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A REVIEW OF INSTRUMENTS MEASURING RESILIENCE

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The objectives of the study were to evaluate the psychometric properties and appropriateness of instruments for the study of resilience in adolescents. A search was completed using the terms resilience *and* instruments *or* scales *using the EBSCO database (CINAHL, PreCINAHL, and Academic Search Premier), MEDLINE, PsychINFO and PsychARTICLES, and the Internet. After instruments were identified, a second search was performed for studies reporting the psychometric development of these instruments. Using inclusion and exclusion criteria, six psychometric development of instrument studies were selected for a full review. A data extraction table was used to compare the six instruments.*

Two of the six instruments (Baruth Protective Factors Inventory [BPFI] and Brief-Resilient Coping Scale) lacked evidence that they were appropriate for administration with the adolescent population due to lack of research applications. Three instruments (Adolescent Resilience Scale [ARS], Connor–Davidson Resilience Scale, and Resilience Scale for Adults) had acceptable credibility but needed further study in adolescents. One instrument (Resilience Scale [RS]) was determined to be the best instrument to study resilience in the adolescent population due to psychometric properties of the instrument and applications in a variety of age groups, including adolescence.

Findings of this review indicate that the RS is the most appropriate instrument to study resilience in the adolescent population. While other instruments have potential (e.g., ARS, BPFI) as they were tested in the adolescent and young adult populations, they lack evidence for their use at this time. An evaluation of the review and recommendations are discussed.

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BACKGROUND

Adults have always expressed apprehension regarding adolescent behavior that puts them at risk (e.g., sexual behavior, drug experimentation). According to Erikson (1968), the developmental stage of "identity versus role confusion" often results in risky behaviors in the adolescent. Risk is an essential component (or "factor") in the formation of identity, as the adolescent "tries on" different roles (Erikson, 1968) (p. 96). Adolescents participate in a variety of risk behaviors that compromise their health and well-being (Rew & Horner, 2003). Results of the latest National Youth Risk Behavior Survey (Centers for Disease Control and Prevention, CDC, 2004) report a variety of student behavior statistics, including alcohol/drug use, sexual behaviors, dietary behaviors, physical activity, and behaviors contributing to injury. These risk behaviors, which may lead to higher morbidity and mortality outcomes in middle and high school youth, were reported most frequently in adolescents ages 12 to 17 years (CDC, 2004; Rew & Horner, 2003).

Little is known about how risk-taking and health-promoting behaviors develop during childhood or how these behaviors are related to the health-risk behaviors manifested in adolescence (Rew & Horner, 2003). In addition to risk factors, researchers have documented that protective resources can interact with existing risks to influence health-promoting behaviors (Davey, Eaker, & Walters, 2003; Haase, 2004; Hunter, 2001; Rew & Horner, 2003; Rew, Taylor-Sheehafer, Thomas, & Yockey, 2001). The approach of protecting youth from harm through a combination of risk reduction and promotion of protective factors has sparked great interest in resiliency-based research (Rutter, 1993).

Resilience is a concept that is viewed as a continuum of adaptation or success (Hunter & Chandler, 1999; Tusaie & Dyer, 2004). The roots of resilience are found in two bodies of literature: the psychological aspects of coping and the physiological aspects of stress (Tusaie & Dyer, 2004). Researchers argue that the concept of resilience may be a set of traits (Jacelon, 1997), an outcome (Olsson, Bond, Burns, Vella-Brodrick, & Sawer, 2003; Vinson, 2002), or a process (Olsson et al., 2003). Resilience is most often considered a personality characteristic that moderates the negative effects of stress and promotes adaptation. Resilience is further defined as the ability to successfully cope with change or misfortune (Wagnild & Young, 1993).

Several researchers and scholars have generated theories and developed frameworks related to resilience. Polk (1997) developed a middle range theory for this concept. More recently, Rew and Horner (2003)

developed the Youth Resilience Framework to address individual and sociocultural risk factors and protective resources that enhance or hamper positive and negative health outcomes in adolescence. Resilience represents the interaction between risk factors (vulnerability) and protective resources (protection). Interventions to improve health outcomes are aimed at enhancing resiliency in the effort to decrease high-risk behaviors.

