

Measuring Spiritual Well-being using a numerical rating scale: Additional evidence of the validity of the Well-being Numerical Rating Scales (WB-NRSs)

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Abstract

The Well-being Numerical Rating Scales (WB-NRSs) can be used to assess rapidly and accurately different types of well-being. However, the spiritual well-being scale showed slightly weaker psychometric properties. This study aimed to further investigate its suitability in measuring spiritual well-being. Participants ($N = 270$, age: $M = 32.98$; $SD = 15.64$; 67% females) were administered a questionnaire including spiritual well-being, gratitude, compassionate love, and personality traits measures. A network analysis (based on correlations) was used to display graphically the pattern of relationships among the measured constructs (i.e. the nomological net). Results provided evidence that the scale measures spiritual well-being as defined in the literature, that is, a component distinct from faith and compassionate love, but connected to meaning in life, quality of relationships, personality traits, and gratitude. These findings confirm the WB-NRSs is a psychometrically sound and easy-to-use tool with clear benefits for both research and clinical assessment.

Keywords

assessment, nomological network, numerical rating scale, spiritual well-being, validity

Introduction

Over the years, well-being has been studied (and measured) at length by many disciplines (Linton et al., 2016). Based on the World Health Organization (WHO) definition of health, Bonacchi et al. (2021) developed a new tool, called the Well-being Numerical Rating Scales (WB-NRSs), to assess physical, psychological, spiritual, relational, and general well-being rapidly and accurately.

“Rapidly” because the numerical rating scale is a segmented numeric scale in which a respondent selects a number that best reflects

the intensity of the investigated characteristic (usually pain or a symptom). This type of scale

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has high comprehensibility, ease of completion and scoring, and short administration time (usually less than 1 minute). Hence, to avoid test-takers' fatigue and loss of interest, and simplify test-users' work, the WB-NRSs are appropriate for large, multivariate studies in which many tests and scales are used, and they can be employed to test quickly pre-post changes after a well-being intervention program.

"Accurately" because administering the WB-NRSs to large clinical and non-clinical samples, Bonacchi et al. (2021) provided evidence that the instrument has adequate psychometric properties. Through applying IRT, they showed that each NRS performs adequately in measuring the targeted well-being component (i.e. it has a good discriminant ability, and the spread of threshold parameters attested to the appropriateness of the response categories). Moreover, they were able to replicate the nomological net documented in the literature concerning the relationships of well-being with dispositional optimism, sense of coherence, sense of mastery, stress, anxiety, and depression (e.g. Linton et al., 2016). Finally, it was investigated if the WB-NRSs were able to detect changes in well-being after an intervention program testing the responsiveness of the tool in two different studies. One was conducted with cancer patients who were invited to attend live classical music concerts during the chemotherapy (Toccafondi et al., 2018). The other one was related to cultural heritage and focused on the development of an augmented reality museum itinerary (Gianni Falvo et al., 2014). Both the interventions were original strategies developed for improving participants' well-being and the ability of the WB-NRSs to detect such a change can be considered an important feature of the instrument.

The WB-NRSs were developed in Italian and then validated in English proving the invariance to the original version (Bonacchi et al., 2021). Very recently the Chinese adaptation of the WB-NRSs was conducted confirming the good psychometric properties of the instrument and providing evidence that it can be used to assess the well-being of Chinese-speaking people (Luo

et al., 2023). Finally, a European University for Well-Being (EUniWell) project¹ allowed to work on different European language validations (namely, Dutch, French, German, Hungarian, Spanish, and Swedish) and to confirm the psychometric properties of the English version.

Despite these positive results, Bonacchi et al. (2021) reported that the spiritual well-being numerical rating scale showed slightly weaker psychometric properties. Thus, it was suggested to extend the study of this scale to better understand its ability to assess this specific type of well-being. According to the literature (e.g. Tanyi, 2002), spirituality has been defined from a broader perspective, including a sense of connection and integration (with the community to which one belongs, with a transcendent power) and the meaning of life (King et al., 1995; Koenig et al., 2012). Specifically, finding meaning and purpose is the fundamental desire of human beings and the driving force of life that can alleviate their suffering and result in spiritual well-being (Frankl, 1988). Hence, spiritual well-being consists of the sense of serenity and joy that derive from living coherently with one's values and with the recognized meaning of life, to be satisfied with one's life and the goals achieved, to relate to others, but also with the transcendent or a higher power (Bredle et al., 2011; Koenig et al., 2012). Nonetheless, it is kept distinct from religious faith, defined as the way an individual believes, follows, and practices a religion, and how usually these beliefs influence how people seek to live out their lives and behave with others (Parker et al., 2003).

