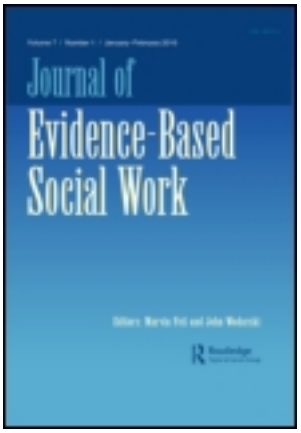

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Assessing Resilience: A Review of Measures across the Life Course

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Assessing Resilience: A Review of Measures across the Life Course

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Through this systematic review the authors analyze scales used to measure resilience in individuals across the life course. The scales were obtained according to a priori inclusion criteria through searches using electronic databases, cited references, and requests to human services researchers currently engaged in research utilizing a resiliency theory framework. Eleven measurement tools meeting study inclusion criteria were located within the existing literature. Currently validated instruments measure specific populations and vary in length and format. The need for an analytical approach to measuring resilience is long overdue. This assessment is intended to aid social work practitioners working with populations that have faced adversity.

Keywords: Resilience, measurement, life course, vulnerable populations, social work practice, intervention research

Two divergent streams of research have operationalized the construct of resilience as either a personality trait (or cluster of traits) or as a process of personal, interpersonal, and contextual protective mechanisms, resulting in an anomalous, positive outcome in the face of adversity (Egeland, Carlson, & Sroufe, 1993; Greene, 2008, 2010; Werner, 1982; Werner & Smith, 1992). Attention to the former appears to predominate; for example, a search of the keyword "resilience" in the electronic database collection EBSCO showed that the database embedded this search term within the larger category of "personality trait." In contrast, use of the construct as a contextualized process resulting in a positive outcome, rather than as an internal characteristic has been applied in many fields. One example from another discipline, information management, is in application to key confirmation protocols used in cryptographic computer security. In these applications, resilience is defined as the maintenance of the pre-existing system state or equilibrium after an attack—in other words, the system's function has not been disrupted by the attack (Mohammed, Chen, Hsu, & Lo, 2010). As an illustrative comparison, this application highlights the construct as both a dynamic protective process and a desirable outcome under adverse circumstances. Operationalization of the construct as a dynamic process is particularly consistent with the biopsychosocial, person-in-environment focus of the social work discipline, and the contexts of adversity often experienced by social work clients, such as childhood abuse and neglect, domestic violence, chronic illness, discrimination, and poverty (Fraser & Galinsky, 1997; Greene, 2007, 2010; Smith-Osborne, 2007).

Furthermore, a shift from problem-focused and diagnostically driven theories and practice models to the strengths perspective and resilience theoretical framework has been noted not only in social work practice (Greene, 2010; Richardson, 2002; Smith-Osborne, 2007), but also

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in such diverse fields as military medicine (Bowles & Bates, 2010), nursing (Tusaie & Dyer, 2004), and international youth development (Unger & Liebenberg, 2007). Application of the theory in a variety of disciplines has supported growing recognition and evidence that risk and protective factors for resilience may operate differently at different points and trajectories across the life course (Garmezy, 1991; Garmezy, Masten, & Tellegen, 1984), and for different types of desired outcomes and adverse contexts (Bynner, 2000; Rudolph & Troop-Gordon, 2010; Rutter, 1979, 1985, 1990, 1995; Smith-Osborne, 2009a, 2009b). The need for an analytical approach to measuring resilience is long overdue to support intervention research and practice (Luthar & Cicchetti, 2000; Luthar, Cicchetti, & Becker, 2000; Luthar & Cushing, 1999; Luthar & Zigler, 1991). Although reviews of resilience measures have been done over the last decade in the fields of nursing (Ahern, Kiehl, Sole, & Byers, 2006) and education (O'Neal, 1999; Rak & Patterson, 1996), to our knowledge none have examined contrasting operationalizations of the construct in these measures and none have been done to date in social work. This systematic assessment of resilience measures of individuals across the life course is intended as a guide for social work practitioners working with individuals having faced adversity.

METHOD

Systematic reviews of measures should account for variations in design, implementation, construct operationalization, sample characteristics, settings, and psychometric analyses to produce better results for application in real life practice (Alderson, Green, & Higgins, 2003; Boruch, Petrosino, & Chalmers, 1999; Chalmers, Hedges, & Cooper, 2002). Thus, operationalization of resilience constructs are specified in Tables 1 and 2, sample, setting, and psychometrics in Table 3, and study quality summarized in Table 4.

