Journal of Parapsychology
2018, Vol. 82, No. 1, 24-40

http://doi.org/10.30891/jopar.2018.01.03

Belief in the Paranormal: A State, or a Trait?[1]

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Abstract: Although belief in paranormal phenomena has long been studied as if it were a psychological trait, many commentators recently have preferred to define beliefs as a psychological state. Somewhat surprisingly, the psychometric decomposition of a belief into state and trait components has yet to be undertaken. To this end, we invited a sample of 584 American adults to complete a questionnaire measure of paranormal and traditional religious beliefs on four occasions at monthly intervals. An application of latent state-trait models to the data showed both paranormal belief and traditional religious belief to be predominantly trait-like constructs, with a small but significant state-like component. These findings may have specific implications for the assessment of paranormal beliefs, as well as general implications for a state theory of beliefs.

Keywords: state versus trait, belief in paranormal phenomena, latent state-trait models

In terms of both description and measurement the distinction between psychological states and psychological traits has made a substantial contribution to the study of individual differences in personality, ability, moods, and emotions (Chaplin, John, & Goldberg, 1988; Deary, 2009). Definitions of these two constructs are by no means standardized, but a generally agreed distinction is that states are relatively transient reactions to an internal or external situation or context, whereas traits are relatively stable attributes or dispositions to behave in certain characteristic ways (Hamaker, Nesselroade, & Molenaar, 2007).

A general objective of this project was to explore the status of *beliefs* in terms of states and traits. Although this approach has been applied to the cognate domain of attitudes (e.g., Kaczmarek, Bujacz, & Eid, 2015; Steyer & Schmitt, 1990), and at least one study reported the construction of purportedly state and trait measures of a specific set of beliefs (Radtke, Inauen, Rennie, Orbell, & Scholz, 2014), the potentially instructive psychometric decomposition of beliefs into state and trait components appears not to have been undertaken. We chose to focus our investigation on beliefs in paranormal phenomena as its context on the grounds that a distinction between state and trait models of such beliefs has recently been

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suggested by Nees and Phillips (2014). Further, a resolution of this issue could well have implications for the future construction and administration of questionnaire measures of paranormal belief.

Beliefs as a State

There has been some philosophical speculation on the nature of the mental representation of beliefs (e.g., Clapin, 2002; Pitt, 2013), and even some doubts that such representation exists (Horgan, 1992), but as yet there is no broadly agreed position on these issues. Nonetheless, some psychologists (e.g., Connors & Halligan, 2015; Heiphetz, Spelke, Harris, & Banaji, 2013), philosophers (e.g., Jackson, 2007; Schwitzgebel, 2010), and other cognitive scientists (e.g., Ghrab, Saad, Kassel, & Gargouri, 2017; Reser, 2011) are converging on an operational definition of belief as *a state in which a person regards a given proposition as true*. At first glance this formulation of beliefs as a state may seem trite, but it does successfully function to accommodate the remarkably wide range of mental phenomena that various commentators have dubbed "beliefs" or "belief systems" (e.g., Boden, Berenbaum, & Gross, 2016; Quine & Ullian, 1970). In recent years the designation of belief as a state has shown a surge in popularity, although the fundamental elements of this notion can be traced at least as far back as William James (1889) who observed, "In the case of… belief, the object is not only apprehended by the mind, but is held to have reality. Belief is thus the mental state or function of cognising reality" (p. 321).

The foregoing definition may serve successfully to differentiate state models from trait models of belief but in itself it is insufficient as a general account of belief, if only for the reason that "the acceptance of a proposition as true" is not necessarily an all-or-nothing event. In other words, unless we adopt the conceptually unparsimonious position that there is to be one explanation for unreserved core beliefs and another for qualified or half-hearted beliefs, a "state" view of belief must also accommodate degrees of conviction or doubt. This primary property of beliefs is of pivotal importance to the psychometrics of belief for the following reason. A belief questionnaire typically lists individual instances of a belief or a belief system and respondents are asked to indicate in each case the level of their endorsement of the belief or the frequency with which the specified belief-related act (e.g., praying) is performed. Although the designers of such tests may well have had a trait model in mind (explicitly or implicitly) during the construction of the test it is possible also to interpret belief questionnaires from a state perspective. In this context such a questionnaire would be deemed to elicit a succession of transitory belief states, potentially one state for each test item. Given that the participant's task is to rate each successive state in real time for the degree of conviction with which it is accepted, what might be the interpretation of the aggregate questionnaire score under the state model? In this regard the state approach to belief would have to be slightly extended to encompass not only the acceptance of a given belief but also the relative intensity of acceptance. Under this extended state model an aggregate score on a belief questionnaire therefore may be construed as an indication of the intensity with which the relevant belief state was evoked on this occasion; that is, the aggregate score may be interpreted as an index of the overall disposition to that type of belief state at the time of assessment. The key issue in assessing the viability of the state model of beliefs, however, is whether the intensity of these questionnaire-elicited belief states varies from one occasion to another.

