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8 *(Original Article)*

9 **Religiosity and Psychological Resilience in Patients with Schizophrenia and Bipolar**
10 **Disorder: An International Cross-sectional Study**

11 Abbreviated title: **Religiosity and Psychological Resilience**

12
13 Yuya Mizuno, MD, PhD^{1,2}, Alex Hofer, MD³,

14 Beatrice Frajo-Apor, MD, PhD³, Fabienne Wartelsteiner, MD³, Georg Kemmler, PhD³,

15 Silvia Pardeller PhD³, Takefumi Suzuki, MD, PhD^{1,4}, Masaru Mimura, MD, PhD¹,

16 W. Wolfgang Fleischhacker, MD³, Hiroyuki Uchida, MD, PhD^{1,5}
17

18 ¹ Department of Neuropsychiatry, Keio University School of Medicine, Tokyo, Japan

19 ² Department of Psychosis Studies, Institute of Psychiatry, Psychology & Neuroscience,
20 King's College London, London, UK

21 ³ Department of Psychiatry, Psychotherapy and Psychosomatics, Medical University
22 Innsbruck, Innsbruck, Austria

1 ⁴ Department of Psychiatry, Inokashira Hospital, Tokyo, Japan

2 ⁵ Geriatric Mental Health Program, Centre for Addiction and Mental Health, Toronto,

3 Ontario, Canada

4

5 **Corresponding Author**

6 Hiroyuki Uchida, MD, PhD

7 Department of Neuropsychiatry, Keio University School of Medicine

8 35 Shinanomachi, Shinjuku-ku, Tokyo, 160-8582, Japan

9 Phone +81.3.5363.3829

10 Fax +81.3.5379.0187

11 email: hiroyuki.uchida.hu@gmail.com

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14

1 **Abstract**

2

3 **Objective:** The impact of religious/spiritual activities on clinical outcomes in patients with
4 serious mental illnesses remains controversial, which was addressed in this international
5 cross-sectional study.

6 **Method:** Three-hundred sixty-nine subjects were recruited from Austria (n=189) and Japan
7 (n=180), consisting of 112 outpatients with paranoid schizophrenia, 120 with bipolar I
8 disorder (DSM-IV), and 137 healthy controls. Religiosity was assessed in terms of
9 attendance and importance of religious/spiritual activities, while resilience was assessed
10 using the 25-item Resilience Scale. General linear models were used to test whether higher
11 religiosity will be associated with higher resilience, higher social functioning, and lower
12 psychopathology. The association between levels of spiritual well-being and resilience was
13 also examined.

14 **Results:** Attendance of religious services ($F_{[4,365]}=0.827$, $p=0.509$) and importance of
15 religion/spirituality ($F_{[3,365]}=1.513$, $p=0.211$) did not show significant associations with
16 resilience. Regarding clinical measures, a modest association between higher importance of
17 religion/spirituality and residual manic symptoms was observed in bipolar patients
18 ($F_{[3,118]}=3.120$, $p=0.029$). In contrast to the findings regarding religiosity, spiritual
19 well-being showed a strong positive correlation with resilience ($r=0.584$, $p<0.001$).

20 **Conclusion:** The protective effect of religiosity in terms of resilience, social functioning,
21 and psychopathology was not evident in our sample. Spiritual well-being appears more
22 relevant to resilience than religiosity.

1

2 **Key Words:**

3 religion, psychological resilience, serious mental illness, spirituality, transcultural

4

5 **Significant Outcomes:**

- 6 • Higher religiosity (i.e. self-reported attendance and importance of religious/spiritual
7 activities) was not significantly associated with higher resilience, higher social
8 functioning, or lower psychopathology in clinically stable outpatients with paranoid
9 schizophrenia and bipolar I disorder in Austria and Japan, in spite of the distinct
10 religious climates between the two countries.
- 11 • Spirituality (i.e. the sense of meaning, peace, and purpose in life), as opposed to
12 religiosity or engagement with formal religious traditions *per se*, appears more closely
13 linked to psychological resilience in patients with these disorders.
- 14 • Our findings highlight the complex association between religiosity and positive mental
15 health in patients with serious mental illnesses, while underscoring the relevance of
16 spirituality to patients' inner strength to cope with psychosocial adversities.

17

18 **Limitations:**

- 19 • Longitudinal studies are required to shed further light on the relevance of religiosity in
20 promoting wellness and the temporal relationship between spirituality and resilience.
- 21 • Our findings may not be generalizable to patients with other psychiatric disorders, or
22 to countries with largely different religious backgrounds.

