

Adapting the Revised Paranormal Belief Scale within the Nigerian South: The real and imagined paranormal phenomena taxonomy

Sulaimon Olanrewaju Adebayo¹, Babatola Dominic Olawa², & Amarachi Grace Ajah²

¹Department of Psychology, Ekiti State University, Ado-Ekiti, Nigeria.

²Department of Psychology, Federal University, Oye Ekiti, Nigeria.

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ABSTRACT

The Tobacyck's Revised Paranormal Belief Scale (RPBS) was subjected to validation within the Nigerian South-West. We assessed the fitness of the seven-factor model of the RPBS by utilizing confirmatory factor analysis (CFA) in study 1. However, the model could not be replicated. Consequently, an exploratory factor analysis (EFA) was performed to obtain an alternative model. EFA outcome showed a two-factor structure namely Imagined Paranormal Phenomena (IPP) and Real Paranormal Phenomena (RPP). In study 2, CFA was performed to confirm the two-factor solution. Result suggested that only the IPP (with 2 items excluded) could be retained in the model. The IPP (renamed as RPBS-12 items) gave an accepted internal consistency coefficient of .79 and invariant for ethnicity. In study 3, we assessed for both criterion-oriented and discriminant validity for the RPBS-12. For the criterion-oriented validity, a hierarchical regression model showed that the RPBS-12 scores predicted fear of charm scores ($\beta = .28, p < .001$). The correlation of the RPBS-12 items scores with social support scores was not significant ($r = -.01, p = .62$), thus providing evidence for a discriminant validity. We recommended the use of the one factor RPBS-12 items in the assessment of paranormal belief within the Nigerian context, and a further test of its suitability within other African populations.

Introduction

African belief in the existence of paranormal phenomena is no doubt an overarching factor embedded in their cultural practices which mostly influence the interpretation given to events in the physical world. In sub-Saharan Africa, the belief in the reality of paranormal or occult power has affected people's way of life as they interact with others in their social, political and economic lives (Max-Wirth, 2016; Obiwulu, 2010). Beliefs in the existence of God, the devil, ghost or spirits, spiritual afflictions, witchcraft, fortune telling, superstitions, possession of magic or occult power, reincarnation, divination, consultation of the dead, inter-alia, are central to the indigenous African cultural system and religion (Ilori et al., 2014; Asogwa, 2014). Paranormal beliefs and its existence have greatly influenced how Nigerians attend to medical and legal matters (Asogwa, 2014). For example, there are many instances where people prefer to seek treatment at the witchdoctor's shrine than having to visit the physician; and sometimes, medical doctors themselves refer patients whose illness are difficult to manage to witchdoctor for treatment. Additionally, anecdotal evidence has suggested that the highly learned such as lawyers, judges, business mogul, medical doctors and politicians have recourse to the use of paranormal powers to enhance the success of their professions.

In a study conducted by Gallup (2010), evidence showed that believe in the existence of witchcraft is widespread among 18 countries surveyed in sub-Saharan African with 95% of respondents from Ivory Coast agreeing that witches really exist while the poll gave an average of 55% for the region. According to the Gallup study, survey sample for Nigeria showed that 45% of respondents believe in the existence of witchcraft which is a nearly modest one. Although the area sampled in Nigeria was not stated in the report, it may be argued that this figure is underestimated considering the common belief in the existence of witchcraft in the country's rural and urban areas. The belief in the existence of the paranormal is also reflected in the operative manner by some men and officers of the Nigerian Police Force. There are some cases where these men give supernatural potency to their guns by attaching to it pieces of red cloth and other charm objects with the belief that there are some armed robbers who cannot be killed or wounded with ordinary gunshot because of possession of occult "bullet-proof bodies" (Obiwulu, 2010). There is further evidence that the growing trend of cybercrime in Nigeria, popularly known as Yahoo Yahoo Plus is aided using charms and paranormal powers (Tade, 2013; Osuntuyi, 2021). Perpetrators (also referred to as Yahoo Boys) defraud their victims of a huge amount of money using magic spells and incantations as they communicate

with them on the cyberspace (Suleiman, 2019). The belief in the reality of the paranormal have profound consequences on the social, economic and political lives of the African people (Asogwa, 2014; Max-Wirth, 2016)

Even though paranormal phenomena are outside the realm of science, researchers over the years have attempted the investigation of the existence of an idea of a supernatural world. Many measures of paranormal phenomena have emerged in this regard. Examples are the Revised Paranormal Belief Scale (RPBS- Tobayck, 2004), the Australian Sheep-Goat scale (Thalbourne & Delin, 1993), Paranormal Belief Questions (Rice, 2003), the Paranormal Assessment Scale (Reiner & Wilson, 2015) and so on. The RPBS is regarded as one of the most widely used measure of paranormal beliefs in different cultural systems (Reiner & Wilson, 2015; Irwin, 2007). The RPBS views the paranormal beliefs from seven domains or factors namely; Traditional Religious Belief, Psi, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms and Precognition. Different versions of the RPBS have emerged to confirm its factor structures and possibly revalidating the items to suit concept of the paranormal in different cultural domains. There is the Russian adaptation and validation of the RPBS (Grigotyev, 2015), the French version (Bouvet, et al., 2014), the Chinese version (Shiah et al., 2010), Croatian version (Mikloušić et al., 2012), the Spanish version (Díaz-Vilela & Álvarez-González, 2004) and so forth.

