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ORIGINAL PAPER

Age Trends in Well-Being and Depressive Symptoms: the Role of Social Desirability

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Abstract
This study was conducted to determine whether age-related variance in social desirability mediates age trends in psychological health. Self-report measures assessing depressive symptoms, well-being and social desirability were administered to wide age range sample (158 participants aged 20–101 years) from Sardinia, an Italian region located in the Mediterranean Sea being characterized by high level of longevity. Binary correlations showed that ageing was significantly correlated with fewer depressive symptoms and greater well-being; social desirability was significantly correlated with fewer depressive symptoms and higher well-being; age and social desirability were positively correlated. Mediation analyses indicated that social desirability explained a significant proportion (7–33%) of age-related variance in perceived well-being and depressive symptomatology. In conclusion, age differences in self-reported depressive symptoms and well-being partially reflect age differences in social desirability. The age-related increase in social desirability may reflect development of an advantageous coping style that contributes to psychological health.

Keywords Social desirability · Ageing · Depressive symptoms · Well-being · Self-report

Introduction

Perceived well-being and depressive symptoms are among the most frequently studied indices of psychological health in older adults, since they reflect complementary but independent aspects of psychological health [1]. High levels of perceived well-being are indicative of optimal psychological functioning, a state sometimes referred to as positive mental health [2].

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Besides, low levels of depressive symptoms denote an ability to cope with the inevitable difficulties of ageing and reflect the absence of mental ill-health. An extensive literature indicates that both characteristics are linked to social functioning, physical and psychological health and even mortality [3].

Age trends in psychological health have long attracted the interest of researchers. Perceived well-being can be assessed in a variety of ways but, in general, studies have found similar or higher levels among older adults [4]. Similarly, previous reports indicate that ageing is associated with fewer depressive symptoms [5], although some reports have detected subsequent increases during later old age [6]. One concern about this evidence is the near-exclusive reliance on self-report measures which are known to be vulnerable to the influence of social desirability. Thus, intentionally or otherwise, respondents may have given socially desirable responses, over-reporting perceived well-being and under-reporting depressive symptoms. This concern remains overlooked in most research despite continued reports of significant correlations between social desirability scales and self-reported well-being or depressive symptoms [5, 7]. At first glance this does not appear to be a serious problem since covariance techniques can be used to remove variance due to self-presentation bias assessed via a co-administered social desirability scale [8]. However, although this approach is widespread, it can produce anomalous results when applied to self-rated affective experience and well-being. A well-known example of this is the effect of correcting for social desirability on the strength of association between self- and other-rated well-being. Several studies [9, 10] have shown that this reduces, rather than increases, the observed correlation. As McCrae and Costa [9] have noted, provided self-reported affect and well-being are uniformly over- or under-rated, there is little reason for concern unless there is a specific requirement to assess their absolute levels. However, the issue becomes more problematic when this response bias is unevenly distributed across individuals or groups and confounds the relationship between independent and dependent variables.

With respect to age trends in perceived well-being and depressive symptoms, this several studies have observed a significant positive relationship between age and social desirability [5, 11]. Such evidence suggests that age-related changes in affect and well-being could, either wholly or in part, be explained by age trends in social desirability and, in fact, some reports confirm this to be the case. These show that partialling variance associated with social desirability decreases the magnitude of correlation coefficients between age and self-reported affect or well-being [5, 7].

The reduced magnitude of partial correlations indicates that, at least with respect to the associations between age and both affect and well-being, social desirability acts as a mediator, rather than a suppressor variable. This could indicate that ageing is associated with an increased self-favoring response bias. Another possibility arises from evidence that social desirability scales tap a substantive personality variable, most commonly identified as defensiveness. This trait is commonly defined as a tendency to protect self-esteem by avoidance of threatening information and minimization of negative affect [12] and high defensiveness is associated with better emotional health and well-being [11, 13]. The reports of a positive correlation between age and social desirability could, therefore, indicate that ageing is associated with increased defensiveness which contributes to improved emotional regulation in late adulthood.

The present study was conducted to determine if social desirability mediated age trends in self-rated negative affect and well-being. Although prior studies have addressed this question, the present sample consisted of inhabitants of the Sardinian Blue Zone. The unusual longevity and robust psychological health of this population has attracted much interest [14–18]. Individuals (e.g., centenarians) possessing this combination of characteristics are considered

a vital resource for the investigation of healthy and/or successful ageing [19, 20]. Yet, while there is evidence that social desirability contributes to psychological health, especially in older adults [11], its role in this population is not certain. Significant correlations between the Marlowe-Crowne scale of social desirability [21] and both self-rated depressive symptoms and well-being have been reported in Sardinian elders [17, 22]. However, these studies were primarily concerned with the distortion of absolute levels of the outcomes due to response bias in exclusively old-aged samples. By contrast, the focus of the present study was whether social desirability mediates age trends in self-rated well-being and depressive symptoms, an issue not previously investigated in this population. Other noteworthy aspects of the present study are the extended age range of the sample (20–101 years) and the measurement of multiple dimensions of well-being [23].

