



## The internal structure of the Post-Critical Belief scale

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Received 7 February 2002; received in revised form 28 May 2002; accepted 23 July 2002

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### Abstract

According to Wulff (1991, 1997) the various approaches to religion can be located in a two-dimensional space along the bipolar dimensions Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic. Drawing on Wulff, Hutsebaut and his colleagues (1996, 1997, 2000) developed the Post-Critical Belief scale to measure interindividual differences in these dimensions. In this article, results from multidimensional scaling and principal component analyses in 16 samples ( $N=4648$ ) gathered in Flanders (Belgium) are presented which support the interpretation of the relationships between the Post-Critical Belief scale items in terms of Wulff's dimensions.

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*Keywords:* Post-Critical Belief; Religion; Religiosity; Religious Beliefs

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In the late 1990s, Hutsebaut (1996, 1997) developed the Post-Critical Belief scale to measure interindividual differences in the four approaches towards religion which Wulff (1991) described in his seminal “*Psychology of religion: classic and contemporary views*”. According to Wulff (1991, 1997), these approaches can be organized along two theoretical bipolar dimensions, i.e. Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic. Since its construction, four different versions of the Post-Critical Belief scale were administered to a total of 16 different samples ( $N=4648$ ). Results from most of these studies, which, in general, supported the validity of the Post-Critical Belief scale, have been described elsewhere (see further). In the present article, all 16 samples were combined to investigate (1) whether two dimensions are sufficient to represent the empirical relationships between the Post-Critical Belief scale items, (2) whether these dimensions can be interpreted in terms of Wulff's (1991, 1997) dimensions Exclusion vs. Inclusion of

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Transcendence and Literal vs. Symbolic, and (3) whether this structure is stable across the four different versions of the Post-Critical Belief scale that have been used over time and across the various types of samples. We will start this article with a presentation of Wulff’s (1991, 1997) theoretical model, followed by an overview of the development of the Post-Critical Belief scale and results from previous studies using this scale.

**1. Wulff’s theoretical framework**

Wulff (1991, 1997) argued that the various possible approaches to religion can be located in a two-dimensional space (see Fig. 1). The vertical axis in this space, the Exclusion vs. Inclusion of Transcendence dimension, specifies the degree to which the objects of religious interest are granted participation in a transcendent reality. The horizontal axis, the Literal vs. Symbolic dimension, indicates

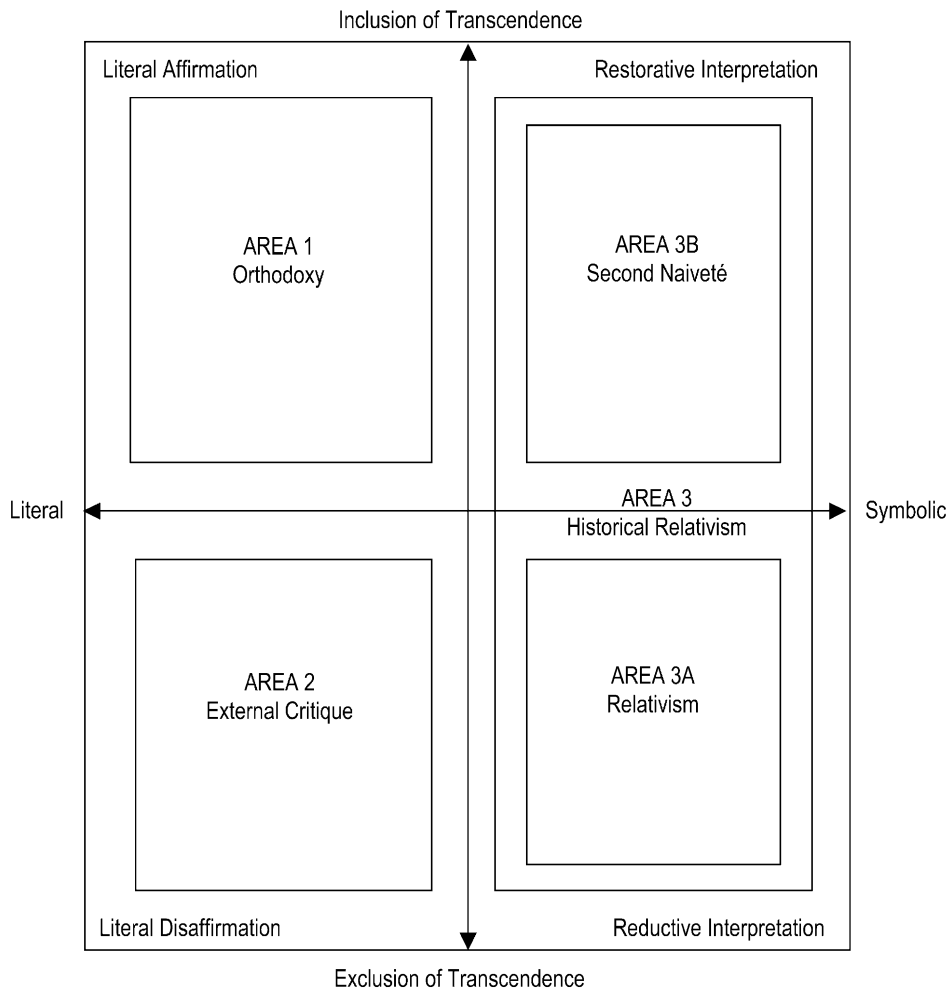


Fig. 1. Integration of Hutsebaut’s religiosity dimensions in Wulff’s (1991, 1997) theoretical model.

whether religion is interpreted literally or symbolically. In this way four quadrants are defined, each covering a specific attitude towards religion, which Wulff (1991, 1997) labeled Literal Affirmation, Literal Disaffirmation, Reductive Interpretation, and Restorative Interpretation (see Fig. 1).

