Loneliness, Resilience, Mental Health, and Quality of Life in Old Age: A Structural Equation Model

Eva Gerino¹, Luca Rollè¹*, Cristina Sechi² and Piera Brustia¹

¹ Department of Psychology, University of Turin, Turin, Italy, ² Department of Pedagogy, Psychology, Philosophy, University of Cagliari, Cagliari, Italy

OBJECTIVES: In the scientific literature on aging, a recent core issue has been the role of individuals’ internal and external resources, which are considered intrinsically connected, in contributing synergistically to physical and psychological quality of life (QoL). The current study investigates the way in which psychological factors—such as, loneliness, resilience, and mental states, in terms of depression and anxiety symptoms—affect the perceived QoL among elderly individuals.

METHOD: Data from 290 elderly Italian participants were used to study the mediation effects of both mental health and resilience to elucidate the relationship between loneliness and psychophysical QoL.

RESULTS: The best model we obtained supports the mediation effect of both resilience and mental health between loneliness and mental and physical QoL. These results highlight that loneliness influences mental and physical QoL via two pathways, with the impact of loneliness mediated by mental health and resilience dimensions.

CONCLUSIONS: The findings suggest the importance of the support that elderly people receive from social relationships. In terms of clinical interventions, the reduction of loneliness could be an important factor in primary prevention or the recovery process. A way to reduce levels of mental distress could be represented by the increasing of resilience and self-efficacy and reduction of loneliness dissatisfaction. A high degree of resiliency contributes to increasing perceived life quality at the physical and psychological levels, and at the same time, reducing anxiety and depressive symptoms.

Keywords: old age, loneliness, resilience, mental health, quality of life

INTRODUCTION

In old age, people experience profound changes and face important challenges, including modifications in their roles, retirement, and the death of loved ones (friends and family members). These experiences can increase their levels of stress and lead to a decrease in the resources that individuals feel they have in dealing with their daily lives (Sachs-Ericsson et al., 2014).

In demographic studies, it has been estimated that by 2050, the elderly population in Europe will reach 28%, which emphasizes that the highest proportion of elderly people is currently concentrated on the European continent (Börsch-Supan et al., 2005). This percentage will rise to 34% in Italy by 2025 (United Nations, 2002), while in the last Eurostat report (Eurostat, 2015a), as of 1 January 2014, there were almost 94 million people aged 65 and over in the European Union. The report...
showed that 16.1% of these people were aged 65–84 years, while 2.4% were 85 years and over. In this scenario, the health condition of the elderly is a core issue; however, although there is a shared recognition of the importance of this aspect at the medical, public, and social levels, unfortunately, it is often a neglected area of scientific study and intervention (National Board of Health and Welfare, Sweden, 2008; Djukanovic et al., 2015; Eurostat, 2015b). As the issues of health, and above all, illness or disability in old age, are a matter of increasing public concern, a perspective on healthy aging is crucial when it comes to identifying, designing, and implementing appropriate strategies to meet the growing needs of the population (Djukanovic et al., 2015).

Considering the projections on the European population aging—especially in Italy—it can be assumed that this issue will become increasingly central in national policies. Lately, as noted by Stephens et al. (2015), the focus of social policies has been changing, shifting from care or symptom reduction to the promotion of well-being according to the biopsychosocial paradigm. The Health Psychology perspective, in opposition to a deficit model, is useful for critically analyzing the effects of strategies to promote healthy aging and reflect on the factors that could improve their efficacy to develop more inclusive models of intervention. Old age is stereotypically considered a period of progressive decline, and consequently, a heavier and heavier healthcare burden for society. This bias in social narratives on aging is traditionally widespread (Jeste et al., 2013; Settersten and Godlewski, 2016), although it has been refuted by experts. For these reasons, and starting from a holistic perspective, there is a growing need for empirical studies that enable the assessment of psychological functioning and overall health in the Third Age (Fry and Debats, 2010; Jeste et al., 2013). Specifically, analyzing the scientific literature, it appears that little is known about the resources that contribute to resilience and well-being in the elderly, as the research has focused more on the weaknesses or dysfunctions in elderly people than on their strengths (Fry and Debats, 2010).