In the specific context of paranormal beliefs this approach has rarely been advocated. Nees and Phillips (2014) recently distinguished between state and trait accounts of paranormal belief, and they urged researchers to give serious consideration to the view that paranormal belief may be evoked as a state, but as yet this suggestion appears to have had no discernible influence on the study of paranormal beliefs. Under a "state model" internal or external cues would serve to activate the mental representation of a paranormal belief as a psychological state. Note, however, that this activated state need not necessarily be conscious; thus, one day a person may exhibit uncharacteristically cautious behavior without consciously connecting this to the fact that the day is Friday the thirteenth (Näyhä, 2002).

Although the state model of paranormal belief has yet to be investigated directly, perhaps some earlier empirical findings could be interpreted to lend support to this approach. There are a few indications that a person's score on a paranormal belief questionnaire may not be as stable as has generally been assumed; rather, the score may depend in part on the circumstances in which the test is taken and on the participant's psychological state at that time. People made to feel helpless by being given an unsolvable problem (Dudley, 1999), or induced to experience negative affect (Dudley, 2000), or led to contemplate their own mortality (Jong, Halberstadt, & Bluemke, 2012), or otherwise placed under acute stress (Keinan, 2002) may then show elevated belief in the paranormal. More generally, people in a negative affect state at the time of testing may show stronger paranormal belief than the other participants (Beck & Miller, 2001). On the other hand, some people in an unconscientious mood may also tend to generate slightly higher belief scores (Irwin, 2003), as may participants in a "good mood" at the time of testing (e.g., King, Burton, Hicks, & Drigotas, 2007). In a group testing context, scores on a paranormal belief questionnaire may differ with the demand characteristics of the setting and, in particular, the perceived attitude of the test administrator (Layton & Turnbull, 1975; Wiseman & Schlitz, 1997). Again, based on responses to a setting with a haunted reputation Houran and Lange (1996) advocated a contextual account of the evocation of paranormal beliefs. These diverse observations are consistent with a view of paranormal belief as in part an adaptation to prevailing circumstances, a transitory state, or contextually invoked mental set that may fluctuate with the psychological setting. On the other hand, several studies (e.g., Hergovich, 2003; Roig, Bridges, Renner, & Jackson, 1998; Watt & Ramakers, 2003) deliberately manipulated the context of the test administration and found no consequent variation in paranormal belief scores. In short, there is scope for a study to assess in a more explicit fashion the viability of a state model of paranormal belief.

The endorsement of traditional religious tenets or *religiosity* is sometimes classified as a belief in the paranormal; certainly the two are correlated (for a review see Irwin, 2009) and, in many respects, cognate constructs (Irwin & Marks, 2013). In any event religiosity may be a useful yardstick by which to interpret the characteristics of paranormal belief, and both types of belief therefore were included in the study reported here. In relation to a state model of such beliefs there is ample empirical evidence that pre-existing religious beliefs may be accentuated by situational factors such as serious illness, bereavement, and other stressful life events (e.g., Hussain, Weisaeth, & Heir, 2011; Johnson et al., 2011), although the construction of these changes as *transient* states may sometimes be moot. Further, these data in themselves do not necessarily disqualify an account in terms of traits. Nevertheless a state model of the activation of traditional religious beliefs may well be as cogent as that for (other) paranormal beliefs, and these models therefore warrant conjoint empirical evaluation.

Beliefs as a Trait

Another conceptual approach to the study of beliefs is to portray them as relatively stable facets of personality, that is, as traits. This view has a long history in psychology (e.g., see Jastrow, 1902; Williamson, 1915), and some detailed analyses of beliefs as a trait were undertaken in the first half of the twentieth century (e.g., Allport, 1937). Today, however, the construction of beliefs as a trait typically remains implicit or is simply declared with scant supportive argument (Saucier, 2008). Although the intensity of some beliefs certainly seems to be consistent across situations and contexts, there are instances in which the evidence of consistency is weak (Hamaker, Nesselroade, & Molenaar, 2007). The legitimacy of assuming beliefs to be trait-like therefore warrants explicit evaluation. The study of paranormal beliefs offers a convenient opportunity for this assessment.

Again, despite occasional references to paranormal beliefs as a personality trait (e.g., Delacroix & Guillard, 2012; Mohr, Koutrakis, & Kuhn, 2015), researchers' assumption that paranormal beliefs constitute a trait is largely implicit and unproven (Grimmer & White, 1990). Be this as it may, the substantial majority of the numerous correlative investigations of paranormal beliefs (for a review of this extensive literature see Irwin, 2009) have indexed the intensity of these beliefs by way of a single administration of a paranormal belief questionnaire, presumably on the assumption that the data generated from this test would be much the same as those solicited on virtually any other occasion. Admittedly, the high test-retest reliability of some of these questionnaires (Irwin & Marks, 2013) may be taken to support this assumption, but in the surveys from which these psychometric parameters were educed, perhaps the context in which the retest was administered was highly similar to the context of the original administration; if so, a routine test-retest design may not be sufficiently sensitive to the potential role of context. In any event the habitual practice of assessing paranormal beliefs by means of a single administration of a questionnaire suggests that the interpretation of these beliefs as a stable trait is very widespread and by default constitutes the conventional position.