### *1.1. Literal Affirmation*

Literal Affirmation represents a position in which the literal existence of the religious realm is affirmed. This position is most clearly embodied by religious fundamentalists, although elements of this posture also appear among those who are not particularly conservative. According to Wulff (1991, 1997), this position, which is partly reflected in scales like Barron's (1963) Fundamentalist Belief scale, can only be sustained by rejecting those who doubt the validity of the conservative view. Therefore, it should not be surprising that literal believers tend to score higher on measures of prejudice and lower on measures of cognitive development, and can be characterized as rather rigid and low in ability to adapt (see Wulff, 1991, 1997).

### *1.2. Literal Disaffirmation*

Literal Disaffirmation represents a position in which the existence of the religious realm is rejected, but in which the possibility is lost out of sight that the religious language has a symbolic meaning. So, like in the first quadrant, religious language is understood in a literal way. The difference lies in the rejection of what is written or said. If anything is considered absolute, it is the scientific method and rational principles of knowledge. According to Wulff (1991, 1997), this position is partly reflected in the indiscriminately anti-religious orientation (Allport & Ross, 1967) as well as in the Fundamentalist Disbelief scale (Barron, 1963). People occupying this quadrant tend to be less dogmatic and more intellectual than many of the religious subjects, but also less fair-minded, less capable to evaluate ideas, rather rigid and low in ability to adapt (see Wulff, 1991, 1997).

### *1.3. Reductive Interpretation*

Reductive Interpretation represents a position in which the existence of the religious realm is rejected, and in which a privileged perspective on the hidden meaning of religion's myths and rituals is claimed. This quadrant is derived from the work of Ricoeur (1970), who proposed that in modern hermeneutics, in order to clear away from religious symbols the excrescence of idolatry and illusion, a reductive interpretation is necessary. Wulff (1991, 1997) draws on findings obtained with the Quest scale (Batson, Schoenrade, & Ventis, 1993) and the Enlightenment Disbelief scale (Barron, 1963) to fill out a portrait of persons in this quadrant, and concludes that these persons are complex, socially sensitive and insightful, rather unprejudiced and original.

### *1.4. Restorative Interpretation*

Restorative Interpretation represents a position in which the existence of the religious realm is affirmed, and in which one tries to encompass and transcend reductive interpretations in order to find the symbolic meaning of the religious language. Again, this quadrant is derived from the work of Ricoeur (1970), who proposed that in modern hermeneutics, in order to make it possible

for the object of suspicion to be restored to an object of understanding and faith, a restorative interpretation is needed. Ricoeur also used the term *Second Naiveté* to refer to this process of restorative interpretation. According to Wulff (1991, 1997), it is difficult to characterize subjects in this quadrant, for they have largely been neglected in empirical research. Moreover, Wulff argued that, given its profoundly individual character, this quadrant is probably difficult to measure with standardized questionnaires.

## **2. The Post-Critical Belief scale**

Inspired by Wulff (1991, 1997), Hutsebaut (1996) developed the Post-Critical Belief scale. This scale originally consisted of 24 items capturing the four approaches to religion discerned by Wulff within a secularized Christian context (see Appendix). Especially the concept of *Second Naiveté* was focussed upon, since it played a central role in Wulff's model, but had barely been investigated.

### *2.1. Initial analysis of the internal structure*

An initial analysis of the internal structure of the Post-Critical Belief scale, in a mixed sample of adolescents, university students and adults (Hutsebaut, 1996), offered only partial support for Hutsebaut's contention that the Post-Critical Belief scale was a valid measure of Wulff's concepts. Factor analysis followed by VARIMAX rotation neither pointed to two bipolar factors referring to the two bipolar dimensions discerned by Wulff, nor to four unipolar factors referring to Wulff's four quadrants. Instead, three unipolar factors emerged. Items referring to the acceptance of Christian beliefs (e.g. item O2, see Appendix) had a positive loading on the first factor. This factor could easily be interpreted in terms of what Wulff called *Literal Affirmation* and was labeled *Orthodoxy*. Items that had a significant loading on the second factor referred either to the meaningfulness of Christian religion (e.g. item S1, see Appendix) or to its historical relativity (e.g. item R1, see Appendix). This factor was described by Hutsebaut (1996) as consistent with what Wulff called *Restorative Interpretation* and was labeled *Historical Relativism*. Items designed to measure either what Wulff called *literal disaffirmation* (e.g. item E4, see Appendix) or what Wulff called *reductive interpretation* (e.g. item E1, see Appendix) had a positive loading on the third factor. Therefore, this factor was considered to measure *Exclusion of Transcendence* and was labeled *External Critique*.

The existence of three factors was supported in subsequent studies (Desimpelaere, Sulas, Duriez, & Hutsebaut, 1999; Hutsebaut, 1997). However, the results of Desimpelaere et al. (1999) allowed a refinement of the interpretation of *External Critique*. They found that both *External Critique* and *Orthodoxy* were positively related to Perry's (1970) psycho-epistemological style of *Dualism*, which is characterized by a preference for unambiguity and by the assumption that there exists only one right answer for each problem. This finding suggested that *External Critique*, like *Orthodoxy*, is rooted in a literal mode of thinking, implying *External Critique* was measuring what Wulff called *Literal Disaffirmation*.

In sum, these initial studies revealed only three instead of four of the approaches to religion described by Wulff (1991, 1997), i.e., *Literal Affirmation (Orthodoxy)*, *Literal Disaffirmation (External Critique)*, and *Restorative Interpretation (Historical Relativism)*.

