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PSYCHOMETRIC PROPERTIES OF THE ITALIAN VERSION OF RESILIENCE SCALE IN ADULTS AND ELDERLY HEALTHY SUBJECTS

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Abstract: *Background:* Resilience is a complex personality characteristic of people facing a significant change, adversity, distress, acute or chronic disease. The Wagnild and Young Resilience Scale is an appropriate instrument to study resilience and has been already validated in the Italian young-adult population. *Objective:* To verify psychometric properties of the Italian version of the RS scale in adults and elderly healthy subjects. *Design:* The participants filled out RS questionnaire; statistical analysis was performed to evaluate psychometric properties of the scale. *Setting:* University of Genoa: courses reserved for elderly people and Clinical Neurology outpatients' department. *Participants:* 178 adults and elderly healthy subjects. *Measurement:* The Italian version of RS scale and three associate questionnaire (General Health Questionnaire, Ego-Resilience Scale, Beck Depression Inventory) were used to assess concurrent validity of RS, its reliability, stability, internal consistency and concurrent validity. *Results:* Time stability was assessed in a sub-sample of 48 subjects (Mean age = 68.89 yr, SD 7.54) by test-retest correlation (r=0.80). RS reliability was evaluated in the whole sample of 178 subjects (Mean age = 63.92 yr, SD 14.6) with an RS mean score of 138.43 (SD 14.6). Internal consistency was evaluated by Cronbach alpha (α=0.86). Concurrent validity was assessed by correlation with General Health Questionnaire (r=-0.45), Ego-Resilience Scale (r=0.59) and Beck Depression Inventory (r=-0.31). Principal component analysis resulted into six components, labelled according to the best association with the five components hypothesized by Wagnild and Young (i.e.: meaningfulness, self-reliance, perseverance, existential aloneness, equanimity a and b). *Conclusion:* Our data indicate that the Italian version of the RS scale is a reliable tool in the adults and elderly subjects in order to promote interventions and stress-management to improve resilience and facilitate successful aging.

Key words: Resilience scale, elderly, successful aging.

Introduction

Resilience is a multidimensional concept including a personal trait that protects people from psychiatric disorders and a dynamic process of adaptation to negative life events. Ahern et al (1) and Wagnild and Young (2) defined resilience as a personality characteristic that moderates the negative effects of stress and facilitates adaptation. Therefore, resilience is a complex personality characteristic and plays a notable role when people face a significant change, adversity, or distress.

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Some features of resilience are optimism, trying to reach personal goals, sense of commitment to self, hardiness, effectiveness, strength, and self-esteem. Other relevant characteristics of resilience are patience and the ability to tolerate negative emotions. As a matter of fact, human capacity to adapt in the face of trauma, tragedy, adversity in general, and stressful life events can be defined as resilience. Regarding the elderly subjects, resilience is described as the ability to achieve, retain, or regain a level of physical or emotional health after illness or loss. Being resilient in advanced age is very important due to the common occurrence of adverse life events, physical changes associated with aging and various acute and chronic clinical issues. It is known that psychological and social problems can accelerate the development of disability, hospitalization, nursing home placement and death (3-6). Living with a chronic illness is stressful, therefore it is fundamental to consider the risk factors, the protective factors, the outcome of adaptation and the characteristics of resilience in adults who suffer from

chronic disease. Some chronic conditions, such as rheumatoid arthritis, osteoarthritis and fibromyalgia, are known to have a negative impact on the quality of life, but the way in which patients cope with such conditions affects their long-term physical and psychological adaptation (7). Resilience may influence long-term physical and psychological functioning and adaptation under high stress condition of patients with rheumatic disorders (8). Mertens et al (9) found that a high level of resilience is significantly associated with physical, mental and social functioning in patients with type 2 diabetes or chronic obstructive pulmonary disease. Chronic pain also influences all aspects of life but resilient individuals with chronic pain recognize the value of remaining positive, accepting help and learning to live with the pain (10).

