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Validation of the Paranormal Health Beliefs Scale for adults

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Abstract

We present the validation study of the Paranormal Health Beliefs Scale adult version, aimed to measure illusory beliefs about health. The scale was administered to 643 participants (54.3% females), having an average age of 29.7 years (standard deviation = 18.31). The results of the analyses confirmed the dimensions of the Paranormal Health Beliefs Scale as developed in the previous adolescent study (Beliefs: Religious, Superstitious, in Extraordinary Events, Parapsychological, and Pseudo-scientific of a biomedical nature), as well as the convergent and discriminant validity through the correlation with other constructs (locus of control and self-efficacy). The results also showed significant differences between subgroups by gender and age. The Paranormal Health Beliefs Scale shows satisfactory psychometric properties and thus may be used effectively to identify the varied range of illusory beliefs related to health, even within the context of lifelong educational programs aimed at health promotion.

Keywords

Health Locus of Control, Paranormal Health Belief, self-efficacy, validation of measurement scales

Introduction

Safeguarding one's own health is a central topic for health promotion according to the bio-psycho-social approach (World Health Organization, 1986), which considers persons as active subjects making reference to a system of resources, which are material, cognitive, emotional, and relational (Capone and Petrillo, 2013). In this regard, it appears relevant to understand better where persons stand with respect to that set of beliefs surrounding the paranormal sphere, which may become operative when one has to deal with issues related to health, thus influencing one's coping strategies, outcome expectancies, and the display of harmful behaviors. Furthermore, it is important to understand the role of illusory beliefs about health even in the diagnostic and therapeutic process, and their eventual impact on the outcome, such as adherence to medical prescriptions and the duration and the result of the treatment (Capone, 2016). In fact, it has already been shown that irrational beliefs about health were significant predictors of adherence to rehabilitative care in persons affected by cardiovascular diseases and diabetes (Anderson and Emery, 2014).

Paranormal beliefs are convictions relative to any phenomenon that in one or more ways exceeds the limits of what is deemed to be physically possible according to prevailing scientific assumptions. Several studies have shown the multidimensionality of such systems of beliefs (Aarnio and Lindeman, 2004; Utinans et al., 2015).

Significant associations with other constructs were also highlighted. Particularly, in relation to the locus of control, some studies found that persons who believe in the paranormal have a generally higher tendency for external locus of control (Newby and Davis, 2004; Tobacyk and Milford, 1983). In contrast, according to the Cognitive Adaptation Theory (Taylor and Lobel, 1989), the tendency to develop illusory beliefs is found just in those persons who, in a way, give up on seeking an explanation for threatening circumstances or experiences that are otherwise difficult for them to explain—such as being afflicted by an illness—in terms of, for example, the

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conviction of being able to personally control the course of the illness, or the treatment. Self-efficacy (Bandura, 1997) must be considered among the associations investigated with regard to illusory beliefs: persons having high levels of illusory beliefs should present low levels of self-efficacy (Tobacyk and Shrader, 1991). Understandably, the absence of a sense of self-efficacy, in circumstances that a person feels are potentially threatening and unavoidable, such as the appearance of symptoms or the onset of an illness, might trigger an anxiety difficult to deal with: thus, having at one's disposal a complex set of knowledge, even if baseless, such as beliefs in paranormal phenomena, can be very comforting.