## 2.2. Re-analyses of the internal structure

Duriez, Fontaine, and Hutsebaut (2000) re-investigated the internal structure of the Post-Critical Belief scale using multidimensional scaling in three different samples.<sup>2</sup> Multidimensional scaling (MDS) (Borg & Groenen, 1997; Davison, 1983; Kruskal & Wish, 1991) represents psychological (dis)similarities between stimuli, in this case the Post-Critical Belief items, as points in a geometrical space in such a way that the distances between the points represent the observed (dis)similarities as well as possible. An MDS configuration can be interpreted in two ways (Borg & Groenen, 1997; Davison, 1983; Kruskal & Wish, 1991). First, a dimensional interpretation interprets the dimensions by looking at the coordinates of the stimuli on the dimensions. Second, a regional interpretation looks for bounded regions within the geometrical representation containing each a specific type of stimuli.

A two-dimensional MDS representation of the observed relationships between the items of the Post-Critical Belief scale could be interpreted by means of both a dimensional and a regional interpretation (see Fig. 1 for a schematic representation). The first dimension could be interpreted as Exclusion vs. Inclusion of Transcendence, with the External Critique items having negative coordinates and the Orthodoxy and most of the Historical Relativism items having positive coordinates on this dimension. The second dimension could be interpreted in terms of Literal vs. Symbolic, with the Orthodoxy and External Critique items having negative coordinates and the Historical Relativism items having positive coordinates. This dimensional interpretation was compatible with the regional interpretation (see Fig. 1). The Orthodoxy items were situated in the upper left quadrant, the External Critique items were situated in the lower left quadrant, and most Historical Relativism items were situated in the upper right quadrant. However, some of the Historical Relativism items were situated in the lower right quadrant. A close inspection of the items revealed a difference in content between the items in the upper right and the lower right quadrant. The items in the upper right quadrant clearly implied an adherence to Christian religion, while the items in the lower right quadrant merely focused on the historical relativity of Christian religion without implying an adherence to it. Hence, both the position and the content of the items in the lower right quadrant indicated that these items were not suited to measure Restorative Interpretation. Therefore, Duriez et al. (2000) decided to divide Historical Relativism into two parts. The upper right quadrant, implying Inclusion of Transcendence, was labeled Second Naiveté.<sup>3</sup> The lower right quadrant, referring to a purely relativist stance, was labeled Relativism. Furthermore, the fact that the Relativism items had negative coordinates on the first dimension suggested that these items were measuring Reductive Interpretation. Apparently, it seems to be the case that Reductive Interpretation is characterized by taking a relativist stance towards religion rather than by an explicit rejection of religion.

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<sup>2</sup> As a dissimilarity measure, Duriez et al. (2000) used the Euclidean distances between the standardized Post-Critical Belief items. In this way, a positive correlation between two items is represented as a small distance. A negative correlation is represented as a large distance.

<sup>3</sup> In previous research, this dimension was also labeled Historical Awareness (Duriez, Hutsebaut, & Roggen, 1999) and Symbolic Belief (Fontaine, Luyten, & Corveleyn, 2000; Luyten, Corveleyn, & Fontaine, 1998). However, we prefer the term Second Naiveté because it explicitly points to Ricoeur's concept (1970) (cf. Duriez et al., 2000; Duriez, Fontaine, & Luyten, 2001; Duriez & Hutsebaut, 2000; Duriez, Luyten, Snauwaert, & Hutsebaut, 2002; Duriez & Van Hiel, 2002).

Thus, an MDS-representation of the internal structure of the Post-Critical Belief scale (1) supported the interpretation of the Post-Critical Belief scale in terms of Wulff's bipolar dimensions Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic and (2) indicated the presence of two different aspects within what was formerly labeled Historical Relativism (namely Second Naiveté and Relativism). The Orthodoxy items refer to a Literal Affirmation of religious statements, the External Critique items refer to a Literal Disaffirmation of religious statements, and both the Relativism items and the Second Naiveté items refer to a symbolic approach of religion. However, the latter two approaches differ with respect to whether or not religion is seen as a privileged and guiding framework in one's life. Contrary to those high on Second Naiveté, those high on Relativism do not grant special status to the religious framework: it is merely seen as one possible source of meaning in life among so many others. In sum, the use of MDS led to new insights into the structure of the Post-Critical Belief scale.

However, there was a discrepancy between the results obtained with MDS and with factor analysis. Whereas MDS revealed two bipolar dimensions, factor analysis revealed three predominantly unipolar factors. Duriez et al. (2000) proposed an explanation for this in terms of differences in response style, i.e. the tendency to endorse or reject the items of the Post-Critical Belief scale irrespective of the item content. Green, Goldman, and Salovey (1993) have demonstrated that such differences lead to an increase of positive correlations and a suppression of negative correlations between the different items in a questionnaire, which, in turn, masks bipolarity in factor analysis because it tends to produce unipolar factors. MDS, however, is only marginally affected by differences in response style, since, contrary to factor analysis, MDS represents the pattern of relations instead of the absolute size of correlations. Contrary to the absolute size of correlations, this pattern of relations is only marginally affected by differences in response style. In line with this explanation, when the three-componential PCA solution was rotated towards the bipolar MDS configuration using orthogonal Procrustes rotation (Schoneemann, 1966; see also McCrae, Zonderman, Costa, & Bond, 1996), Duriez et al. (2000) found, a high congruence between the first two rotated components and the two bipolar dimensions. The first component could be interpreted in terms of a bipolar Exclusion vs. Inclusion of Transcendence dimension and the second component in terms of a bipolar Literal vs. Symbolic dimension. Furthermore, after this rotation, *all* items of the Post-Critical belief scale, even the ones with a clearly contradictory content such as items E2 and S2 (see Appendix), had a positive loading on the third component. Hence, differences in response style (i.e. acquiescence) offer a plausible interpretation of this component. Thus, the assumption of the presence of interindividual differences in response style combined with the use of orthogonal Procrustes rotation led to a convergence between the results obtained with MDS and factor analysis. This supported the results concerning the internal structure of the Post-Critical Belief scale obtained with MDS.