Starting from this premise, the goal of the current study is to extend the previous findings on the WB-NRSs, focusing on the spiritual well-being numerical rating scale (SpWB-NRS). Notably, we aimed to provide further evidence of its validity by exploring a nomological net. In detail, given that spiritual well-being is related to finding meaning in life and connectedness (both with others and higher power), but it is something different to religious faith, we expected medium to high correlations

between the SpWB-NRS with the meaning of life and quality of relationships measures, and a small correlation with indicators of religious practice. Additionally, gratitude (i.e. the generalized tendency to respond with a positive emotional reaction to the receipt of a gift or benefit from someone recognizing the positive experiences and outcomes that one obtains from it) can be related to spiritual well-being (Emmons and Kneezel, 2005; McCullough et al., 2002; Tudder et al., 2017), while compassionate love (i.e. the attitude to be focused on caring, concern, tenderness, helping, and understanding the others), should be related to religious faith and gratitude (Kim et al., 2018; Sprecher and Fehr, 2005), but distinct from spiritual well-being. Finally, in literature, spiritual well-being was linked to personality (Ramanaiah et al., 2001; Saroglou, 2002; Unterrainer, 2023; Unterrainer et al., 2010). Whereas there is some disagreement and different personality measurement tools were used, the Big Five factors (Costa and McCrae, 1992a) were found to be weakly to moderately linked to spiritual well-being. Thus, we predicted to observe similar relationships between the SpWB-NRS and personality traits.

In sum, we expected to find a pattern of relationships following the literature to provide evidence that the SpWB-NRS can grasp the main features of spiritual well-being.

Methods

Participants and procedure

The sample consisted of 270 Italian adults (males=90, 33.3%; females=180, 66.7%) aged between 18 and 79 years ($M=32.98$; $SD=15.64$). The 49.3% of them ($N=133$) were undergraduate students from a large university in central Italy. They were invited to complete a Google Forms questionnaire through social networking webpages. The web-based assessment was chosen because it has general documented merits (e.g. flexibility, speed and timeliness, reduced costs, ease of data collection and data entry) (Evans and Mathur, 2005; Gosling et al.,

2004), but especially because it was suggested that it does not compromise measurement validity (Martins, 2010) and that individuals who respond to Internet surveys are deemed more self-aware, reflective, and more likely to reveal deeper feelings (Hanna et al., 2005). These two aspects are potentially very important when measuring spiritual well-being and testing the validity of an instrument.

Participants were also invited to ask their relatives or acquaintances to participate via the snowball method (Biernacki and Waldorf, 1981). All participants were informed that their participation was voluntary, that they could leave the study at any time, and that their data would be treated anonymously. All participants provided informed consent and they voluntarily took part in the study. No compensation or incentives were provided. The study was approved by the university's local institutional ethical review board (N. 223-0189161).

Measures

The online questionnaire consisted of the following scales.

Well-Being Numerical Rating Scales (WB-NRSs; Bonacchi et al., 2021). It is a five-item instrument that assesses physical, psychological, relational, spiritual, and general well-being. Each item uses a 10-point numerical rating scale with 1 indicating a state of "absolute distress" and 10 a state of "complete well-being." The respondent selects a number that best reflects the magnitude of the characteristic being investigated. In the current study, only the measure of spiritual well-being (SpWB-NRS) was reported by isolating it from other components of the WB-NRSs.

Jarel Spiritual Well-Being Scale (JSWBS; Hungelmann et al., 1996; Italian version: Magnano et al., 2019). It consists of 16 items with five-point Likert Scale options (1 = strongly disagree, 5 = strongly agree) distributed on three factors, namely Faith and belief (e.g. "Prayer is an important part of my life"), Meaning of life (e.g. "I find meaning and purpose in my life"), and Quality of relationships (e.g. "I am able to

appreciate differences in others”). The scale showed a good internal consistency ($\alpha=0.83$).