The relationship between the paranormal and health has been accepted by some in terms of self-serving illusions (Taylor and Brown, 1988), in other words, illusory beliefs that are certainly false, but which, however, allow the fundamental function for mental health to create a "filter" through which reality acquires its own order and meaning. On the subject, several studies have investigated the relationship between paranormal beliefs and mental health (Dag, 1999), finding the existence of a significant and positive correlation with mental illness (Kelly, 2011; Thalbourne, 1994) and with manic-depressive experiences (Thalbourne and French, 1995); other studies have found some contradictory results on the relationships between paranormal beliefs, neuroticism (Lester and Monoghan, 1995; Thalbourne et al., 1995), and anxiety (Okebukola, 1986; Tobacyk, 1982). Furthermore, a line of studies dealt with beliefs in complementary and alternative medicine (Bishop et al., 2007), and paranormal beliefs were found as the strongest predictor of complementary and alternative medicine beliefs (Pettersen and Olsen, 2007; Van den Bulck and Custers, 2010). Other studies, with differences across gender and nationality, have found that some types of beliefs, such as religious and fatalistic, may inhibit health care utilization and health care behaviors, leading to poor health outcomes (Franklin et al., 2007; Gall et al., 2005). Petrillo and Donizzetti (2012) instead have considered illusory beliefs specifically related to the sphere of health, such as the beliefs and practices of prompt healing, protection from disease, and health promotion. From this study, it has emerged that adolescents have little tendency to believe in paranormal; furthermore, the boys have more confidence in medicine as science and have a tendency to rely on a biomedical approach in relation to the protection of the species because they have been socialized to take more interest in and to be better informed about scientific matters than other issues (Irwin, 1993; Zusne and Jones, 1982). Finally, there was a greater anchoring to the religious faith and faith in "medical science" in younger people.

Review of instruments

At first time, the paranormal belief had been considered as an expression of a relatively stable personality characteristic, with the consequent definition of one-dimensional instruments (Randall and Desrosiers, 1980). Subsequently, Scheidt's (1973) hypothesis was established about the existence of two or more relatively independent dimensions (Clarke, 1991; Grimmer and White, 1990; Sobal and Emmons, 1982; Thalbourne and Delin, 1993). Indeed, studies carried out since the 1990s have shown the multidimensionality of such systems of beliefs (Grimmer and White, 1990), which include dimensions related to alternative therapies, paratherapies, and functional and structural parapsychology (together with popular science, obscure unbelief, and traditional religion). The best known instrument for detecting paranormal beliefs is the *Paranormal Belief Scale*, developed by Tobacyk (1988, 2004; Tobacyk and Milford, 1983) and validated in various contexts (Bouvet et al., 2014; Díaz-Vilela and Álvarez-González, 2004; Utinans et al., 2015). Starting with a review of international literature on paranormal beliefs, as well as of ethnographic and psychosocial cutting literature, Petrillo and Donizzetti (2012) have developed the *Paranormal Health Beliefs Scale* (PHBS) that investigated adolescents' adherence to the system of paranormal beliefs about health. The scale consists of 31 items that are distributed in five related dimensions: Religious Beliefs (RB) (α=.90), Superstitious Beliefs (SB) (α=.83), Extraordinary Events Beliefs (EEB) (α=.79), Parapsychological Beliefs (PsiB) (α=.73), and Pseudo-scientific Beliefs of a biomedical nature (MedB) (α=.67). To examine whether three factors tapped the same dimension, a second-order confirmatory factor analysis was conducted. This model fitted the data very well. Results highlighted α=.91. Furthermore, the construct and criterion validity were satisfactory. There are no other instruments in the review of literature that can detect paranormal beliefs related to health.

Aims and hypothesis

Considering the lack of measures in this specific field, the objective of this study was to attain the validation of the adult's version of the PHBS (Petrillo and Donizzetti, 2012) for adolescents. This scale is designed to measure the level of adhesion to illusory beliefs about health, understood as a complex and extensive system of beliefs, ranging from the superstitious and magical to those about the power of the mind and healers, as well as those of a traditional religious type. For this purpose, we proposed to verify the psychometric properties of the PHBS (dimensionality, reliability, and construct and content validity, as well as convergent and discriminant validity), and the existence of differences according to gender and age, in order to prove that the PHBS is suitable to be usefully employed for the detection of the articulated range of the construct within the population.