However, the RPBS is yet to be validated within African sub-population considering some culturally specific items on the scale which may not be applicable to the paranormal construct as conceived locally. Such items are “The abominable snowman of Tibet exists”, “The Loch Ness monster of Scotland exists”, “The number “13” is unlucky”. Apparently, these items are inappropriate for measurement of paranormal belief among Africans and may not be comprehended since the “snowman of Tibet” and the “Loch Ness monster of Scotland” mythically originated from Tibet and the Scotland while number “13” seems insignificant and may not call for attention. Moreover, there have been suggestions that the factor structure of the RPBS may be different from one culture to the other (Diaz-Vilela & Alvarez-Gonzalez, 2004; Tobacyk & Thomas, 1997). Given that Africans and in particular, Nigerians have deeply rooted belief in the existence of the paranormal, and that no existing scale has been developed to measure the concept within this population, it is important to examine the fitness of the RPBS within samples drawn from two major ethnic groups in Nigeria- Yorubas and Igbos located in the Southwest and Southeast of Nigeria respectively. Specifically, we aim to examine the factor structure of the RPBS as it fits into the Nigerian context using both exploratory and confirmatory factor analyses. We also attempted to establish the reliability of the RPBS and correlate it with instruments measuring fear of charm or voodoo (Olawa et al., 2020) and social support (Parkerson et al., 1991) for construct validity evidence.

Study 1: Factor Analysis of the RPBS

The purpose of Study 1 was to initially confirm the seven-factor

structure of the RPBS as provided by Tobacyk (2004) using the CFA and to test its invariance in measuring the concept of paranormal belief within the Yoruba and Igbo ethnic groups. The establishment of the seven-factor structure of the RPBS and its invariance for the two ethnic groups would ensure the fitness of the RPBS in the measure of paranormal belief; otherwise, an exploratory factor analysis would be performed on the RPBS to discover its factor structure as applied to local sample data, and the new factor structure would be confirmed by a second CFA.

Sample and procedure

Data were collected using the convenient sampling method from 477 teachers (284 females, 193 males; mean age = 35.22 years) within some selected public and private primary and secondary schools in five States from Nigeria namely Lagos, Oyo, Osun, Ondo, Kogi and the Federal Capital Territory, Abuja. Participants were drawn for 20 ethnic groups, in which the Yoruba ethnic group constituted 70.9% of the total sample. The percentage distribution of other ethnic groups (which include Igbo, Hausa, Igala, Tiv, Ibara, Egun, Ika, Jukun etc.) ranged from .2% - 5%. Age distribution shows that 17% of participants were between 16-25 years, 30.6% (26-35 years), 38.6% (> 35 years) while the ages of 13.8% were unknown. Based on religious affiliation, 71.3% were Christians, Islam (18.2%) Traditional (1.5%) while others (9%) did not indicate their religion. Participants were approached in the classrooms and offices. Prior to administration of the RPBS, consent of participants was obtained, and confidentiality was assured. Participants were encouraged to respond and submit RPBS immediately after completion. A total of 513 participants responded to survey instrument; however, the responses of 36 participants were excluded from data analysis due to missing data.

Measure

The Revised Paranormal Belief Scale: The RPBS (Tobacyk, 2004) was a revised version of the Paranormal Belief Scale developed by Tobacyk and Milford (1983). The RPBS is a 26-item scale measured on a five-point Likert scale format ranging from strongly agree (1) to strongly disagree (5). The scale is designed to measure belief in the paranormal. Paranormal phenomena are those events that violate the “basic limiting principles of science” (Broad, cited in Tobacyk, 2004, p. 94). The RPBS has seven subscales namely; Traditional Religious Belief (e.g., I belief in God), Psi (e.g., Mind reading is not possible), Witchcraft (e.g., There are actual cases of witchcraft), Superstition (e.g., If you break a mirror, you will have bad luck), Spiritualism (e.g., Reincarnation does occur), Extraordinary Life Forms (e.g., The Loch Ness monster of Scotland exists) and Precognition (e.g., Some people have an unexplained t (e.g., There are actual cases of witchcraft), Superstition (e.g., If you break a mirror, ability to predict the future). All items follow the direct scoring format except item

23 (Mind reading is not possible) which is reverse coded. Each subscale score measures dimensionality of the RPBS while summation of subscale scores gives a general or global inclination towards belief in the paranormal. Higher scores reflect greater belief in the existence of paranormal phenomena.