The following hypotheses were tested. First, the zero-order correlations among the study variables will demonstrate: (a) that ageing is associated with increasing perceived well-being and decreasing depressive symptoms; (b) that ageing is associated with higher levels of social desirability; and (c) that higher social desirability is associated with higher perceived well-being and fewer depressive symptoms. Second, that social desirability will mediate the observed age trends in perceived well-being and depressive symptoms. All hypotheses involving perceived well-being were expected to be evident in terms of overall well-being and all 3 specific dimensions also.

Method

Participants

One hundred and fifty-eight cognitively healthy community-dwelling adults residing in rural areas of Sardinia took voluntarily part in the current study. To investigate differences in demographic characteristics participants were assigned to one of 5 age groups: Young (i.e., 20–35 years old), Middle-aged (i.e., 40–59 years old), Young Old (i.e., 65–74 years old), Old (i.e., 75–84 years old) or Oldest Old (i.e., 85–101 years old). Gender ($\chi^2 = .57$, df = 4, $p = .97$) was counterbalanced across the age groups whereas, as expected from previous research conducted in the Sardinian rural areas [14, 24], education (i.e., 0–8 years versus >8 years) was not counterbalanced ($\chi^2 = 15.16$, df = 4, $p = .004$). Consistent with previous research in this population [15, 16, 25] recruitment was constrained by three criteria: 1) respondents had to have been born in the same areas where they were recruited and currently lived; 2) they had to be a descendant of Sardinians resident in that area for at least two previous generations; 3) they had not to show any signs of cognitive decline as assessed by the Mini-Mental State Examination (MMSE) [26]. Table 1 illustrates the socio-demographic characteristics of the participants.

Materials

Each participant completed the following inventories:

1) The Mini-Mental State Examination (MMSE) [26]. This contains 30 items assessing various cognitive processes, including motor coordination, spatial-temporal orientation, short and long-term memory, attention, mental calculation and language. It was

Table 1 Distribution of age, gender and education within the sample. Information has been provided for the young, middle aged, young old, old and oldest-old groups, respectively

	Young adults (20–35 years)	Middle-aged (40–59 years)	Young old (60–74 years)	Old (75–84 years)	Oldest old (85–101 years)
Gender					
Male	21	8	13	15	17
Female	24	10	14	20	16
Age					
Mean	25.8	52.9	69.3	78.7	88.5
S.D.	3.6	2.6	3.5	2.9	3.8
Education (years)					
≤ 8	13	9	13	23	22
> 8	32	9	14	12	11
Total n/-group	45	18	27	35	33

administered to screen cognitive efficiency and a score < 24/30 was used to exclude participants with suspected cognitive decline.

2) A preliminary interview developed by Fastame and Penna [22] was used to determine basic socio-demographic characteristics (e.g., age, marital status, years of education) and lifestyle activities of each participant.
3) The Marlowe and Crown Social Desirability Scale (MCSDS) [21], Italian adaptation for old people by Fastame and Penna [22]. This measure consists of 33 dichotomous (i.e., true versus false) items concerning socially approved but unlikely behaviors and socially unacceptable but likely behaviors (reverse-scored). The number of items responded to as true are totaled giving a maximum score of 33. In the current sample, this measure exhibited good internal consistency, Cronbach's alpha = .81.
4) The Centre for Epidemiological Studies of Depression Scale (CES-D) [27], Italian version by Fava [28]. This is a 20-statement self-report measure assessing the frequency of depressive symptoms (e.g., loss of interest, sadness) experienced over the past week on a four-point Likert scale (from 0, *never or rarely* to 3, *most days or every day*). The maximum score is 60. A score between 16 and 23 indicates at a risk of mild-moderate depressive symptomatology, whereas a score ≥ 24 indicates a risk for severe depression [28]. In the current sample, this measure exhibited good internal consistency, Cronbach's alpha = .83.
5) The Psychological Well-Being and Ageing Questionnaire (PWAQ) [23]. This is composed of 37 items assessing perceived psychological well-being. The tool yields an index of overall well-being (PWAQ-tot), as well as sub-scores for the following three separate dimensions of well-being. Personal satisfaction (PWAQ-PS), assesses the individual's satisfaction with one's life past and present plus the expectation of future satisfaction. Coping strategies (PWAQ-CS), assesses the individual's capacity to face and overcome daily life problems. Emotional competency (PWAQ-EC), assesses the individual's capacity to recognize and understand their emotional states and satisfaction with social relationships. Respondents self-rate the frequency of occurrence of a series of situations along a 4-point Likert scale ranging from 1 (*never*) to 4 (*often*). The maximum score for the general psychological well-being measure is 148. A score ≤ 103 is the cut off indicating a low level of general psychological well-being, whereas a score ≥ 115 indicates a very high

