

Article

# Faith Unchanged: Spirituality, But Not Christian Beliefs and Attitudes, Is Altered in Newly Diagnosed Parkinson's Disease

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**Abstract:** In this study, we aimed at investigating the validity and characteristics of the concept of hyporeligiosity in Parkinson's disease. Twenty-eight newly diagnosed, never-medicated patients with Parkinson's disease and 30 matched healthy control individuals received the Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS), the Stolz's index of Christian religiosity, and the Francis Scale of Attitude to Christianity (FSAC). All participants identified themselves as Roman Catholic or Protestant. Parkinson's patients displayed decreased positive and negative spirituality on the BMMRS, whereas beliefs and attitudes related to their Christian religion were unchanged. The severity of the disease was associated with reduced spirituality, but not with Christian faith. These results suggest a dissociation between general spirituality and traditional religious faith in Parkinson's disease, which is consistent with the findings from patients with schizophrenia.

**Keywords:** spirituality; Parkinson's disease; Brief Multidimensional Measure of Religiousness/Spirituality

## 1. Introduction

As a cornerstone of Reformed epistemology, John Calvin argued that human individuals have a mental faculty that mediates fundamental intuitions, beliefs, and experiences related to God without a necessity of external justification [1]. In the *Institutes of Christian Religion*, Calvin gives the following description of this mental faculty, the *sensus divinitatis* (divine sense): "There is within the human mind, and indeed by natural instinct, an awareness of divinity. This we take to be beyond controversy. To prevent anyone from taking refuge in the pretense of ignorance, God himself has implanted in all men a certain understanding of his divine majesty. Ever renewing its memory, he repeatedly sheds fresh drops" [1].

The concept of divine sense provided an excellent framework to better understand human faith, as, among others, exemplified by the work of Alvin Plantinga [2], Jonathan Edwards [3], and Paul Helm [4], who delineated a metaphysical-cognitive and a moral-cognitive component of the divine sense. As a distant inheritance of Justin Martyr's Logos doctrine and Calvin's *sensus divinitatis*, today's cognitive science and neuroscience provided details on the internal representation of religious/spiritual phenomena and related biological mechanisms in the human brain [5–8]. Although these results cannot form a basis of substantial and ultimate theological conclusions, cognitive science and neuroscience may be useful to gain fresh insight into how people build beliefs and experience their connectedness to superhuman agents and transcendent entities.

By studying different diseases of the nervous system, one may have a unique opportunity to understand the cognitive faculty and neural mechanisms of religious and spiritual phenomena. Although the difference between religion and spirituality seems to be taken for granted, there is no general consensus in the literature: theologians, psychologists, anthropologists, and sociologists approach this question from distinct points of view [9]. Generally, religion is defined as a system of shared beliefs, values, symbols, and practices based on tradition and cultural heritage to answer existential questions of transcendent power, morality, salvation, and ultimate truth. Theologians explicitly express that this belief and symbol system is centered around God, the Divine, and the Sacred. Spirituality is more personal, referring to individual experiences with the transcendent, searching for eternal meaning and purpose outside the self, directedness to the universe and mankind, and superhuman qualities of beatitude, elation, awe, and reverence [9].

In the neuropsychological approach of McNamara and Butler [10], there are two broad categories of brain dysfunctions: in the first group we can observe increases in religiosity (e.g., schizophrenia and temporal lobe epilepsy), whereas the second group is characterized by decreases in religiosity (e.g., Parkinson's disease and autism). From our point of view, Parkinson's disease and schizophrenia are especially important. Parkinson's disease is mainly, but not exclusively, caused by the destruction of dopamine-producing cells in the brainstem (substantia nigra, pars compacta), leading to slow movements, increased muscle tone ("cogwheel" rigidity), abnormal posture and gait, and various non-motor symptoms (e.g., slowness of thinking, apathy, depression, and sleep disturbances) [11]. In contrast, evidence suggests elevated dopamine synthesis in schizophrenia, which is linked to various psychotic symptoms (delusions, hallucinations, and disorganized thinking) [12]. Antipsychotic medications used in schizophrenia block dopamine receptors and cause hypokinetic parkinsonian symptoms, whereas drugs that boost dopamine levels in Parkinson's disease induce psychotic symptoms in some patients [11,12]. However, the dichotomous view of hypo- versus hyper-religiosity associated with decreased versus increased dopamine levels is an oversimplification. The pathophysiology of Parkinson's disease and schizophrenia are very different, and both disorders are much more complex than an altered balance of a single neurotransmitter (dopamine). Therefore, the "mirror-image" hyper vs. hypo-religiosity conceptualization of schizophrenia and Parkinson's disease must be readdressed.