The Adolescent Resilience Model has been proposed by Haase and colleagues (Haase, 2004; Haase, Heiney, Ruccione, & Stutzer, 1999). This model was developed through triangulation research of adolescents with chronic illness, especially cancer. The components of this model include individual protective factors (courageous coping, hope and spiritual perspective), family protective factors (family atmosphere and family support and resources), and social protective factors (health resources and social integration). According to the researchers, the outcome factors depicted by the model include resilience (self-esteem, self-transcendence, and confidence/mastery) and quality of life (sense of well-being) (Haase et al., 1999).

Empirical evidence has thus led to the development of models of resilience and instruments that operationalize the concept. Resilience has enormous utility for nursing, as it has been demonstrated that resilient individuals are individuals who have positive outcomes in the face of adversity (Rew & Horner, 2003). An understanding of resilient characteristics and the processes that enhance resilience in individuals can enable nurses to promote such behaviors during life transitions and periods of adversity. Reliable and valid instruments are necessary to assess resilience.

METHODS

Objective of the Review

A review was undertaken to identify instruments that measure resilience. The instruments were evaluated for their psychometric properties and appropriateness for the study of resilience in adolescents.

Key Questions

The research questions to be considered in the review included the following:

1. What instruments are available that measure resilience?
2. What are the psychometric properties of the identified instruments?
3. What are the applications of the instruments?
4. Which instrument is most appropriate to measure resilience in the adolescent population?

Inclusion and Exclusion Criteria

Based on these key questions, a list of inclusion and exclusion criteria were developed (Table 1). Although adolescents are the target population, it was decided to evaluate instruments studied in all populations. All criteria had to be met in order for the study to be included in the review.

Literature Search and Retrieval Process

A variety of search strategies were used to identify relevant studies for the systematic review (Table 2). Search terms included Resilience AND Scale OR Instrument. Limiters (where possible) included English language AND human. PsychINFO and PsychARTICLES were searched to find studies in the field of psychology, as many of the studies were conducted in this

Table 1. Literature searches: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
1. Study population • All races, cultural, and ethnic groups • Individuals of any age 2. Study settings • Any types of settings 3. Time period • Published from 1980 to present 4. Publication criteria • English only • Articles in print and unpublished manuscripts identified that could be retrieved from the original author 5. Admissible criteria (study design and other criteria) • Original research study of the psychometric development and/or evaluation of the instrument • Study included presentation of instrument items • Eligible research studies include: All types of study designs Minimum sample size of at least 50 If longitudinal study, retention ≥ 70% When several studies from the same research data were published, the original psychometric study was included.	1. The study contains no original data. 2. The study did not measure resilience, or a construct of resilience, in study participants 3. The study did not include the items from the instrument. 4. The article or manuscript could not be retrieved.

Table 2. Literature search strategy: Yield and final article count

Database and search strategy	Total references identified	Articles excluded	Articles retained for full review	Articles rejected after full review	Articles included in systematic review
PsychINFO and PsychARTICLES	123	110	13	8	5
EBSCO (CINAHL, PreCINAHL, Academic Search Premier)	181	173	8	7	1
MEDLINE	45	43	2	2	0
Journal searches	3	3	0	0	0
Author searches	18	9	9	9	0
Internet—Google search engine	0 duplicates	0	0	0	0
Totals	370	338	32	26	6

Note: Numbers retained for review reflect deletion of duplications.

discipline. Secondly, the EBSCO database was searched to locate studies in CINAHL, PreCINAHL, and Academic Search Premier. MEDLINE also was searched for additional studies. The majority of articles were found in this first search, with mainly duplications occurring when using the latter search strategies. Once original psychometric development studies were retrieved, author names, instrument or scale names, and journal names were searched for studies using the resilience instruments/scales. Lastly, an Internet search was made that only resulted in duplications. Not evident in the search are the attempts made to retrieve "gray" literature (e.g., unpublished sources or literature not available through usual bibliographic sources or databases). Where applicable, dissertation abstracts were located and attempts were made to contact the authors (n = 3). In addition, one author was contacted for further clarification on the instrument's format, and requests for unpublished manuscripts were made (see Figure 1).