Operational Definitions

For inclusion criteria, resiliency was defined as a process of personal, interpersonal, and contextual protective mechanisms, resulting in an anomalous, positive outcome in the face of adversity,

TABLE 1
Resilience Construct Operationalization of Child and Adolescent Instruments

Instrument (Authors)	*Factors*	*Theoretical Basis*	*Number of Items*	*Scaling*
RSAS (Jew, Green, & Kroger, 1999)	1. Active skill acquisition 2. Future orientation 3. Independence/risk taking	Past research by Mrazek and Mrazek	35 items	5-point Likert scale
ARS (Oshio et al., 2003)	1. Novelty seeking 2. Emotional regulation 3. Positive future orientation	Drawn from past resilience research	21 items	5-point rating scale
READ (Hjemdal et al., 2006)	1. Personal competence 2. Social competence 3. Structured style 4. Family cohesion 5. Social resources	Drawn from past research on resilience	28 items	5-point Likert scale
RSCA (Prince-Embury, 2008)	1. Emotional reactivity 2. Sense of mastery 3. Sense of relatedness	Developmental theory and past research on resilience	64 items	5-point Likert scale

TABLE 2
Resilience Construct Operationalization of Adult Instruments

Instrument (Authors)	*Factors*	*Theoretical Basis*	*Number of Items*	*Scaling*
RS (Wagnild & Young, 1993)	1. Personal competence 2. Acceptance of self and life	Drawn from past resilience research	25 items	7-point Likert scale
BPFI (Baruth & Carroll, 2002)	1. Adaptable personality 2. Supportive environment 3. Fewer stressors 4. Compensating experiences	Drawn from past resilience research	16 items	5-point Likert scale
RSA (Friborg et al., 2003; Friborg et al., 2009)	1. Positive perception of self 2. Positive perception of future 3. Social competence 4. Structured style 5. Family cohesion 6. Social resources	Drawn from past resilience research	33 items	Semantic differential response format
CD-RISC (Connor & Davidson, 2003)	1. Personal competence, high standards, and tenacity 2. Trust in one's instinct, tolerance of negative effects, and strengthening effects 3. Positive acceptance of change and secure relationships 4. Control 5. Spiritual influences	Coping, adaption, and stress research	25 items	5-point Likert scale
BRCS (Sinclair & Wallston, 2004)	Adaptive coping (Polk's situational patterns)	Polk's theory of resilience	4 items	5-point rating scale
RIM (Ryan & Caltabiano, 2009)	1. Self-efficacy 2. Family/social networks 3. Perseverance 4. Internal locus of control 5. Coping and adaptation	Drawn from past resilience and midlife research	25 items	5-point Likert scale

TABLE 3
Validation Sample Characteristics

	Instrument									
	RIM	*RS*	*RSA*	*CD-RISC*	*BPFI*	*ARS*	*BRCS*	*READ*	*RSCA*	*RSAS*
Author(s)	Ryan & Caltabiano, 2009	Wagnild & Young, 1993	Friborg et al., 2003	Conner & Davidson, 2003	Baruth & Carroll, 2002	Oshio et al., 2003	Sinclair & Wallston, 2004	Hjemdal et al., 2006	Prince-Embury, 2008	Jew, Green, & Kroger, 1999
Location of validation	Australia	United States	Scandinavia	United States	United States	Japan	United States	Scandinavia	United States	United States
Sample size	*N* = 130	N = 810	Sample One = 59	*N* = 806	*N* = 98	*N* = 207	Sample One = 90 Sample Two = 140	*N* = 425	*N* = 819	*N* = 408
Age (years)	35–60	53–95	18–75	Mean = 43.8	19–54	19–23	Mean (S1) = 46 Mean (S2) = 57.8	13–15	9–18	14–15
Sex	M = 40 F = 90	M = 47.7% F = 62.3%	M = 14 F = 45	F = 510 M = 274	M = 19 F = 79	M = 104 F = 103	F(S1) = 100% F(S2) = 73%	M = 184 F = 235	M = 325 F = 325	M = 49% F = 51%
Ethnicity	Not reported	Not reported	Norwegian	Majority Caucasian participants	Multiethnic	Japanese	Not reported	Norwegian	Multiethnic	Multiethnic
Target population	Multi-study sample	Community dwelling older adults	Patients from an adult outpatient clinic	Multi-study sample	Undergrad psychology students	Undergrad students	Adults with rheumatoid arthritis	Adolescents in junior high	Academic/office settings (normative sample); clinical treatment facilities (clinical sample)	High school students
Psychometric properties (Cronbach's Alpha/test–retest)	.87/not available	.91/not available	Composite: .83/.77	.89/.87	.83/not available	.85/not available	.69/.71	.94/not available	Composite: .95/.87	Composite: .71/.53

*Denotes adolescent and child instruments.