level of psychological well-being. In the current sample, this measure exhibited good internal consistency, Cronbach's alpha = .87.

Procedure

After that written informed consent was provided by all participants prior to participation, each respondent was tested individually and completed the inventories in a quiet room of his/her own home. To minimize the risk of fatigue among older participants, the experimenter read aloud each inventory items and recorded the spoken responses of each participant. For all participants, cognitive efficiency was assessed first using the MMSE. The socio-demographic interview followed this. Subsequently, the order in which the CES-D, PWAQ and MCSDS measures were presented was counterbalanced across participants. The time taken to complete all the measures was approximately 60 min.

Results

First, a series of bivariate Pearson product-moment correlations were computed to test associations among age, social desirability, depressive symptoms and the various psychological well-being indexes. As Table 2 shows, the hypotheses that ageing would be associated with increasing well-being and decreasing depressive symptoms were confirmed with one exception. Thus, whereas significant positive correlations between age and personal satisfaction and emotional competencies subscales were observed, there was no significant correlation between age and the coping strategies subscale. A positive correlation between age and overall well-being, and a negative correlation between age and depressive symptoms were also detected. All hypotheses related to social desirability were also confirmed (see Table 2). There was a significant positive correlation between age and scores on the MCSD scale. Finally, social desirability scores were significantly correlated with higher levels of all dimensions of well-being and overall well-being. As expected, there was a significant negative correlation between social desirability and depressive symptoms. The observed bivariate correlations are consistent with the possibility that age-related changes in perceived well-being and depressive symptoms might be mediated by age-related increases in social desirability. This possibility was examined via a series of regression analyses.

Each regression analysis investigated whether the relationship between age and depressive symptoms or psychological well-being (overall total and the personal satisfaction and emotional competencies subscales) was mediated by social desirability. In each case, the indirect effect was tested using a bootstrap estimation approach with 5000 samples [29]. Age and social desirability did not explain significant variance ($R^2 < 1\%$) in the remaining subscale of psychological wellbeing (coping strategies) and details of mediation analysis are therefore not reported.

Age was a significant predictor of social desirability, b = .135, SE = .014, $p < .0005$ (path a in Figs. 1, 2, 3 and 4) and social desirability was a significant predictor of each outcome (path b in Figs. 1, 2, 3, and 4): depressive symptoms (Fig. 1), b = −.527, SE = .136, p < .0005; total psychological well-being (Fig. 2), b = .987, SE = .218, $p < .0005$; personal satisfaction (Fig. 3), b = .289, SE = .092, $p = .002$; and emotional competencies (Fig. 4), b = .198, SE = .075, $p = .009$. These results support the mediation hypothesis for all 4 outcomes. After controlling

Table 2 Pearson Correlation Matrix among age, social desirability, self-reported depressive symptoms (CES-D), total psychological well-being (PWAQ-tot), emotional competence (EM-PWAQ), and personal satisfaction (PS-PWAQ) indexes

	Age	Social Des	CES-D	PWAQ-tot	PWAQ-PS	PWAQ-CS	PWAQ-EC
Age	1	.626**	−.224**	.379**	.540**	.065	.175*
Social Des		1	−.367**	.484**	.499**	.268**	.268**
CES-D			1	−.435**	−.409**	−.269**	−.277**
PWAQ-tot				1	.805**	.687**	.705**
PWAQ-PS					1	.360**	.443**
PWAQ-CS						1	.357**
PWAQ-EC							1

*$p < .05$; **$p < .001$

for social desirability (path c' in Figs. 1, 2, 3, and 4) age was no longer a significant predictor of: depressive symptoms, b = .003, SE = .029, $p = .925$; total psychological well-being, b = .066, SE = .047, $p = .164$ and emotional competencies, b = .002, SE = .016, $p = .908$. Age remained a significant predictor of personal satisfaction after controlling for social desirability, b = .089, SE = .020, $p < .0005$. These findings are consistent with full mediation of the age-outcome relationships, except in the case of personal satisfaction. Age and social desirability accounted for 5%, 14% 29% and 3% of the variance in depressive symptoms, total wellbeing, personal satisfaction and emotional competencies, respectively. For all 4 outcomes, the indirect coefficient was significant: depressive symptoms b = −.071, SE = .025, 95% CI = −.1234, −.0248; total psychological well-being, b = .133, SE = .033, CI = .0725, .2017; personal satisfaction, b = .039, SE = .013, CI = .0139, .0675; and emotional competencies, b = .027, SE = .011, CI = .0056, .0519.