- 1 • The questionnaire used in this study was not designed for comprehensive assessments
- 2 of religious activities and beliefs, and cannot distinguish between beneficial and
- 3 potentially harmful effects of religiosity.

4

5

1 **Introduction**

2

3 Resilience is a multidimensional construct, defined as “the capacity of a dynamic system to
4 withstand or recover from significant challenges that threaten its stability, viability, or
5 development” (1). When applied to an individual’s psychological dimension, resilience
6 connotes one’s inner strength, competence, optimism, flexibility, and the ability to cope
7 effectively when faced with adversity (2). In recent years, the concept of psychological
8 resilience (hereafter referred to as “resilience”) has received increasing attention in serious
9 mental illnesses including schizophrenia and bipolar disorder. A focus on resilience in such
10 patients represents a paradigm shift from the traditional focus on ‘deficit’ models and
11 psychopathology, and is expected to provide valuable insight into the heterogeneous
12 outcomes associated with these disorders.

13

14 While the concept of resilience holds promise in understanding how patients cope with and
15 recover from serious mental illness, there is currently no consensus on how to best measure
16 resilience in this population. Numerous psychological scales have been developed for use
17 in general and clinical populations, but all have limitations in terms of psychometric
18 properties, and none have been developed specifically for patients with schizophrenia or
19 bipolar disorder (3). A review of resilience research in schizophrenia (4) highlights the
20 heterogeneity of scales being used, including the Resilience Scale (5), the Resilience Scale
21 for Adults (6), the Brief Resilience Scale (7), and the Connor-Davidson Resilience Scale
22 (8). Although a preferable measurement tool remains to be agreed upon, several lines of

1 evidence shed light on the correlates of resilience in patients with schizophrenia and bipolar
2 disorder and suggest its relevance to clinical outcomes (9-16). However, the impact of
3 cultural and religious factors on resilience in these patients remains understudied.

4
5 Of note, previous reports suggest that religiosity is associated with positive mental health.
6 According to a systematic review of studies between 1990-2010, religious involvement was
7 associated with better mental health in 70% of the included studies with consistent benefits
8 reported in depression, substance abuse, and suicide (17). In a more recent report,
9 individuals who claimed that religion or spirituality was highly important had a decreased
10 risk of developing major depression over a 10-year period (18). Similarly, in a nationally
11 representative cohort in the USA, individuals attending religious services 24 times per year
12 or more were less likely to die by suicide compared to less frequent attenders (19). Taken
13 together, religiosity is expected to exert protective effects against mental illness.

14
15 In contrast to other fields of psychiatry, the evidence regarding the protective effects of
16 religiosity in schizophrenia and bipolar disorder remains scarce and controversial (17).
17 However, to the best of our knowledge, no studies have directly addressed the relationship
18 between religiosity and resilience in these disorders. Furthermore, the evidence regarding
19 religiosity in these patients is limited by the fact that most reports come from Western
20 countries with predominantly Christian traditions. As a related concept of religiosity,
21 spirituality is concerned with the ultimate questions about life's meaning and purpose as it
22 relates to the transcendent, which may or may not arise from formal religious traditions

1 (20). While there is likely to be overlap between religiosity and spirituality, and some
2 authors use these terms interchangeably, it is useful to distinguish these two concepts as
3 some individuals who value the concept of spirituality may reject the notion of being
4 religious (e.g. belonging to a specific denomination, engaging in religious behavior) (21).
5 Since religiosity in the current study was measured in the context of formal religious
6 traditions, the assessment of spirituality was expected to be relevant in gaining a
7 comprehensive understanding on the relationship between religiosity/spirituality and
8 resilience.

9

10 **Aims of the Study**

11 We investigated the relationship between religiosity, which was defined as self-reported
12 attendance and importance of religious/spiritual activities, and resilience levels in a large
13 sample of patients with paranoid schizophrenia and bipolar I disorder. In order to shed light
14 on the similarities and differences in such association between distinct religious cultures,
15 we carried out a cross-sectional study in Austria and Japan. We hypothesized that patients
16 reporting higher religiosity would have higher resilience. As a secondary hypothesis, we
17 anticipated that higher religiosity would be associated with higher social functioning and
18 milder symptoms. Finally, we hypothesized that higher spiritual well-being would also be
19 associated with higher resilience.