According to the World Health Organization (2002, 2015), quality of life (QoL) can be defined as a subjective perception of the self-positioning in life that combines a person’s psychological and PHY—cultural position, value system, expectations, aims and states, independence, and personal beliefs—with the capacity to create relationships. From another viewpoint, the perspective assumed in the theoretical framework of health-related QoL is based on a complex set of relationships that involves biopsychosocial factors related to well-being (Bowling, 2001; Ekwall et al., 2005; Gerino et al., 2015). In line with this, QoL is defined as a multidimensional concept with both objective and subjective factors that refer to general satisfaction with life or its components (Lawton, 1991; Bowling et al., 2002; Arkar et al., 2004). In the context of geriatric psychology and older people’s awareness, it is increasingly clear that individuals’ internal and external resources are intrinsically connected, and both these aspects contribute synergistically to physical and their psychological well-being (Ryff and Singer, 2000; Fernández-Ballesteros, 2003, 2008; Fry and Debats, 2010).

Loneliness, Mental Health, and Quality of Life

For the analysis of psychological factors that expose the elderly to the risk of malaise, it has been evidenced that depressive symptoms affect the QoL of the elderly population (Beekman et al., 1999; Blane et al., 2008). Concerning adult life, according to Blazer (2003), among the causes of emotional distress, the presence of depressive symptoms is the most frequent, as this condition significantly contributes to decreasing the QoL of the older segment of the population. For example, depressive symptoms have been proven to be associated with functional impairment, chronic diseases, and mortality (Schoevers et al., 2000; Nilsson et al., 2011; Djukanovic et al., 2015). Moreover, researchers have identified close associations between the presence of depressive symptoms and loneliness (Barg et al., 2006; Cacioppo et al., 2006, 2010; Hawkyler et al., 2009; Hawkyler and Cacioppo, 2010). As indicated by Peplau and Perlman (1982), loneliness can be defined as a set of negative emotional states arising when a subject feels a discrepancy, in an unfavorable direction, between the desired and actual social relationships. Studies have shown that loneliness can be a significant predictor of increases in depressive symptomatology at least 1 year later (Cacioppo et al., 2010).

Although many older people maintain a satisfactory condition of life, risks related to loneliness and psychological distress grow with age (Fry and Debats, 2002). As stated by Fry and Debats (2002), in fact, some elderly people with self-expectancies or internalized beliefs about their aging can experience severe anxiety connected with feelings of loneliness. Clinicians and institutions that are dealing with the elderly have shown a growing concern about its consequences, including profound depressive feelings. Cacioppo et al. (2006) observed that loneliness is associated with strong negative feelings, and other researchers have shown that it impairs self-regulation (Baumeister et al., 2005) or that “[l]onely adults have poor emotion regulation and are less likely to use positive feelings to alleviate their negative mood” (Wong et al., 2016, p. 2487). Loneliness, anxiety, and depressive symptoms may contribute synergistically to a significant decrease in levels of well-being (Liu and Guo, 2007). In addition, Sachs-Ericsson et al. (2014) studied the consequences of rape in an elderly sample, and found a connection between loneliness, depression, anxiety, and psychological functioning. Considering that multiple studies have pointed out that depression and loneliness are strongly associated and that they have detrimental effects on well-being in the Third Age (Tiikkainen and Heikkinen, 2005; Cacioppo et al., 2006; Golden et al., 2009; Theeke, 2010, 2012; Prieto-Flores et al., 2011; LeRoy et al., 2017), it is important to further investigate the prognosis for older persons suffering from depression (Bjorklof et al., 2013).

Loneliness, Resilience, and QoL

In the general population, people with a low sense of self-efficacy are subject to an increased risk of physical and mental health issues (Marshall, 1991; Krause, 1994; Smith-Osborne and Felderhoff, 2016). In the elderly, loneliness dissatisfaction can
significantly contribute to reduce self-evaluations of perceived self-efficacy (i.e., Fry and Debats, 2002). In Bandura's (1977) definition, self-efficacy can be conceptualized as the perception that a person has his/her own ability to enact effective and functional responses to environmental demands. Specifically, this construct refers to people's individual differences in their aptitudes and dispositions when they evaluate themselves as able or unable to cope with situational demands in different contexts and situations (Jerusalem and Schwarzer, 1992). It can be considered a global personality trait, specifically, and permanently connected to the self-perception of mastery (Bandura, 1977, 1982, 1986, 1997, 2000; Luszczynska et al., 2005), and because of its core role in individuals' evaluation of their skills, it is closely linked with the dimension of subjective well-being (Gabriel and Bowling, 2004).