As a result of some culturally specific items earlier identified on the RPBS, a Focus Group Discussion (FGD) consisting 14 staff and students of Federal University Oye-Ekiti considered alternative items that could replace these items. Through thorough judgmental processes, two items (6-The abominable snowman of Tibet exists & 13- The Loch Ness monster of Scotland exists) of the Extraordinary Life Forms subscale were replaced with “Marine spirits do exist” and “Ghosts do exist” respectively. Also, item 18 (The number “13” is unlucky) of the superstition subscale was replaced with “Walking around in the afternoon could bring bad luck to a pregnant woman and her unborn child”.

Data Analyses

Confirmatory Factor Analysis I

We performed the first CFA using the maximum likelihood estimation method in IBM® SPSS® AMOS 24.00 to test the goodness of fit of the RPBS. SPSS AMOS generates different goodness of fit measures; however, the chi-square value for the model together with its degree of freedom and probability value are regarded as a measure of absolute fit. An insignificant chi-square probability value (i.e., $> .05$) indicates a good fit for the model specified. In case of larger sample size (with 400 cases or more), the chi-square value is almost always significant, which may make researchers reject appropriate model that ought to be accepted (Kenny, 2015; Gatignon, 2010; Byrne, 2001). Consequently, researchers turn to relative fit measures such as the Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), Root-Mean-Square Error of Approximation (RMSEA), p of Close Fit (PCLOSE) in evaluating the fitness of a model (Miller, 2005). Hu and Bentler (1999) recommended that the value of the Chi-square/df (cmin/df) should be less than 3, CFI and TLI should be greater than .90, SRMR should be less than .09, RMSEA value less than .05 is considered good while those between .05 and .10 are moderate and a PCLOSE value greater than .05. To perform CFA, a minimum sample size of 200 is considered good while larger sample size gives a better accuracy especially when data are not normally distributed (Loehlin, 1992; Arbuckle & Wothke, 1999).

Results

The path diagram for the seven-factor model of the RPBS with standardized estimates is shown in Figure 1. After covarying the error terms between items 3 and 10; 13 and 16 (as specified by the Modification Indices), the chi-square value for the model was significant $\chi^2(276, N = 477) = 767.49, p < .0001$. The measures of relative fit showed an acceptable cmin/df (2.78) and RMSEA (.06; CI .95 = .056-.066) and SRMR (.07) while others fit indices (CFI = .69; TLI = .63, PCLOSE = $< .001$) were poor. In addition, the factor loadings for the model

were relatively small ranging from .05-.59. In view of the poor fitness of the 7 factor RPBS, it was necessary to re-specify the RPBS model by performing an EFA to generate other factor structure compatible with the sample data.

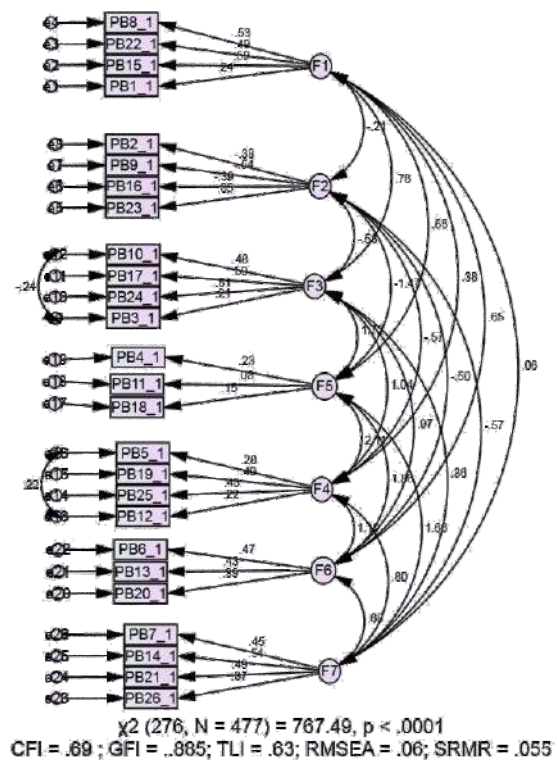


Figure 1: Path diagram for the 7 factor model of the RPBS with standardized estimates

Exploratory Factor Analysis

The EFA for the RPBS was conducted with the aid of the Statistical Package for Social Sciences (IBM SPSS 20.0). To ensure sampling adequacy, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was performed, and it yielded a score of .77. According to Hutcheson and Sofroniou (1999), KMO values between .70 and .80 are considered good. The principal axis factor method of extraction with oblique rotation was performed for the 26 items. The oblique rotation method was used because previous studies found the factors of the RPBS not to be orthogonal (i.e., correlated) even though the authors of the scale used varimax rotation, a rotation method utilized when factors in a model are believed to be orthogonal or uncorrelated. Past studies have indicated that there is no theoretical and statistical justification for the orthogonality of the scale because of high inter-correlation of the scales (Lange et al., Lawrence & De Cicco, Tobacyk & Thomas, as cited in Mikloušić, Mlačić & Milas, 2012). The result of the extraction and rotation methods yielded eight factors for the RPBS (based on eigenvalues greater than 1) as against the seven-factor structure obtained by Tobacyk (2004). The Scree test is presented in figure 2.