It was hypothesized that the PHBS, adult version, would have a multidimensional structure with five factors that would converge in a single second-order dimension. In relation to the verification of the validity of the instrument, considering the above-mentioned literature on the subject, a

good content and construct validity was hypothesized. It was expected that the concurrent validity would result in a significant and positive correlation between the scale used to measure the central construct in our study, and the scale used to measure the affine construct of external Health Locus of Control (HLC). However, regarding the discriminant validity, we hypothesized a significant and negative correlation between the Paranormal Health Beliefs (PHB) measure and the measure of Internal Health Locus of Control, which is a construct complementary to that previously considered, as well as a low negative correlation or a nil correlation with the General Self-Efficacy (GSE) measure. Finally, we hypothesized differences between subgroups by gender and age, in line with literature available on the subject (Aarnio and Lindeman, 2005; Lange et al., 2000).

Method

Participants and procedures

We used a snowball sampling that relied on referral from initial participants, starting from University Students (through word-of-mouth) to generate additional participants. A convenience sample of people was composed by 643 persons almost equally divided by gender (45.7% males and 54.3% females), with ages ranging between 18 and 80 years and an average of 29.7 years ($SD = 18.31$), grouped in the following four categories: youngsters (18 years old) = 48.1 percent; young adults (19–30 years old) = 22.1 percent; adults (31–60 years old) = 19.3 percent; elderly persons (61–80 years old) = 10.6 percent. All participants filled in an anonymous questionnaire on their own.

Measures and analyses

Making use of a quantitative methodology, a questionnaire containing various instruments was specifically designed.

The *Paranormal Health Beliefs Scale* (PHBS) follows the version developed in a pilot study (Petrillo and Donizzetti, 2012), from which emerged five dimensions of illusory beliefs about health: RB (eight items), which invoke faith, God, the guardian angels, and the saints, as well as the cult related to their relics, as elements of a speedy recovery, protection from illness, and health promotion; SB (seven items), related to that combination of superstitious practices that are believed to ward off direct threats to health or other accidental or intentional events that may endanger one's health; EEB (six items), deemed, in some way, to have an influence on health because of alien entities, forces of the universe, extraordinary astral phenomena, and the experience of exceptional conscious states; PsiB (six items), referring to mental energies as sources of positive or negative influence on health, such that they may alter physiological parameters and provoke illness; MedB (four items), which refer to the negative contribution for the health of the human species by specific categories that are considered to be deviant or marginal social groups (homosexuals, immigrants), and to health threats deriving from hereditary transmission or genetic contamination. The PHBS is composed of 31 items rated on a 5-point Likert-type scale (from 1 = Strongly Disagree to 5 = Strongly Agree): high scores relate to high levels of illusory beliefs referring to health (see Supplementary Materials).

The *General Self-Efficacy Scale* (GSES) of Schwarzer and Jerusalem (1995; Sibilia et al., 1995) measures the trust that subjects have in their own competences in facing adversary events. The Likert-type scale comprises 10 items with an answering range of 4 points (from 1 = Totally Untrue to 4 = Totally True).

The *Health Locus of Control Scale* (HLCS) for adults (Donizzetti and Petrillo, 2015), useful for the measurement of the orientation of locus of control related to health in this population, is composed of three dimensions: Internal Health Locus of Control (IHLC; eight items), God Health Locus of Control (GHLC; two items), and Other Health Locus of Control (OHLC; 3 items). The HLCS is made up of 13 items, with an answering range of 5 points (from 1 = Strongly Disagree to 5 = Strongly Agree). Finally, the questionnaire included a section for the collection of sociodemographic data (gender and age).