A similar view of the domain of traditional religious beliefs also seems to be customary, although in this instance the trait hypothesis is often made explicit (e.g., Baumsteiger & Chenneville, 2015; Van Praag, 2013). Indeed, despite intergenerational differences and episodic fluctuations in religiosity this personality characteristic is remarkably stable over a person's lifespan (Hamberg, 1991) and thereby it may function largely as a trait. In summary, there is evidently a common assumption among researchers that both paranormal belief and religious belief constitute psychological traits.

The Present Study

The aim of our study therefore was to assess the domain of paranormal beliefs in terms of its psychometric status as a state or as a trait, using the cognate domain of traditional religious beliefs for comparison. Note that there was no necessary assumption here that paranormal beliefs cannot be both a state and a trait. Many psychological constructs initially identified as meeting the requirements for one of these categories have subsequently been shown to comprise components of both (Deinzer et al., 1995). Extraversion, for example, has long been recognized as a personality trait but has more recently been found to have a state component too (Fleeson, 2001; Schutte et al., 2003); and anxiety, originally conceptualized as a state, was subsequently found to be more effectively represented by both state and trait components (Endler & Kocovski, 2001; Kendall et al., 1976).

The study was essentially exploratory, designed to investigate if scores on a standardized questionnaire measure of paranormal belief are best deemed to represent a psychological trait, or a psychological state, or indeed, a hybrid construct with components of both. A potential means of discriminating among these options is provided by a body of psychometric theory known as latent state-trait (LST) theory (e.g., Geiser et al., 2015; Steyer, Geiser, & Fiege, 2012). In an LST analysis a given psychological measure is administered to group of people on several occasions, then structural equation modelling is applied to the longitudinal data in order to distinguish between the portion of the variance that can be attributed to a stable disposition consistently evident over time (latent psychological traits) and the portion attributable to fluctuation across occasions (latent psychological states), plus a residual portion attributable to random measurement error.

Method

Design

The study was conducted as an online survey of a panel of participants assessed on four occasions with an interval of four weeks between each assessment; that is, the project had a four-wave longitudinal design. The methodology of the study was approved by the Human Research Ethics Committee of the first author's home university (*Approval No. HE15-018).*

Participants

A total of 611 residents of the USA were sourced from an online research panel provided by Qualtrics™ (Qualtrics, Provo, UT). Of these, 27 failed to respond correctly to a dummy question embedded in the survey to ensure respondents were paying attention to the questionnaire items. These cases were deleted leaving a total sample of 584 at Phase 1, reducing by attrition to 239 at Phase 4. Details of participant numbers, age and gender for each of the four phases of the study are shown in Table 1.

Table 1
Details of Participants for Each Phase of the Study

Phase			Age		
	N	% male	M	SD	Median
Phase 1	584	49.8	51.47	13.86	53
Phase 2	355	50.4	51.81	13.98	53
Phase 3	344	50.0	51.88	14.01	53
Phase 4	239	50.6	51.43	14.13	53

Materials and Procedure

Measures were amalgamated into four online surveys using Qualtrics™ software (Qualtrics, Provo, UT) and each released to participants at 4-weekly intervals. The names of the survey designers (HI and AM) and their affiliated university were stated in a plain-language information page, but beyond this the participants had no knowledge of the investigators' personal style or beliefs. For the record we should state these researchers' level of support for the psi hypothesis: for HI, grade 4 ("supportive"), and for AM, grade 3 ("neutral").

After reading a plain-language information page, potential participants implicitly signified their consent to participate by clicking the option to progress to the survey questionnaire. Qualtrics personnel allocated an identity code number to each participant, thereby allowing the researchers to match data across phases without compromising the participants' anonymity.

For the first wave participants provided information on age and gender, and for all four waves they completed the *Survey of Scientifically Unaccepted Beliefs* (SSUB; Irwin & Marks, 2013), a 20-item scale with 15 items assessing paranormal or New Age Beliefs (NAB; e.g., "Fortune tellers can accurately sense the future using a crystal ball") and 5 items measuring basic Judeo-Christian religious beliefs or Traditional Religious Beliefs (TRB; e.g., "There is a Hell, where unbelievers or sinners are punished"). Participants reported the extent to which they agreed or disagreed with these statements on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). All items within the SSUB were randomized for each participant for each wave to reduce the possibility of carry-over effects. Both subscales have exhibited excellent internal consistency in previous administrations as well as in all phases of the present study; for the latter Cronbach's alpha for New Age Beliefs ranged from .89 to .91 and for Traditional Religious Beliefs, .91 to .92.