An Evaluation of Quality and Strength of Evidence

One reviewer evaluated the study abstracts using the inclusion and exclusion criteria previously defined. The main reasons for exclusion included no original data (50%), no reliability and/or validity values (8%), loss of too many study subjects during a longitudinal study (3%), and not being

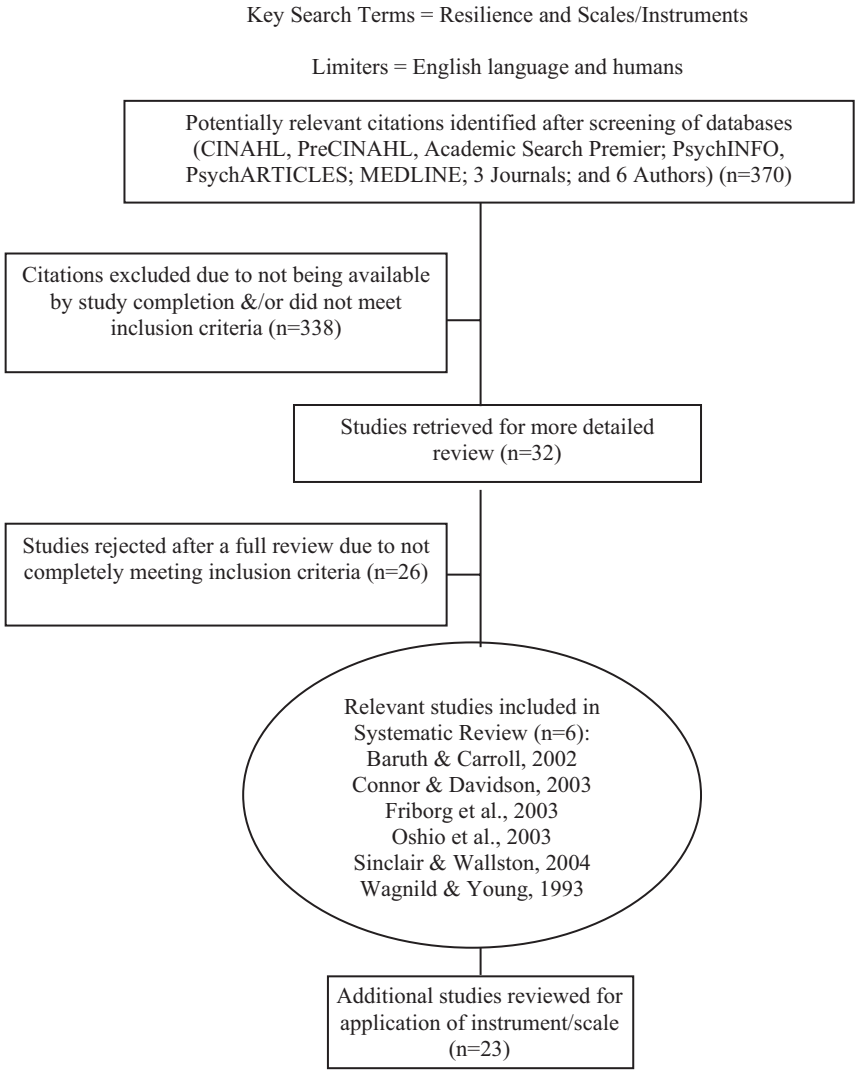

Figure 1. Flow diagram of study selection process.

able to retrieve the article due to lack of response by the original author (e.g., dissertations and unpublished manuscripts; 39%).

Six psychometric development studies were selected for the in-depth review. All of the studies retained for review were quantitative studies that described the initial psychometric development of the individual

instrument. The number of study participants ranged from 59 to 810. Target populations ranged from undergraduate students (n = 2) to adults (n = 4) in general and clinical populations. The majority of the study subjects were female. The variety of ethnic backgrounds included Whites, Norwegians, Japanese, and multiethnic groups (one did not report specific ethnicity). One study was longitudinal (another used a longitudinal piece for the control group), and only one study used controls. All of the instruments evaluated were self-report scales (e.g., Likert, n = 5, and Semantic Differential, n = 1), which included reliability and validity values.