The verification of the factorial structure was computed through confirmatory factor analysis of first and second order, using Lisrel 8.54 software. The difference between the observed and expected covariance matrices was evaluated by using the association between the chi-squared distribution and the degrees of freedom (χ^2/df), as well as Comparative Fit Index (*CFI*), Non-Normed Fit Index (*NNFI*), Root Mean Square Error of Approximation (*RMSEA*), and Standardized Root Mean Squared Residual (*SRMR*). The χ^2/df must be in a range between 2 and 5; the values of the *CFI* and of the *NNFI* must be > .90; those of *RMSEA* are considered to be good if they are < .05 and acceptable if they are < .08 (McNeish et al., 2017); those of *SRMR* must be < .09 (Bentle, 1990). The analysis of reliability was computed by using Cronbach's alpha, and is considered to be satisfactory if its values are greater than .70; even an alpha between .60 and .69 would be considered acceptable (Nunnally and Bernstein, 1994). The concurrent and discriminant validity were verified by means of Pearson's correlation analysis (p-value < .05). The differences between the subject groups were verified through analysis of variance (*ANOVA*) (p-value < .05). The analyses of reliability, correlation, and variance were calculated by using IBM SPSS.22 software.

Results

Verification of the factorial structure, reliability, and validity

The internal consistency of the PHBS was verified by calculating the corrected correlation between the score of the

Table 1. Confirmatory factor models of theories of the latent structure of the PHBS items ($N = 643$).

Model	χ^2 (*df*); *p*	RMSEA (90% CI)	SRMR	NNFI	CFI	GFI	AGFI	AIC
Single factor	5204.34 (434); $p < .001$	.131 (.13–.13)	.090	.95	.84	.98	.97	5328.34
Five factor	1451.26 (424); $p < .001$	.060 (.058–.065)	.052	.95	.96	.98	.97	1595.26
Second order (five factor)	1354.38 (419); $p < .001$	.059 (.055–.062)	.052	.95	.96	.98	.97	1508.38

PHBS: Paranormal Health Beliefs Scale; CI: Confidence Interval; *df*: Degrees of Freedom; RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Squared Residual; NNFI: Non-Normed Fit Index; CFI: Comparative Fit Index; GFI: Goodness-of-Fit Index; AGFI: Adjusted Goodness-of-Fit Index; AIC: Akaike Information Criterion.

items and the scale. The coefficients were considered adequate (Nunnally and Bernstein, 1994) since they ranged between .33 (item 2) and .68 (item 28). The means of the items ranged from 1.41 (item 19) to 3.07 (item 48). The SD ranged between .87 (item 57) and 1.33 (item 2). Therefore, Maximum Likelihood (ML) estimation was used in all the analyses. Confirmatory factor analyses were computed to ascertain the factor structure of the PHBS. Table 1 shows that the five-factor structure as emerged with adolescents (Petrillo and Donizzetti, 2012) was confirmed. The oblique five-factor model fitted the data best, suggesting that PHBS is best understood in terms of five empirically related dimensions. The standardized regression coefficient weights of all variables loading onto their respective factors are between .47 and .82, with all critical ratios above 1.96 (which means that all the regressions are statistically significant at the 95% confidence level). The five dimensions are related to each other with scores ranging from .45 to .74.

Moreover, in order to verify the convergence of the five dimensions in the most general construct of illusory beliefs about health, a second-order confirmatory factor analysis was also performed (Figure 1). The *fit* indices were found to be even better than those in the basic (Table 1). The regression weights are very close and range from .47 to .82, and the standardized regression coefficients weights of all dimensions loading onto second-order factor are between .47 and .82 with all critical ratios above 1.96. The model fit indices show similar results as the first-order confirmatory factor.

The reliability of the instrument resulted as excellent, with $\alpha = .92$. Besides, reliability was also verified for each of the PHBS dimensions, with results ranging from satisfactory to excellent (see Table 2). An analysis of the correlations between the PHBS and its five dimensions, as well as between these and the GSES and the HLCS, was carried out for the verification of the construct validity of the instrument. With reference to the content validity, the results of the analysis of the correlations demonstrate that all of the five dimensions of the PHBS are strongly correlated with the PHBS (see Table 2).