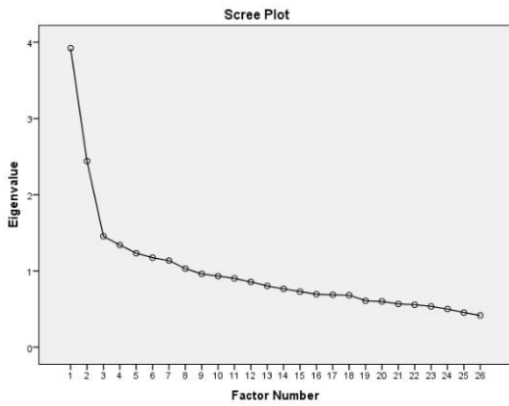


Figure 2: Scree plot indicating two factor for the RPBS

Inspection of the scree plot revealed that a two-factor solution was suitable for extraction. This is confirmed by the eigenvalues and variance of the first two factors as compared to the third to eight factors. The first two factors have eigenvalues of 3.92 and 2.44 respectively with corresponding variances of 15.08% and 9.34%. The other six factors have eigenvalues ranging from 1.46 - 1.03 with corresponding variances ranging from 3.97% - 5.60%. From these observations, there is clear and sharp decline in eigenvalues and variances after the first two factors. Therefore, it was appropriate to proceed with the extraction of the two factors. The factor loadings of the two-factor extraction are presented in table 1.

It can be seen (in table 1) that factor 1 contains all items in the precognition subscale, three items from spiritualism subscale, two items each from superstition, ELF and Psi subscales and one item from witchcraft subscale. The two items in Psi (items 2 & 23) and one item in spiritualism subscale (item 12) were dropped because of low factor loadings. Factor 2 contains all items in the TRB subscale except for item 1 that was dropped because of low factor loading. Factor 2 also consists of three items in the witchcraft subscale and one item each from the superstition and ELF subscales. Thus, factor 1 and 2 consists of 14 and 8 items respectively. In all four items were dropped. In terms of the possible cultural significance of each paranormal phenomenon and the extent to which its occurrence could be certain and believed, we decided to name the two factors Imagined Paranormal Phenomena (IPP) and Real Paranormal Phenomena (RPP) respectively. The Cronbach alpha reliability coefficient of the two extracted factors yielded .80 for IPP and .73 for RPP. The full scale yielded .80 reliability coefficient. The correlation coefficient for the two factors was significant ($r = .25, p < .0001$).

Table 1: Factor Loadings, Descriptive Statistics and Items

Items	Full scale	Factor Loadings	
		Factor 1 IPP	Factor 2 RPP
14 The horoscope accurately tells a person's future.		.50	
21 Some psychics can accurately predict the future.		.48	
3 Black magic really exists		.45	
18 Walking around in the afternoon could bring bad luck to a pregnant woman and her unborn child		.44	
25 It is possible to communicate with the dead.		.43	
11 If you break a mirror, you will have bad luck.		.39	
7 Astrology is a way to accurately predict the future		.38	
19 Reincarnation does occur		.37	
13 Ghosts do exist		.36	
26 Some people have an unexplained ability to predict the future		.34	
16 A person's thoughts can influence the movement of a physical object.		.32	
20 There is life on other planets		.31	
5 Your mind or soul can leave your body and travel (astral projection)		.26	
9 Psychokinesis, the movement of objects through psychic powers, does exist.		.25	
15 I believe in God			-.60
10 Witches do exist			-.57
8 There is a devil			-.47
24 There are actual cases of witchcraft			-.42
22 There is a heaven and a hell			-.42
6 Marine spirits do exist			-.41
4 Black cats can bring bad luck			-.37
17 Through the use of formulas and incantations, it is possible to cast spells on persons			-.33
Mean	78.04	45.50	32.55
Standard deviation	9.83	7.27	4.76
Skewness	-.25	-.12	-.66
Kurtosis	-.05	-.095	.39
Cronbach's Alpha	.75	.69	.71
Extraction Method: Principal Axis Factoring.			
Rotation Method: Oblimin with Kaiser Normalization.			
Inter-factor Correlations			
	1	2	3
1. Full Scale	-		
2. IPP (13 items)	.89**	-	
3. RPP (8 items)	.71**	.31**	-

For clarity, only loadings $\geq .35$ are indicated in the table; ** $p < .001$
 IPP-Imagined Paranormal Phenomena, RPP- Real Paranormal Phenomena

Study 2: Confirmatory Factor Analysis of the RPBS two factor model

In study 2, the aim was to cross validate the hypothesized two factor model obtained through the EFA in study 1. We also tested the invariance of the final CFA model for sex, age and ethnicity.