Gratitude Questionnaire-Six (GQ-6; McCullough et al., 2002). It is a brief, six-item measure that assesses one’s disposition to experience gratitude with Likert-style response options (1=strongly disagree to 7=strongly agree). Two items are reverse-scored to inhibit response bias. The GQ-6 has reportedly good internal reliability. Cronbach’s Alpha calculated on the current sample was adequate ($\alpha=0.76$).

Compassionate Love Scale for Humanity (CLS-H-SF; Sprecher and Fehr, 2005). This scale assesses compassionate, or altruistic love in intimate relationships as well as for people in general. The scale comprises nine statements in which the participant indicates how true or false each is of themselves on a seven-point Likert scale (1=not at all true of me, 7=very true of me). In the current sample, Cronbach’s Alpha was excellent ($\alpha=0.92$).

Ten-Item Personality Inventory (TIPI; Gosling et al., 2003; Italian version: Chiorri et al., 2015). This brief measure assesses five broad personality traits based on the Big Five model consisting of Extraversion, Agreeableness, Conscientiousness, Emotional stability, and Openness to experience (Costa and McCrae, 1992a). Each dimension is measured by two items, each consisting of a pair of adjectives describing the trait in question. The scale demonstrated adequate levels of convergence with the Big Five measures and test-retest reliability (Chiorri et al., 2015).

Statistical analysis

Bayesian correlation tests were performed among SpWB-NRS and the other measured constructs. Mathematical details of the Bayesian correlation test have been described by Ly et al. (2016). Bayes Factors for evidence of alternative hypotheses is presented as an easy-to-interpret odds ratio that represents the magnitude of the difference: 1–3 as weak, 3–10 as substantial, 10–30 as strong, 30–100 as very strong, and >100 as decisive (Jarosz and Wiley, 2014).

To further analyze and display graphically the nomological net, network analysis was used (*correlation estimator*). In a network, the observed variables are called nodes, and the estimated links between nodes are called edges. To evaluate the pattern of the connections in which the node of interest plays a role, centrality measures are examined and represented in the centrality plot. The centrality indices are betweenness, closeness, strength, and expected influence. *Betweenness* is computed by identifying all the shortest paths and then counting how many times each node falls on one. This index provides information on the role a node has in the network by looking at its participation in the connections between the other nodes (Saramäki et al., 2007). *Closeness* represents how likely the information from a particular node goes through the entire network both directly and indirectly (Barrat et al., 2004). High closeness indicates a short average distance of a specific node to all other nodes. *Strength* represents the direct influence of the node given to the network, namely how many one-step connections each node has to other nodes in the network. Finally, *Expected Influence* is the sum of a node’s connections and represents the relative importance of a node in a network (Robinaugh et al., 2016). It is called “relative” because even in weakly connected networks there will always be a node with a high expected influence.

All the analyses were carried out using JASP version 0.18.0. (JASP Team, 2023). Data are available at <https://osf.io/gv6uq/>.

Results

Positive and low to large correlations were observed between the SpWB-NRS and the JSWBS subscales, namely Faith and belief ($r=0.23$, $BF_{10} > 100$), Quality of relationship ($r=0.39$, $BF_{10} > 100$), and Meaning of life ($r=0.60$, $BF_{10} > 100$). The SpWB-NRS and gratitude were positively correlated ($r=0.40$, $BF_{10} > 100$) and, whereas compassionate love was related to Faith and gratitude ($r=0.28$, $BF_{10} > 100$ and $r=0.39$, $BF_{10} > 100$,

Table 1. Correlation among the spiritual well-being measure (SPWB-NRS) and faith, meaning of life, quality of relationship, personality traits, gratitude, and compassionate love.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Spiritual well-being										
(2) Faith and belief	0.23***									
(3) Meaning of life	0.60***	0.20*								
(4) Quality of relationship	0.40***	0.18	0.52***							
(5) Extraversion	0.03	0.06	0.17	0.17						
(6) Agreeableness	0.20*	0.15	0.17	0.29***	-0.14					
(7) Conscientiousness	0.22**	0.02	0.41***	0.25***	0.06	0.20*				
(8) Emotional stability	0.42***	0.04	0.44***	0.30***	0.10	0.13	0.24***			
(9) Openness to experience	0.16	0.02	0.13	0.33***	0.26***	0.05	-0.01	0.10		
(10) Gratitude	0.40***	0.28***	0.52***	0.48***	0.18	0.29***	0.23***	0.16	0.17	
(11) Compassionate Love	0.13	0.28***	0.17	0.41***	0.02	0.24***	0.05	-0.06	0.22**	0.39***