Discussion

The goal of the present study was to investigate whether age-related changes in depressive symptoms and self-rated well-being might be mediated via age differences in social desirability. The significant relationships between age and both outcomes were observed: ageing was significantly associated with reduced depressive symptomatology [27] and higher levels of

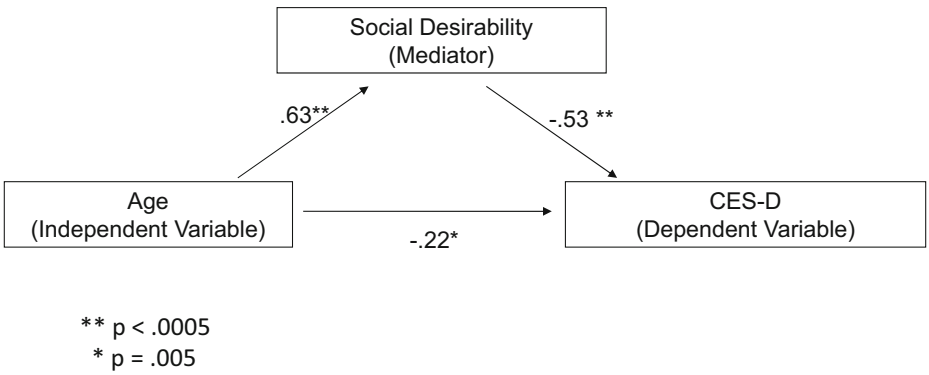
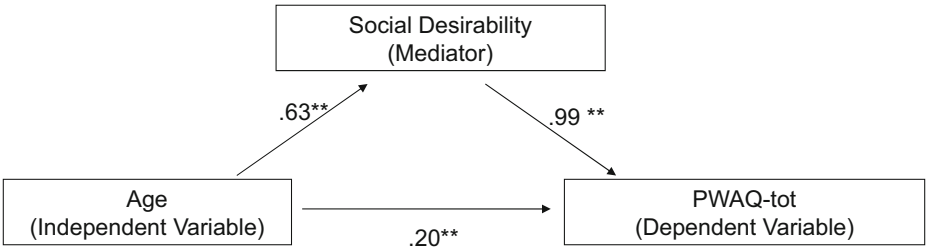


Fig. 1 Social desirability as a mediator of the age trend in depressive symptoms

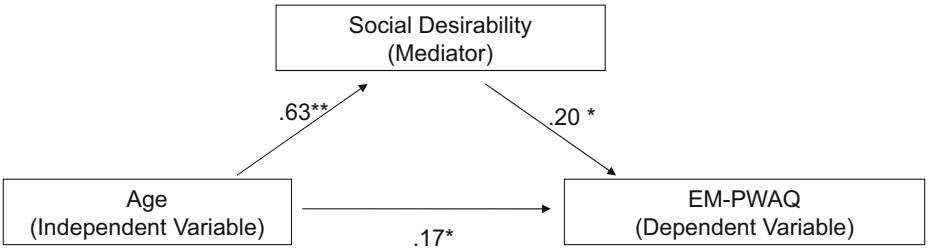


** p < .0005

Fig. 2 Social desirability as a mediator of the age trend in overall perceived well-being

self-rated well-being [23]. Significant positive correlations between age and personal satisfaction and emotional competencies were observed. By contrast, age was not significantly correlated with the third well-being subscale, coping strategies. As expected, scores on the Marlowe-Crowne social desirability scale [21] were negatively correlated with depressive symptoms [20, 27] and positively correlated with overall well-being and all three subscales of this measure developed by De Beni et al. [23]. Moreover, ageing was associated with increasing social desirability scores. These findings suggested that the observed age trends in perceived well-being and depressive symptoms might be mediated by age differences in social desirability. This possibility was confirmed. Social desirability was found to be a significant mediator of all significant age-outcome relationships detected.