Sample and procedure

Data were obtained from a sample of 856 students and staff of Federal University Oye-Ekiti and Federal University Ndufe-Alike, both from Southwest and Southeast, Nigeria respectively. The mean age of participants was 23.23yrs (SD = 6.15) with an age range of 15-54 years. The sample consisted of 450 males and 406 females in which 559 (65.3%) and 297 (34.7%) were from the Yoruba and Igbo ethnic groups respectively. Majority of participants were Christians (91.8%) whereas the rest were Muslims (7.1%) and Traditional Religion Worshippers (1.1%). Based on age distribution, 42.8% of the sample size was between age range 15-20 years, 21-25 years (32.2%) while those above 25 years were 21%.

Students and staff were recruited for the study by approaching them in the classrooms and offices respectively. Prior to administration of instrument, consent of participants was obtained and confidentiality was assured. Participants were encouraged to respond and submit survey instruments immediately after completion. A total of 945 participants responded to survey instrument; however, the responses of 89 participants were excluded from data analysis due to missing data and outlier cases.

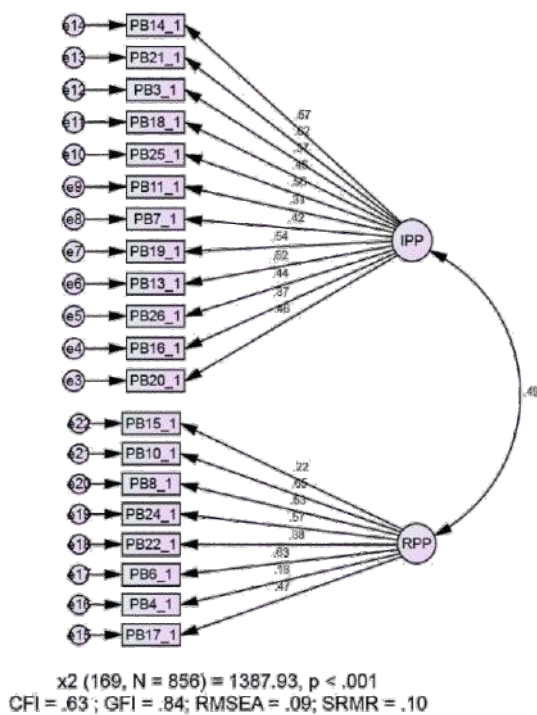


Figure 3: Path diagram for the two-factor model with standardized estimates

Results

We performed a second CFA using the maximum likelihood estimation to cross validate the hypothesized two factor model. The path diagram for the two-factor model with standardized estimates is shown in figure 3. The chi-square value for the model was significant, $\chi^2 (169, N = 856) = 1387.93, p < .0001$. The measures of relative fit reflect a poor fit. The cmin/df(8.21) could not be considered good. The CFI (.63) is below the acceptable threshold. The values of the RMSEA (.09; CI .95 = .09-.10) and PCLOSE (< .01) were not also acceptable. Factor loadings ranged from .18 to .65. Two items (6 and 15) were deleted on the RPP because they had factor loadings of .18 and .22 as these could cause problem for model fit. Modification Indices (MI) specified co-varying error terms between some items in the model. The covariance of these error terms led to an improvement in the fitness of the FCS model [$\chi^2 (161, N = 856) = 828.74, p < .0001$]. However, the cmin/df (5.15), CFI (.81), RMSEA (.07; CI .95 = .065-.07) and PCLOSE (< .01) were not still acceptable.

To achieve a good fit, it was necessary to check the Standardized Residual Covariances (SRC) for items causing discrepancies between our proposed model and the estimated model. SRC values above .40 across items are considered problematic at matching the estimated model into the proposed model (Gaskin, 2011). Items are deleted when it has many values greater than .40 in the SRC output. A critical examination of the SRC output shows that all items in RPP subscale had SRC values above .99. Thus, these items were deleted.

Following the removal of the RPP, the IPP was specified as one factor in a new model. The result of the new model showed significant chi-square value, $\chi^2 (77, N = 856) = 440.11, p < .001$ but without a good fit. In order to improve the model for fitness, items 3 and 11 were deleted because their factor loadings were quite low (< .40), thereby reducing the IPP to 12 items. In addition, error terms were covaried between items as suggested by MI. The final model, $\chi^2 (48, N = 856) = 136.83, p < .001$ gave rise to an excellent fit for the RPP. The final model was renamed RPBS 12 items (see figure 4).