RESULTS

Data Extraction

Studies were reviewed with a data extraction coding tool. Table 3 displays the categories of data extracted and related data for each of the six studies. All of the studies measured the construct of resilience either directly or indirectly. While only two studies designated a specific theoretical basis, the remaining authors attributed their framework to resilience in some form. All studies included the full instrument and many included scoring interpretations. Psychometric properties, such as norming, scaling, reliability, and validity values, were reported in all of the studies, many of which were within acceptable limits. When the reliability and validity values were minimal or unacceptable, this was addressed by the authors. In addition to reliability and validity calculations, descriptive statistics to describe the sample and/or further define the instrument were available, as were factor analyses. A discussion of the advantages and disadvantages of the instrument and instrument application further assisted in the review of each of the instruments. The following section contains a summary of the instruments reviewed.

Baruth Protective Factors Inventory

The Baruth Protective Factors Inventory (BPFI) is a 16-item 5-point (1–5) Likert Scale. The BPFI measures the construct of resilience by assessing four primary protective factors: adaptable personality, supportive environments, fewer stressors, and compensating experiences. The authors state that the reliability and validity of the BPFI will need further testing, as the scale is refined further (Baruth & Carroll, 2002). There are no applications of the BPFI in the literature.

Table 3. Data extraction and evaluation of the instruments measuring resilience

Instrument name	Baruth Protective Factors Inventory (BPFI)	Connor–Davidson Resilience Scale (CD-RISC)	Resilience Scale for Adults (RSA)	Adolescent Resilience Scale (ARS)	Brief-Resilient Coping Scale (BRCS)	Resilience Scale (RS)
Author(s)	Baruth & Carroll, 2002	Connor & Davidson, 2003	Friborg et al., 2003	Oshio, Kaneko, Nagamine, & Nakaya, 2003	Sinclair & Wallston, 2004	Wagnild & Young, 1993
Domain or construct measured	Protective factors that support resiliency Psychometric development of instrument	Resilience as a measure of successful stress-coping ability Psychometric development of instrument	Central protective resources of healthy adjustment Psychometric development of instrument	Adolescent resilience Construct validity of the ARS	Resilient coping behaviors Psychometric evaluation of instrument	Resilience as a positive personality characteristic that enhances individual adaptation Psychometric development of instrument
Theoretical basis	Research support of four protective factors: adaptive personality, supportive environment, fewer stressors, and compensating experiences	Stress, coping, and adaptation research	Adjustment and coherence	Research support of resilience	Polk's middle range theory of resilience	Research support of the construct of resilience
Target population • Number • Age • Gender • Ethnicity	Undergraduate psychology students 98 19–54 years (predominantly young) 19 male, 79 female multiethnic	Multi-study sample: general population (n = 577), primary care outpatients (n = 139), psychiatric outpatients in private practice (n = 43), subjects in a study on generalized anxiety disorder (n = 25),	Patients from an adult outpatient clinic 59 Males (n = 14) ages 19 to 75 (mean = 33.7); females (n = 45) ages 18 to 75 (mean = 36.2)	Undergraduate students 207 104 Males 103 Females Ages 19 to 23 (mean = 20.2 years) Japanese sample	Two samples of adults with rheumatoid arthritis Group 1—90 females Group 2—140 males and females Group 1—mean age 46 years Group 2—57.8 years Ethnicity not reported	Random sample of readership of senior citizen periodical 810 adults Age range—53–95 (mean = 71.1) 62.3% female Caucasian (n = 796) Asian (n = 7) Ethnicity not reported (n = 7)

		subjects in 2 clinical trials on post-traumatic stress disorder (n = 22, n = 22) (last group only used for partial comparisons; other groups total n = 806) Majority female Majority white	Normal controls (randomly selected) consisted of 128 males (mean age 37.1) and 162 females (mean age 35.6) Norwegian sample			
Study setting	University	Multisite	Adult psychiatric outpatient clinic and controls	University	Not reported	Mailed survey
Study type and design	Quantitative, exploratory, psychometric development	Quantitative, exploratory, psychometric development	Quantitative, quasi-experimental, longitudinal component for controls only, psychometric development	Quantitative, exploratory, psychometric development	Quantitative, longitudinal, psychometric development	Quantitative, quasi-experimental, psychometric development
Length of follow-up	N/A	N/A	4 months for control group	N/A	3 months	N/A
Drop outs	none	none	Response rates for both groups reported	none	none	Response rate reported
Missing data	Not reported	Missing data available for gender and ethnic status	Not reported	Not reported	Not reported	Not reported
Number of items	16	25	37	21	4	25

(*Continued*)

Table 3. Data extraction and evaluation of the instruments measuring resilience (*Continued*)