With regard to concurrent validity, it was found that the two dimensions of external HLC are significantly and positively correlated with all the components of the PHBS; with regard to the discriminant validity, it was found that all dimensions of the PHBS, except PsiB, result negatively correlated with the IHLC. Furthermore, as assumed, results show that the PHBS is not correlated with GSES (Table 2).

Descriptive statistics

From the descriptive analyses, it resulted that the general level of PHB is on average equal to 2.07. Higher RB and PsiB levels were also recorded ($M = 2.47$; 2.44, respectively), while the MedB stands around the average score ($M = 1.95$); lower average scores are those related to the EEB ($M = 1.70$) and to the SB ($M = 1.66$).

The *ANOVA* by gender resulted in significant differences relative to RB ($F(1, 641) = 6.780$; $p \leq .009$; *effect size* = .010) and MedB ($F(1, 6413) = 10.920$; $p \leq .001$; *effect size* = .017). Females have higher levels of RB ($M_M = 2.36$, $M_F = 2.56$), while males have higher levels of MedB ($M_M = 2.07$, $M_F = 1.86$). The *ANOVA* carried out by age, taking into consideration the four groupings, showed significant differences with respect to most of the dimensions under study. In the light of the post hoc tests of Tukey, it resulted that, with regard to the PHB and the dimensions of the RB and the MedB, the elderly have higher scores when compared with those of the adults, young adults, and the youngsters. Moreover, the elderly and youngsters have higher scores than young adults and adults regarding the SB dimension (see Table 3). In addition, the effect of the interaction between gender and age was also verified and it resulted as not significant in all of the emerged dimensions.

Discussion and conclusion

This study aimed to reach the validation of the PHBS, an instrument for the assessment of the range of illusory beliefs about health, through a series of 31 items.

The results, in their entirety, substantially attest the goodness of the psychometric properties of the scale. The results of the confirmatory factor analyses of first and second order, as well as Cronbach's alpha scores of the scale and the subdimensions, may be considered to be very satisfactory, and likewise for the validity of content, construct, and criterion, considering the correlations with the external HLC and the absence of correlations with the self-efficacy perceptions.