Religious and spiritual phenomena are multidimensional and cannot be operationalized as a unified construct. Beyond the fact that there are multiple components of religious beliefs, experiences, and behavior (e.g., daily spiritual experiences, finding higher purposes and meaning in life, forgiveness, private religious practices, and organizational religiousness) [13], there might be substantial differences between self-declared religiosity based on past traditions, socialization, or individual religious conversions and the current religious/spiritual stance of an individual. Recently, we found an unexpected dissociation between self-declared Christianity and actual religious cognition/spirituality in patients with schizophrenia [14]. Although patients reported increased spiritual experiences, which were partly associated with psychotic symptoms and self-disorder, these experiences differed in character from the religious beliefs they held in a stable clinical state [14]. When the psychotic symptoms are in remission, beliefs, attitudes, and practices related to the patients' original Christian religion are separated from spiritual experiences merged with psychotic symptoms, disturbed sense of self, and anomalous perceptual experiences (illusions and hallucinations). For example, during acute psychosis the patient may feel that he or she is a reincarnation of Jesus Christ, or persecuted and invaded by the devil and evil spirits, but after the amelioration of the acute phase these spiritual experiences will be re-evaluated as aberrant and pathological. The patient will return to the default doctrines and practices of the Christian religion [14].

It might be assumed that the mental representations of Christian religion and those emerged during acute psychosis are stored in separate internal "files". If the *separate file hypothesis* is true, it can be confirmed in other brain disorders with distinct changes in religiosity and spirituality. Parkinson's disease is a candidate for such studies as a possible model of decreased religiosity [15–18]. In this study,

we asked two main questions. First, we recruited newly diagnosed, never-medicated patients with Parkinson's disease. The studies conducted so far included chronic and medicated patients with high general disease burden [15–18]. It is unclear whether decreases in religiosity can also be observed in early-stage Parkinson's disease. Second, we assessed beliefs, attitudes, and practices specifically related to Christian religion. If the separate file hypothesis is valid, Parkinson's disease patients who are self-identified Christians would be expected to exhibit decreases in general spirituality (e.g., spiritual experiences, feeling of purpose/meaning, and connection with superhuman powers), but they would report similar Christian beliefs and attitudes to matched control volunteers.

## 2. Materials and Methods

### 2.1. Participants

We recruited 28 newly diagnosed, never-medicated patients with Parkinson's disease and 30 non-clinical individuals matched for age, gender, education, IQ, and psychosocial status. The study was conducted at the National Institute of Psychiatry and Addiction, Budapest, Hungary, in close collaboration with eight outpatient centers specializing in the diagnosis and treatment of Parkinson's disease. Trained and experienced neurologists conducted the clinical examination according to the protocol described in our previous studies [19,20]. In brief, the diagnosis was based on the UK Parkinson's Disease Society Brain Bank Clinical Diagnostic Criteria. The clinical symptoms and characteristics were evaluated with the following instruments: Hoehn-Yahr Scale, Unified Parkinson's Disease Rating Scale (UPDRS), Hamilton Depression Rating Scale (HAM-D), Hamilton Anxiety Rating Scale (HAM-A), Hollingshead Four-Factor Index for socioeconomic status, and the revised Wechsler Adult Intelligence Scale (WAIS-R) for general intellectual functions. Mild cognitive impairment was excluded using the criteria of the Movement Disorder Society Task Force guideline [21]. All participants received the Mini-International Neuropsychiatric Interview to exclude major depressive disorder and other mental disorders [22]. The clinical and demographic variables are summarized in Table 1.