1 **Methods**

2

3 **Participants**

4 We recruited outpatients with the following criteria: 1) DSM-IV diagnosis of paranoid
5 schizophrenia or bipolar I disorder (22), 2) clinical stability for at least six months (with the
6 same prescriptions of antipsychotics and mood stabilizers), 3) native German or Japanese
7 speaker, and 4) age over 18 and capability of providing informed consent. Those with a
8 history of epilepsy, mental retardation, organic mental disorders, or currently unstable
9 physical diseases were excluded. In addition, healthy individuals over 18 years of age with
10 no history of psychiatric disorders were recruited. The Mini-International Neuropsychiatric
11 Interview (M.I.N.I.) (23) was used to confirm the diagnosis in patients and the absence of
12 psychiatric diagnoses in controls. Recruitment took place at 11 sites in Austria and Japan
13 (Supplementary Table S1). The cross-sectional study was approved by the local research
14 ethics committees, and all subjects received full information about the study and provided
15 written informed consent prior to enrollment.

16

17 **Assessments**

18 All assessments were carried out by trained psychiatrists or psychologists. Results focusing
19 on resilience and its clinical correlates in Austrian and Japanese subjects (11, 12, 15), as
20 well as spiritual well-being in Japanese subjects (12) have been previously reported.

21

22 *Religiosity*

1 Religiosity was assessed using the questions reported by Miller and colleagues (18). Briefly,
2 denomination was assessed with the question “How would you describe your current
3 religious beliefs? Is there a particular denomination or organization that you are part of?”.
4 Next, attendance of religious services was assessed with the question “How often, if at all,
5 do you attend church, synagogue, or other religious or spiritual services?” (response
6 categories: 0=never, 1=less than once a year, 2=once or twice a year, 3=about once a month,
7 4=once a week). Finally, personal importance of religion was assessed with the question
8 “How important to you is religion or spirituality?” (response categories: 1=not important at
9 all, 2=slightly important, 3=moderately important, 4=highly important). These questions
10 are referred to as denomination, attendance, and importance, respectively.

11

12 *Spiritual Well-being*

13 Translated versions (24, 25) of the 12-item Functional Assessment of Chronic Illness
14 Therapy-Spiritual Well-Being Scale (FACIT-Sp) (26) were used to assess spirituality. This
15 self-report scale includes eight and four questions relating to the sense of meaning in life
16 and peacefulness (Meaning/Peace subscale) and the sense of strength and comfort from
17 one’s faith (Faith subscale), respectively (26). Of note, the FACIT-Sp is scored without
18 referral to religious beliefs or practice. Each item is scored between 0-4 with higher scores
19 indicating higher spiritual well-being.

20

21 *Resilience*

1 Resilience was assessed using the translated versions (27, 28) of the 25-item Resilience
2 Scale (RS) (5). This self-report scale measures the degree of individual resilience, which
3 the original authors defined as “a positive personality characteristic that enhances
4 individual adaptation” (5). Five characteristics serve as the conceptual foundation of
5 resilience in this scale: perseverance, equanimity, meaningfulness, self-reliance, and
6 existential aloneness. Representative questions include “I can get through difficult times
7 because I’ve experienced difficulty before” and “I can usually find something to laugh
8 about”. Each item is scored on a 7-point scale from 1=disagree to 7=agree, and total scores
9 range from 25 to 175 with higher scores indicating higher resilience. The RS has been
10 widely used in research (2, 3), including studies focusing on patients with bipolar disorder
11 (12) and schizophrenia (11, 12, 15, 16, 29, 30).

12

13 *Clinical and Demographic Variables*

14 Social functioning was assessed using the Personal and Social Performance Scale (PSP)
15 (31). This 100-point single-item scale is scored based on operational criteria in four
16 domains of personal and social performance, with higher scores indicating higher
17 functioning. Psychopathology was assessed using the Positive and Negative Syndrome
18 Scale (PANSS) (32) for paranoid schizophrenia, and the Montgomery-Asberg Depression
19 Rating Scale (MADRS) (33) and the Young Mania Rating Scale (YMRS) (34) for bipolar I
20 disorder. Additional information including age, sex, education, and duration of illness was
21 collected.