The level of generalized self-esteem is a factor that is interrelated with the dimension of well-being in its physical, emotional, and psychological components (Smith et al., 2000; Bandura, 2004; Fry and Debats, 2010). Longitudinal studies support the view that resilience traits, like self-efficacy, are protective in the later life stage (Smith-Osborne and Felderhoff, 2016) and that these beliefs are linked to stress resistance in the face of minor distress (i.e., anxiety and loneliness; e.g., Fry, 2001; Fry and Debats, 2006, 2010). As pointed out by the American Psychological Association (2004) and Bonanno (2004), resilience is configured as a common response to losses and conditions of severe stress during the lifecycle. Concerning people's ability to deal with adverse conditions in the lifespan, the attention to the construct of resilience progressively increases in relation to QoL in older people (Fry and Keyes, 2010; MacLeod et al., 2016). Gattuso (2003), Braudy Harris (2008), and recently, other authors (Wiles et al., 2012; Stephens et al., 2015), have suggested that the construct of resilience is useful for understanding health in older people. The American Psychological Association (2011) defines resilience as a successful adaptation process in response to threatening, stressful, or traumatic adverse experiences, or the ability to bounce back from difficult life conditions. It is a flourishing state despite adversity (Hildon et al., 2010), where, in the case of the elderly, “adversity” may be considered in terms of an increased frequency of life conditions that entail personal loss, inequalities, disabilities, and the general PHY challenges of aging (Stephens et al., 2015).

Wild et al. (2013) stated that resilience is a key component in successful aging. Several authors have specified that the different generations do not differ in their ability to be resilient (Carstensen et al., 2003; Laditka et al., 2009; Vahia et al., 2012), but MacLeod et al. (2016) stated that resilience may support longevity. Furthermore, according to these authors, high resilience in later life has been associated with positive health outcomes. According to the international scientific literature, it is possible to identify the following outcomes: reduced vulnerability to depressive symptomatology and mortality risks (Sharples and Yardley, 1999; Carstensen et al., 2003; de Jager et al., 2003; Fredrickson et al., 2003; Inui, 2003; Wallace, 2003; Charney, 2004; DeSalvo et al., 2006; Montross et al., 2006; Reichstadt et al., 2007; Laditka et al., 2009; Lamond et al., 2009); better self-perceptions of aging successfully (Montross et al., 2006); and increased levels of QoL, mental health, and well-being, with improved lifestyle behaviors (Inui, 2003; Montross et al., 2006; Reichstadt et al., 2007; Vahia et al., 2012). According to Connor and Zhang (2006), resilience is a key target of anxiety and depression treatment. Studying the role of the ability to savor positive life experiences in terms of older people's life satisfaction, Smith and Hollinger-Smith (2015) confirmed that people with lower levels of resilience tend to report higher depression. Finally, resilience seems to be a protective factor for depression symptoms in the case of the spousal careers of people with dementia (O’Rourke et al., 2010; O’Dwyer et al., 2013).

To our knowledge, and according to Bowling et al. (2002), the way in which psychological factors—including loneliness, resilience, and individuals’ mental states, in terms of depression and anxiety—affect the perceived QoL is still largely unexplored. As described above, authors have studied the psychological variables that can be predictive of QoL, but how variables mediate and influence perceived QoL requires further elucidation.

**AIMS**

The purpose of the study was to explore a multidimensional model including the relationships among loneliness, resilience, mental health, and mental and physical QoL among elderly individuals. In line with authors who found relationships between loneliness and mental and physical QoL (Tiikkainen and Heikkinen, 2005; Cacioppo et al., 2006; Golden et al., 2009; Theeke, 2010; Prieto-Flores et al., 2011) and those who found relationships among loneliness, resilience, and mental health (Fry and Debats, 2002; Fry and Keyes, 2010; Wild et al., 2013; Sachs-Ericsson et al., 2014), our hypothesis was that higher loneliness levels would be associated with low levels of mental health and resilience, and loneliness, resilience, and mental health would be associated with mental and physical QoL. It was also expected that both resilience and mental health would mediate the negative association between loneliness and mental/physical QoL.

**MATERIALS AND METHODS**

**Participants**

The sample comprised 290 older adults from Italy (70% females and 30% males), aged 65–90 years ($M_{Age}$ = 74.7 years, $SD$ = 6.9 years); the participants were split into two groups—those in the age range of 65–74 years old (66% females and 34% males) comprised the young old group ($M_{Age}$ = 69 years, $SD$ = 2.9 years), while those older than 74 years (73% females and 27% males) comprised the old group ($M_{Age}$ = 81 years, $SD$ = 4.3 years). Participants volunteered for the study. They were all Italian native speakers, and they were active in the cultural and social activities of the neighborhood. None of the participants were undergoing medical/neurological or psychiatric treatment at the time of assessment. Their education levels were as follows: 58% of the participants had an elementary school education, 31% had a high school diploma, and 11% had completed a university degree. Fifty-one percent of participants were married or in a civil partnership and lived independently with their spouses; 49% of the participants were single, widowed, separated, or divorced and...
lived alone (40.2%), with their children (6.4%), with brothers or sisters (1.4%), or with other people (e.g., carers; 1%).