Among elderly subjects a good diet and physical activity are essential for the prevention of a number of health problems and they can also contribute to positive mental wellbeing. Moreover, the physiological, psychological, and social changes that often accompany aging can impair food intake resulting in poorer diet quality (11). As a matter of fact, chronic illnesses may further affect appetite and intake (12). In the same manner, despite the numerous age-related challenges to maintaining an active life and sufficient diet, some elderly people make efforts to meet these challenges thereby demonstrating resilience. Dietary resiliency is the ability to develop adaptive strategies to maintain an adequate diet despite facing dietary challenges. (13). Stewart Knox et al (14) studied the associations between obesity (BMI and waist circumference) and a number of biological and socio-demographic variables, including resilience, in two samples of English and Portuguese adult healthy subjects. They found that lower resilience was one among the variables that significantly predicted higher BMI in the Portuguese group or a larger waist circumference in the British group. Assuming that resilience determines how we respond to negative life experiences and hitches, the promotion of resilience could reduce vulnerability to life troubles. It is important for psychologists, physicians, nurses and other health care professionals to enhance resilience and to recognize the role of supporting positive attributes in adults and elderly subjects, especially if they live with chronic diseases.

To measure the construct of resilience, it is necessary to have an appropriate instrument. One of the most used tools to measure resilience is the Resilience Scale (RS) (2). In their review, Ahern et al (1) asserted that the RS was the most appropriate instrument to study resilience in adulthood as well as in the adolescent population. In a more recent review, the RS obtained a good rating in comparison with other analogous scales (15). This scale has been already translated from the original English version into several languages and the Italian version (16) of the RS has been validated in a sample of young adults. Wagnild and Young developed the RS for the purpose "to identify the degree of individual resilience, considered a positive personality characteristic that enhances individual adaptation"(2). They identified five components of resilience: 1) equanimity; 2) perseverance; 3) self-reliance 4) meaningfulness; 5) existential aloneness. The RS is a 25-item Likert scale using a 7- point rating (1 disagree – 7 agree): the score ranges from 25 to 175. In the Italian version (16) one item (item 11, "I seldom wonder what the point of it all is") was excluded as outlier in internal consistency analysis. On the basis of approximated normal distribution, in this 24-item version, values of 141 or above were considered as indicating high resilience, values from 116 to 140 characterizing the mid-range, and values lower than 116 indicating low resilience

The aim of the present study was to verify the stability, internal consistency and concurrent validity of the Italian version of the RS in a sample of adult subjects mainly focused on elderly people.

Methods

Design

This study analyses the data collected on a sample of voluntary healthy subjects and their relatives contacted during University courses reserved for elderly people who completed all scales and questionnaires used to validate the Italian version of RS.

Participants

178 out of 192 voluntary healthy subjects (111 females and 81 males) aged from 29 to 95 years (mean = 64.18 standard deviation – SD = 14.40) filled out all scales and questionnaires used to validate the Italian version of RS (16). They had their general medical histories carefully taken and underwent clinical examination. Exclusion criteria were previous or present neurological, psychiatric, metabolic or cardiovascular disorders.

According to the recommendations of the Helsinki Declaration of 1975, as revised in 2008, all subjects were informed about the objectives and methods of the research, and they agreed to take part in the study. The study was explained to all participants both orally and by written instructions; they completed the whole package scale in an average time of 20 minutes.

The test-retest reliability was evaluated in a sub-sample of 48 subjects (34 females and 14 males) aged from 50 to 88 years (mean = 68.89, SD = 7.54). They filled out the resilience questionnaire and then filled it out again about one month later.

Associated questionnaires

The 12-item Italian version (17) of the General Health Questionnaire (GHQ), the Italian version of the Ego-Resilience Scale (ER) (18) and the Italian version of the Beck Depression Inventory Second Edition (BDI-II) (19) were used to assess concurrent validity of RS. GHQ is a self-administered 12-item (4-point Likert scale: 0-3) questionnaire aimed at detecting minor psychiatric disorders. The overall score ranges from 0 to 36 with higher points indicating poorer health. The ER scale is composed of 14 items (7-point Likert scale: 1-7) measuring the subject's capacity to conciliate his own needs and desires while respecting rules and other people. Higher points indicate good ego-resiliency. The BDI-II is a 21-item (4-point Likert scale: 0-3) self-report instrument intended to assess the existence and severity of symptoms of depression. Higher total BDI-II scores indicate more severe depressive symptoms. A positive correlation between RS and ER was expected; on the contrary, a negative correlation with RS was expected for GHQ and BDI.