Instrument name	Baruth Protective Factors Inventory (BPFI)	Connor–Davidson Resilience Scale (CD-RISC)	Resilience Scale for Adults (RSA)	Adolescent Resilience Scale (ARS)	Brief-Resilient Coping Scale (BRCS)	Resilience Scale (RS)
Psychometric Properties						
• Scaling	Fivepoint Likert Scale	Fivepoint Likert Scale	Not indicated	Fivepoint rating scale	Fivepoint rating skill	Sevenpoint Likert scale
• Dimension ality	Factor analysis yielded 3 subscales	Factor analysis yielded 5 subscales	Factor analysis yielded 5 subscales	Factor analysis yielded 3 subscales	Unidimensional A factor analysis did not support multi-dimensionality of the scale	Factor analysis yielded 2 subscales
• Norming	Reported with this original psychomet-ric development	Reported with this original psychometric development	Reported with this original psychomet-ric development	Reported with this instru-ment develop-ment but not described	Reported with this original psychometric development	Reported with this original psychomet-ric development
• Administration procedure	Directions for completion	Not described	Not described	Not described	Directions for completion	Directions for completion
• Scoring procedure	Combine scores of all items; higher score equals higher resil-iency for total scale and subscales	Combine scores of all items; higher score equals higher resil-ience	Not described	Total scale score and subscale scores obtained by calculating means	Not described	Combine scores of all items; higher score equals higher resilience

• Reliability	Internal consistency for total scale Cronbach's Alpha (.83) and subscales (adaptive personality .76, supportive environment .98, fewer stressors .55, and compensating experiences .83) using	Internal consistency for full scale Cronbach's Alpha .89 for group 1 and item-total correlations ranged from .30 to .70 Test-retest reliability assessed from subjects in groups four and five with intraclass correlation coefficient of .87	Internal consistency for (Cronbach's alpha) of all contrast scales indicate adequate psychometric properties. Internal consistency of subscales ranged from 0.67 to 0.90. Test-retest correlations satisfactory for subscales ranging from 0.69 to 0.84 ($p < 0.01$) Item-total correlations for subscales: personal competence (0.51 to 0.75), social competence (0.48 to 0.74), family coherence (0.56 to 0.74), social support (0.43 to 0.70), and personal structure (0.37 to 0.48)	Internal consistency among all factors of the ARS ($r = .72$ to $.75$ for subscale range)	Internal consistency for Cronbach's alpha reliability for the scale was computed for group 1 as 64 (first baseline), .76 (second baseline), .69 (end of intervention), and .71 (3 month follow-up). Cronbach's alpha reliability for the scale was computed for group 2 as .68. Pooled sample alpha was .69 Test-retest reliability for group 1 was .71 ($n = 87$, $p < .001$) during baseline and .68 ($n = 83$, $p <. 001$) at 3 months follow-up	Authors cite acceptable reliability from previous studies using the RS Reliability coefficient alpha of .91 Item-to-item correlations ranged from .37 to .75 (majority between .50 and .70, $p \leq .001$

(*Continued*)

Table 3. Data extraction and evaluation of the instruments measuring resilience (*Continued*)

Instrument name	Baruth Protective Factors Inventory (BPFI)	Connor–Davidson Resilience Scale (CD-RISC)	Resilience Scale for Adults (RSA)	Adolescent Resilience Scale (ARS)	Brief-Resilient Coping Scale (BRCS)	Resilience Scale (RS)
• Validity	Content validity—expert Construct validity—established by comparison with other established tools to determine correlations of subscales	Convergent and discriminant validity were assessed by correlating the scores of this scale with other more established instruments Convergent validity—present Discriminant validity—not present	Construct validity reported as high (no statistics reported) Discriminant validity was indicated by differential positive correlations between scale, the Sense of Coherence Scale, and the Hopkins Symptom Checklist	Coefficients alpha for total scale score .85; subscales Novelty seeking (.75), emotional regulation (.77), positive future orientation (.81) Construct validity was reported with comparison of mean scores to those of two other established scales	Content validity—panel of experts Predictive validity reported that the BRCS scores correlated in theoretically predicted directions with scores from a variety of other measures	A priori content validity (during construction of scale, items were selected that reflected generally accepted definitions of resilience from interviews with resilient individuals and with an expert panel) Authors cite acceptable validity from previous studies using the RS Concurrent validity support was shown by high correlations of the RS with well-established valid measures of the constructs linked with resilience and outcomes of resilience (depression r = –.37), life satisfaction (r = .30), morale (r = .28), and health (r = –.26)