**Measures**

The UCLA Loneliness Scale (Version 3)
The UCLA Loneliness Scale (Version 3) (Russell, 1996; 10 positively worded items [PI] = non-loneliness and 10 negatively worded items [NI] = loneliness) is used to assess participants’ level of loneliness, defined by an incongruity between actual and desired social interaction. On this scale, participants are asked to report how often (from 1 = never to 4 = often) they feel the way illustrated for each item. Positive items are reverse coded to generate a global measure in which higher scores denote greater loneliness. For the present study, the authors adapted the scale into Italian using the back-translation technique to guarantee the semantic correspondence of the Italian and English versions. Based on the current participants, the Cronbach’s alpha coefficient was 0.87 for global loneliness, 0.83 for the loneliness subscale (NI), and 0.84 for the non-loneliness subscale (PI).

The Geriatric Anxiety Inventory—Short Form
The Geriatric Anxiety Inventory—Short Form (GAI-SF; Byrne and Pachana, 2011) consists of five items, and it is used as a screening tool for individualizing anxiety in older adults. Questions require yes/no answers. It was developed as a briefer version of the full 20-item GAI, and its validity and internal consistency have been demonstrated (Cronbach’s alpha 0.81). For the present investigation, the authors adapted the GAI-SF into Italian using the back-translation technique to guarantee the semantic correspondence of the Italian and English versions. Based on the current participants, the Cronbach’s alpha coefficient was 0.78.

The Geriatric Depression Scale
The Geriatric Depression Scale—Short Form (GDS-SF; Hoyl et al., 1999; Italian version, Rinaldi et al., 2003) consists of five items, and it is used as a screening tool for individualizing depression in older adults. It comprises items about how the person has felt over the past week. The questions require yes/no answers. It was developed to be a version of the 15-item GDS, and its overall performance has been demonstrated to be comparable to that of the 15-item scale. Moreover, the 5-item GDS is a better screening tool than the 15-item version is (Hoyl et al., 1999). Based on the current participants, the internal consistency coefficient was 0.70.

The Generalized Self-efficacy Scale
The Generalized Self-efficacy (GSE) Scale (Jerusalem and Schwarzer, 1986; Italian version, Sibilia et al., 1995) consists of 10 items, and it is designed to measure a sense of perceived self-efficacy with the objective of predicting coping with everyday adversity, as well as adjustment after experiencing different types of stressful life events. The participant responds to the instrument using a 4-point Likert scale (from 1 = not at all true to 4 = exactly true). A high score signifies a high perception of self-efficacy. The GSE has been administered widely and has been found to have satisfactory internal consistency reliability. Based on the current participants, the internal consistency coefficient was 0.87.

**The Resilience Scale**
The Resilience Scale (RS; Wagnild and Young, 1993; Italian version Peveri, 2010) consists of 10 items rated on a 7-point Likert scale (from 1 = disagree to 7 = agree), and it is a measure of the ability to bear stressful life events and make meaning from challenges. The concurrent validity and internal consistency reliability of the RS scale have been shown to be adequate (Wagnild, 2009). Based on the current participants, the internal consistency coefficient was 0.91.

The World Health Organization Quality of Life Questionnaire
The World Health Organization QoL (WHOQOL-BREF; World Health Organization, 1993; Italian version, De Girolamo et al., 2000) Questionnaire evaluates QoL in four areas, as follows: psychological health (PSY), physical health (PHY), environment (E), and social relationships (SR). It includes 24 self-report items, and the participant responds to the instrument via a 5-point Likert scale (from 1 = not at all to 5 = completely). It is a shorter version of the original tool, and it may be better adapted for use in big clinical trials or studies. Higher scores show a higher perceived QoL. The WHOQOL-BREF is appropriate for use with older adults (Lucas-Carrasco, 2012). For this study, the subscales assessing QoL across the physical and PSY domains were used. Based on the current participants, the internal consistency coefficient was 0.85 for the PHY subscale and 0.78 for the PSY subscale.