* $BF_{10} > 10$. ** $BF_{10} > 30$. *** $BF_{10} > 100$.

respectively), a non-significant correlation was observed with SpWB-NRS ($r=0.13$, $BF_{10} < 10$). There was evidence of a medium positive correlation between the SpWB-NRS and Emotional stability ($r=0.42$, $BF_{10} > 100$). Referring to the other Big Five factors, the relationship was low with Agreeableness ($r=0.20$, $BF_{10} > 10$) and Conscientiousness ($r=0.22$, $BF_{10} > 30$), while the correlations between SpWB-NRS with Extraversion ($r=0.03$) and Openness to experience ($r=0.16$) were non-significant ($BF_{10} < 10$). All the correlations are reported in Table 1.

Figure 1 shows the network model characterized by 11 nodes. It can be seen visually that the SpWB-NRS is linked positively (as represented by the blue color), strongly (as represented by the large thickness of the edges), and closely (as represented by the short distances) to gratitude, meaning of life, quality of relationships, and emotional stability. Edges with faith and conscientiousness are thinner and more distant. The other nodes are far and weakly (e.g. the agreeableness node) or non-correlated (e.g. the extraversion node) with it. The centrality indices of the SpWB-NRS node reflect this pattern of correlations: betweenness is -0.284 ,

closeness is 0.568 , strength is 0.745 , and the expected influence is 0.779 (Figure 2 and Table 2). All these indices provide evidence that this variable is not the crucial node of the network, but a node strongly related to some variable in the network, and moderately or not related to some other ones, as expected when testing the validity through a nomological net.

Discussion

Despite the good amount of evidence in favor of the psychometric strength of the WB-NRSs (Bonacchi et al., 2021; Luo et al., 2023), there is a need to better understand the ability of the instrument to assess spiritual well-being. To fill this gap, the present study aimed to investigate the validity of the spiritual well-being numerical rating scale of the WB-NRSs looking at the relationships with the meaning of life, quality of relationship, religious faith, personality traits, gratitude, and compassionate love.

In line with the theoretical framework, the strong correlations with the quality of relationship and the meaning of life confirm the ability of the spiritual well-being numerical scale to grasp these two important facets of spiritual

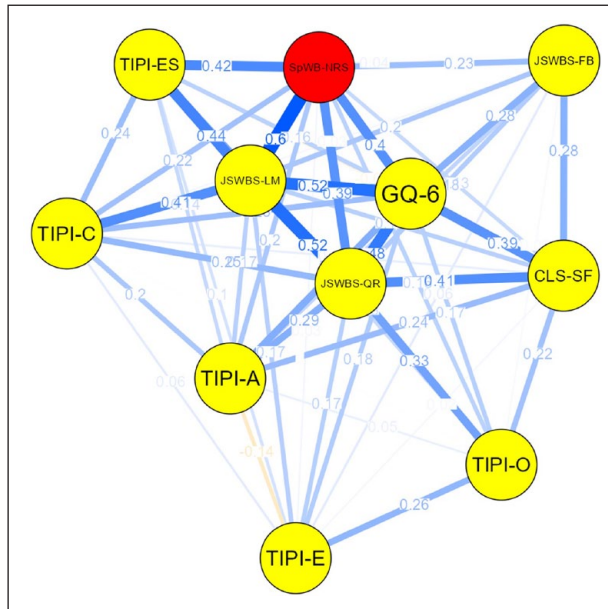


Figure 1. Correlation network graph. $N=270$. The nodes represent spiritual well-being (SpWB-NRS), Meaning of life (JSWBS-ML), Quality of relationships (JSWBS-QR), Faith and belief (JSWBS-FB), gratitude (GQ-6), compassionate love (CLS-SF), and personality traits (TIPI-ES=Emotional stability, TIPI-C=Conscientiousness, TIPI-O=Openness to experience, TIPI-E=Extraversion, TIPI-A=Agreeableness). The edges represent the correlations between them. Thicker edges represent stronger associations, with blue edges representing positive associations and yellow edges representing negative associations.