**Table 1.** Demographic and clinical characteristics of the participants.

Measures	Parkinson's Disease (n = 28)	Healthy Control Individuals (n = 30)
Age (years)	50.8 (6.2)	51.8 (7.6)
Gender (male/female)	18/10	20/10
Education (years)	14.1 (3.4)	13.7 (3.5)
Socioeconomic status <sup>(1)</sup>	39.6 (9.4)	38.8 (10.1)
IQ <sup>(2)</sup>	107.3 (10.8)	106.6 (11.0)
Self-declared religion	Roman Catholic: 20 (71%)	Roman Catholic: 22 (73%)
Time since onset of first symptoms (months)	Protestant: 8 (29%) 19.4 (7.6)	Protestant: 8 (27%)
UPDRS <sup>(3)</sup> total	38.8 (5.1)	
UPDRS motor	25.4 (3.8)	
Side of motor symptom onset	Left: 19 Right: 9	
Hoehn-Yahr stages	1: 4; 1.5: 2; 2: 20; 2.5: 2	12.1 (8.7)
HAM-D <sup>(4)</sup>	11.6 (7.1)	4.1 (3.3)
HAM-A <sup>(5)</sup>	3.6 (2.7)	

Notes: Data are mean (standard deviation) with the exception of gender, religion, side of motor symptom onset, and Hoehn-Yahr stages. Two-tailed *t*-tests and chi-square tests indicated no significant differences between the patients with Parkinson's disease and healthy control individuals in demographic parameters. <sup>(1)</sup> Hollingshead Four-Factor Index; <sup>(2)</sup> Wechsler Adult Intelligence Scale, revised; <sup>(3)</sup> Unified Parkinson's Disease Rating Scale (UPDRS); <sup>(4)</sup> Hamilton Depression Rating Scale; <sup>(5)</sup> Hamilton Anxiety Rating Scale.

The study was done in accordance with the Declaration of Helsinki. All participants gave written informed consent and the study was approved by the institutional ethics board.

### 2.2. Brief Multidimensional Measure of Religiousness/Spirituality (BMMRS)

This self-report instrument, originally published by the Fetzer Institute & National Institute on Aging Working Group [13], assesses the following dimensions as defined by Johnstone *et al.* [23]: (a) positive (15 items) and negative (two items) spiritual experiences (positive and negative emotional experiences of connectedness with a higher power/the universe/God); (b) forgiveness (five items; a specific coping strategy of forgiving others/oneself and being forgiven by a higher power/God); (c) cultural-religious practices (five items; prayers, rituals, and religious services); (d) positive (two items) and negative (two items) congregational support (support or rejection by the religious community). Each item is scored on a zero- to three-point Likert-type scale.

### 2.3. Stolz's Index of Christian Religiosity

This index consists of four items to measure Christian religiosity [24]: (a) importance of Christian religion in general; (b) frequency of Christian prayers; (c) incidence of Christian religious service; (d) belief that God exists and that he has shown himself in Jesus Christ. All items are scored by the participants on a 1–5 scale (1–min, 5–max). In accordance with the scoring of the BMMRS, higher scores indicate greater levels of religiosity.

### 2.4. Francis Scale of Attitude to Christianity (FSAC)

The FSAC is a widely used 24-item questionnaire assessing the attitudes towards fundamental aspects of the Christian faith (God, Jesus Christ, the Bible, church, and prayers). Each item is rated on a five-point Likert scale. Higher scores indicate more positive attitudes [25].

### 2.5. Data Analysis

We used STATISTICA 12 software (StatSoft, Tulsa) for data analysis. Demographic parameters and scale scores were compared with two-tailed Student's *t*-tests and chi-square tests. Multiple comparisons were corrected with the False Discovery Rate (FDR) method. We performed multiple regression analyses to determine the clinical predictors of religious/spiritual measures. The level of statistical significance was set at  $\alpha < 0.05$ .