**Procedure**
All participants were contacted individually at their place of living and signed the written informed consent. Participants who agreed to participate, understood the instructions, and met the selection criteria autonomously completed a questionnaire on demographic data, the UCLA, GAI-SF, GDS-SF, GSE, RS, and WHOQOL–BREF self-reports. The questionnaires were offered in a counterbalanced order on two forms, and no order effect was found. The confidentiality of participants’ answers was guaranteed. The time needed to fill in the questionnaires was approximately 60 min.

**Data Analyses**
Descriptive statistics were computed on the evaluated psychological variables, reporting means, standard deviations, kurtosis, and skewness. The association between continuous variables was tested by means of Pearson correlations. A two-step process was adopted to test the hypothesized model, as follows: (1) a confirmatory factor analysis was implemented to create a measurement model with an adequate fit to the data; and (2) the structural equation model (SEM) established after this phase was verified in the second step (Anderson and Gerbing, 1988). The hypothesized model comprised four latent factors (loneliness, mental health, resilience, and mental and physical QoL) and eight observed variables. Specifically, it comprised one hypothetical latent independent factor, two latent mediator
factors (mental health and resilience), and one latent dependent factor (mental and physical QoL). The loneliness latent factor was measured using the two subscales of UCLA (PI and NI). The mental health latent factor was measured using two sources, the GAI-SF and GDS-SF, while the resilience latent variable was measured by the GSE and RS. As mentioned above, the concept of resilience is a multifaceted construct, and together, these scales may provide a more complete assessment of resilience than each measure alone would. Finally, the mental and physical QoL latent factor was measured using two subscales of the WHOQOL-BREF (PHY and PSY).

For evaluating the model fit, a set of fit indices were used based on recommended criteria, including the following: a comparative fit index (CFI) and Tucker–Lewis index (TLI) ≥0.90, which showed an acceptable fit of the model (Bentler, 1990; Schumacker and Lomax, 1996; Kline, 2005; Brown, 2006); the root mean square error of approximation (RMSEA), where values ≤0.05 can be regarded as an appropriate fit and values between 0.05 and 0.08 as an acceptable fit (Browne and Cudeck, 1993; Hu and Bentler, 1999; Brown, 2006); and the standardized root mean square residual (SRMR) of <0.1 (Bentler, 1990).

To compare the models, the Akaiki information criterion (AIC; Akaiki, 1987) of smaller values representing a better fit of the hypothesized model (Byrne, 2001) and expected cross-validation index (Browne and Cudeck, 1993) of the smallest values exhibiting the greatest potential for replication (Byrne, 2001) were also considered to establish the best model. Finally, to establish whether the hypothesized model performed equivalently across age, multi-group analyses were run.

RESULTS

Descriptive Analysis

Descriptive statistics of eight observed variables were tested to check for the normality of distribution. For each of the observed variables, the kurtosis and skewness values were between 1 and −1; therefore, this sample can be defined as having a normal distribution. The descriptive statistics of the eight observed variables are shown in Table 1. Correlations were computed to study the relationships of all eight measured continuous variables. The coefficients of correlation are shown in Table 2. The results revealed that loneliness is significantly and positively correlated with anxiety and depression and negatively associated with resilience, self-efficacy, and psychological and PHY.

Mediation Model

First Phase: Measurement Model

The confirmatory factor analysis measured four latent factors (loneliness, mental health, resilience, and mental and physical QoL) and eight observed variables (Figure 1). All latent factors were found to associate with one another. The model was assessed using the method of maximum likelihood. A test of the measurement model showed a very acceptable fit to the data, \( \chi^2 = 27.80, df = 14, p = 0.05, CFI = 0.99, TLI = 0.98, RMSEA = 0.05 \) (90% confidence interval (CI): 0.01–0.08), SRMR = 0.03. In addition, all the factor loadings were significant, \( p < 0.001 \), which supports the convergent validity of the indicators (Anderson and Gerbing, 1988). These results indicate that all the latent factors were well exemplified by their observed variables. In addition, the four latent factors were significantly connected, \( p < 0.001 \). Thus, this model was used to examine the hypothetical structural model.

Second Phase: The Structural Equation Model

The SEM was verified using the method of maximum likelihood. To obtain the best model, five alternative models were calculated (Table 3). First, a partially mediated model (Model A) with two mediators and a direct path from loneliness to mental and physical QoL showed an appropriate fit, \( \chi^2 = 29.85, df = 15, p = 0.01, CFI = 0.98, TLI = 0.97, RMSEA = 0.06 \) (90% CI: 0.03–0.08), SRMR = 0.04. However, it is important to note that there was no significant direct effect of loneliness mental and physical QoL in this model, \( b = 0.11, p > 0.05 \). Thus, a fully mediated model (Model B) was verified with this path constrained to zero, which showed a good fit to the data, \( \chi^2 = 29.97, df = 16, p = 0.02, CFI = 0.98, TLI = 0.97, RMSEA = 0.05 \) (90% CI: 0.02–0.08), SRMR = 0.03.