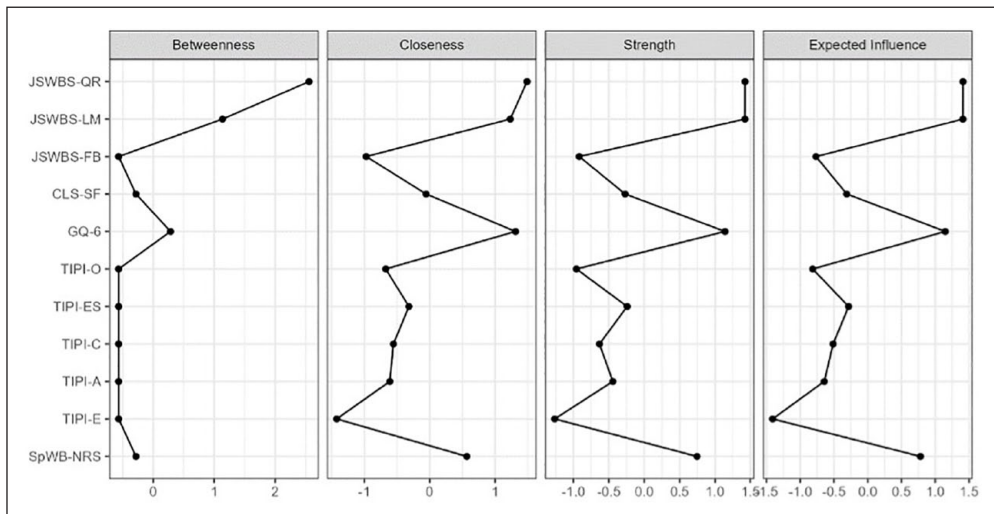


Figure 2. Centrality plot for network analysis. For variable abbreviations see Figure 1.

well-being (King et al., 1995; Koenig et al., 2012; Magnano et al., 2019). At the same time, the small correlation with religious faith attested

that spiritual well-being as assessed by this scale differs from faith that includes institutions and traditions, whereas spirituality is a broader

Table 2. Centrality measures for network analysis.

Variable	Betweenness	Closeness	Strength	EI
JSWBS-QR	2.556	1.490	1.423	1.410
JSWBS-LM	1.136	1.233	1.422	1.409
JSWBS-FB	-0.568	-0.972	-0.919	-0.768
CLS-SF	-0.284	-0.054	-0.270	-0.311
GQ-6	0.284	1.314	1.141	1.148
TIPI-O	-0.568	-0.673	-0.959	-0.816
TIPI-ES	-0.568	-0.318	-0.242	-0.285
TIPI-C	-0.568	-0.555	-0.633	-0.513
TIPI-E	-0.568	-1.424	-1.266	-1.410
TIPI-A	-0.568	-0.610	-0.444	-0.645
SpWB-NRS	-0.284	0.568	0.745	0.779

Values are presented as z-scores. For variable abbreviations see Figure 1.

EI: expected influence.

construct related to a transcendent power but without institutional constraints (Bredle et al., 2011; Koenig et al., 2012).

Furthermore, the present study confirms the relationships reported in the literature between spiritual well-being, gratitude, and compassion. We found a positive medium correlation between the SpWB-NRS and gratitude. According to Emmons and Kneezel (2005), this positive relationship could reflect the fact that people with a high level of spirituality tend to perceive positive circumstances in their lives that are not caused by human actions, but rather by a benevolent moral agent (e.g. God or positive higher energy). As such, gratitude is related not only to traditional religiousness but also to spiritual experiences and sentiments (e.g. a sense of contact with a higher power, the perception that all living things are interconnected) independently of a specific theological orientation (McCullough et al., 2002). The spiritual well-being rating was not related to compassionate love, which refers to an altruistic attitude toward others (including non-intimate or strangers) triggered by their suffering, beliefs about suffering and taking care, and behaviors focused on offering help (Lazarus, 1991). Based on this definition, Sprecher and Fehr's (2005) scale assesses a construct that is closer to empathy and altruism toward others. As such, compassionate love differs from spiritual well-being because is more a general reaction to

known and unknown people's pain and sorrow and is linked to the need to offer them some help.