Statistics

Reliability of RS was estimated by the test-retest procedure, evaluating the Pearson correlation coefficient between the first and second test, and by the internal consistency measure provided by Cronbach Alpha followed by the analysis of its components. Concurrent validity of RS was evaluated by computing the Pearson correlation coefficients between RS and the other three tests evaluating psychological health (GHQ), ego-resiliency (ER) and depression (BDI-II). The effect of age and sex on the total score at the four tests was evaluated by general-linear-model analysis. The structure of RS was further explored by factor analysis, where factors were identified by principal component analysis and rotated by varimax method to optimize the separation between factors. Only the factors explaining a portion of variance greater than the mean variance of the original variables were entered into the analysis (Kaiser criterion: eigenvalues greater than 1.0) were considered. Statistical analysis was performed by means of the Statistica software (StatSoft Inc., Tulsa, OK; http://www.statsoft.com/).

Results

The RS mean score in the test-retest sample was141.10 (SD = 13.37, range: 98-162) at T1and 141.64 (SD = 14.00, range: 105-164) at T2. The test-retest correlation was 0.80 (R^2 = 0.64, p<0.0001). The RS mean score in the test-retest sample (# = 48, mean age = 68.89, mean RS = 141.37, SD = 12.97) was not significantly different from the mean score in the single-test group (# = 130, mean age = 62.09, mean RS = 137.35, SD = 15.06, t = -1.64). The RS mean score in the whole study sample was 138.43 (SD = 14.60, range 93–168). As for data distribution compared with standard reference values, 8.4% of the sample could be classified as low resilient individuals (score <116), 48.9% as high resilient (score >140) while the remaining 42.7% was in the mid-range. RS correlations were -0.45 with GHQ, 0.59 with ER and -0.31 with BDI (see Table 1 and 2 for details), all being statistically significant at p<0.0001. Internal consistency reliability of RS, as evaluated by Cronbach

Table 1

Descriptive statistics for male and female subjects and for whole group are reported for each scale

Variable	Number of Subjects	Mean	Standard deviation	Range
Age	178	63.92	14.56	29-95
Female	101	64.39	14.53	31-92
Male	77	63.32	14.69	29-95
RS	178	138.43	14.60	93-168
Female	101	138.19	15.06	94-163
Male	77	138.74	14.06	93-168
GHQ*	178	12.32	5.19	0-28
Female	101	13.74	4.81	2-28
Male	77	10.46	5.10	0-26
ER	178	72.82	10.92	47-96
Female	101	72.35	11.25	47-94
Male	77	73.42	10.50	48-96
BDI-II*	178	9.53	7.40	0-41
Female	101	11.35	8.00	0-41
Male	77	7.14	5.75	0-26

Abbreviations: RS, Resilience Scale; GHQ, General Health Questionnaire; ER, Ego-Resilience Scale; BDI-II, Beck Depression Inventory - II. * The asterisk indicates a significant difference between males and females (p < 0.001).

alpha, was 0.86; the correlation of each item with the total score was in the range 0.13-0. 66 and was greater than 0.4 for 18 out of the 24 items. The correlation between each item and the total score is reported in Table 3 along with mean item score and Cronbach alpha as evaluated after deleting the current item. Three items (#11, 19 and 21) were associated, if deleted, to an increase of Cronbach alpha indicating a poor contribution to the overall common factor underlying the RS also in agreement with their low item-total correlation. There was a significant positive relationship between age and resilience (r^2 = 0.041, $F_{1,190}$ = 7.46, p<0.0001): mean increasing rate of RS score was 0.202 per year. A significant difference between genders, but non-significant effect of age, was found for GHQ ($F_{1,177}$ = 19.33, p<0.0001) and BDI ($F_{1,177}$ = 14.88, p<0.0001) , with higher values (poorer health) for females. No significant effects of age and gender on ER were found in this adult sample.