### *2.3. Adaptations of the Post-Critical Belief scale*

Results from the above mentioned analyses of the Post-Critical Belief scale, using MDS and factor analysis, together with feedback from subjects responding to the scale, led to three subsequent revisions of the original 24-item version of the Post-Critical Belief scale, resulting in a revised 33-item version (see Appendix) (see also Duriez et al., 2000). This revised 33-item version offers a better construct representation of the four different approaches to religion that are mea-

sured by the Post-Critical Belief scale. In several studies of adolescents, university students and adults, the validity of the four Post-Critical Belief subscales, including the distinction between Second Naiveté and Relativism, received support by showing differential relationships with a number of variables such as racism (Duriez et al., 1999, 2000, 2002; Duriez & Hutsebaut, 2000), economic and cultural conservatism (Duriez et al., 2002), authoritarianism and social dominance orientation (Duriez & Van Hiel, 2002), mental health (Luyten et al., 1998), and value orientations (Duriez et al., 2001; Fontaine et al., 2000).

### 3. Method

#### 3.1. Samples

In total, a version of the Post-Critical Belief scale was administered to 16 different samples ( $N=4648$ ) in Flanders (Belgium). In a first validation study, the Post-Critical Belief scale was administered to a large sample of adolescents, university students and adults ( $N=1162$ ), ranging in age from 16 to 92 with an average of 39.<sup>4</sup> In order to obtain a heterogeneous sample, the Post-Critical Belief scale was distributed by undergraduate students in schools and various organizations, and by relatives and friends of these students, who were asked to hand out questionnaires to their neighbors. Subsequently, the Post-Critical Belief scale was administered in an adolescent sample (aged less than 18) (sample 2), in five student samples (samples 3–7), and eight adult samples (samples 8–16). Table 1 lists some descriptive statistics of these 16 samples, including

Table 1  
Description of the samples

Sample	Type	<i>N</i>	% Male	Age (Mean)	Age (S.D.)
1	General	1162	44	39	19
2	Adolescent	183	36	16	02
3	Student	210	42	22	02
4	Student	389	20	18	01
5	Student	113	40	21	03
6	Student	338	18	18	01
7	Student	376	20	18	01
8	Adult	251	35	42	17
9	Adult	161	69	31	08
10	Adult	365	47	41	13
11	Adult	228	48	32	13
12	Adult	240	38	35	15
13	Adult	87	53	40	15
14	Adult	176	55	39	15
15	Adult	301	35	45	13
16	Adult	68	74	39	15

<sup>4</sup> For reasons of consistency with previously published articles using this sample (Duriez et al., 2000; Duriez & Hutsebaut, 2000; Hutsebaut, 1996, 1997), we left this sample intact.

number of participants, sex and mean age of the participants. All 4648 participants had Belgian nationality and belonged to the Flemish-speaking part of the country. Subjects from the adolescent sample were pupils from a secondary school who were contacted by an undergraduate student. All subjects from the student samples followed a psychology course at a large Belgian university. Participation was obligatory and they received full course credit. Subjects from the adult samples were gathered by undergraduate students who asked their neighbors to complete the Post-Critical Belief scale, except for sample 15 and 16. Sample 15 was gathered among highly religious subjects and sample 16 was gathered among political activists. All subjects having over two missing values were excluded from further analyses. In total, only 2.3% ( $N=95$ ) of the subjects needed to be removed across the 16 samples. For the subjects with less than three missing values, these missing values were replaced by the sample-specific mean of the item. In total 284 missing values were replaced (less than 0.25% of the individual scores included in this research).

### *3.2. Measures*

All 4648 participants completed one of four different versions of the Post-Critical Belief scale. The original 24 item version (version 1) of this scale was presented to sample 1.<sup>5</sup> A slightly adapted 23 item version (version 2) was presented to sample 3. A 31 version (version 3) was presented to samples 4, 5, and 8–10. The most recently revised 33 item version (version 4) (see Duriez et al., 2000) was presented to samples 2, 6, 7, and 11–16. All items were scored on a 7-point Likert scale (1 = completely opposed, 4 = neutral, 7 = completely in agreement). In the Appendix, items are listed by subscales (Orthodoxy, External Critique, Relativism and Second Naiveté). Each item is given a label which allows its identification in the tables and figures presented throughout this article.

### *3.3. Analyses procedures*

To investigate whether the relationships between the Post-Critical Belief items could be accounted for by two underlying dimensions, and whether these dimensions could be interpreted in terms of Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic, we used both multidimensional scaling (MDS) and principal component analysis (PCA). As explained in the introduction, MDS has the advantage that it can represent the internal structure of the Post-Critical Belief scale with being only marginally influenced by interindividual differences in acquiescence. Furthermore, it offers the possibility to represent an average internal structure for complex data, as is the case here: since four different versions of the Post-Critical Belief scale have been used over time, we have no information about the relationships between items that are specific to a single version. A data structure with information lacking for some item pairs does not form a problem for MDS. A disadvantage of MDS, however, is that it does not offer a measurement model for individual differences: it only represents the observed relationships

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<sup>5</sup> The original scale consisted of 24 items (see Duriez et al., 2000). However, one Orthodoxy item and one External Critique item were reversely formulated. Since the impact of reversed formulation could not be investigated extensively with only two reversed items, and since these items have not been included in the more recent versions of the Post-Critical Belief scale that were used in the 14 other samples, we excluded these two items from the present analyses.



between the items. PCA, in contrast, does offer a measurement model for interindividual differences. However, PCA is likely to be affected by acquiescence. Hence, a combination of both MDS and PCA was appropriate.