TABLE 4
Methodological Quality Summary following QUADAS Standards

	Study First Author, Publication Year, and Life Stage			
	Jew, 1999, Adolescents	*Oshio, 2003, Older Adolescents and Young Adults*	*Hjemdal, 2006, Adolescents*	*Prince-Embury, 2008, Adolescents*
Representative sample spectrum	+	+	+	+
Reference standard	+	+	+	+
Time for adversity change during testing limited	−	+	+	+
Partial verification	+	+	+	+
Differential verification	+	+	+	+
Incorporation	+	+	+	+
Test review	n.a.	n.a.	n.a.	n.a.
Diagnostic review	n.a.	n.a	n.a.	n.a.
Clinical review	+	+	+	+
Uninterpretable results	?	?	?	?
Withdrawals	+	+	+	?
Sponsoring precluded	+	+	+	+

	Study First Author, Publication Year, and Life Stage					
	Wagnild, 1993, Adults	*Baruth, 2002, Adults*	*Connor, 2003, Adults*	*Friborg, 2003, Adults*	*Sinclair, 2004*	*Ryan, 2009*
Representative sample spectrum	+	+	+	+	−	+
Reference standard	+	+	+	+	+	+
Time for adversity change during testing limited	+	+	+	+	+	+
Partial verification	+	+	+	+	+	+
Differential verification	+	+	+	+	+	+
Incorporation	+	+	+	+	+	+
Test review	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Diagnostic review	n.a.	n.a	n.a	n.a	n.a	n.a
Clinical review	+	+	+	+	+	+
Uninterpretable results	?	?	?	?	?	?
Withdrawals	+	+	+	+	+	+
Sponsoring precluded	+	+	+	+	+	+

including a range of outcomes, such as health status, educational attainment, and vocational success. Anomalous, positive outcomes were defined as those which were better than expected from the empirical literature, given the adversity experienced.

Literature Search and Data Sources

Studies used in this review were obtained following the guidelines of the Cochrane Collaboration (Reitsma et al., 2009) from electronic searches of the following databases through 2009: Academic Search Complete, Alt HealthWatch, CINAHL Plus with Full Text, EBSCO Animals, E-Journals, ERIC, Health Source: Nursing/Academic Edition, MasterFILE Premier, MEDLINE, Professional Development Collection, PsycARTICLES, Psychology and Behavioral Sciences Col-

lection, PsycINFO, PubMed, Social Work Abstracts, JSTOR, and Google Scholar. Keywords entered were: resilience instruments, resilience/resiliency, resilience measures, protective mechanisms, and scale validation.

The articles were scanned for references. Abstracts for additional references were obtained and reviewed. Finally, requests for relevant articles and reviews were made to professionals involved in resiliency intervention and research across disciplines, and results were evaluated for inclusion criteria and to ensure that appropriate instruments had not been omitted.

Inclusion Criteria and Study Selection

Inclusion criteria specified peer-reviewed journal articles published in English up to 2009 reporting high quality (see below) validation of resiliency instruments for children, adolescents, adults, or older adults. Statistical conclusion validity was assessed initially to exclude studies which reported insufficient statistical data or used inappropriate statistical methods or validation criteria to determine psychometric properties, including specification of procedures used to determine statistical properties of some dimensions of both validity and reliability.

The two researchers, working independently, reviewed the retrieved abstracts and compared their results (Moher, Liberati, Tetzlaff, & Altman, 2009). Differences were discussed and recorded until consensus was reached. Full text articles were retrieved for those remaining abstracts, and the same independent review process followed (see Figure 1).