Comparing the chi-square differences, no significant difference between Model A and Model B, \( \Delta \chi^2 = 0.12, df = 1, p > 0.05 \), showing that the Model B exhibited a better fit for the data. Next, a path from mental health to resilience was added to the fully mediated model (Model C), and the results showed an extremely satisfactory fit to the data, \( \chi^2 = 23.84, df = 15, p = 0.07, CFI = 0.99, TLI = 0.98, RMSEA = 0.05 \) (90% CI: 0.0–0.08), SRMR = 0.03. Comparing Model B to Model C, \( \Delta \chi^2 = 6.13, df = 1, p = 0.01 \), it was shown that the added path contributed significantly to the model. The path coefficient from mental health to resilience was significant, \( b = −0.51, p < 0.01 \); however, the path from loneliness to resilience became non-significant, \( b = −0.28, p > 0.05 \). Thus, this path was eliminated, and the model was retested (Model D). The results also showed an extremely appropriate fit to the data, \( \chi^2 = 26.66, df = 16, p = 0.05, CFI = 0.99, TLI = 0.98, RMSEA = 0.05 \) (90% CI: 0.01–0.08), SRMR = 0.03. However, the chi-square difference between Model C and Model D was not significant, \( \Delta \chi^2 = 2.82, df = 1, p > 0.05 \), suggesting that Model D was better.

| Variable | M   | SD  | Skewness | Kurtosis |
|----------|-----|-----|----------|----------|
| PI       | 28.4| 4.4 | −0.7     | 1        |
| NI       | 24.6| 6   | 0.3      | 0.1      |
| GAI-SF   | 1.7 | 1.7 | 0.6      | −0.9     |
| GDS-SF   | 1.2 | 1.2 | 1        | 0.8      |
| RS       | 54.9| 9   | −0.9     | 1        |
| GSE      | 27.7| 4.1 | −0.4     | 0.5      |
| PSY      | 80.7| 13.1| −0.5     | 0.8      |
| PHY      | 101.7| 18 | −0.6     | 0.6      |

Notes: PI, positively worded items of UCLA Loneliness Scale; NI, negatively worded items; GAI-SF, Geriatric Anxiety Inventory—short form; GDS-SF, Geriatric Depression Scale; RS, Resilience Scale; GSE, Generalized Self-Efficacy Scale; PSY, psychological health subscale of WHOQOL-BREF–World Health Organization Quality of Life Questionnaire; PHY, physical health subscale of WHOQOL-BREF–World Health Organization Quality of Life Questionnaire.
TABLE 2 | Pearson correlations for the eight observed variables.

|    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|----|------|------|------|------|------|------|------|------|
| 1. PI | 1    |      |      |      |      |      |      |      |
| 2. NI | 0.400** | 1    |      |      |      |      |      |      |
| 3. GAI-SF | 0.288** | 0.268** | 1    |      |      |      |      |      |
| 4. GDS-SF | 0.368** | 0.330** | 0.447** | 1    |      |      |      |      |
| 5. RS  | −0.394** | −0.422** | −0.388** | −0.498** | 1    |      |      |      |
| 6. GSE | −0.160** | −0.238** | −0.335** | −0.314** | 0.629** | 1    |      |      |
| 7. PSY | −0.431** | −0.410** | −0.531** | −0.559** | 0.676** | 0.529** | 1    |      |
| 8. PHY | −0.289** | −0.302** | −0.387** | −0.439** | 0.509** | 0.410** | 0.638** | 1    |

*p < 0.01.

Finally, Model E was verified by adding a path from resilience to mental health to Model B, which showed a good fit to the data, $\chi^2 = 23.84$, $df = 15$, $p = 0.07$, CFI = 0.99, TLI = 0.98, RMSEA = 0.05 (90% CI: 0.0–0.08), SRMR = 0.03. The standardized path coefficients from resilience to mental health, $b = −0.40$, $p < 0.01$, from loneliness to mental health, $b = 0.49$, $p < 0.001$, and from loneliness to resilience, $b = −0.66$, $p < 0.001$, were significant.