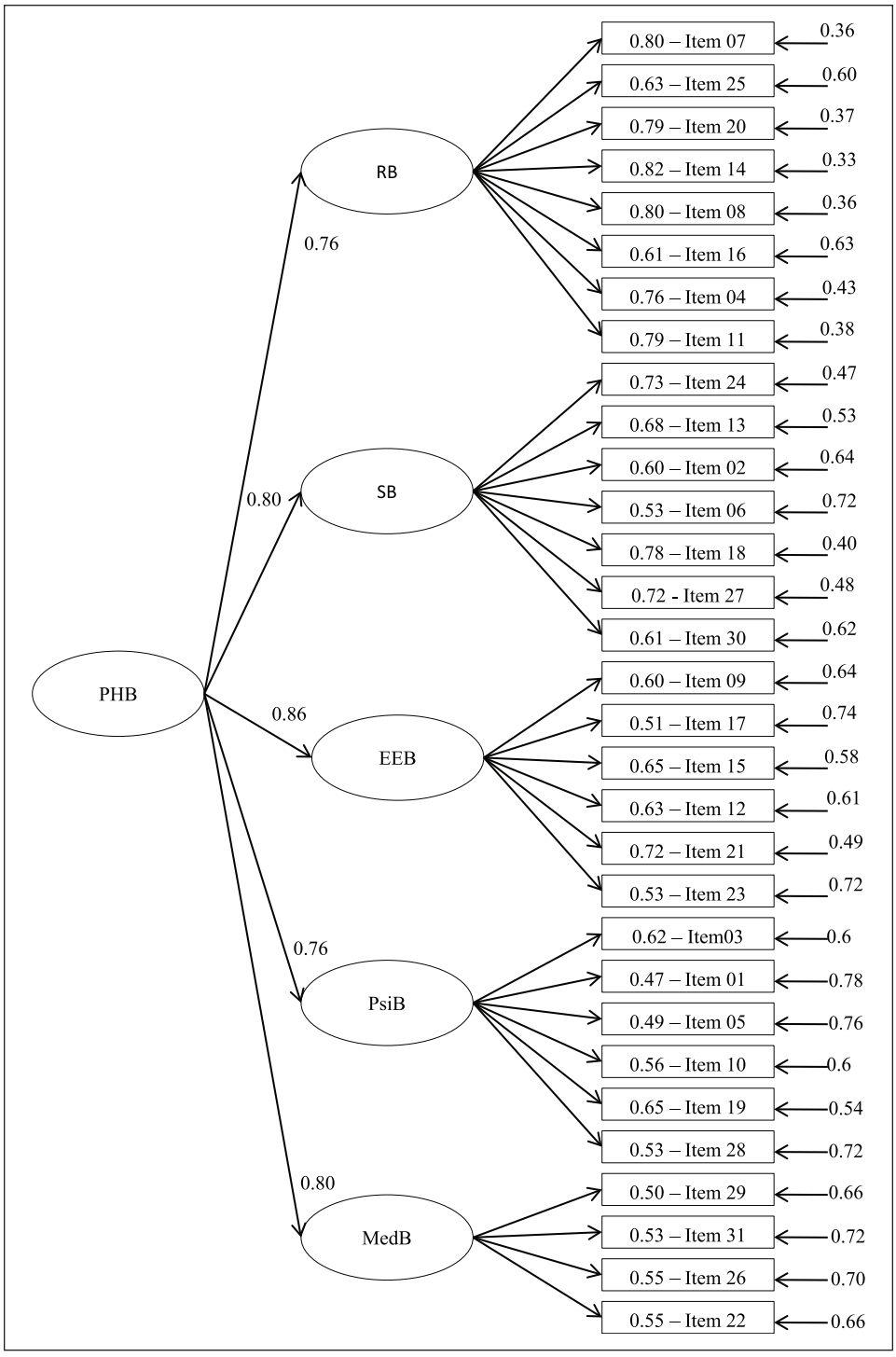

Figure 1. Second-order confirmatory factor analysis (five correlated dimensions).
PHB: Paranormal Health Beliefs; RB: Religious Beliefs; SB: Superstitious Beliefs; EEB: Extraordinary Events Beliefs; PsiB: Parapsychological Beliefs; MedB: Pseudo-scientific Beliefs.

The results of the descriptive analysis clearly show a scant general tendency for people to believe in the paranormal: all the mean scores are, in fact, below the theoretical average. In particular, a low tendency to rely on SB and supernatural forces emerged, while, in line with previous studies (Petrillo and Donizzetti, 2012; Tobacyk and Milford, 1983), RB, as seen, reach the highest average score.

Table 2. Analysis of the correlations and reliability.

	α	1	2	3	4	5	6	7	8	9
1. PHB_Paranormal Health Beliefs	.92	1								
2. RB_Religious Beliefs	.91	.81**	1							
3. SB_Superstitious Beliefs	.85	.81**	.54**	1						
4. EEB_Extraordinary Events Beliefs	.78	.74**	.37**	.60**	1					
5. PsiB_Parapsychological Beliefs	.73	.69**	.40**	.38**	.50**	1				
6. MedB_Pseudo-scientific Beliefs	.65	.67**	.41**	.49**	.47**	.36**	1			
7. IHLC_Internal Health Locus of Control	.76	−.17**	−.14**	−.22**	−.14**	−.03	−.10**	1		
8. GHLC_God Health Locus of Control	.89	.49**	.66**	.26**	.17**	.28**	.24**	−.05	1	
9. OHLC_Other Health Locus of Control	.62	.37**	.20**	.37**	.36**	.25**	.24**	−.06	.16**	1
10. GSES_General Self-Efficacy	.81	−.02	−.07	−.06	.01	.03	.08*	.36**	.00	−.05

**$p \leq .01$; *$p \leq .05$.

Table 3. Analysis of variance by age.