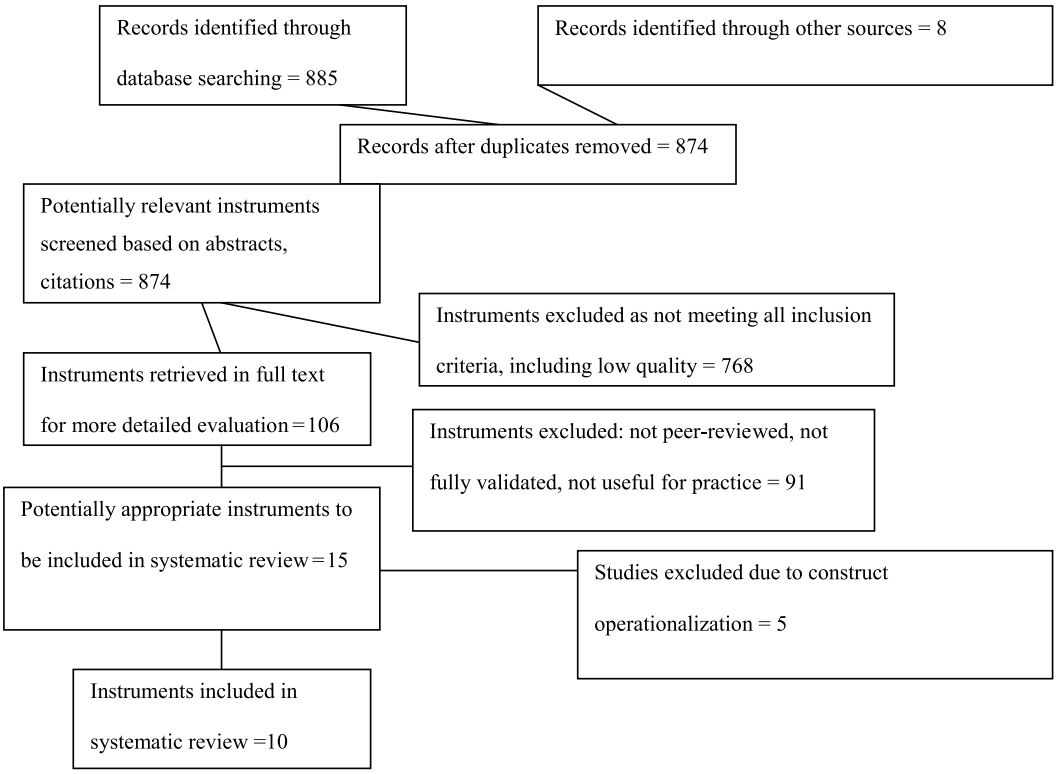

FIGURE 1 Flow chart of resilience instrument validation studies retrieval process following Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

Data Extraction

Studies that met inclusion criteria had data extracted by one author, followed by review by the other. Population, Intervention, Comparison, and Outcome (PICO) criteria, as recommended by Gambrill (2006), were applied to all studies. The answers to PICO questions define the population under study, the specified measure and its use of extrinsic, contextual, as well as intrinsic, intrapsychic, protective mechanisms, the comparison instrument if any, and specified outcomes, all with an element of time (e.g., how old are the participants, when is the outcome measured). Finally, quality of evidence was considered during the data synthesis phase as well, as recommended by Boruch et al. (1999) and Gambrill (2006).

Quality Assessment

We used the validity framework approach (Cook & Campbell, 1979; Wortman, 1994; Reitsma et al., 2009) for this study both as inclusion criteria and to evaluate the quality of included studies. With reference to construct validity, studies were evaluated to determine degree of match with the operationalization of resilience defined above. External validity was assessed for sample characteristics and sampling method, life course applicability, and relevance to social work practice. Then internal validity was assessed, excluding studies with fewer than two validity and reliability analyses and insufficient sample size to meet measure validation criteria of 2 participants per item for sample size (Nunnally, 1978) and 5–30:1 for participant to variable ratio when factor analytic methods were used (Osborne & Costello, 2004), since both issues may introduce excessive threats to internal validity. Statistical conclusion validity was assessed to verify use of appropriate statistical methods and validation criteria.

For further assessment of quality of evidence, a summary score approach, using scales such as the Downs and Black tool (Downs & Black, 1998), has been used recently for systematic reviews of self-report diagnostic/screening measures such as this one (e.g., Gorber, Tremblay, Moher, & Gorber, 2007). However, in 2009, Reitsma and collegues for the Cochrane Collaboration (Reitsma et al., 2009) recommended against this approach, supporting in its place the qualitative approach of a modified 11-item QUADAS (Quality Assessment of Diagnostic Test Accuracy Studies) checklist tool (Whiting et al., 2006); therefore this approach has been used here. Items which pertain to diagnostic measures rather than the type of measures of functioning examined here are indicated as "not applicable."

RESULTS

Ten scales met a priori inclusion criteria for this review. Eight scales were validated on American samples, while two—the Resilience Scale for Adolescents and Adolescent Resilience Scale—were originally validated on non-American samples and have been included due to their adherence to inclusion criteria, availability in English, and good convergent and discriminant validity with scales validated on American samples. Refer to Tables 1 and 2 for construct operationalization, Table 3 for psychometric properties, and Table 4 for study quality summary.