To investigate whether the dimensions of an average two-dimensional structure across all samples could be interpreted in terms of Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic, and whether this structure is stable across samples, we relied on orthogonal Procrustes rotations (McCrae et al., 1996; Schonemann, 1966). Orthogonal Procrustes rotation is a factor rotation in which the factor structure obtained in one sample is orthogonally rotated towards either the structure obtained in another sample or a theoretical pattern. For this purpose, the average two-dimensional configuration across the samples was orthogonally rotated towards a theoretical configuration. In this theoretical two-dimensional configuration, the Orthodoxy items and the Second Naiveté items are situated at the positive end of Exclusion vs. Inclusion of Transcendence whereas the External Critique items and the Relativism items are situated at the negative end on this dimension. On the second Literal vs. Symbolic dimension, the Orthodoxy items and the External Critique items are situated at the negative end whereas the Relativism items and the Second Naiveté items are situated at the positive end (see Table 2). To investigate the stability of the average two-dimensional structure across each of the samples, the sample-specific configurations were orthogonally rotated towards the average (theoretically rotated) configuration. The congruence was quantified by means of the Tucker's Phi, which can range from 0 to 1, with a value of 0.90 or higher pointing to substantial congruence (Van de Vijver & Leung, 1997).

## 4. Results

### 4.1. *Multidimensional scaling*

#### 4.1.1. *The number of dimensions*

In order to investigate the dimensionality that is needed to represent the empirical relationships between the items of the Post-Critical Belief scale, without being affected (too much) by random sampling fluctuation and sample-specific information, average Euclidean distances between the standardized items across the samples were used as dissimilarity measure. These Euclidean distances were represented in a one- up to a six-dimensional configuration by means of non-metric MDS. The scree test of both the Kruskal stress and the fit of each dimensionality clearly pointed to a two-dimensional representation.<sup>6</sup> The Kruskal stress declined from 0.31 over 0.12, 0.08, 0.06, 0.05 to 0.05 for a one-dimensional up to a six-dimensional solution respectively. These different solutions accounted for respectively 70, 92, 94, 96, 98 and 98% of the variance in the optimally transformed dissimilarities. Thus, on average, a two-dimensional representation adequately represents the empirical relationships between the items of the Post-Critical Belief scale.

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<sup>6</sup> It has to be noted that the scree test functions differently for MDS than for PCA. For MDS the adequate dimensionality is situated at the elbow, while for PCA the adequate componentiality is situated just above the elbow (Davison, 1983).

Table 2

Items of the Post-Critical Belief scale, a priori pattern (A1, A2), coordinates in a two-dimensional representation (D1, D2), and average component pattern (C1, C2) for Exclusion vs. Inclusion of Transcendence and Iteral vs. Symbolic per subscale

Subscale	Label	A1	A2	D1	D2	C1	C2
Orthodoxy	O1	1	-1	1.56	-0.44	0.48	-0.29
	O2	1	-1	1.63	-0.60	0.47	-0.29
	O3	1	-1	1.23	-0.87	0.32	-0.38
	O4	1	-1	1.59	-0.10	0.50	-0.14
	O5	1	-1	0.74	-1.28	0.17	-0.52
	O6	1	-1	0.81	-1.55	0.20	-0.56
	O7	1	-1	1.62	-0.12	0.59	-0.16
	O8	1	-1	1.12	-1.20	0.31	-0.49
External Critique	E1	-1	-1	-1.14	-1.13	-0.44	-0.42
	E2	-1	-1	-1.30	-0.85	-0.46	-0.28
	E3	-1	-1	-1.30	-0.55	-0.51	-0.17
	E4	-1	-1	-1.01	-1.36	-0.39	-0.51
	E5	-1	-1	-0.87	-0.31	-0.43	-0.12
	E6	-1	-1	-0.78	-0.06	-0.39	-0.01
	E7	-1	-1	-1.11	-1.26	-0.33	-0.44
	E8	-1	-1	-1.24	-1.00	-0.53	-0.36
	E9	-1	-1	-0.76	-1.12	-0.33	-0.34
	E10	-1	-1	-0.76	-1.49	-0.32	-0.46
	E11	-1	-1	-1.40	-0.60	-0.52	-0.15
Relativism	R1	-1	1	-0.35	1.17	-0.26	0.36
	R2	-1	1	-0.62	1.06	-0.34	0.36
	R3	-1	1	-0.99	0.81	-0.35	0.31
	R4	-1	1	-0.41	1.02	-0.29	0.37
	R5	-1	1	-0.88	0.96	-0.41	0.41
	R6	-1	1	-0.87	0.36	-0.35	0.14
	R7	-1	1	-0.42	0.69	-0.29	0.34
	R8	-1	1	-1.27	0.37	-0.39	0.14
	R9	-1	1	-1.09	1.10	-0.28	0.14
	R10	-1	1	-1.37	0.11	-0.40	0.14
	R11	-1	1	0.20	0.68	0.01	0.27
Second Naiveté	S1	1	1	1.28	0.72	0.37	0.39
	S2	1	1	1.30	0.80	0.30	0.36
	S3	1	1	1.22	0.78	0.48	0.50
	S4	1	1	1.05	0.57	0.30	0.39
	S5	1	1	1.12	0.82	0.25	0.29
	S6	1	1	0.62	1.20	0.02	0.42
	S7	1	1	1.10	0.89	0.41	0.52
	S8	1	1	1.41	0.48	0.52	0.27
	S9	1	1	0.36	1.29	0.00	0.32

4.1.2. The interpretation of the two-dimensional MDS structure

The two-dimensional representation of the average Euclidean distances across the samples was orthogonally rotated towards the theoretical structure (see Table 2 for both this theoretical structure and the rotated solution). Tucker’s Phi indices indicated good congruence for both dimensions: 0.93 for Exclusion vs. Inclusion of Transcendence and 0.90 for Literal vs. Symbolic. Furthermore, a regional interpretation of the two-dimensional configuration allowed for the identification of four bounded regions with 38 of the 39 items of the Post-Critical Belief scale being situated in the predicted region (see Fig. 2). All Orthodoxy items are situated in the upper left quadrant, all External Critique items are situated in the lower left quadrant, all Second Naiveté items are situated in the upper right quadrant, and all Relativism items (except for item R11) are situated in the lower right quadrant. One relativism item (item R11) was situated in the Second Naiveté region.

