (Connor et al., 2003; Crawford, Wright, & Masten, 2006). Spirituality gives people hope and strength to deal with challenging situations (Fleming & Ledogar, 2008). Regarding the external factors, social support including family well-being and peer relationships is essential to support the individual overcome adversities (Horton & Wallander, 2001; Kafetsios, 2007; Kamtsios & Lolis, 2016). Specifically, strong family and peer relationships can support and protect a person in stressful situations (Armstrong, Birnie-Lefkovich, & Ungar, 2005; Ganong & Coleman, 2002; Jackson, Firtko, & Edenborough, 2007; Walsh, 2002). Thus, TRS has the advantage of evaluating some of the most important internal and external factors that have been identified in the literature to impact resilience.

Limitations of the study and future research

Firstly, as a self-report measure, the TRS assesses the perceived and not the actual resilience of teachers. Measuring actual resilience would require a different methodology than the one adopted in this study.

To begin with, a possible drawback of the TRS is that it has two different response scales. In the subscales derived from the CD-Risc, responses are on a 5-point Likert scale, while in the subscales derived from the RSA the responses are on a 5-point

semantic differential where every item has a positive and a negative anchor. Future studies should address this issue, possibly by rephrasing the items of the RSA so as they are answered in the response scale as the CD-Risc. Another weakness is that, although the reliability of the TRS is satisfactory, discriminant validity needs improvement, as the AVE values indicate. Moreover, the construct and the concurrent validity of the TRS needs to be tested in relation to other resilience measures and/or control variables, such as burnout and/or work stress.

Finally, in the present sample, female participants prevailed. Thus, a replication of the study seems appropriate involving a more balanced sample regarding the participation of the two genders.

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