Child and Adolescent Scales

Resilience Scale for Adolescents. The Resilience Scale for Adolescents (READ) is a 28 item scale, rated on a 5-point Likert scale. Five factors are discerned: Personal Competence, Social Competence, Structured Style, Family Cohesion, and Social Resources (Hjemdal, Friborg, Stiles, Martinussen, & Rosenvinge, 2006). The READ was validated on 425 adolescents between

the ages of 13 and 15 in Norway (Hjemdal et al., 2006). Currently, validation of the READ is occurring on American and other non-Scandinavian populations (O. Hjemdal, personal communication, June 7, 2010). The scale is available at no cost by request to the first author.

Resilience Scale for Children and Adolescents. The Resilience Scale for Children and Adolescents (RSCA) was developed for use in preventive screening for psychological vulnerability (Prince-Embury, 2008). The RSCA consists of three scales that assess for resilience in children and adolescents: Sense of Mastery, Sense of Relatedness, and Emotional Reactivity (Prince-Embury & Courville, 2008a). Sense of Mastery is a 20 item scale rated on a 5-point Likert scale and consists of three content areas: optimism, self-efficacy, and adaptability. The Sense of Relatedness consists of 24 items rated on a 5-point Likert scale and encompasses comfort and trust in others, perceived access to support by others, and capacity to tolerate differences in others. The Emotional Reactivity scale consists of 20 items rated on a 5-point Likert scale and consists of sensitivity/threshold for and intensity of reaction, length of recovery time, and impairment while upset. The RSCA validation consisted of normative samples of 226 children aged 9 to 11 years, 224 adolescents aged 12 to 14 years, 200 adolescents between 15 and 18 years (Prince-Embury & Courville, 2008b), and a clinical sample of 169 adolescents between ages of 15 and 18 years (Prince-Embury, 2008). This scale's 3rd grade reading level may be conducive to use with children and adolescents with special needs, although it has not been validated with this population. The scale may be purchased online from the PsychCorp Division of Pearson Assessments at http://psychcorp.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=015-8006-186&Mode=summary.

Adolescent Resilience Scale. The Adolescent Resilience Scale (ARS) for college-age youth consists of a 5-point Likert 21 item scale, consisting of three factors: novelty seeking, emotional regulation, positive future orientation. The construct validation on a Japanese population of 207 young adults between the ages of 19 and 23 (Oshio, Kaneko, Nagamine, & Nakaya, 2003) differentiated among groups who were vulnerable (high stressors and psychopathology), resilient (high stressors, low psychopathology), and well adjusted (low stressors, low psychopathology). The scale is available at no cost from the first author's website at http://psy.isc.chubu.ac.jp/∼oshio lab/index_e.html

Resilience Skills and Abilities Scale. The Resilience Skills and Abilities Scale (RSAS), originally developed as the Adolescent Resiliency Belief System Scale (Jew, 1997), consists of 35 items rated on a 5-point Likert scale (Jew, Green, & Kroger, 1999). Validation of this measure took place through four studies of high school students. Initially, the RSAS was comprised of four sub-scales. During the fourth validation study, two of the subscales were merged, reducing the number of subscales to three: Active Skill Acquisition, Future Orientation, and Independence/Risk Taking. Thus, this scale operationalizes resilience in a psychological context, of characteristics that individuals use in stressful contexts, drawing heavily on the cognitive appraisal theory of Mrazek and Mrazek (1987). This scale is available at no cost from the first author.

Validity and reliability issues. Quality indicators of sufficient sample size and type, appropriate validation criteria, and appropriate statistical methods were required for study inclusion. Sample sizes used for validation of instruments were adequate for the instruments reviewed. Sample sizes exceeded 100, with the largest samples used for the RSCA ($n = 819$) for the child and adolescent instruments (see Table 3).

Studies reporting psychometric properties of the instruments did not cover all aspects of validity and reliability, but did report internal reliability, test–retest/stability reliability and construct, factorial, convergent, divergent, and/or predictive validity, albeit with the resilience construct was

limited to intrapsychic, individual traits in all instruments except the READ, limiting their utility for social workers. Studies generally reported a level of internal reliability that was acceptable at Cronbach's alpha = .70 or above (Nunnally, 1978). An intraclass correlation coefficient of .50 for test–retest reliability from pre-test to post-test may be considered an acceptable level of stability reliability (Fleiss, 1981), and the RSCA and RSAS reported at least that level. However, the statistic used to calculate test–retest reliability was not always specified, making it difficult to assess the meaning of the stability reliability coefficients reported. Simple correlations, in particular, may be more affected by temporal instability and measurement error (Heise, 1969). Length of time between test–retest was 6 months for RSAS and not specified for the RSCA.