4.1.3. The stability of the two-dimensional MDS-structure

In order to investigate the stability of the average two-dimensional structure in each of the samples, a two-dimensional MDS was performed on the observed Euclidean distances between the standardized items in each sample. On average, a two-dimensional representation had a Kruskal stress of 0.14 and accounted for 88% of the variance in the optimally transformed

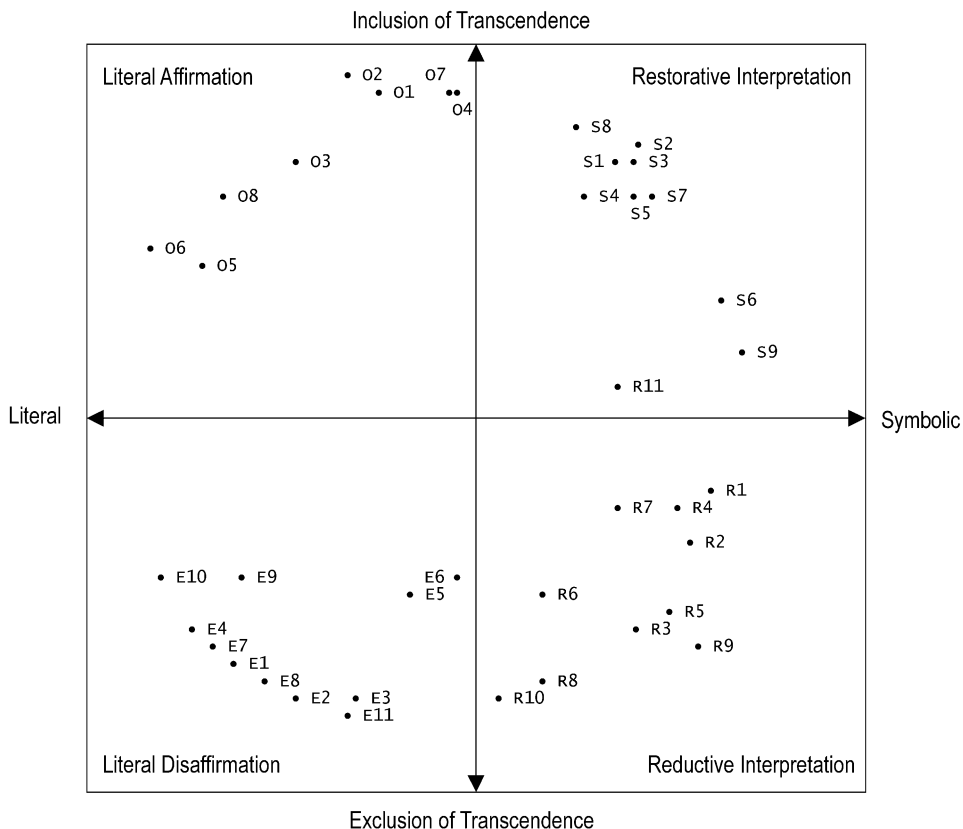


Fig. 2. Two-dimensional consensus representation of the Post-Critical Belief scale items.

dissimilarities (see Table 3). The sample-specific configurations were then orthogonally rotated towards the average two-dimensional MDS structure (McCrae et al., 1996; Schonemann, 1966) (see Table 2). For the dimension Exclusion vs. Inclusion of Transcendence, Tucker's phi's ranged from 0.90 to 0.98 with an average of 0.95 (see Table 3). For the dimension Literal vs. Symbolic the Tucker's phi's ranged from 0.89 to 0.98 with an average of 0.94 (see Table 3). Thus, the two-dimensional MDS appears to be stable in all samples.

#### 4.2. Principal component analyses

As already discussed, interindividual differences in acquiescence can affect PCA. Since, in previous research, Duriez et al. (2000) found evidence for the existence of a response style, acquiescence was controlled for. In order to do this, the acquiescence level for each subject was estimated by computing its weighted mean score across all items. Acquiescence means that a subject prefers a specific score level irrespective of the content of an item. Thus, a tendency to use the same score level across items can be interpreted as acquiescence. However, since the four approaches to religion are not represented by the same number of items in all versions, acquiescence was estimated by a weighted mean score across all items (assigning the same weight to each of the four approaches irrespective of its number of items). This weighted mean score across all items was then subtracted from the observed item scores for each subject. In this way, interindividual differences in acquiescence were removed. PCA's were then performed on these weighted-mean-corrected item scores.