	Youngsters	Young adults	Adults	Elderly persons	*F, df* (3, 639)	Effect size
PHB_Paranormal Health Beliefs	2.06_a (.64)	1.94_a (.60)	2.02_a (.58)	2.42_b (.57)	9.697**	.044
RB_Religious Beliefs	2.42_a (.95)	2.21_a (.88)	2.48_a (.96)	3.23_b (.103)	18.872**	.081
SB_Superstitious Beliefs	1.71_{ab} (.79)	1.55_a (.68)	1.54_a (.71)	1.89_b (.87)	4.519**	.021
EEB_Extraordinary Events Beliefs	1.74 (.78)	1.63 (.75)	1.68 (.56)	1.73 (.65)	.802	.004
PsiB_Parapsychological Beliefs	2.43 (.80)	2.37 (.87)	2.43 (.79)	2.69 (.73)	2.546	.012
MedB_Pseudo-scientific Beliefs	1.91_a (.78)	1.95_a (.86)	1.84_a(.69)	2.36_b (.85)	6.956**	.032

Standard deviations appear in parentheses below means. Subscripts a and b show graphically the results of the Tukey test.
**$p \leq .01$.

The results emerged through the ANOVAs are interesting but should be considered with caution because of the low effect size. With respect to differences by gender, the obtained results belied the idea that women have a more irrational approach than men or that they would make more predominant recourse to intuitive rather than analytical thinking than men (Aarnio and Lindeman, 2005); with reference to health, in fact, gender differences slightly emerge with a higher tendency for women to trust in religion and for men to trust more in medicine as a science and having an acritical tendency to take a biomedical approach with respect to the protection of the human species. This result is in line with the comparisons according to gender about illusory beliefs (Saher and Lindeman, 2005; Tobacyk, 1982; Tobacyk and Milford, 1983), which show significant differences only in specific dimensions, thus dispelling the common conception that women have a higher propensity to believe in the paranormal. A study about the relationship between beliefs in paranormal phenomena, alternative medicine, and magical beliefs about food and health, which involved a wide Finnish population with an age ranging from 15 to 60 years, demonstrated the null predictive power of the gender variable with respect to recourse to alternative medicine (Saher and Lindeman, 2005).

As regards the age differences, it has been confirmed that the traditional RB are stronger in elderly people than in young adults (Irwin, 1993). Moreover, referring to SB, the results—in partial contrast with the findings of the literature (Lange et al., 2000; Tobacyk et al., 1988)—show that there is a higher tendency to hold on to illusory beliefs among the elderly, in line with the social marginality hypothesis (Emmons and Sobal, 1981). Youthfulness is highly valued in our society, and the older people constitute a socially marginal group. Under the social marginality hypothesis, elderly people should be relatively oriented to paranormal belief (Irwin, 1993). Moreover, this study is not directly comparable to those available in the literature since it considers four age groups at the same time.

Finally, considering the range of beliefs included in this instrument, which comprises five sub-dimensions (Beliefs: Religious, Superstitious, in Extraordinary Events, Parapsychological, and Pseudo-scientific of a biomedical nature), it can be definitely stated that the PHBS is a relatively agile instrument that can be utilized in a simple way. Notwithstanding the limits of the study—attributed to the relatively small number of participants, the cross-sectional characteristics, the limited territorial origin of the participants, and self-report data—the results highlight the instrument's potential in evaluating illusory beliefs related to health. The PHBS can find optimal applications in empirical studies of the factors that influence the adoption of healthy behaviors, the adherence to medical therapy, the

perceived well-being and coping strategies, as well as being used in interventions programs that aim to strengthen internal resources, in different contexts (see, for example, Aarnio and Lindeman, 2005; Genovese, 2005; Petrillo and Donizzetti, 2013) such as perceptions of control and self-efficacy, throughout the entire course of life or during particular conditions of illness.

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Supplementary material

Supplementary material is available for this article online.

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