Results for the RSCA indicate that all three measures exhibit strong internal consistency and construct validity. Prince-Embury identifies the need for additional research to accompany preliminary findings to increase sample size and enhance understanding of RSCA scores associated with psychological symptoms (Prince-Embury, 2008).

The initial validation study of the ARS (Oshio, Nakaya, Kaneko, & Nagamine, 2002) found acceptable internal reliability. The scale has shown good convergent and discriminant validity with the American-validated scale of the Big Five Personality Inventory (Nakaya, Oshio, & Kaneko, 2006). However, test–retest reliability was not reported in published studies.

The RSAS appears both reliable and valid, showing acceptable intraclass correlations indicating test–retest reliability (.36–.70) and internal consistency (.68–.95). The authors call for further research to refine the instrument and increase the instrument's relevance to resilience as a construct (Jew et al., 1999). However, later use of the instrument has been confined to a dissertation (Bass, 2006).

The only identified child/adolescent measure utilizing the full construct was the READ. The READ scale shows good discriminant validity with the Short Mood and Feeling Questionnaire and Social Phobia Anxiety Index for Children, both American-validated scales (Hjemdal, 2007) and good predictive validity relevant to prevention efforts (Hjemdal, Aune, Reinfjell, Stiles, & Friborg, 2007). The READ appears both reliable and valid. Further studies should replicate the validation of this scale, since the initial age group only spanned two years. A Norwegian validation of a shorter, 23-item version of the scale was recently reported as yielding acceptable psychometric properties (von Soest, Mossige, Stefansen, & Hjemdal, 2010). This scale not only has the advantage of measuring the full resilience construct, but also has been co-developed with an adult version, the Resilience Scale for Adults, making them particularly useful for longitudinal research and treatment monitoring (RSA; see below).

Predictive validity was established for the READ, the RSCA, and the RSAS. For a methodological quality summary, see Table 4.

Adult Scales

Resilience Scale. The Resilience Scale (RS) is a 25-item scale rated on a 7-point Likert scale measuring two factors: personal competence, and acceptance of self and life; it was originally developed on a sample of older women (Wagnild, & Young, 1990). The RS was validated on 810 adults between 53 and 95 years (Wagnild & Young, 1993). Following the validation of the RS, numerous studies have used this instrument on individuals of all ages and ethnic backgrounds, and a 14 item version was developed and validated (Wagnild, 2009). The scale is written at a 6th grade reading level. The Resilience Scale is available at no cost, and the User's Guide for purchase, from http://www.resiliencescale.com.

Connor-Davidson Resilience Scale. The Connor-Davidson Resilience Scale (CD-RISC) consists of 25 items rated on a 5-point Likert scale that address 5 factors: personal competence,

high standards, and tenacity; trust in one's instinct, tolerance of negative effects, and strengthening effects; positive acceptance of change and secure relationships; control; and spiritual influences. The validation sample of the CD-RISC consisted of 6 groups (general population, primary care, psychiatric outpatients, generalized anxiety disorder, and PTSD) with a total of 827 participants (Connor & Davidson, 2003). The validation of CD-RISC suggested that health influences resilience and resilience can improve through treatment when psychiatric disorders constitute the ongoing context of adversity (Connor & Davidson, 2003; Davidson et al., 2005; Vaishnavi, Connor, & Davidson, 2007). This scale is available at no cost from the first author.

Baruth Protective Factors Inventory. The Baruth Protective Factors Inventory (BPFI) consists of 16 items rated on a 5-point Likert scale, addressing four factors: adaptable personality, supportive environment, fewer stressors, and compensating experiences. The BPFI was validated on 98 undergraduate students in a Human Development course between the ages of 19 and 74 (Baruth & Carroll, 2002). The BPFI should be validated on a larger sample prior to use in assessing for the protective factors that contribute to the presence of resilience. Furthermore, the initial researchers had predominantly female Hispanic and Anglo-American participants in the initial validation and suggest that further research is needed to validate the instrument for other populations. The scale was modified to generate a family scale (Gardner, Huber, Steiner, Vazquez, & Savage, 2008), but has had no further validation studies to date. The scale may be found in the appendix to the validation article.

Resilience in Midlife. The Resilience in Midlife Scale (RIM) consists of 25-items, rated on a 5-point Likert scale and contains four factors: self-efficacy, family/social networks, perseverance, internal locus of control, coping and adaptation. The RIM was validated on an Australian population of 130 adults between the ages of 35 and 60 (Ryan & Caltabiano, 2009). The RIM is the only peer reviewed instrument focusing on midlife present in the literature to date. Further research should be done to demonstrate the effectiveness of the RIM in assessing for resilience in individuals during midlife. The scale is available at no cost by request to the first author.