## 3. Results

Table 1 summarizes the demographic and clinical measures. The patients with Parkinson's disease and control individuals did not differ in age, gender, education, self-declared religion, socioeconomic status, and IQ. All participants reported Christian self-identification, and the majority of them were Roman Catholic. The patients with Parkinson's disease exhibited a moderate severity of motor symptoms (25.4 points on the UPDRS motor scale, maximum: 56 points) and were mildly depressed (11.6 points on the HAM-D scale, normal range: 0–7 points, default threshold indicating a need of clinical intervention: 20 points) (Table 1).

Table 2 depicts the data from the BMMRS, FSAC, and Stolz's index. There was no significant difference between the patients with Parkinson's disease and healthy control participants on measures of beliefs, experiences, and attitudes towards the Christian religion. We found only two dimensions of the BMMRS in which the patients displayed lower values as compared with the control individuals: positive and negative spirituality (Table 2).

**Table 2.** Results from the self-report measures of religiosity and spirituality.

Measures	Parkinson's Disease (n = 28)	Healthy Control Individuals (n = 30)	t	p
Stolz's index	13.1 (3.3)	11.9 (3.5)	1.36	0.18
FSAC <sup>(1)</sup>	83.1 (17.5)	78.3 (16.2)	1.10	0.28
BMMRS <sup>(2)</sup>				
Positive spirituality	12.3 (9.7)	19.7 (9.2)	−2.97	0.004 *
Negative spirituality	0.8 (1.2)	1.7 (1.2)	−2.76	0.008 *
Forgiveness	8.4 (2.9)	9.3 (2.6)	−1.24	0.22
Cultural-religious practices	5.9 (3.2)	6.1 (3.9)	−0.29	0.77
Positive congregational support	2.3 (1.6)	2.3 (1.5)	−0.13	0.90
Negative congregational support	1.0 (1.1)	1.1 (1.0)	−0.62	0.54

Notes: Data are mean (standard deviation). Patients with Parkinson's disease and healthy control individuals were compared with two-tailed *t*-tests. \* Significant differences following False Discovery Rate (FDR) corrections for multiple comparisons. <sup>(1)</sup> Francis Scale of Attitude to Christianity; <sup>(2)</sup> Brief Multidimensional Measure of Religiosity/Spirituality.

We also investigated the clinical and demographic predictors of BMMRS, FSAC, and Stolz's index results. We found that BMMRS positive spirituality was predicted by gender ( $R^2 = 0.14$ ,  $t(17) = 3.97$ ,  $p = 0.001$ ), UPDRS motor scores ( $R^2 = 0.18$ ,  $t(17) = -3.48$ ,  $p = 0.003$ ), and HAM-D scores ( $R^2 = 0.54$ ,  $t(17) = -2.19$ ,  $p < 0.05$ ). No other dimensions of religion/spirituality were predicted by the clinical variables ( $p > 0.1$ ).

Given that a relationship between the side of onset of motor symptoms and religiosity/spirituality has been demonstrated, we compared Parkinson's patients with left- vs. right-sided dominance of symptoms. Although the results were not statistically significant, there was a tendency of a lower positive spirituality score for left compared to right motor severity (left: 9.3, SD = 8.9; right: 15.3, SD = 10.4;  $t(23) = -1.50$ ,  $p = 0.15$ ).

#### 4. Discussion

The results of the present study indicate a dissociation between beliefs and attitudes related to self-identified religion and general spiritual phenomena. Our patients continued to participate in religious community life (as measured by the religious support questions of the BMMRS) and adhered to their doctrinal beliefs (as measured by the Stolz's index and the FSAC). These results reveal that the symptoms of Parkinson's patients have not reduced their religious beliefs and practices. Parkinson's disease is therefore not characterized by general hypo-religiosity at every clinical stage: only positive and negative spirituality scores were reduced relative to the control individuals, whereas self-identified Christian faith was unchanged.

There is a wealth of evidence that the interaction between dopamine and serotonin is crucial in the development of spiritual experiences [6]. The most likely neuroanatomical structure mediating this effect is the frontal lobe and its connections with temporal and parietal association areas [6]. A remarkable finding from the present study is that perturbations in neurotransmitter dynamics might affect general spiritual experiences, but not fundamental beliefs and attitudes towards self-identified Christianity.