The chi-square difference between Model D and Model E was not significant, $\Delta \chi^2 = 2.82$, $df = 1$, $p > 0.05$, implying that Model E was a better model. Furthermore, the slightly smaller AIC value (see Table 3) implied that Model E was better than Model D. Therefore, Model E was designated as the best model (Figure 2). In Model E, mental health and resilience fully mediated the link between loneliness and mental and physical QoL. The partial mediation effect of mental health in the link between resilience and mental and physical QoL was significant. Moreover, resilience partially mediated the link between loneliness and mental health ($z = −2.98$, $p < 0.001$).
Especially, the path of loneliness → resilience → mental health → mental, and physical QoL was significant. This path indicated that elderly people with high loneliness levels are not able to face the adversity, trauma, and stress, which may lower their mental health, and in turn, lead to low mental and physical QoL.

Finally, the multigroup analysis was tested to investigate whether the path coefficients were moderated by age. The age differences (young old group and old group) were tested by comparing the first model, which allows the structural paths to vary across ages, with the second model, which constrains the structural paths across ages to be equal. All the factor loadings, structure co-variances, and error variances were constrained to be equal.

The non-significant chi-square differences between the two models, $\Delta \chi^2 = 8.43$, $df = 6$, $p > 0.05$, as well as the slightly smaller AIC value, suggested that the structural paths of the final model did not differ by age, offering initial support for its robustness.

**DISCUSSION**

The current study was planned to test the mediation effects of both resilience and mental health for the relationship between loneliness and mental and physical QoL with a sample of elderly Italian people, given the lack of national and international literature concerning a multidimensional model of QoL, loneliness, resilience, and mental health. The best model from the current study supports the mediation effect of both resilience and mental health between loneliness and mental and physical QoL.

These results strongly suggest that loneliness influences mental and physical QoL via two pathways, with the impact of loneliness mediated by mental health and the impact of loneliness mediated by resilience. In other words, elderly people with high levels of loneliness are at an increased risk of experiencing low levels of mental health and low capacity to withstand stressors, resulting in low mental and physical QoL. The QoL seems to be the outcome of different psychological processes interrelated in a complex way, and not a direct effect of the perceived loneliness level.

Another relevant finding of the study regards the path of loneliness → resilience → mental health → mental and physical QoL, which was shown to be significant. This path could underline that elderly people with high loneliness levels are not able to face adversity, trauma, or stress; persons in this condition may evidence a lower resilience level, which may threaten their mental health. In turn, this condition could lead to a lower mental and physical QoL. That is, mental health is a mediator between resilience and mental and physical QoL, while resilience partially mediates the relationship between loneliness and mental health.

In line with the literature (Fry and Debats, 2010), the results of our study seem to indicate that people with greater levels of self-efficacy and resilience can mobilize emotional and psychological resources to face the stressful elements of their lives, and therefore, to express and feel more QoL satisfaction. According to the socio-cognitive model of health proposed by Bandura (1977, 1986, 1988), the concept of self-efficacy is included in a perspective that considers people as having an active role in producing and giving meaning to their experiences. These agency beliefs would affect the way in which the elderly face typical limitations and loss at their stage of life. In fact, according Lawton et al. (1999), maintaining a sense of agency can help a person to preserve a positive attitude toward life, moderating the emotional effect of loneliness and distress and supporting a greater life satisfaction.

In terms of clinical interventions, the model highlights how important the support that elderly people receive from social relationships could be. The reduction of loneliness dissatisfaction may be an important factor in primary prevention or the recovery process. Elderly people’s active participation in social activities in their communities could be increased via specific initiatives aimed at the elderly population. The opportunity to reduce the level of mental distress has been evidenced in the model with increasing resilience and self-efficacy and reduced loneliness dissatisfaction. This reduction will strengthen the capacity to face adversity, different losses, and stressful situations (resilience). In addition, as evidenced by the literature, a high degree of resiliency contributes to increased perceived life quality at the physical and psychological levels, and at the same time, reduces anxiety and depressive symptoms. The fact that loneliness could be reduced (Findlay, 2003; Cattan et al., 2005; Fokkema and Van Tilburg, 2007; Dickens et al., 2011; Forsman et al., 2011; Masi et al., 2011; Hagan et al., 2014), self-efficacy beliefs modified (Bandura, 1993), and resilience strengthened (Hartling, 2008) makes these factors primary for early intervention in support of QoL among the elderly (Fry and Debats, 2002). Ultimately, the results could also have economic implications in term of reducing healthcare costs (Bramley et al., 2002) and resulting in fewer contacts between elderly people and general practitioners and hospitals.