For the present LST analyses, however, we assigned the items of each scale to two item parcels for each wave, respectively. This was done because LST analyses require at least two measurements per construct and time point to statistically identify trait, state residual, and measurement error components. Item parceling was based on an item-level principal component analysis with a single component for each scale. Items were assigned to parcels based on the size of their component loadings to create homogenous parcels. Parcels were composed of identical items at each wave.[2] In our LST analyses, we specified a series of models to test whether NAB and TRB represented more trait-like or more state-like constructs. For each construct, we estimated three models and compared their fit to the data. In Model 1, we included only (parcel-specific) trait latent variables and measurement error variables, but no state residual latent variables. Model 1 thus represented the assumption that each construct was purely trait-like. In Model 2 we included only state latent variables that were not allowed to correlate across time as well as measurement error variables. Model 2 thus represented the assumption that each construct was purely state-like. In Model 3, we included trait, state residual, and measurement error variables (full LST model). Model 3 thus represented the assumption that the NAB and TRB constructs may contain both state and trait components. Model 3 also allowed us to compute coefficients representing the proportion of trait, state residual, and error variance in each measure as well as underlying true score variables (as discussed below). Finally, we estimated combined multi-construct LST models with both NAB and TRB (Models 1C through 3C). The

2 We also ran all model versions with three (as opposed to two) parcels. The analyses with three parcels yielded essentially the same results as the analyses with two. For simplicity, we only report the analyses based on two parcels.

combined models allowed us to look at relations between the trait and state residual components for both constructs in terms of latent correlations between trait and state residual factors across constructs.

The LST analyses were based on the so-called multitrait-multistate (MTMS) model of LST theory (Eid, 1996, see Figure 1) which allows taking potential indicator heterogeneity into account and which has been recommended for LST analyses based on theoretical reasoning and simulation work (Geiser & Lockhart, 2012). The MTMS model includes trait latent variables for each measure (parcel), common state residual (*SR*) latent variables for each time point, and measurement error variables for each variable. Figure 1 shows a path diagram of the combined multiconstruct MTMS model for the NAB and TRB parcels estimated in the present study.

Based on an MTMS model, coefficients can be calculated to reflect the proportion of variance explained by trait, state residual, and error variables. The consistency coefficient gives the proportion of observed (or true score) variance due to trait variance. The occasion-specificity coefficient gives the proportion of observed (or true score) variance due to state residual variance. The reliability coefficient gives the proportion of observed variance not due to measurement error. A detailed mathematical description of these coefficients can be found in Geiser and Lockhart (2012).

Model 1 estimated in the present study represented a version of the MTMS model in which the SR factors were omitted (trait only model). In Model 1, all intercepts and factor loadings were fixed to zero and one, respectively, and trait factor means were freely estimated. This specification reflects the assumption of perfect stability of true individual differences across time, thus representing a pure trait model. In Model 2, we omitted the trait factors and only included uncorrelated state factors. In Model 2, all state factor loadings were fixed to one and all intercepts were freely estimated to allow for potential mean changes across time. Latent state factor means were not estimated. Model 2 thus reflected the assumption of a pure state variability process with no trait stability. Model 3 included both trait and SR factors as shown in Figure 1. In Model 3, all intercepts and factor loadings were fixed to zero and one, respectively, and all trait factor means were freely estimated. This again reflected the assumption of a stable trait component, but now allowing for systematic state fluctuations at each time point as reflected in the SR factors.[3]

All models were analyzed with the software Mplus 8 (Muthén & Muthén, 1998-2015) using robust full information maximum likelihood information (R-FIML). R-FIML estimation allows taking all available data points into account to avoid bias and loss of statistical power due to missing data and provides robust fit statistics and parameter standard errors for nonnormal data.

Results

Table 2 contains descriptive statistics for all variables used in the LST models. Table 3 shows goodness of fit results for the different models. It can be seen that Model 1 (the trait-only model with no *SR* factors) did not show a good fit for either NAB or TRB according to the chi-square test of model fit, which was highly significant for this model for both constructs. Model 2 (the state-only model) showed

3 We also tested versions of Model 3 that allowed for autoregressive effects among *SR* latent variables (Eid, Holtmann, Santangelo, & Ebner-Priemer, 2017). Including autoregressive effects did not lead to a significant improvement in model fit for either construct and none of the autoregressive effects were statistically significant. We therefore report the analyses without autoregressive effects.

an even worse fit for both constructs. Model 3 (which included both trait and state residual components) fit the data very well for both constructs as indicated by non-significant chi-square values and descriptive model fit indices.

When both constructs were combined into multi-construct models (Models 1C through 3C) in Table 3, we obtained similar results. The trait-only (Model 1C) and state-only (Model 2C) models did not fit well. In contrast, the multiconstruct LST model with both trait and state components (Model 3C) fit the data very well. We therefore present detailed outcomes for Model 3C.

Table 4 contains the parameter estimates obtained for Model 3C. It can be seen that all trait factor variances and standardized trait factor loadings were large and highly significant, indicating a strong trait influence on both the NAB and TRB measures. In contrast, *SR* factor variances and standardized *SR* loadings were much smaller for both constructs and non-significant for TRB at Time 1 and Time 3, indicating a much weaker state influence on both constructs relative to the trait influence.