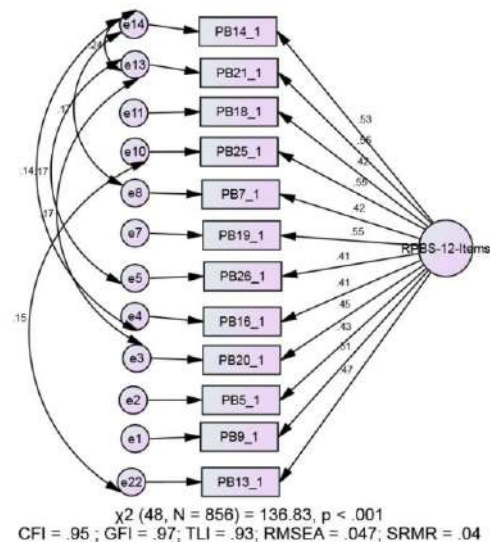


Figure 4: Path diagram for the one factor RPBS-12 items with standardized estimates

Table 2 displays the fit indices for the RPBS 7 factors, 2 factors and the unidimensional RPBS 12-items.

Table 2: Model fit indices for the RPBS models

Index	7 factors (26 items)	Two factors (22 items)	1 factor (12 items)	Cut-off
χ^2 (df, p)	767.49 (276, <.001)	828.74 (161, <.001)	136.83 (48, <.001)	p > 0.05
CMIN/DF	2.78	5.15	2.85	CMIN/DF < 3
CFI	.68	.81	.95	CFI > .90
TLI	.63	.78	.93	TLI > .90
RMSEA	.06	.07	.047	RMSEA < .06
PCLOSE	<.001	<.001	.72	> .05
SRMR	.07	.07	.036	< .09

Invariance test of the RPBS-12 items

Configural invariance test was performed to demonstrate model equivalence of the RPBS-12 items for sex, age and ethnic group. The configural test demonstrated a good fit for sex, age and ethnic groups as reflected in the acceptable cut-off values. The results of configural invariant test for the RPBS 12 items is presented in table 3

Table 3: Configural Invariant test for the RPBS-12items

Index	Sex	Age	Ethnic group
χ^2 (df, p)	273.66 (96, <.001)	277.83 (144, <.001)	218.13 (96, <.001)
CMIN/DF	2.85	1.93	2.27
CFI	.95	.93	.95
TLI	.93	.90	.90
RMSEA	.03	.03	.04
PCLOSE	1.00	1.00	.998
SRMR	.04	.04	.04

Reliability of the one factor RPBS-12 items

A Cronbach alpha reliability estimate of .79 was obtained for the RPBS-12 items. This is an improvement over the reliability estimate (.69) obtained for the IPP subscale in study 1.

Study 3: RPBS-12 items: Criterion-Oriented and Discriminant Validity

The aim of study 3 was to provide evidence for both criterion related and discriminant validity of the RPBS-12 items. It was hypothesized that the RPBS-12 items would predict a measure of fear of charm or voodoo to demonstrate its criterion-oriented validity while showing little or no relationship with a measure of social support to establish its discriminant validity. Though the correlations among paranormal belief, fear of charm and social support have not been investigated in the research literature, it was intuitively conceived that increased belief in the paranormal phenomena should correlate positively with fear of charm since fear of charm itself is dependent on the belief in the paranormal. On the other hand, it was conceived that paranormal belief should not be highly related to social support as compared to fear of charm. Among Africans, receiving care and support from others may not necessarily predict the extent of the belief in paranormal events. Instead, paranormal belief seems to be a product of cultural beliefs (Asogwa, 2014).

Sample and Procedure

The sample consisted of 655 participants (372 males and 283 females) obtained from the students and staff population of Federal University Oye-Ekiti and Federal University Ndufe-Alike, both from Southwest and Southeast, Nigeria respectively. The mean age of participants was 23.74yrs (SD = 6.62) with an age range of 14-54 years. Based on religious affiliation, 88% were Christians, 9% practice the Islamic religion, 2% were traditional religion worshipers while 2% of participants did not indicate age. According to ethnicity, 50% were Yorubas, 40% were Igbos, 7% were Hausas while 5% of participants did not indicate their ethnicity. Based on age distribution, 42% of the sample size was between age range 15-20 years, 21-25 years (32%) while those above 25 years were 26%. The procedure for data collection used in Study 2 was adopted in Study 3. A total of 670 participants responded to survey instruments; however, the responses of 15 participants were excluded from data analysis due to missing data.

Measures

The Revised Paranormal Belief Scale (RPBS)-12 items: The unidimensional RPBS-12 items derived in study 1 was used to measure paranormal belief. Items were rated on a five-point Likert scale format ranging from strongly agree (1) to strongly disagree (5).

Duke Social Support and Stress Scale (DUSOCS): The DUSOCS as a measure of social support was utilized to establish discriminant validity for the RPBS-12 items. The DUSOCS was developed by Parkerson et al., (1989). It is a 24 item, multi-dimensional scale designed to assess the perceptions of an individual's levels of support received and stress induced by family members and non-family. For the purpose of this study, the social support subscale of the DUSOCS was adopted. The social support subscale consists of 12 items which assesses support received from family and non-family members. Validity coefficient of $\rho=0.43$ was derived between the family support score of the DUSOCS and Olson's Family Strength measure (Parkerson et al., 1991). Further evidence of validity for the DUSOCS was obtained by Olawa (2016) in which the scores on the scale correlated positively with the extraversion trait ($r = .27$), and children's achievement ($r = .39$) and correlated negatively with loneliness ($r = -.37$),

neuroticism ($r = -.20$) and depression ($r = -.17$).