We investigated relatively young, newly diagnosed Parkinson's patients receiving no dopaminergic medications, allowing the characterization of a genuine hypo-dopaminergic state. In comparison with previous studies conducted in elderly, chronic patients receiving dopaminergic drugs, we observed some differences. McNamara *et al.* [15] assessed life goals, religiosity, mood, and cognitive functions in 22 persons with mid-stage Parkinson's disease (mean age: 72.1 years) and 20 age-matched healthy individuals. Interestingly, only a slight reduction was found in overall religiosity and private religious practices in Parkinson's disease. In the case of spirituality, the authors observed a tendency for smaller intensity in the patient group relative to the control participants.

In comparison with other major personal goals, the patients reported that religion was less important in their life [15]. In contrast, young, never-medicated patients in our study displayed less intensive spiritual experiences; meanwhile, their religious interest and practice were similar to that of the control participants. It is important to note that our patient group consisted of Christian individuals, whereas in the McNamara *et al.* [15] study a religiously heterogeneous group was included. In addition, the life goal questionnaire refers to personal “religion or life philosophy” rather than a specific religious commitment.

In a large sample of 71 patients with mid-stage Parkinson’s disease (mean age: 67.6 years) and 75 age-matched control volunteers with non-neurological chronic health conditions, Butler *et al.* [16] demonstrated disease-associated decreases in positive and negative spirituality, forgiveness, and religious practices. This study also showed that decreased religiosity was linked to more severe parkinsonian symptoms and, interestingly, to symptom asymmetry (lower scores for left than for right motor severity of the disease) [16]. The authors interpreted the laterality effect in the framework of hemispheric functional specialization, which assumes that right, but not left, forebrain dysfunction is associated with changes in religious cognition, as originally observed in patients with temporal lobe epilepsy [26]. The results of Butler *et al.* [16] are in accordance with our findings, with the exception that we detected more circumscribed alterations in spiritual experiences, which can be explained by the fact that our patients were in the early stage of Parkinson’s disease. The lack of significance for symptom asymmetry may be due to our small sample size.

Theoretically, it is possible that decreased positive spirituality is a psychological reaction of patients receiving the diagnosis of a severe neurodegenerative disease, or it is due to depression associated with Parkinson’s disease. However, several studies indicated that coping with a severe illness may be associated with spiritual growth and strengthening [27–29]. In the present study, patients with Parkinson’s disease and non-clinical control individuals did not differ in depression scores. A slightly higher HAM-D score in non-clinical individuals may seem to be counterintuitive, but there is epidemiological evidence for heightened depressive traits in the Hungarian population [30]. Finally, increased disease burden and depression could not explain decreased negative spirituality in our Parkinson’s patients.

Redfern and Coles [31] reviewed the literature on religiosity/spirituality and Parkinson’s disease and showed that qualitative interview studies and case-control investigations arrived at different conclusions: most of the case-control studies [15–18] revealed decreases in religiosity, whereas qualitative studies [32–34] indicated that religious faith plays an important role in the life of Parkinson’s patients. Giaquinto *et al.* [35] also found that religious faith is preserved in Parkinson’s disease. Redfern and Coles [31] highlighted several methodological shortcomings in previous case-control reports, including the fact that the potential detrimental effect of motor disability was not taken into consideration and in some cases there was no adequate statistical rigor. In comparison with the published case-control studies [15–18,35], we assessed young and mildly affected patients with less marked motor disability and general disease burden.

The BMMRS does not investigate religious and spiritual phenomena linked to a specific faith tradition. Johnstone *et al.* [36] demonstrated that by changing the word “God” to “higher power”, the BMMRS can be applied in different faith traditions (Buddhists, Christians, Jews, and Muslims). We added specific measures of beliefs, experiences, attitudes, and practices related to Christian religiosity to investigate how the disease process might interfere with self-declared religiosity based on past socialization, tradition, culture, or individual religious conversion. The results are in accordance with the separate file hypothesis: disease processes may have an effect on general aspects of spirituality, religious/existential goal attribution, feelings of meaning and purpose, and practices/rituals, but the belief, symbol, and practice systems of the self-identified religion are less changed. It is important to underline that we do not claim that our findings are unique to Christianity, and we did not intend to discriminate faith traditions. The separate file hypothesis may be true for other faith traditions as well, which is an interesting question for further studies.