Study results	The reliability and validity of the scale need to be further investigated to insure the accuracy and precision of the scale in the assessment of protective factors	The scale demonstrated good psychometric properties with a factor analysis yielding 5 factors. Scale demonstrates that resilience is modifiable and can improve with treatment.	The scale may be used as a valid and reliable measurement in health and clinical psychology to assess the presence of protective factors important to regain and maintain mental health.	The scale correctly reflects psychological features of individuals who show resilience after facing negative life events.	The scale demonstrated to possess adequate reliability and validity. The BCRS may be useful for identifying individuals in need of interventions designed to enhance resilient coping skills	The study supports the internal consistency reliability and concurrent validity of the RS as an instrument to measure resilience.
Instrument advantages	The scale can be useful for educators and counselors (with further refinement of the scale). Presence of reversed scored items	Tested in general population and in clinical samples Good internal consistency and test-retest reliability Validity demonstrated with other measures of stress and hardiness reflecting different levels of resilience 4 item Likert-forced response to positive or negative	Good construct and discriminant validity Presence of reversed scored items	Results support the construct of adolescent resilience	Easy to administer (4 items) Sufficient internal consistency and stability for a 4-item scale Scale can easily be administered multiple times in a longitudinal study	Multiple applications of the scale in both sexes, multiple ages, and ethnic groups with good reliability and validity are available.
Instrument disadvantages	Other factors not measured can affect resilience Reliability and validity need further investigation Cannot generalize findings to all ages and ethic groups	Assesses characteristics of resilience but does not assess the resiliency process Lack of administration procedure description and detailed scoring procedure No reversed scored items (risk for rating bias)	Questionable external reliability of scale due to non-random sample and low response rate Findings may be only generalizable to Norwegian adults seeking psychiatric treatment	Findings only generalizable to Japanese adolescents One published application of instrument (in Japanese)	Scale meets minimal reliability standards (.70) Scale brevity (4 items) can affect internal consistency Lack of administration procedure description and detailed scoring procedure	Test-retest reliability needs further evaluation Initial wording of items were compiled from women's statements only Further piloting of item wording is needed

(*Continued*)

Table 3. Data extraction and evaluation of the instruments measuring resilience (*Continued*)

Instrument name	Baruth Protective Factors Inventory (BPFI)	Connor–Davidson Resilience Scale (CD-RISC)	Resilience Scale for Adults (RSA)	Adolescent Resilience Scale (ARS)	Brief-Resilient Coping Scale (BRCS)	Resilience Scale (RS)
	Possibly small sample size Lack of administration-procedure description and detailed scoring procedure		Lack of administration procedure description and detailed scoring prcedure No reversed scored items (risk for rating bias)	Lack of administration procedure description and detailed scoring procedure	No reversed scored items (risk for rating bias)	Questionable as to whether the construct is unidimensional or multidimensional Lack of administration-procedure description and detailed scoring procedure No reversed scored items (risk for rating bias)
Applications for use of the measurement instrument	Scale may be useful for educators and counselors No studies using instrument reported in the literature	Designed for use with in mental health clinical sites Three applications in the literature (mental health) Assessment of post-traumatic stress disorder (Connor & Davidson, 2001) Post-traumatic stress disorder (Davidson, Payne, & Connor, 2005) Treatment of anxiety disorders (Pollack, Murray, & Davidson, 2004)	One application in the literature with the same sample population and primary author Resilience, personality, and intelligence: convergent and discriminate validity well supported; lower reliability than previously supported (Friborg, Barlang, Martinussen, Rosenvinge, & Hjemdal, 2005)	Has only been used with the same population with one application in the literature (by the same author and only available in Japanese)	May be easy to use (due to limited items), especially in the clinical mental-health setting No applications of use in the literature	Numerous applications in the literature, including both sexes and all ages, and ethnic groups Russian immigrants: reliability 88; construct validity .46–.81 (Arorian & Norris, 2000) Psychometric evaluation of the Russian version RA: internal consistency .87 (Aroian, Schappler-Morris, Neary, Spitzer, & Tran, 1997)