Fear of Charm Scale: The fear of charm scale (FCS) was used in establishing criterion-oriented validity for the RPBS-12 items. The FCS is a 16-item scale developed by Olawa et al. (2020) to measure the fear of charm, voodoo or occult power. The scale is measured on a 6-point Likert scale format ranging from Disagree very strongly (1) to Agree very strongly (6). Using both exploratory and confirmatory factor analyses, a three-factor model was developed for the fear of charm scale. The factors are: General Charm Fear (GCF -e.g. If I have a land dispute with someone who threatens to harm me with charms, I will not hesitate to relinquish my ownership of such landed property); Charm Proximity Fear (CPF-e.g. As an employee, I might not work for someone who is known to possess charms because of fear of spiritual attack) and Charm Object Fear (COF- e.g. I might be afraid of picking up and throwing away charms placed on my personal property.). The Cronbach alpha reliability coefficients of .83, .79, and .82 were obtained for the GCF, CPF and COF subscales respectively while a value of .89 was obtained for the full scale. High scores indicate high fear of charm.

Statistical Analyses

Data inspection and analyses were done with IBM SPSS Statistics, version 21.0 for Windows (SPSS Inc., Chicago, IL). Data inspection led to the removal 15 cases due to outlier and missing data. Hierarchical regression analysis was used in demonstrating criterion-oriented validity for the RPBS-12 item by specifying paranormal belief as the predictor variable and fear of charm as the criterion variable while controlling for sex, age, religious affiliation and ethnicity. Discriminant validity was done using bivariate correlation.

Results

Criterion-oriented validity

After controlling for the effect of sex, age, religious affiliation and ethnicity, hierarchical regression model showed that the RPBS-12 items were a predictor of fear of charms scores including the subscales and full scale; GCF ($\beta = .33$, $p < .0001$), CPF ($\beta = .72$, $p < .0001$), COF ($\beta = .51$, $p < .0001$), and the full scale ($\beta = .61$, $p < .0001$). This prediction provides the evidence for the criterion-oriented validity of RPBS-12 items.

Table 4: Regression analysis

Model	Variables	β			
		GCF	CPF	COF	Full Scale
1	Sex	.16**	.06	.15**	.17**
	Age	-.05	-.08	-.06	-.08
	Religion	-.06	.01	.06	.00
	Ethnicity	.15**	.05	.05	.11
	R^2	.06	.01	.04	.05
	F	9.87**	2.35	6.18	8.47**
	2	Sex	.14**	.05	.13**
Age		-.06	-.08*	-.07	-.08
Religion		-.05	.01	.06	.001
Ethnicity		.10	.0	.02	.07
RPBS-12items		.29**	.16**	.21**	.28**
R^2		.14	.04	.08	.13
ΔR^2		.08	.023	.04	.08
F		20.34**	5.04	11.22**	18.52**

* $p < .01$; ** $p < .00$

Discriminant validity

The correlation of the RPBS- 12 items with social support scales ($r = -.01$, $p = .62$) was not significant, showing that the two variables may not be theoretically related, and providing support for evidence of discriminant validity of the RPBS-12 items. However, the relationship of the RPBS-12 items with fear of charm scale ($r = .30$, $p < .0001$) and subscales was significant and ranging from .16 to .32.

Table 5: Correlation of the RPBS-12-Items with fear of charm and social support scores

	GVF	VPF	VOF	Fear of Charm full scale	Social Support
RPBS 12-items	.32**	.16**	.23**	.30**	-.01

** $p < .0001$

General discussions

In this study, we attempted to assess the fitness of Revised Paranormal Belief Scale in the measurement of paranormal phenomena. Specifically, the factor structure, validity and reliability of the RPBS were examined. In study I, the seven-factor structure of the RPBS was tested using the CFA. However, the seven-factor structure showed lack of fitness to sample data. Consequently, data was subjected to an exploratory factor analysis to obtain the underlying latent structure of the RPBS as its fits local data. Result from EFA suggested a two-factor solution for the RPBS with exclusion of 4 items with poor factor loadings. The two factors were named Imagined paranormal phenomena (IPP- 14 items) and Real paranormal phenomena (RPP- 8 items). This outcome was supported by Tobacyk and Thomas (1997), suggesting that the seven-factor structure of the RPBS may not necessarily represent the actual dimensionality of paranormal beliefs, but rather an outcome dependent on cultural contexts. Thus, the factor structure of the RPBS may change when considered in different cultural domains.