**Limits and Future Perspectives**

Critically analyzing the outcomes of the present study, it could be interesting to consider the results in the context of the study’s limitations. First, self-report tools were used, and they

**TABLE 3 | Fit indices among the competing models.**

|        | Model A | Model B | Model C | Model D | Model E |
|--------|---------|---------|---------|---------|---------|
| $\chi^2$ | 29.85   | 29.97   | 23.84   | 26.66   | 23.84   |
| $df$    | 15      | 16      | 15      | 16      | 15      |
| CFI     | 0.98    | 0.98    | 0.99    | 0.99    | 0.99    |
| TLI     | 0.97    | 0.97    | 0.98    | 0.98    | 0.98    |
| RMSEA   | 0.06    | 0.05    | 0.05    | 0.05    | 0.05    |
| CI for RMSEA | 0.03–0.08 | 0.02–0.08 | 0.00–0.08 | 0.01–0.08 | 0.00–0.08 |
| SRMR    | 0.04    | 0.03    | 0.03    | 0.03    | 0.03    |
| AIC     | 71.85   | 71.85   | 65.84   | 66.66   | 65.84   |
| ECVI    | 0.25    | 0.25    | 0.23    | 0.23    | 0.23    |
| CI for ECVI | 0.21–0.32 | 0.21–0.32 | 0.20–0.29 | 0.20–0.29 | 0.20–0.29 |

$N = 290$. *Represents the best model.

CRI: comparative fit index, TLI: Tucker Lewis index, RMSEA: root-mean-square error of approximation, SRMR: standardized root-mean-square residual, AIC: Akaike information criterion, ECVI: expected cross validation index, CI: confidence interval.
are not exempt from limitations, such as, inaccurate reporting and social desirability bias. Second, the participation in the study was voluntary; consequently, the sample composition may not represent the characteristics of the general Italian population. Third, the did not considered the variables of being in a couple (Ha, 2016), having siblings (Cicirelli, 2013), or being in a twin relationship (Brustia et al., 2013; Prino et al., 2016).

Future studies should examine and consider the relationship between mental health—in terms of anxiety, depression, resilience, and QoL—from a longitudinal perspective. For example, research could compare people's conditions at different stages in the Third Age or monitor longitudinal changes in the relationships between these factors in the lifecycle. Moreover, they could analyze people resilience and self-efficacy before and after completing a specific intervention program. It would also be interesting to further analyze the absence of the relationship between loneliness and QoL and to carry out the following: (1) pre–post evaluation of a specific training program on increasing resilience and reducing loneliness in a group of elderly people to see if their QoL increases (Lloyd et al., 2017); (2) consider the variable of being in a couple or whether the person a caregiver everyday life; and (3) consider older people who have experienced specific Third Age losses and study the evolution of the mediation model presented here.

**ETHICS STATEMENT**

This research project has been approved by Scientific Commission of “Fondazione Giovanni Goria” and everything has been done in accordance with the ethical standard of Associazione Italiana Di Psicologia and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed sheet on the questionnaire was given and discussed with all individual participants included in the study and no identifying details (name, surname, dates of birth, identity numbers, and other information) of the participants that were studied has been gathered and collected. After the discussion on the information sheet and to have answered to the their questions about the issues on the administration/questionnaire, each participant gave oral consent before filling. Researchers don’t have any opportunity to identify any specific participant.

**AUTHOR CONTRIBUTIONS**

EG prepared the study design, organized the sample recruitment, collected data, and contributed to the writing of the manuscript's introduction, discussion, and references sections. LR contributed to the study design and writing of the manuscript's introduction,
discussion, and references sections. CS prepared the data set, performed statistical analysis, prepared the tables, and contributed to the writing of the methods and results sections. PB prepared the study design and supervised the research team.

FUNDING

The first part of this research was supported by a grant, titled “Solitudine e Qualità della Vita nella popolazione anziana: validazione della UCLA Loneliness Scale (Versione 3) e costruzione di un modello esplicativo della Qualità della Vita nella terza età,” from “Progetto Master dei Talenti della Società Civile”—Giovanni Goria and CRT Foundations (Italy) to EG (Ph.D.).

ACKNOWLEDGMENTS

A special thanks to the participants who made this study possible. A special thanks for the help to Mr. M. Bergaglia, Ms. G. Costa, Mr. A. Magliano, Ms. L. Patteri, and Mr. N. Utelle.

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**Conflict of Interest Statement:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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