22

1 **Statistical Analysis**

2 SPSS Statistics Version 24 (IBM Corp., Armonk, NY) was used for statistical analysis. The
3 Shapiro-Wilk test was used to test continuous variables for deviations from normality.
4 Demographic variables were compared between the six groups (two countries \times three
5 groups) using the Kruskal-Wallis test for continuous variables and the chi-squared test for
6 dichotomous variables. In addition, duration of illness was compared between the four
7 groups (two countries \times two patient groups) using the Kruskal-Wallis test, while measures
8 of psychopathology were compared between Austrian and Japanese patients using the
9 Mann-Whitney U test. The proportion of subjects reporting specific denominations between
10 Austrian and Japanese subjects was compared using the chi-squared test. Post-hoc
11 comparisons were carried out when statistically significant results were obtained with the
12 omnibus Kruskal-Wallis test or the chi-squared test. For continuous variables, the
13 Kruskal-Wallis test was followed with a series of post-hoc Mann-Whitney U tests with
14 Bonferroni adjustment. For dichotomous and other categorical variables, the column
15 proportions in the cross-tab were compared using z tests with Bonferroni adjustment.
16
17 For the primary outcome, the univariate general linear model (GLM) was used to examine
18 the effects of religiosity (i.e. attendance and importance), country, and group as fixed
19 factors on the dependent variable of RS total scores, taking into account main effects and
20 all two-way interaction terms. Age was significantly different between the six groups, and
21 therefore was included as a covariate (i.e. main effect) in the GLM following categorization
22 into six decade groups, starting with 10s and ending with 60s and above. Education and

1 marital status were also considered as covariates but ultimately excluded due to significant
2 associations with age groups (Supplementary Table S2). For secondary outcomes, a similar
3 GLM was used with PSP and psychopathology ratings as dependent variables. Finally,
4 Spearman's rank correlation coefficient and linear regression were used to examine the
5 relationship between spiritual well-being and resilience. This analysis was restricted to the
6 patient group since the FACIT-Sp is designed for patients with chronic illnesses. A
7 minority of subjects with missing values were excluded from individual analyses (i.e. less
8 than 4% of the sample). All statistical tests were performed at a two-tailed alpha-level of
9 0.05.

10

11 G*Power 3.1 (35) was used for power analysis. For the primary outcome, the planned
12 sample size of 360 subjects (60 Austrian and 60 Japanese subjects \times three diagnostic
13 groups) allows for detecting an effect size of $f=0.262$ and $f=0.252$ for GLMs including
14 attendance and importance, respectively under standard conditions regarding significance
15 level ($\alpha=0.05$) and power ($1-\beta=0.8$). The same detectable effect size applies for the
16 secondary outcome of social functioning. For psychopathology, the smallest detectable
17 effect size increases to $f=0.414$ and $f=0.400$ for GLMs including attendance and importance,
18 respectively owing to the smaller sample size ($n=120$ each for paranoid schizophrenia and
19 bipolar I disorder). Moreover, under the same requirements regarding α and β , the sample
20 size of the joint patient group ($n=240$) allows detection of correlation coefficients with
21 $|r|>0.18$. All effect sizes stated above except for psychopathology are in the medium range
22 according to Cohen's classification (36).

1

2 **Exploratory Analysis**

3 Taking into account the inherent differences between our Austrian and Japanese cohorts, a
4 post-hoc analysis was carried out to assess the primary outcome separately in each country
5 sample. A GLM including religiosity (i.e. attendance and importance) and diagnostic group
6 as fixed factors, age groups as a covariate, and RS total scores as the dependent variable
7 was used for this purpose. In addition, because individuals who were “non-denominational”
8 (i.e. reporting to be agnostic, atheist, or not knowing their religious affiliation) were more
9 likely to “never” attend religious services, a similar post-hoc GLM analysis was carried out
10 to assess the primary outcome according to subgroups of individuals with specific
11 denominations and those who were “non-denominational”. Finally, we explored
12 associations between religiosity and spirituality using a GLM including religiosity, country,
13 and diagnostic group as fixed factors, age groups as a covariate, and FACIT-Sp total scores
14 as the dependent variable.

15

1 **Results**

2

3 **Subject Characteristics**

4 Recruitment took place between December 2012 and February 2016. A total of 369
5 subjects were included (Austria: n=189, Japan: n=180), consisting of 112 patients with
6 paranoid schizophrenia, 120 patients with bipolar I disorder, and 137 healthy controls.
7 Subject characteristics are summarized in Table 1. Significant differences between the six
8 groups were observed for age, education, and marital status (all $p < 0.01$). The clinical
9 characteristics were similar between the two countries except for duration of illness and
10 depressive symptoms. Japanese schizophrenia patients had a longer duration of illness
11 compared to Austrian bipolar patients ($p < 0.001$) and schizophrenia patients ($p = 0.046$),
12 while Austrian bipolar patients showed significantly higher MADRS scores compared to
13 Japanese bipolar patients ($p = 0.022$). Most patients were receiving either monotherapy or
14 combination therapy with antipsychotics, mood stabilisers, or antidepressants, while five
15 Austrian patients with bipolar I disorder were drug-free. Ten and four patients with
16 paranoid schizophrenia were receiving long-acting injectable antipsychotics in Austria and
17 Japan, respectively.