Table 3  
Kruskal stress ( $K$ ) and proportion of variance accounted for ( $R^2$ ) for a two-dimensional MDS representation and Tucker's Phi congruence measures after orthogonal Procrustes rotation towards the average two-dimensional structure (T1-T2) per sample

Sample	$K$	$R^2$	T1	T2
1	0.09	0.96	0.96	0.92
2	0.17	0.85	0.91	0.92
3	0.15	0.88	0.96	0.89
4	0.14	0.90	0.98	0.95
5	0.18	0.83	0.97	0.90
6	0.13	0.90	0.92	0.97
7	0.13	0.90	0.91	0.94
8	0.12	0.92	0.98	0.98
9	0.14	0.90	0.97	0.95
10	0.13	0.90	0.96	0.98
11	0.11	0.94	0.98	0.97
12	0.14	0.88	0.96	0.97
13	0.17	0.85	0.92	0.94
14	0.13	0.90	0.97	0.96
15	0.20	0.77	0.90	0.90
16	0.13	0.90	0.90	0.94

#### 4.2.1. The number of components

Since PCA requires information about the relationships between all item pairs included in the analysis and since we have no information about the relationships between version-specific items, PCA cannot be applied on the average relationships across the samples. Therefore, the adequate number of components was investigated in each sample separately. Cattell's scree test (Cattell, 1966) pointed to a two-componential solution for all samples (see Table 4 for the Eigenvalues of the first six components in each sample). A two-componential solution accounted, on average, for 35% of the total variance in each sample (see Table 4).

#### 4.2.2. The interpretation of the two-componential PCA-structure

Our aim was to investigate whether the average two-componential solution corresponds to the theoretical expectations. However, since the presence of four different versions of the Post-Critical Belief scale did not allow a straightforward computation of an average structure, we estimated the average two-componential structure by means of a two-step procedure. First, for each sample, we orthogonally rotated the two-componential configuration towards the average two-dimensional configuration generated by MDS. Second, average loadings (after Fisher- $z$  transformation) were computed for each item on each of the two components across the samples. These average loadings were considered a reasonable estimate of an average two-componential structure. The estimated average two-componential structure was then orthogonally rotated towards the theoretical structure (see Table 2 for the rotated solution). Tucker's Phi indices indicated good congruence for both components: 0.93 for Exclusion vs. Inclusion of Transcendence and 0.92 for Literal vs. Symbolic.

Table 4

Eigenvalues for the first six components (E1–E6), proportion of variance accounted for by a two-componential solution ( $R^2$ ), and Tucker's Phi congruence measures after orthogonal Procrustes rotation towards the average component structure (T1–T2) per sample

Sample	E1	E2	E3	E4	E5	E6	$R^2$	T1	T2
1	5.32	2.95	1.28	1.17	1.02	0.94	0.38	0.96	0.98
2	6.10	4.14	1.63	1.53	1.48	1.28	0.31	0.92	0.94
3	5.10	3.07	1.72	1.42	1.23	1.01	0.36	0.98	0.92
4	6.18	2.97	1.61	1.34	1.31	1.22	0.30	0.97	0.96
5	7.31	2.97	1.71	1.68	1.54	1.40	0.33	0.97	0.93
6	6.84	3.80	1.51	1.44	1.25	1.18	0.32	0.94	0.98
7	7.35	4.21	1.43	1.29	1.24	1.12	0.35	0.92	0.96
8	7.56	3.68	1.50	1.34	1.20	1.17	0.36	0.98	0.98
9	7.50	3.74	1.68	1.38	1.33	1.22	0.36	0.98	0.97
10	7.13	4.79	1.51	1.44	1.28	1.08	0.38	0.99	0.96
11	8.53	4.11	1.84	1.49	1.33	1.24	0.38	0.99	0.97
12	6.63	3.87	1.78	1.53	1.32	1.27	0.32	0.97	0.98
13	7.97	4.52	2.21	1.69	1.64	1.28	0.38	0.93	0.98
14	8.13	4.20	1.85	1.40	1.21	1.16	0.37	0.91	0.98
15	4.60	3.81	1.97	1.56	1.43	1.34	0.25	0.90	0.94
16	8.43	5.67	1.86	1.59	1.48	1.38	0.43	0.92	0.96

#### 4.2.3. *The stability of the two-componential PCA-structure*

In order to investigate the stability of the average estimated two-componential structure in each of the samples, each two-componential configuration was orthogonally rotated towards the average estimated two-componential structure. For both Exclusion vs. Inclusion of Transcendence and Literal vs. symbolic, Tucker's phi's ranged from 0.90 to 0.99 with an average of 0.96 (see Table 4), supporting the stability of this average two-componential structure.

### 5. Discussion

Since its first conception, the Post-Critical Belief scale has undergone modifications and adaptations based on sample specific information. In the present study, all empirical information has been brought together allowing for a more general evaluation of the scale. The internal structure analyses lend considerable support for the construct validity of the Post-Critical Belief Scale. First, MDS on the average Euclidean distances between the standardized items across the 16 samples and PCA on the weighted-mean-corrected subject scores in each sample separately clearly pointed to a two-dimensional or a two-componential structure. Second, a high convergence between the empirical and the theoretical structure supported our interpretation of the empirical structure in terms of Wulff's (1991, 1997) dimensions Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic. Third, this two-dimensional and two-componential structure proved to be stable across the different versions of the Post-Critical Belief scale that have been used over time and across the different samples.

Although the scope of the present article was limited to the investigation of the internal structure of the Post-Critical Belief scale, studies that yield support for its external validity have already been conducted as well. Results of these studies show that the dimensions Exclusion vs. Inclusion of Transcendence and Literal vs. Symbolic relate in a theoretically meaningful way to a number of external variables. The Exclusion vs. Inclusion of Transcendence dimension relates to unidimensional religiosity measures such as church attendance, religious belief and religious involvement (Hutsebaut, 2001) and known correlates such as authoritarianism and conservatism, predictability, preference for order and conservation values (Duriez, in press b, submitted for publication c, submitted for publication d; Fontaine, Duriez, Luyten, Corveleyn, & Hutsebaut, submitted for publication). The Literal vs. Symbolic dimension relates positively to cognitive variables such as moral competence, perspective taking, empathy, tolerance of ambiguity and openmindedness (Duriez, in press a,b, submitted for publication) and to self-transcendence values (Fontaine et al., submitted for publication), and negatively to known correlates such as racism, social dominance, authoritarianism and conservatism (Duriez, in press a,b submitted for publication; Duriez, Van Hiel, & Kossowska, submitted for publication). Results have also shown that these relationships are stable across the different version of the Post-Critical Belief scale that were used over time (Duriez, submitted for publication b; Duriez, Van Hiel, & Kossowska, submitted for publication).