Table 2
Pearson correlation coefficients between resilience (RS) and concurrent scales

Variable	RS	GHQ	ER	BDI-II
RS	1.0			
GHQ	-0.45 ***	1.0		
ER	0.59 ***	-0.25**	1.0	
BDI-II	-0.31 ***	0.58 ***	-0.19 *	1.0

Significance levels: *: p < 0.02 ; **: p < 0.001; ***: p < 0.0001; Negative correlations indicate variations in the opposite directions (due to different definitions of the score with respect to well-being).

Principal component analysis resulted (according to the Kaiser criterion) into six components with eigenvalues greater than 1: these six components, altogether explaining 57.1% of total variance, were retained for factor analysis. Final communality estimates, representing the (relative) variance explained by the model for each item, ranged from 0.36 (item 18) to 0.72 (item 21). Factor loadings, representing item-factor correlation, overcame the conventional threshold, set at 0.4, for at least one factor for all items but one, item 3, which however reached the value 0.39. The first factor of principal component analysis accounted for 26.9% of total variance and was the most correlated with 18 out of 24 items. Following varimax rotation, explained variance and factor loadings were more evenly distributed between factors and the loadings overcame a 0.4 threshold for 23 out of 24 items: the maximum factor loading for item 18 was slightly lower than the threshold value (0.30). The association between items and factors, based on maximum factor loading, reached by each item, is reported in Table 4, in which the best fitting labels, among the five generally used in resilience theory, are reported for each factor. One item (14) contained double loadings, as the threshold value was exceeded in 2 factors. Two items (11 and 21) were apart associated to two specific factors, in agreement with their low correlation with total score, as highlighted by Cronbach analysis.

Discussion

The test-retest reliability, internal consistency reliability and concurrent validity of the Italian version of the RS, as applied to a sample of adult subjects, were consistent with data reported in the literature (20, 21) and, although slightly lower, with the Italian validation applied to a sample of young adults (16). The present study was mainly focused on resilience in elderly people but a larger age span was considered in order to find out age-related trends.

The mean value of RS in our study group was 138.43, without significant difference between the single-test group and test-retest group. These values were comparable to those reported in the paper by Wagnild and Young (2) which were a bit higher (mean = 147.91, SD = 16.85) because the RS had 25 items instead of 24 (their mean value can be proportionally reduced to 142.0 ± 16.18). In our sample we found a positive effect of age on RS (0.202 RS units per year) that is not significantly different from the one reported by Lundman et al (20), equal to 0.134 RS units per year; no relationship with age was found in the previous Italian study on resilience in young – adults (16), probably due to the narrow age range. The mean value in that sample (126.6 ± 17.4) was slightly lower than expected from the present fitting, confirming the increase of RS with age and suggesting a stronger decrease in younger people. This trend is also stressed by the percent of people falling in the low-resilience range: it was 8.4% in the present study (48.9 and 42.7% respectively for the high and middle resilience range) but it was 32.5% in the Italian validation on young – adult sample (16). Wagnild and Young (2) and, more recently, Jeste et al (22) proposed that resilience correlates with positive aspects of successful aging. Our findings that resilience increases with age could depend on the processes developing during the life span which are probably influenced by several protective factors (23). According to, Lundman et al (20) and Girtler et al (16) we did not find an effect of gender on RS values. On the other hand, we found a significant gender difference for GHQ and BDI which showed higher values (poorer health) for females, in agreement with a number of studies concerning general health and depression (24). As for time stability, the correlation coefficient for the test-retest was 0.80, close to the result obtained by Wagnild and Young (0.81; (2)) and to the correlation reported in the Swedish (0.78; (20)) and Italian (0.78; (16)) validation studies. The value of Cronbach alpha (0.86) confirmed the internal consistency of the Italian version of RS in adults and elderly sample, being in accordance with consistency