Adolescent mothers: Cronbach's alpha reliability .85 (Black & Ford-Gilboe, 2004)
Irish immigrants (Christopher, 2000)
Resilience and older women (Felten & Hall, 2001)
Alzheimer family caregivers (Garity, 1997)
Mexican women and depression: internal consistency reliability .90–.92, modified version .74–.77 (Heilemann, Lee, & Kury, 2002)
Psychometric evaluation of Spanish version of RS: Chronbach's alpha .93 (Heilemann, Lee, & Kury, 2003)
Sheltered battered women: Chronbach's alpha .94 (Humphreys, 2003)
Adolescents: alpha coefficient .72 (Hunter & Chandler, 1999)

(*Continued*)

Table 3. Data extraction and evaluation of the instruments measuring resilience (*Continued*)

Instrument name	Baruth Protective Factors Inventory (BPFI)	Connor–Davidson Resilience Scale (CD-RISC)	Resilience Scale for Adults (RSA)	Adolescent Resilience Scale (ARS)	Brief-Resilient Coping Scale (BRCS)	Resilience Scale (RS)
						Low income young Mexican Americans (Linderberg, Solorzano, Bear, Strickland, Galvis, & Pittman, 2002) Middle-age Soviet Union women: Chronbach's alpha .91 (Miller & Chandler, 2002) Mothers: Chronbach's alpha .85 (Monteith & Gilboe, 2002) Young adults and adventure education (Neill & Dias, 2001) Homeless adolescents: Cronbach's alpha .91 (Rew, Taylor-Sheehafer, & Taylor, 2002) Military mothers: Chronbach's alpha .86 (Schachman, Lee, & Lederman, 2004 Resilience and older women (Wagnild, 1990) Resilience and older adults: reliability coefficient alpha .76–.94 (Wagnild, 2003)

						Wagnild and Young report five additional studies performed by other researchers after their initial work with the instrument but prior to their psychometric evaluation (e.g. caregivers of spouses with Alzheimer's, graduate students, first-time mothers returning to work, residents in public housing, and pregnant and postpartum women). All are unpublished manuscripts. When requested, Wagnild (personal communication, November 24, 2005) reported that these data did not contribute further to the research findings
Quality rating	1	2	2	2	1	3

Key: 1—Indicates that there is not acceptable validity for the use to study resilience in the adolescent population. Due to limited or no applications of the instrument, concern regarding reliability or validity, or instrument use, further study is needed for use with adolescents.

2—Indicates that there may be acceptable validity for the use to study resilience in the adolescent population. Due to limited use of the instrument, further study of the instrument is needed to determine reliability and validity values and applications for use with adolescents.

3—Indicates that there is an acceptable validity for use to study resilience in the adolescent population due to psychometric properties of the instrument and applications in a variety of age groups, including adolescence.

Connor–Davidson Resilience Scale

The Connor–Davidson Resilience Scale (CD-RISC) contains 25 items, each of which is rated on a 5-point (0–4) scale with higher scores reflecting more resilience. The rating scale assessing resilience was evaluated for reliability, validity, and factor structure. Data analyses indicate that the CD-RISC has sound psychometric properties and distinguishes between those with lesser and greater resilience (Connor & Davidson, 2003). The BPFI has been tested in the general population and in clinical settings, suggesting that there are numerous potential applications for its use. To date there are only three studies using the CD-RISC in the literature using samples of patients with psychiatric disorders.

Resilience Scale for Adults

The Resilience Scale for Adults (RSA) is a 37-item, 5-point semantic differential scale (O. Friborg, personal communication, April 18, 2005). The scale is intended to measure the protective resources that promote adult resilience. The RSA contains five factors: personal competence, social competence, family coherence, social support, and personal structure. According to the authors (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003), the RSA is a valid and reliable measure in health and clinical psychology to assess the presence of protective factors important to regain and maintain mental health. To date, there is one documented application in the literature using the RSA (written by Friborg).

Adolescent Resilience Scale

The Adolescent Resilience Scale (ARS) is a 21-item scale on a 5-point rating scale (1–5) measuring the psychological features of resilient individuals. The scale was designed for Japanese youth and is comprised of three factors: novelty seeking, emotional regulation, and positive future orientation. Data analyses demonstrate acceptable reliability and validity. The results support the construct of adolescent resilience, but findings may be difficult to generalize to other populations (Oshio et al., 2002). There is one clinical application in the literature available only in Japanese.