An important topic for future research concerns the generalizability of both the internal structure of this scale and its relations to external variables across cultural and religious groups. Until now the Post-Critical Belief scale was exclusively administered in Flanders (Belgium). In this respect, data are currently being gathered in Australia, Germany, the Netherlands, Peru, Poland,

Romania, and the USA. We can conclude that by reconciling Wulff’s (1991, 1997) comprehensive theoretical framework with the empirical measurement of religion, the present results offer important perspectives for further research on antecedents, concomitants, and consequences of interindividual differences in the two religiosity dimensions and the four approaches to religion discerned by Wulff.

**Appendix. The Post-Critical Belief scale**

In this appendix, all items of the The Post-Critical Belief scale are listed for the four subscales separately, i.e. Orthodoxy, External Critique, Relativism and Second Naiveté. For all items, the label by which they are referred to in this article and the version(s) in which they appeared are also given. Note that although all items were administered in Flemish, we present them in English. The translation was done according to the guidelines specified by the International Test Commission (Hambleton, 1994), using the translation back-translation procedure (Brislin, 1980). Differences between the back-translated and the original version were minimal. A committee of four bilingual research assistants decided on the final English version of the test (Van de Vijver & Leung, 1997).

Label	Version	Item
<b>Orthodoxy</b>		
O1	1,2,3,4	God has been defined for once and for all and therefore is immutable . . . . .
O2	1,2,3,4	Even though this goes against modern rationality, I believe Mary truly was a virgin when she gave birth to Jesus . . . . .
O3	1,2,3,4	Only the major religious traditions guarantee admittance to God. . . . .
O4	1,2,3,4	Religion is the one thing that gives meaning to life in all its aspects . . . . .
O5	1,2,3,4	Only a priest can give an answer to important religious questions . . . . .
O6	1,2,3,4	I think that Bible stories should be taken literally, as they are written . . . . .
O7	2,3,4	You can only live a meaningful life if you believe . . . . .
O8	1,2,4	Ultimately, there is only one correct answer to each religious question . . . . .
<b>External Critique</b>		
E1	1,2,3,4	Faith is more of a dream, which turns out to be an illusion when one is confronted with the harshness of life . . . . .
E2	1,2,3,4	Too many people have been oppressed in the name of God in order to still be able to have faith . . . . .
E3	1,2,3,4	God is only a name for the inexplicable . . . . .
E4	1,2,3,4	A scientific understanding of human life and the world has made a religious understanding superfluous . . . . .
E5	1,2	I sometimes find it hard to believe, because you can never attain real certainty . .
E6	1,2	I experience God as an impersonal power somewhere . . . . .
E7	1,2,4	The world of Bible stories is so far removed from us, that it has little relevance . .

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 Label Version Item
 

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E8	3,4	In the end, faith is nothing more than a safety net for human fears . . . . .
E9	3,4	In order to fully understand what religion is all about, you have to be an outsider
E10	3,4	Faith is an expression of a weak personality . . . . .
E11	3,4	Religious faith often is an instrument for obtaining power, and that makes it suspect . . . . .
<b>Relativism</b>		
R1	1,2,3,4	Each statement about God is a result of the time in which it was made . . . . .
R2	1,2,3,4	Official Church doctrine and other statements about the absolute will always remain relative because they are pronounced by human beings at a certain period of time . . . . .
R3	1,2,4	God grows together with the history of humanity and therefore is changeable . . .
R4	3,4	The manner in which humans experience their relationship to God, will always be colored by the times they live in . . . . .
R5	3,4	I am well aware my ideology is only one possibility among so many others . . . . .
R6	3,4	Secular and religious conceptions of the world give valuable answers to important questions about life . . . . .
R7	3	Through contact with people with a different ideology, I learn to put my own beliefs into perspective . . . . .
R8	3	The world would be a lot less interesting if everyone held the same beliefs . . . . .
R9	3	I have totally no problem with other people holding other beliefs . . . . .
R10	4	There is no absolute meaning in life, only giving directions, which is different for every one of us . . . . .
R11	1,2,4	Ultimately, religion means commitment without absolute guarantee . . . . .
<b>Second Naiveté</b>		
S1	1,2,3,4	The Bible holds a deeper truth which can only be revealed by personal reflection
S2	1,2,3,4	The Bible is a guide, full of signs in the search for God, and not a historical account . . . . .
S3	1,2,3,4	Despite the fact that the Bible has been written in a completely different historical context from ours, it retains a basic message . . . . .
S4	1,2	For me, God is neither necessary nor useful, but significant . . . . .
S5	3,4	Because Jesus is mainly a guiding principle for me, my faith in him would not be affected, if it would appear that he never actually existed as a historical individual . . . . .
S6	3,4	The historical accuracy of the stories from the Bible is irrelevant for my faith in God . . . . .
S7	3,4	Despite the high number of injustices Christianity has caused people, the original message of Christ is still valuable to me . . . . .
S8	3,4	I still call myself a Christian, even though a lot of things that I cannot agree with have happened in the past in name of Christianity, . . . . .
S9	3,4	If you want to understand the meaning of the miracle stories from the Bible, you should always place them in their historical context . . . . .

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