The NAB and TRB trait factors were moderately positively correlated across constructs (latent r between .17 and .23, p-values ≤ .001), indicating a rather weak relation between the trait components of NAB and TRB. Parcel-specific trait factors for the same trait were highly correlated (NAB: latent r = .94, TRB: latent r = .86), indicating a high degree of homogeneity of the item parcels within each construct. State residual factors at the same measurement occasion were not significantly correlated across constructs, except for Time 4 (latent r = .62, p = .001).

Figure 1. Path diagram of the multiconstruct LST model estimated for the NAB_{it} and TRB_{it} measures (i = indicator/parcel, t = time point). SR_{tc} = state residual factor (c = construct). All trait factors were allowed to correlate. State residual factors were uncorrelated, except for different constructs at the same time point. All factor loadings were fixed to 1. Trait, state residual, and measurement error variances were freely estimated.

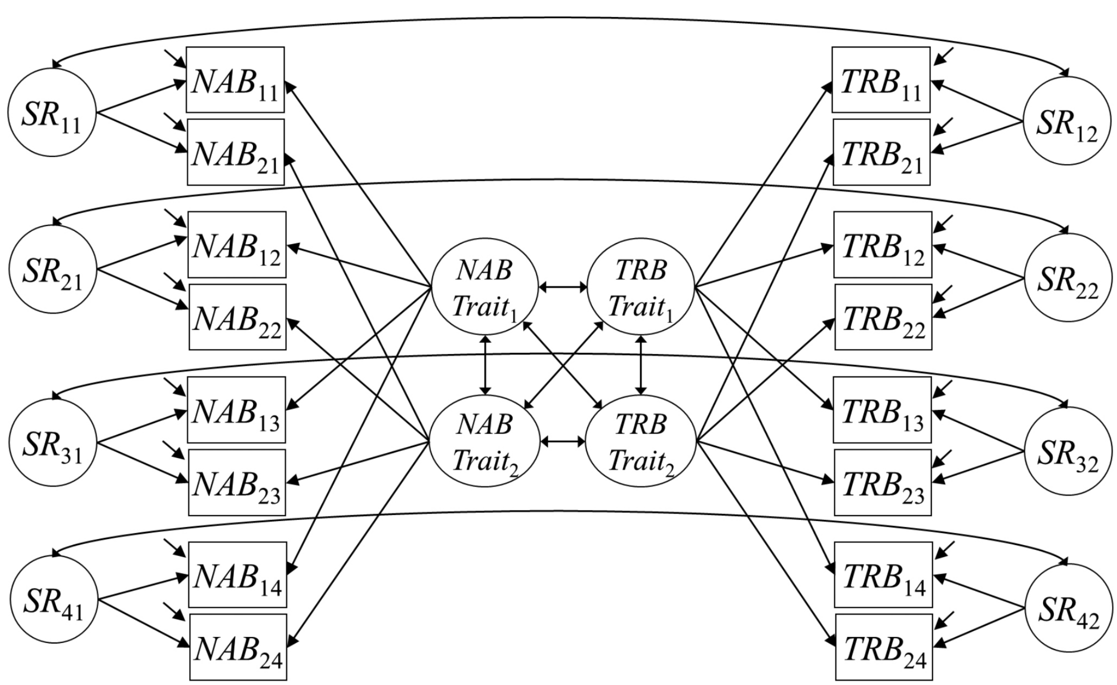

Table 2

Correlations, Means, and Standard Deviations for the NAB and TRB Item Parcels

	NAB_{11}	NAB_{21}	NAB_{12}	NAB_{22}	NAB_{13}	NAB_{23}	NAB_{14}	NAB_{24}	TRB_{11}	TRB_{21}	TRB_{12}	TRB_{22}	TRB_{13}	TRB_{23}	TRB_{14}	TRB_{24}
NAB_{21}	.84															
NAB_{12}	.78	.75														
NAB_{22}	.76	.83	.87													
NAB_{13}	.79	.76	.81	.78												
NAB_{23}	.76	.83	.78	.86	.85											
NAB_{14}	.82	.81	.84	.81	.86	.82										
NAB_{24}	.77	.84	.78	.84	.78	.87	.86									
TRB_{11}	.13	.17	.15	.15	.18	.16	.14	.10								
TRB_{21}	.19	.20	.24	.21	.24	.22	.19	.15	.78							
TRB_{12}	.12	.16	.17	.17	.20	.19	.15	.10	.90	.75						
TRB_{22}	.16	.17	.23	.17	.22	.19	.15	.12	.77	.84	.80					
TRB_{13}	.12	.17	.17	.19	.19	.19	.15	.13	.92	.77	.91	.75				
TRB_{23}	.15	.17	.22	.18	.21	.17	.16	.13	.75	.85	.73	.83	.77			
TRB_{14}	.14	.17	.18	.18	.21	.20	.19	.14	.93	.77	.89	.76	.92	.75		
TRB_{24}	.19	.19	.23	.18	.20	.21	.19	.17	.78	.87	.74	.83	.79	.88	.81	
M	2.57	2.46	2.50	2.38	2.50	2.39	2.53	2.38	3.58	3.80	3.60	3.78	3.57	3.73	3.60	3.75
SD	0.75	0.72	0.76	0.74	0.70	0.72	0.72	0.71	1.23	1.21	1.21	1.22	1.23	1.22	1.25	1.22