Resilience Scale for Adults. The Resilience Scale for Adults (RSA) was originally validated on 183 adults between the ages of 18 and 75 living in Scandinavia (Hjemdal, Friborg, Martinussen, & Rosenvinge, 2001; Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003). After the initial validation, the original researchers continued to modify and validate the RSA and publishing the updates in the academic literature (Friborg, Hjemdal, Martinussen, & Rosenvinge, 2009; Friborg et al., 2005). Currently, the RSA consists of 33-items that address six factors: positive perception of self, positive perception of future, social competence, structured style, family cohesion, and social resources. Thus, this scale operationalizes resilience in both psychological and ecological/contextual terms. Currently, in the United States, the RSA is in the process of validation on an American population (O. Hjemdal, personal communication, June 7, 2010). The scale is available at no cost by request to the first author.

Brief Resilient Coping Scale. The Brief Resilient Coping Scale (BRCS) is a brief assessment aimed at identifying one's ability to cope with stress. There are four items; the response format is a 5-point Likert scale and measures one factor, Adaptive Coping (Sinclair & Wallston, 2004). The scale is available at no cost by request to the first author.

Validity and reliability issues. Quality indicators of sufficient sample size and type, appropriate validation criteria, and appropriate statistical methods were required for study inclusion. Sample

sizes used for validation of adult instruments were adequate for the instruments reviewed. Sample sizes generally exceeded 100, with the exception of the BPFI ($n = 89$), with the largest samples used for the RS ($n = 810$) for the adult instruments. All adult instruments but the BCRS addressed the full operationalization of the construct. As in the case of the child instruments, studies reporting psychometric properties of the adult instruments did not cover all aspects of validity, but did report internal reliability, test–retest/stability reliability and construct, factorial, convergent, divergent, and/or predictive validity. Discriminant and convergent validity were established for all instruments but the BPFI and RS. Predictive validity was established for the RSA, CD-RISC, and BRCS.

In summary, results of the BPFI and RIM validations revealed sound psychometric properties, including good split-half reliability and internal consistency. The BRCS meets the minimal standard for reliability and validity of a resilience instrument; however, it operationalizes resilience primarily in terms of intrapsychic traits. Further research needs to be conducted in order to solidify the reliability and validity of these three measures. However, lack of subsequent replication of the BPFI, BRCS, and RIM to date limits support for their use by social workers.

Stronger results supported by repeated validation studies characterized the RS, the CD-RISC, and the RSA. The RS presented strong internal consistency reliability, concurrent validity, and construct validity (Wagnild & Young, 1993). The RS is adequate in measuring different ages and races (Wagnild, 2009). For the CD-RISC, subsequent validation study with young adults (Campbell-Sills & Stein, 2007) and cross-cultural validation studies (Yu & Zhang, 2008; Bitsika, Sharpely, & Peters, 2010; Singh & Yu, 2010) found acceptable psychometric properties for use in intervention. The RSA continues to demonstrate sound psychometric properties, and good internal consistency and reliability with general and clinical Scandinavian samples (Friborg, Barlang, Martinussen, Rosenvinge, & Hjemdal, 2005; Friborg et al., 2009; Hjemdal, 2007) and in cross-cultural validation and intervention studies (Jowkar, Friborg, & Hjemdal, 2010; Lever & Gomez, 2010; Mikolajczak, Roy, Luminet, & de Timary, 2008), showing good convergent, discriminant, and predictive validity.

Test–retest reliability was only reported for the RSA (4 months) and the CD-RISC (unreported length) among the adult instruments. These differences become important to consider when selecting the most reliable instruments to use in longitudinal research and to evaluate outcomes in longer-term therapy/intervention, since a reduced time interval between tests is known to reduce variance in the scores and may introduce recall threats to reliability (Fleiss, 1981; Heise, 1969). However, with the exception of the BPFI, reliability estimates of the included test scores have been studied in several different investigations, contributing to support for the robustness of these measures' test score reliability.

Methodological quality of instruments included in this review was assessed as high during interpretation of study results (see Table 4), as expected, since QUADAS quality standards were adopted as part of inclusion criteria. Use of these criteria both in inclusion criteria and as a standard for interpretation of review results is recommended by the Cochrane Collaboration (Reitsma et al., 2009).