The age trends in the present data are consistent with previously reports that ageing is associated with declining levels of depressive symptoms [5] and increased self-rated well-being [4]. Ageing was also associated with increased social desirability scores, again consistent with previous reports [5, 11, 20]. These observations underscore concern about the extent to which relationships between age and self-report measures of affect and well-being are distorted by age-related variance in social desirability. This issue has received only limited attention to date but two recent investigations have confirmed that age-outcome relationships can be mediated by social desirability [5, 7]. These reports indicate that age trends in positive and



** p < .0005
* p < .05

Fig. 3 Social desirability as a mediator of the age trend in the personal satisfaction dimension of perceived well-being

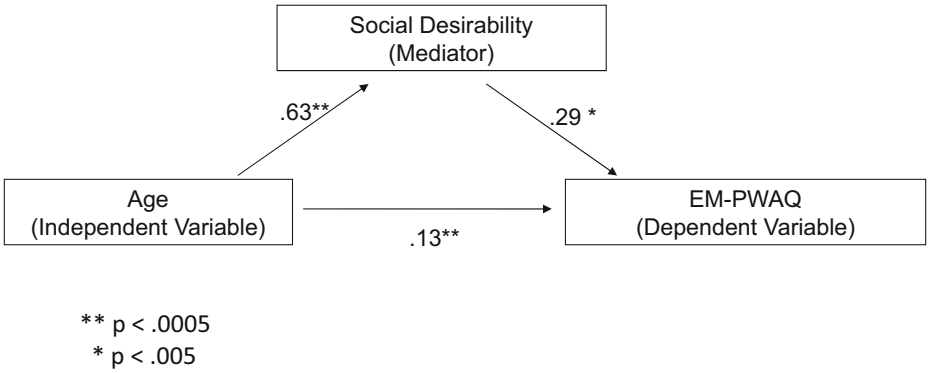


Fig. 4 Social desirability as a mediator of the age trend in the emotional competencies dimension of perceived well-being

negative affect, life satisfaction and the big five personality traits (excluding openness) are mediated by social desirability. The present study extends this evidence by providing a detailed examination of the mediation by social desirability of self-perceived well-being.

The detailed analysis of self-perceived well-being represents one of the principal strengths of the current investigation. Although age was positively correlated with overall self-perceived well-being, it was not similarly associated with all dimensions of this measure. Whereas positive relationships with personal satisfaction and emotional competencies were detected, there was no significant relationship between age and coping strategies. Although the differential age-trajectories of specific dimensions of perceived well-being was not anticipated similar findings have been observed previously [2]. No clear pattern emerges from a comparison of these previous data and those of the present study. This is not altogether surprising given various methodological differences particularly in the choice of measurement scales. Nevertheless, the present findings highlight that age-related variance in social desirability accounts for age differences in some but not all dimensions of perceived well-being.

The present study sampled a longevous population in which older individuals are known to display unusually low levels of depressive symptoms and unusually high levels of self-perceived well-being [17, 30]. Controlling for social desirability has previously been found to reduce, but not eliminate, differences in these outcomes [17]. The present study employed a far broader age range (20–101 years) of individuals from this population to determine specifically if age trends in depressive symptoms and self-perceived well-being are mediated by social desirability. The present data indicate that social desirability partially mediated the relationships between age and both depressive symptomatology and well-being. Similarly, previous studies reported incomplete mediation of age trends in self-reported affect, life satisfaction and personality traits [5, 7].

There are limitations to the present study. An obvious point is that despite its broad age range, the present sample was relatively small and a larger scale replication is necessary. The inclusion of other factors likely to contribute additional variance in self-reported depression and well-being (e.g., health status, social support) could also prove useful as would the inclusion of alternate social desirability measures. The age-related increase in scores on the Marlowe-Crowne social desirability scale [21] could therefore indicate increasing levels of either. How this ambiguity might be resolved is not immediately obvious. It has been suggested that social desirability scales vary in the degree to which they assess defensiveness

[31]. Future research employing different scales or perhaps scales distinguishing between different dimensions of social desirability, such as the Balanced Inventory of Desirable Responding Scale [32] might be useful in this regard. This measure distinguishes between impression management (the deliberate distortion of responses to impress others) and self-deceptive enhancement (an unconscious but overly positive self-view). Thus, it would be of interest to determine if these different aspects of social desirability change across the life span as well as their relationships with self-reported depressive symptomatology and perceived well-being [13]. It is also uncertain if procedural differences (older participants were aided; younger participants were not) influenced the findings.

Compliance with Ethical Standards

Conflict of Interests The authors declare that there is no conflict of interest.

Ethical Approval The ethical committee of the Department of Pedagogy, Psychology, Philosophy of the University of Cagliari approved this study in conformity with the provisions of the Declaration of Helsinki. Written informed consent was given by all participants prior to participation.

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