Brief-Resilient Coping Scale

The Brief-Resilient Coping Scale (BRCS) is a 4-item scale on a 5-point rating (1–5), which is designed to measure tendencies to cope with stress in a highly adaptive manner. Due to the scale's brevity, it meets only minimal standards for reliability and validity. The authors indicate a need for

further testing but suggest that the scale may be useful for identifying individuals in need of interventions designed to enhance resilient coping skills, especially in longitudinal studies (Sinclair & Wallston, 2004). There are no applications of the BRCS in the literature.

Resilience Scale

The Resilience Scale (RS) is a 25-item scale using a 7-point rating (1–7). The scale has two factors, personal competence and acceptance of self and life, which measure the construct of resilience. The authors state that their psychometric evaluation support the internal consistency reliability and concurrent validity of the scale (Wagnild & Young, 1993). Although originally tested with adult subjects, numerous studies have validated that the scale has worked well with samples of all ages and ethnic groups.

Data Synthesis

The six studies were reviewed, and data were abstracted related to population, settings, influencing factors, psychometric properties (including reliability and validity values, etc.), advantages and disadvantages, applications for use, and quality rating. Each instrument was scored based on these criteria. Table 3 summarizes the instrument evaluation.

Instrument Scoring

Instruments were scored from 1 to 3 based on their credibility to study resilience in adolescents. A score of 1 denotes an instrument that is not acceptable for the study of resilience in adolescence. Additional psychometric testing of the instrument or research studies are necessary to apply the instrument to the adolescent population. A score of 2 indicates that although they may be acceptable in other populations, further study is needed to determine reliability and validity values and applications for use with adolescents. A score of 3 indicates that the instrument is acceptable to study resilience in the adolescent population due to psychometric properties of the instrument and applications in a variety of age groups, including adolescence.

Two of the six instruments (BPFI and BRCS) received a score of 1 due to a lack of evidence that they were appropriate for use with the adolescent population (see Table 3 for details). Three instruments (CD-RISC, RSA, and ARS) received a score of 2. Although they may be appropriate for use in other settings, they were not appropriate for use with the target population (adolescents) at this time. Only one instrument (RS) received a

score of 3. Although it was preliminarily tested in adult women, the reliability and validity values reported by the authors and in subsequent applications of the RS have been good. The RS has been used successfully in the adolescent population to date in at least 18 published studies (see Table 3).

Principal Findings of the Review

Although each of the six instruments posses some limitations in terms of their psychometric properties, the findings of the review indicate that the RS may be the best to use with the adolescent population. While others may have more potential (e.g., ARS and BPFI), as they were tested in the adolescent and young adult populations, they lack convincing evidence for their use at this time largely due to a lack of research applications. Further reporting of the use of these instruments would be helpful when making a final decision.

Limitation of the Review

A limitation of the review was the inability of the reviewer to obtain all known studies that used instruments measuring resilience. Several studies found were dissertation abstracts and/or unpublished manuscripts. While the reviewer made attempts to contact the original authors, there was no success. Some of the dissertation literature should be sought out in the future to provide a more thorough review of potential measurement instruments for the concept of resilience.

DISCUSSION

Much can be learned from the work of others. The evaluation process for the psychometric properties of an instrument is a complex and time-consuming endeavor. Reading the report of the psychometric evaluation that an instrument developer has completed allows the novice to gain a better understanding of what is necessary to scale, norm, standardize, and establish acceptable reliability and validity statistics. Reviewing the psychometric development literature and other systematic reviews allows the new researcher to critique such works. The recommendations made by researchers can assist others with these complex procedures.

Suggestions can be made for current and future measurement research. Researchers completing current measurement research need to make sure that they follow the procedures necessary for the psychometric development

of their instruments. In addition, they need to be aware of what is available in the literature to measure their research concept or construct. Future measurement literature should include more published studies of the psychometric development and evaluation of instruments and scales, as well as published studies on the uses, adaptations, and translations of measurement instruments. Such publications benefit all researchers. This can only occur if researchers present their findings (positive and negative) through podium, poster, and written presentations. This knowledge can help to advance the science of nursing.

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