The separate file hypothesis resonates with the two-system model of religion and spirituality. Max Weber distinguished two forms of religion: the first one is characterized by high emotional intensity, attribution of virtue, and extraordinariness (charismatic religion), whereas the second one is more ritualized, based on repetition, cultural transmission, and tradition [37]. More recently, a conceptually related approach has emerged by using a cognitive model of memory systems [38–40]. In this model, episodic memory refers to the representation of specific events in the context of time and place (*i.e.*, when and where life episodes happened). Episodic memories are strongly related to the self: individuals feel that they are the central actors in the events, often with marked emotional salience. In contrast, semantic memory is a systematic record of facts, concepts, and meanings of verbal symbols, which is collective and independent of personal context [38].

In the doctrinal form of religiosity, frequent repetitions of texts (e.g., parts of the Bible) and actions (e.g., prayers, psalms, and Communion) lead to the enrichment of semantic memory for religious teachings and implicit (non-conscious) memory for rituals, which are less personal and emotionally less arousing in their default repetitive form. In contrast, infrequent events with high arousal and intense emotional content build into episodic memory traces, which are organized around self-experience and may establish critical milestones in the autobiographical memory. This latter form is called the imagistic mode of religiosity [39,40]. However, imagistic phenomena are not as rare as one may think: spiritual experiences during critical life events and normative crises continuously shape the individual's beliefs, values, meaning attributions, and practices. These ongoing changes interfere with the foregoing representations of religious commitment, that is, the doctrinal mode of religiosity. We suggest that certain brain disorders, such as schizophrenia and Parkinson's disease, primarily affect the imagistic mode of religiosity. In clinically stable schizophrenia, current spiritual experiences are enhanced [14], whereas in Parkinson's disease, the opposite changes can be observed. However, in both disorders religious beliefs and attitudes incorporated into the inner world model before the illness are unchanged.

There are still several unanswered questions for future investigations. First, a longitudinal study is warranted to explore how more advanced stages of Parkinson's disease with severe symptoms interfere with different aspects of religiosity. From a theological point of view, the question is how a profoundly and permanently disrupted imagistic mode may result in changes in the doctrinal mode of religiosity. Religious manifestations with intensive experiential and emotional tones are necessary for maintaining personal attachment and immersion in the doctrinal mode. This problem is reminiscent of the interaction between episodic and semantic memory. In some memory disorders, these two kinds of memory representations are dissociable [41]. Therefore, it might be supposed that the doctrinal mode of religiosity can be maintained even when the imagistic mode is permanently perturbed. However, semantic memories are often acquired in a personal context (e.g., remembering where and when an individual first read the Bible in front of an audience), but after several repetitions they stand alone as a pure knowledge without the context of self, emotions, time, and space. In other words, via generalization, semantic memory derives from episodic memory. If episodic memory is disrupted, new facts and concepts can hardly be incorporated into semantic memory, although it is not entirely impossible [42]. One might argue that without experiential and emotional imagistic religious experiences, dogmatic concepts will be empty, cold, personally meaningless, and forgettable.

In summary, we showed that Parkinson's patients with self-identified Christian religion exhibit decreased spirituality, whereas the beliefs and attitudes towards their traditional religion were similar to that of the healthy control participants. Nowadays, many people describe themselves as "spiritual but not religious", focusing on the holistic unity of body, mind, spirit, and universe but refusing traditional organized religions [43]; this is the mirror image of Parkinson's patients' attitude which might be characterized as "religious but not spiritual".

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**Conflicts of Interest:** The authors declare no conflict of interest.

## Abbreviations

The following abbreviations are used in this manuscript:

BMMRS	Brief Multidimensional Measure of Religiousness/Spirituality
FSAC	Francis Scale of Attitude to Christianity
HAM-A	Hamilton Anxiety Rating Scale
HAM-D	Hamilton Depression Rating Scale
UPDRS	Unified Parkinson's Disease Rating Scale

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