Table 3
Correlation analysis evaluating internal consistency of Resilience Scale (RS, 24-items Italian version) by Cronbach alpha

Item	Valid N	Mean score	Item-Total - Correlation	Alpha if – deleted
RS1	178	5.926	0.470	0.853
RS2	178	6.129	0.418	0.855
RS3	178	6.188	0.336	0.857
RS4	178	6.400	0.379	0.856
RS5	178	6.337	0.497	0.853
RS6	178	6.058	0.419	0.854
RS7	178	4.991	0.594	0.848
RS8	178	5.461	0.484	0.852
RS9	178	5.115	0.391	0.855
RS10	178	5.688	0.412	0.854
RS11	178	5.231	0.152	0.866
RS12	178	5.946	0.503	0.850
RS13	178	5.916	0.440	0.853
RS14	178	6.191	0.409	0.855
RS15	178	5.752	0.478	0.852
RS16	178	5.807	0.657	0.846
RS17	178	6.084	0.507	0.852
RS18	178	5.642	0.496	0.852
RS19	178	5.443	0.136	0.864
RS20	178	6.110	0.501	0.851
RS21	178	4.825	0.134	0.867
RS22	178	5.789	0.545	0.851
RS23	178	5.719	0.557	0.850
RS24	178	5.660	0.480	0.852

Overall value of Cronbach alpha was 0.86. Data reported in each column are: item identifier, number of valid data, mean score, correlation between the current item and the total score and Cronbach alpha as evaluated after elimination of the current item.

evaluations reported in the recent review by Wagnild (21) and in the Italian validation (16). The concurrent validity was supported, although more slightly respect to the previous study on Italian sample of young-adults (16), by the highly significant correlation with three well established measures of the constructs linked with resilience, namely GHQ for psychological well-being, ER for flexibility in impulse control and a BDI-II for depression. These findings were in agreement with previous validation studies which found highly significant correlation between the RS and other recognized measures of well-being and an inverse correlation with depression (1).

Features of resilience were further explored by factor analysis. In designing the questionnaire Wagnild and Young (2) considered five component of resilience but only two clear components were supported by factor analysis in their original study.

A five-factor and a six-factor solution were found, respectively, in the Swedish version (20) and Italian version (16) of RS and these factors were related to the components of resilience construct.

Also in this sample, principal component analysis resulted into six factors. These factors were labeled looking for the best accordance with the five components hypothesized by Wagnild and Young: as in our previous study (16), factors 5 and 6 were both associated with equanimity, the first one expressing the ability to deal with external obstacles and the second one indicating a pragmatic approach in addressing life events. One item had double loading. Item 14 loaded in the factors "perseverance" and "existential aloneness" which could reflect the interaction of these components (the ability to remain involved and the awareness that certain situation must be faced alone).

On the whole, the correspondence between the percent of items assigned to the same factor in the present study and in the young-adult study (16) was 14/24 (58%) while with respect to the Swedish study (20) it was 9/24 (38%). The factor structure found in our study confirm that RS is a relatively homogeneous construct, with a strong common factor, as confirmed by Cronbach alpha, in which however some underlying interacting components can be distinguished and can be related to the original theoretical model. On the other hand, the low level of correspondence in the groups of items found by factor analysis in the different studies indicates that the association between some items and particular components of resilience is not so strong and the interpretation of these items may be influenced by

Table 4
Factor Analysis: factor loadings of each item of the Resilience Scale on selected factors