Note. NAB = New Age Beliefs. TRB = Traditional Religious Beliefs. The first index after the variable label indicates the parcel (indicator i); the second index indicates the time point t (e.g., NAB11 = NAB Parcel 1, Time 1).

Table 3

Goodness of Fit Measures for Different Models

Model	x^2	*df*	*p*	RMSEA	CFI	SRMR	BIC
	NAB						
Model 1	207.50	31	<.001	.10	0.92	.04	3,412
Model 2	952.66	24	<.001	.26	0.55	.60	4,887
Model 3	26.24	27	.51	.00	1.00	.04	3,200
	TRB						
Model 1	104.18	31	<.001	.06	0.96	.03	6,105
Model 2	1,000.45	24	<.001	.26	0.41	.61	8,484
Model 3	36.63	27	.10	.03	0.99	.03	6,042
	Combined						
Model 1C	385.67	122	<.001	.06	0.94	.03	,510
Model 2C	2593.99	108	<.001	.20	0.47	.47	13,342
Model 3C	117.38	110	.30	.01	1.00	.03	9,239

Note. RMSEA = root mean square error of approximation. CFI = comparative fit index. SRMR = standardized root mean square residual. BIC = Bayes information criterion. NAB = New Age Beliefs. TRB = Traditional Religious Beliefs. Model 1 = trait latent variables only. Model 2 = uncorrelated state latent variables only. Model 3 = latent state-trait (MTMS) model. Model 1C-3C = combined multi-construct versions of Models 1-3 with NAB and TRB in the same model.

Table 4

Parameter Estimates and Standard Errors for Model 4

Parameter	Estimate	SE	Standardized Estimate
		NAB	
Trait factor loadings			
NAB_{1t}	1.00 [a]	–	.88, .89, .91, .94 [b]
NAB_{2t}	1.00 [a]	–	.91, .91, .93, .93 [b]
SR factor loadings			
NAB_{11}	1.00 [a]	–	.31
NAB_{21}	1.00 [a]	–	.32
NAB_{12}	1.00 [a]	–	.32
NAB_{22}	1.00 [a]	–	.33
NAB_{13}	1.00 [a]	–	.24
NAB_{23}	1.00 [a]	–	.24
NAB_{14}	1.00 [a]	–	.21
NAB_{24}	1.00 [a]	–	.20
Factor means			
Trait 1 (NAB_{1t})	2.54	0.03	
Trait 2 (NAB_{2t})	2.42	0.03	
Factor variances			
Trait 1 (NAB_{1t})	0.44	0.03	1.00 [a]
Trait 2 (NAB_{2t})	0.44	0.02	1.00 [a]
SR Time 1	0.06	0.01	1.00 [a]
SR Time 2	0.06	0.01	1.00 [a]
SR Time 3	0.03	0.01	1.00 [a]
SR Time 4	0.02	0.01	1.00 [a]
Measurement error variances			
NAB_{11}	0.08	0.01	.14
NAB_{21}	0.03	0.01	.08
NAB_{12}	0.06	0.01	.11
NAB_{22}	0.03	0.01	.06
NAB_{13}	0.06	0.01	.11
NAB_{23}	0.04	0.01	.08
NAB_{14}	0.04	0.01	.08
NAB_{24}	0.05	0.01	.10
		TRB	
Trait factor loadings			
TRB_{1t}	1.00 [a]	–	.96, .94, .97, .96 [b]
TRB_{2t}	1.00 [a]	–	.93, .91, .92, .94 [b]
SR factor loadings			
TRB_{11}	1.00 [a]	–	.07 [c]
TRB_{21}	1.00 [a]	–	.07 [c]
TRB_{12}	1.00 [a]	–	.25
TRB_{22}	1.00 [a]	–	.26
TRB_{13}	1.00 [a]	–	.15
TRB_{23}	1.00 [a]	–	.15
TRB_{14}	1.00 [a]	–	.17