Finally, it was shown that the SpWB-NRS correlated to various extents with personality traits. By and large, the current results confirm the ones reported in the literature (Ramanaiah et al., 2001; Saroglou, 2002; Unterrainer, 2023; Unterrainer et al., 2010) with some differences. First, the relationship with openness to experience is not significant in the current study. However, when looking at the size of the correlations reported in the literature (Saroglou, 2002; Unterrainer et al., 2010), we can see that it is very similar to the one reported here. Second, the strongest observed relationship was with emotional stability. Whereas this result confirms the studies affirming that people with high spiritual well-being score higher on emotional stability (Ramanaiah et al., 2001) and that individuals open to spirituality are high in emotional stability (Saroglou, 2002), none of them observed that this relationship is the strongest among the Big Five factors. Third, differently from the literature, in the current study extraversion was not related to spiritual well-being. One possible explanation is that previously spiritual well-being was assessed including religious well-being (Ramanaiah et al., 2001; Unterrainer, 2023; Unterrainer et al., 2010) or religiosity (Saroglou, 2002). This might account for the observed difference

because the SpWB-NRS assesses something different from religious faith and belief. An additional reason that might explain all these discrepancies is that we assessed personality using a very brief scale (i.e. the *Ten-Item Personality Inventory*) that can be less accurate than the longer tests usually employed to assess the Big Five factors like the NEO-PI-R (Costa and McCrae, 1992b) employed by Ramanaiah et al. (2001).

The results reported herein should be considered in the light of some limitations. First, the current study has a limitation related to an unbalanced gender distribution. Since women report higher levels of spiritual well-being than men (Maselko and Kubzansky, 2006; Roothman et al., 2003; Van Eeden et al., 2000), this aspect might limit the generalizability. Moreover, almost half of the sample consists of university students and, as such, young people who might have had fewer experiences in life that affected their conception of spirituality when compared to older people. Whereas the literature reports mixed results about the relationship between spiritual well-being and age (Fry, 2000; Isaia et al., 1999; Kızılgöçüt, 2015; Kurt, 2009), this is another aspect that might limit the generalizability. An additional limitation is the cross-sectional nature of the study, which impedes to testing of possible outcomes of spiritual well-being, for example on health or in managing adverse events in life, as suggested in the literature (Gall et al., 2005; Park, 2013). Thus, it would be important to carry out longitudinal research to investigate the predictive validity of the SpWB-NRS.

Despite these limitations, the SpWB-NRS can be considered suitable for assessing spiritual well-being. As such, it can be used for clinical purposes in psychological practice and, more generally, in health promotion. Whereas there are very few studies on the effect of interventions on spiritual well-being, it was shown that they provide a sense of spiritual connection that can improve mood in patients (Moritz et al., 2011). For example,

spiritual counseling (SC), which includes activities such as meditation, releasing emotions, spiritual self-disclosure, prayer, and reading (Aghajani et al., 2014), helps patients to improve their general health and coping strategies, to change their attitude, and to address psychospiritual problems (Richards et al., 2007). Future research is needed to further investigate the outcome of these interventions and the SpWB-NRS might be used to assess spiritual well-being and detect changes. Similarly, some patients with cancer ask for help to find spiritual resources and derive meaning in life (Wei et al., 2016). Hence, healthcare staff should respect spiritual values and be attentive to the patient's needs and beliefs (Saad and de Medeiros, 2021). In this respect, the SpWB-NRS might be used for a quick survey of patients' spiritual well-being that can provide healthcare operators with information for efficient patient-centered care.

The current study suggests that the SpWB-NRS measures spiritual well-being as defined in the literature, that is, a component distinct from faith and compassionate love, but connected to meaning in life, quality of relationships, personality traits, and gratitude. Consequently, the whole WB-NRSs can be considered a reliable and valid tool that offers added value in the assessment of well-being being able to capture different kinds of well-being, including spiritual one.

Author contributions

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be submitted for publication. The corresponding author (FC) conducted conceptualization, methodology, formal analysis, supervision, writing, and revising the manuscript. CT contributed to investigation, formal analysis, interpreting results, and manuscript writing and review. GM provided for investigation, data curation, and formal analysis. AB was the supervisor of the study and conceptualized the research idea.

Data sharing statement

Data are available at <https://osf.io/gv6uq/>.

Declaration of conflicting interests

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Ethics approval

The study was approved by the Ethics Committee of the University of Florence (N. 223-0189161). All participants provided informed consent and they voluntarily took part in the study. No compensation or incentives were provided.

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Note

1. <https://shorturl.at/pHKL5>.

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