The first factor was named IPP because it mainly consists of items from Psi, Superstitions, Spiritualism and Precognition subscales. Although these items connote paranormal ideas but they appear to local sample as paranormal events whose occurrence or existence may be doubted, imagined or considered less certain. For example, items such as “The horoscope accurately tells a person’s future,” “If you break a mirror, you will have bad luck,” “It is possible to communicate with the dead” “Your mind or soul can leave your body and travel,” “There is life on other planets,” “Reincarnation does occur” etc, are paranormal events whose occurrence are less commonly experienced by the majority of the people and thus do not form part of their daily life experiences. These events are mostly found in legends passed from one generation to the other without “concrete” evidence of it.

On the other hand, the RPP subscale, which consists mainly of items from Witchcraft and TRB subscales, convey ideas of the paranormal that people readily believe because its occurrence are relatively common in daily lives of individuals. People have a “concrete” belief in the existence of the RPP

had more or less first-hand “experience” of the phenomena it connotes. The existence of God, the devil, witchcraft, marine spirits, heaven and hell are realities to majority of Nigerians and not subject to doubt. These beliefs have been firmly inculcated through religious experiences accompanied with both personal and anecdotal evidence and as such “real” in the mind of the people than imagined.

It is interesting to note that this two-dimensional RPBS derived by us somehow coincides with the two-factor solution obtained by Lange, Irwin and Houran (2000). They found most items in the Psi, Spiritualism and precognition subscales clustering in one factor which was named New Age Beliefs, while items in the Traditional Religious Beliefs and Witchcraft subscales clustered in the second factor and was named Traditional Paranormal Belief. This corroboration perhaps makes the two-factor solution an empirical sound model of paranormal belief.

However, the subjection of the two-dimensional RPBS to CFA showed that only the IPP items excluding items 3 (Black magic really exists) and 11 (If you break a mirror, you will have bad luck) could be considered a more fitted measure of paranormal beliefs among Nigerians. The exclusion of item 3 seems consistent with the nature of paranormal phenomena conveyed by the IPP. The belief in the existence of black magic may be more “real” to the people than being “imagined” because magical powers provide evidence to the existence of paranormal phenomena. Hence, this item may be unfit to measure imagined paranormal phenomena. The dropping of item 11 may be premised on the notion that “breaking a mirror” does not really constitute any supernatural connotation or consequence for local sample.

The IPP subscale was renamed RPBS-12 items with unidimensional orientation. The exclusion of the RPP subscale could be theoretically explained to mean that, the Nigerian sample perceive the items in the subscale as “normal” supernatural phenomena and too much a reality to be “paranormal” because these phenomena form part of their daily life existence with “concrete” evidence of its occurrence. Although, the existence of God, the devil, witchcraft and so on may not be scientifically proven, however; in the mind of Nigerians, the existence of these events may be regarded as normal and “proven” subjectively rather than objectively, because of the overabundance of evidence signifying their reality in individuals’ daily lives.

Hence, to Nigerians, paranormal phenomena mean those supernatural events that their occurrence or existence may be doubtful or imagined as against those supernatural events considered to be real and certain. Therefore, in this part of the world, what qualifies an event to be paranormal is that it should be supernatural with less certainty of existence and occurrence, and at most imagined.

Conclusion

This study was able to demonstrate that sample data from the Nigerian population yielded a new way of understanding the dimensionality of paranormal phenomena.

In the strict sense, paranormal belief may be understood as those supernatural events that its occurrence or existence is doubtful and do not readily form part of daily life experiences of the people. That is, it is the doubtful or imagined paranormal events that connote the idea of the paranormal within Nigerian sample and not the real paranormal experience. Based on the CFA outcome, the RPBS-12 items is recommended for the assessment of paranormal belief within the Nigerian context. The 12 items obtained here may serve as a brief measure for assessing the actual meaning of paranormal beliefs as against the 26 items contained in the original RPBS. However, researchers may use the two factor RPBS to understand the dynamics of paranormal belief within the Nigerian population.

Although, the interest of the current study is to understand how the RPBS model is compatible with the African population by utilizing a Nigerian sample, it is important to note that the generalizability of study results to the whole Nigerian population may be limited considering that sample was drawn from only Southern Nigeria. Prospective studies in this area may test the models derived in the current study in a wider population of Africa to understand the nature of the belief in the paranormal. Further validity of the one factor and two factor models of the RPBS derived in this study may be investigated in future research to determine a more appropriate model.

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RPBS-12 items

1. The horoscope accurately tells a person's future.
2. Some psychics can accurately predict the future.
3. Walking around in the afternoon could bring bad luck to a pregnant woman and her unborn child
4. It is possible to communicate with the dead
5. Astrology is a way to accurately predict the future.
6. Reincarnation does occur
7. Some people have an unexplained ability to predict the future
8. A person's thoughts can influence the movement of a physical object.
9. There is life on other planets
10. Your mind or soul can leave your body and travel (astral projection)
11. Psychokinesis, the movement of objects through psychic powers, does exist. 12 Ghosts do exist