TRB_{24}	1.00 [a]	–	.18
Factor means			
Trait 1 (TRB_{1t})	3.58	0.05	
Trait 2 (TRB_{2t})	3.77	0.05	
Factor variances			
Trait 1 (TRB_{1t})	1.40	0.07	1.00 [a]
Trait 2 (TRB_{2t})	1.27	0.08	1.00 [a]
SR Time 1	0.01 [c]	0.02	1.00 [a]
SR Time 2	0.10	0.05	1.00 [a]
SR Time 3	0.03 [c]	0.02	1.00 [a]
SR Time 4	0.05	0.02	1.00 [a]
Measurement error variances			
TRB_{11}	0.11	0.02	0.08
TRB_{21}	0.29	0.03	0.14
TRB_{12}	0.07	0.02	0.05
TRB_{22}	0.18	0.03	0.11
TRB_{13}	0.07	0.02	0.04
TRB_{23}	0.18	0.03	0.13
TRB_{14}	0.09	0.03	0.06
TRB_{24}	0.13	0.03	0.09

Note. NAB = New Age Beliefs. TRB = Traditional Religious Beliefs. The first index after the variable label indicates the parcel (indicator i); the second index indicates the time point t (e.g., NAB11 = NAB Parcel 1, Time 1). SR = state residual factor. Standardized factor loadings can be interpreted as correlations between measured variables and latent factors. Standardized measurement error variances indicate 1 – Reliability. a parameter fixed a priori for model identification or theoretical reasons. b standardized trait factor loadings are reported in the order Time 1, Time 2, Time 3, Time 4. c estimates not significant at the .05 level. Dashes (–) indicate that a standard error was not computed due to a parameter being fixed rather than freely estimated. All intercepts were fixed to zero and are therefore not shown in the Table. Factor correlations are reported in the text.

Table 5

Consistency, Occasion-Specificity, and Reliability Coefficients Based on Model 4

Parcel	CO(parcel)	OS(parcel)	Reliability	CO(true scores)	OS(true scores)
NAB_{11}	.77	.10	.86	.89	.11
NAB_{21}	.82	.10	.92	.89	.11
NAB_{12}	.79	.10	.89	.89	.11
NAB_{22}	.84	.11	.94	.89	.11
NAB_{13}	.83	.06	.89	.94	.06
NAB_{23}	.86	.06	.92	.94	.06
NAB_{14}	.88	.04	.93	.95	.05
NAB_{24}	.86	.04	.90	.95	.05
TRB_{11}	.92	.00	.93	1.00	.00
TRB_{21}	.86	.00	.86	.99	.01
TRB_{12}	.89	.06	.95	.93	.07
TRB_{22}	.82	.07	.89	.93	.07
TRB_{13}	.93	.02	.96	.98	.02

TRB_{23}	.85	.02	.87	.97	.03
TRB_{14}	.91	.03	.94	.97	.03
TRB_{24}	.88	.03	.91	.97	.03

Note. NAB = New Age Beliefs. TRB = Traditional Religious Beliefs. The first index after the variable label indicates the parcel (indicator i); the second index indicates the time point t (e.g., NAB11 = NAB Parcel 1, Time 1). CO = consistency (proportion of trait variance). OS = occasion-specificity (proportion of state residual variance). Rel = Reliability (proportion of measured variance that is not due to measurement error). CO(parcel) and OS(parcel) sum up to Rel for a given parcel within rounding error. CO(true scores) and OS(true scores) sum up to 1.0 for a given parcel.

Table 5 shows the consistency, occasion-specificity, and reliability coefficients calculated based on the variance components reported in Table 4. The large consistency and small occasion-specificity coefficients in Table 5 again show that both constructs were mostly trait-like with only small state residual influences. Between 77% and 93% of the measured variance (between 89% and 100% of the true score variance) reflected trait variance, whereas only between 0% and 11% of the (observed or true score) variance reflected state residual variance. Measurements of NAB reflected slightly more state residual variance than measures of TRB. Both constructs were measured with high precision, as indicated by the large reliability coefficients (model-based reliabilities between .86 and .96).

Discussion

The findings of this study provide little support for the construction of beliefs as a psychological state. Both paranormal beliefs (as indexed by items of the NAB scale) and traditional religious beliefs (as indexed by TRB items) had relatively small state residual variance. A definition of beliefs as a state in which a person regards a given proposition as true may be useful for representing the phenomenology of beliefs, but this definition evidently is inadequate as a viable perspective for the psychometrics of beliefs. The potential influence of state-related factors certainly is not to be dismissed out of hand. After all, as noted earlier in the paper, deliberate manipulation of the psychological context of assessment has been reported to affect performance on a paranormal belief questionnaire. Nevertheless, the demonstration of such effects does not in itself contradict our finding that state factors generally play only a minor role in the degree to which people present with paranormal or religious beliefs on a given occasion. A score on a belief questionnaire may depend in part on the circumstances in which the test is taken and on the participant's psychological state at that time, but in the normal course of events it seems these state effects are statistically significant but not substantial.