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Meaningfulness						
6. I feel proud that I have accomplished things in my life	0.665					
8. I am friends with myself	0.683					
15. I can usually find something to laugh about	0.570					
16. My belief in myself gets me through hard times	0.609					
20. My life has meaning	0.792					
Self-reliance						
3. I am able to depend on myself more than anyone else		0.464				
7. I usually take things in my stride		0.668				
9. I feel that I can handle many things at a time		0.707				
22. When I am in a difficult situation, I can usually find my way out of it		0.620				
23. I have enough energy to do what I have to do		0.577				
24. It's okay if there are people who don't like me		0.532				
Perseverance						
4. Keeping interested in things is important to me			0.635			
10. I am determined			0.645			
14. I keep interested in things			0.494	0.406		
19. Sometimes I make myself do things whether I want to or not			0.461			
Existential aloneness						
1. When I make plans I follow through with them				0.659		
2. I usually manage one way or another				0.702		
5. I can be on my own if I have to				0.599		
12. I can get through difficult times because I've experienced difficulty before				0.586		
13. I have self-discipline				0.468		
17. In an emergency, I'm somebody people generally can rely on				0.482		
18. I can usually look at a situation in a number of ways				0.297		
Equanimity a						
21. I do not dwell on things that I can't do anything about					0.839	
Equanimity b						
11. I take things one day at a time						0.785

Six factors were selected according with the Kaiser criterion (eigenvalues greater than 1.0). Factor loadings exceeding the threshold, set at 0.4, are reported for all items but item 18, which does not reach the threshold and for which the maximum loading is reported. The items are grouped according to the factors they are associated to. Each factor has been associated with the best fitting label among the five generally used in resilience theory.

different socio-cultural factors. Further studies with larger samples are needed to clear this point.

Our data indicate that the 24-item Italian version of the RS can be considered as a useful and reliable tool to measure resilience in the Italian adult population.

The analysis of resilience and its components may provide information about productive and effective strategies people can apply to cope with adverse condition such as in the face of a chronic disease or age-related impairments. As a matter of fact, resilience has been shown to play a protective role in patients with rheumatic conditions (25). Evers et al (8) in their review claim that "resilience interventions can improve patients' long-term functioning, and seem to be especially useful when tailored to the specific risk and resilience factors of individual patients". They also claimed that a prerequisite for developing effective treatments is knowledge of possible risk and resilience factors that predict the long-term physical and psychological functioning of patients.

Furthermore, high levels of acceptance of pain and coping and emotional distress (26) are associated with resilience characteristics.

The concept of resilience is also linked to the maintenance of adequate nutrition and it is known that adequate nutrition, especially in the elderly, is closely associated with well-being. Vesnaver et al (13) studied age-related problems with eating in a group of old subjects. They used semi-structured interviews to show how adequate strategies could be adopted to overcome eating-related difficulties. Applying by oneself to keep eating well or getting help when needed were pointed out as important components of dietary resilience. In another study Tiainen K et al (27) found that resilience was associated with favorable health behaviors, such as exercising more, smoking less, and consuming more portions of fruits and vegetables a day and drinking less alcohol. Perna et al (28) assess resilience by a short

version of RS in a cohort of elderly subjects. They investigated whether resilience is positively associated with health behavior in an elderly population and whether this association differs in different socioeconomic groups. They found that resilient people were more likely to consume more servings of fruit and vegetables a day and to perform high/moderate physical activity as compared to non-resilient people. These studies show that validated screening instruments are becoming increasingly useful in clinical practice to identify and select patients at risk.

The RS seems to be a reliable tool to assess resilience in adult and particularly in elderly subjects. As a matter of fact, Resnick and Inguito (29) found an adequate reliability and validity of RS for evaluating elderly people with multiple comorbidities.

In conclusion, knowing the characteristics of resilience of adults and elderly subjects with or without a chronic diseases could be useful for the identification of people needing an intervention designed to improve resilience and coping skills to ameliorate their quality of life.

Very recently the international Consensus Group on "Cognitive Frailty", an heterogeneous clinical manifestation characterized by the simultaneous presence of both physical frailty and cognitive impairment, has proposed potential preventive interventions that include the promotion of emotional resilience to improve well-being and the quality of daily life (30).

Resilience interventions and stress-management offer promising ways to improve the long-term functioning of adults and elderly subjects with or without chronic diseases.

In summary, we have validated in the Italian language the RS in an adult-elderly population which may be used to assess resilience in order to adopt preventive and treatment strategies in the adult-elderly people, especially in those with chronic diseases.

Conflict of Interest statement: All authors state that they have no conflicts of interest.

Ethical standards: This study complies with the current laws of Italy.

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