DISCUSSION

Validated resilience instruments now exist for children, adolescents, and adults, normed on a variety of populations. These populations include adults over age 65, healthy adults, adults with chronic health conditions, college students, teens, and children ages 9 to 12. Only one instrument for children under age 13, the trait-focused RSCA, was included in this review, although some instruments are being used for Head Start and middle school populations (including grade 5) without formal, published validation studies (e.g., the Devereaux Early Childhood Initiative, n.d., and see LeBuffe & Naglieri, 1999; the Resilience and Youth Development Module of the

California Healthy Kids Survey, n.d.; and see Benard, 2004). Psychometric properties for these child resilience measures have not yet been published in peer reviewed journals and so did not meet the inclusion criteria for this review.

The published measures have primarily been used for research to date, although many were developed with intervention applications in mind. For example, the developers of the BPFI suggest specific application of their instrument in individual and family therapy, via assessment of past protective factors and goal-setting to target specific factors, re-administration of the instrument to monitor practice outcomes, and assessment of family members' individual score congruence (Baruth & Carroll, 2002). Notably, the full construct measures which have been used to monitor practice outcomes are the READ for adolescents, and the CD-RISC, the RSA, and RS for adults (e.g., Smith-Osborne, 2012; Connor, Davidson, & Lee, 2003; Neill & Dias, 2001; Wagnild, 2003).

The purpose of the authors in this review is to support more extended use of these instruments in practice, for assessment as well as in monitoring treatment interventions. Since the social work profession historically works with vulnerable and disadvantaged populations, the construct of resilience has particular salience in assessing social work clients and measuring the outcomes of social work prevention and treatment interventions. Inclusion of resilience in social work assessment is consistent with the strengths-based perspective by permitting identification of strengths for support and enhancement in the intervention plan. Empirical evidence suggests that analysis of protective and risk factors within resiliency domains can be useful in setting measurable goals in the intervention plan, since levels of resiliency have been found to affect treatment response across several different types of adversity, such as divorce (Masten, 2001), poverty (Masten, Best, & Garmezy, 1990; Wagnild, 2003), school bullying (Martin & Marsh, 2009), and chronic illness, including psychiatric disorders (Connor & Davidson, 2003; Connor et al., 2003; Davidson et al., 2005).

When should practitioners consider including a measure of resilience in initial assessment? Since these results identified measures of high quality for adolescents and adults, the reviewers recommend that clients of these life stages be assessed using full construct resilience measures (e.g., RS, RSA, CD-RISC, READ) when an ongoing condition of adversity, rather than a single stressor/event (consistent with the bulk of baseline theory and construct development to date), can be clearly identified and when the goal of the assessment is not limited to diagnosis only, but to development of a comprehensive prevention or intervention plan. Rather than measuring levels of psychopathology, the resilience instruments reviewed in this study measure levels of both intrapsychic and contextual protective factors. They therefore offer more to the social work practitioner in determining specific protective domains for selective focus for enhancement strategies as part of the intervention plan.

Use of resilience instruments in planning and monitoring intervention in cases of both ongoing adversity and single stressors/events can direct the practitioner to targeted protective mechanisms not only with reference to the individual client's strengths, but also with reference to the strengths of the client's environment in directing salient resources to the client targeted to specific resilient outcomes appropriate to life stage or trajectory. For example, in addressing the resilient outcome of increased educational attainment for an at-risk population which is not identified for special education services, informational social support may be more protective than emotional social support, so the practitioner may use a resilience instrument to assess the levels of these different types of protective factors and target intervention strategies accordingly (e.g., Dubow, Tisak, Causey, Hryshko, & Reid, 1991; Martin & Marsh, 2009; Smith-Osborne, 2009a, 2009b).

In considering selection of instruments for practice, social workers may wish to consider not only the age of the clients in question but also temporal issues and level of focus in the operationalization of each instrument as it pertains to their client population. Temporally, some instruments (e.g., RSCA, ARS) operationalize resilience in relation only or primarily to specific time-specific stressors or traumatic events, usually outside the range of typical developmental stage demands for adaptation or expected losses. Others (e.g., RSA, READ) operationalize resilience

primarily in relation to ongoing or long term conditions of adversity. Practitioners, then, should select the instrument which has good fit with the temporal nature of the adversity experienced by the client. Another major issue being raised in resilience research now, which has affected the development of measures, is the alternate focus either on primarily intrapsychic, personal traits and states characteristic of resilient individuals, or on dynamic processes which include adverse context and the provision of interpersonal and concrete resources by the family, community, and society to the individual or group in adversity. Those instruments which include contextual items and scales will provide a better fit with the profession's focus on the person-in-environment and transactional, ecological nature of issues which trigger help-seeking. Future research must address the utility of such instruments in supporting intervention outcomes.

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