By contrast the study's findings show much stronger support for the notion that paranormal and religious beliefs function as psychological traits. The substantial portion of the variance in both NAB and TRB scores was shown to be attributable to the contribution of stable traits. This observation could be taken to condone the widespread practice of assessing paranormal beliefs through a single administration of an appropriate questionnaire. By implication, the finding also serves to give some degree of validation to the substantial body of empirical research that has followed this procedure. At the same time, the potential presence of minor state effects stands as a caution to researchers that there may be some "noise" in the data in addition to the usual random measurement error. The dominance of the trait contribution certainly should not be taken as an excuse for neglecting the standardization of questionnaire administration. Note also that the construction of paranormal beliefs as largely trait-like does not assume that these beliefs must be continuously manifest. Rather, the intensity of people's paranormal beliefs would better be regarded as an enduring disposition to show a relatively regular or predictable response when prevailing circumstances warrant this behavior (Fridhandler, 1986). Further, perhaps the person need not necessarily be conscious of a given paranormal belief at the time it influences behavior (Näyhä, 2002).

Conclusions

The findings of this study are consistent with the construction of paranormal and religious beliefs as stable psychological traits, and they do not encourage the current preference for defining beliefs as a psychological state. Nonetheless a caveat should be entered here with regard to the generality of the study's findings. Beliefs are a remarkably heterogeneous category of human mentation, and it may well be the case that the observed pattern of trait and state characteristics of paranormal and religious beliefs does not apply to other types of belief. Paranormal and religious beliefs are known to rely substantially on social mediation, for example (Irwin, 2009; Markovsky & Thye, 2001). Other beliefs less susceptible to social influences may therefore show even greater trait saturation. Just as the findings might not generalize to other beliefs, the identified pattern of relations may be relatively specific to the questionnaire measure of paranormal and religious beliefs used here, or to the US cultural background of participants, or to the four-week interval between test administrations. Constructive replication of the study would be welcome, particularly in regard to the potential operation of moderating variables in this context. We hope that our innovative application of latent state-trait theory to the study of beliefs will inspire similar studies. In addition, we hope that the study's findings will be taken into account by researchers planning to construct or to administer a questionnaire measure of belief in paranormal phenomena.

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La Croyance au Paranormal: Un État, ou un Trait ?

Bien que la croyance aux phénomènes paranormaux est depuis longtemps étudiée en tant que trait psychologique, plusieurs commentateurs ont récemment préféré définir les croyances comme des états psychologiques. De façon surprenante, la décomposition psychométrique d'une croyance en composantes état et trait n'a pas encore été réalisée. A cette fin, un échantillon de 584 Américains adultes fut invité à remplir un questionnaire sur les croyances paranormales et religieuses à quatre occasions, selon des intervalles espacées d'un mois. Une application sur ces données des modèles latents en état et trait a montré que tant les croyances paranormales que les croyances religieuses traditionnelles tendent à être, de façon prédominante, des constructions de type trait, avec une petite mais significative composante de type état. Ces résultats pourraient avoir des implications spécifiques pour l'évaluation des croyances paranormales, ainsi que des implications générales pour une théorie des croyances comme états.

Der Glaube ans Paranormale: Ein Zustand oder eine Eigenschaft?

Obwohl der Glaube ans Paranormale seit langem unter der Annahme erforscht wurde, er stelle eine psychologische Eigenschaft dar, haben es viele Kommentatoren neuerdings vorgezogen, Glaubenseinstellungen als psychologischen Zustand zu definieren. Die psychometrische Zerlegung einer Glaubenseinstellung in ihre Zustands- und Eigenschaftskomponenten muss, was etwas überraschend ist, erst noch geschehen. Zu diesem Zweck wurde eine Stichprobe von 584 erwachsenen Amerikanern gebeten, im monatlichen Abstand bei vier Gelegenheiten einen Fragebogen zur Erfassung paranormaler und traditioneller religiöser Glaubenseinstellungen auszufüllen. Die Anwendung latenter Zustands-Eigenschafts-Modelle auf die Ergebnisse ergab sowohl beim paranormalen Glauben wie auch beim traditionellen religiösen Glauben bevorzugt eigenschaftsähnliche Konstrukte mit einer geringen, aber signifikanten zustandsähnlichen Komponente. Diese Ergebnisse könnten spezifische Implikationen für die Einschätzung paranormaler Einstellungen wie auch allgemeine Implikationen für eine Zustandstheorie von Glaubenseinstellungen haben.

La Creencia en lo Paranormal: Un Estado, o un Rasgo?

Aunque la creencia en los fenómenos paranormales se ha estudiado durante mucho tiempo como si se tratara de un rasgo psicológico, recientemente muchos comentaristas han preferido definir a las creencias como un estado psicológico. De manera algo sorprendente, la descomposición psicométrica de una creencia en componentes de estado y rasgo aún no se ha llevado a cabo. Por ello, invitamos a una muestra de 584 adultos estadounidenses a completar un cuestionario de creencias religiosas paranormales y tradicionales en cuatro ocasiones a intervalos mensuales. Modelos de rasgos de estado latentes de los datos mostró que tanto la creencia paranormal como la creencia religiosa tradicional eran predominantemente constructos de tipo rasgo, con un componente pequeño pero significativo de estado. Estos hallazgos pueden tener implicaciones específicas para la evaluación de las creencias paranormales, así como implicaciones generales para una teoría de estado de las creencias.