18

19

20

-----Table 1-----

21

22 **Denominations**

1 Austrian subjects more frequently reported affiliation with a specific denomination
2 compared to Japanese subjects (119/189 vs. 39/180, $\chi^2(1)=67.624$, $p<0.001$). Details of
3 denominations are shown in Table 2. The distribution of denominations between Austrian
4 and Japanese subjects was significantly different ($p<0.001$), with post-hoc comparisons
5 revealing that a larger proportion of Austrian subjects reported membership in a Christian
6 denomination, whereas a larger percentage of Japanese subjects indicated being Buddhist
7 (all $p<0.05$). Regarding subjects without specific denominations, reasons were not specified
8 for most of the Austrian subjects, while most Japanese subjects reported being either
9 agnostic or atheist. Within each country, distributions of denominations were similar in
10 patients with paranoid schizophrenia, bipolar I disorder, and healthy controls
11 (Supplementary Table S3).

12
13 -----Table 2-----

15 **Attendance, Importance, and Resilience**

16 The RS total score according to attendance, country, and group are displayed in Table 3.
17 The GLM showed that the effect of attendance on RS total score was non-significant
18 ($F_{[4,365]}=0.827$, $p=0.509$), while effects of country ($F_{[1,365]}=48.452$, $p<0.001$) and group
19 ($F_{[2,365]}=11.637$, $p<0.001$) were statistically significant (Corrected model: $F_{[26,365]}=8.181$,
20 $p<0.001$, $R^2=0.386$). Post-hoc Bonferroni tests revealed that Austrian subjects had higher
21 resilience compared to Japanese subjects, with the estimated mean RS total score and
22 standard error (SE) amounting to 137.6 ± 1.7 and 118.3 ± 2.2 , respectively ($p<0.001$).

1 Regarding groups, these values were 137.7 ± 2.8 , 125.7 ± 2.2 , and 120.4 ± 2.2 for healthy controls,
2 bipolar patients, and schizophrenia patients, respectively. Healthy controls had significantly
3 higher resilience compared to patient groups (both $p < 0.01$), while the difference between the
4 two patient groups was non-significant ($p > 0.05$). All two-way interactions between the fixed
5 factors were statistically significant: country \times group ($F_{[2,365]} = 5.106$, $p = 0.007$), country \times
6 attendance ($F_{[4,365]} = 2.426$, $p = 0.048$), and group \times attendance ($F_{[8,365]} = 2.212$, $p = 0.026$). The
7 difference in resilience between countries was smaller in patients with bipolar I disorder
8 and in individuals who “never” attended religious services, while the difference in
9 resilience between healthy controls and patients was larger in individuals who “never”
10 attended religious services (data available on request).

11

12 -----Table 3-----

13

14 The RS total score according to importance, country, and group are displayed in Table 4.
15 Again, the effect of importance on RS total score was non-significant ($F_{[3,365]} = 1.513$,
16 $p = 0.211$), while the effects of country ($F_{[1,365]} = 56.298$, $p < 0.001$) and group ($F_{[2,365]} = 28.952$,
17 $p < 0.001$) were statistically significant (Corrected model: $F_{[22,365]} = 8.552$, $p < 0.001$,
18 $R^2 = 0.355$). The estimated mean RS total score and SE for countries and groups, as well as
19 their relationship in the post-hoc Bonferroni test were nearly identical to the values
20 presented for attendance (data available on request). All two-way interactions between the
21 fixed variables were non-significant ($p > 0.05$).

22

-----Table 4-----

Associations with Social Functioning and Psychopathology

The GLM focusing on social functioning did not show significant associations between attendance and the PSP score ($F_{[4,355]}=2.266$, $p=0.062$), while effects of country and group were statistically significant (both $p<0.001$) (Corrected model: $F_{[26,355]}=14.703$, $p<0.001$, $R^2=0.538$). The GLM including importance yielded similar results, with the association between importance and social functioning remaining non-significant ($F_{[3,355]}=1.862$, $p=0.136$). Detailed results are shown in Supplementary Table S4.

Likewise, most of the associations between religiosity and psychopathology did not reach significance (Supplementary Tables S5 and S6). The exception was the association between importance and manic symptoms in patients with bipolar I disorder ($F_{[3,118]}=3.120$, $p=0.029$). Specifically, patients who reported that religion or spirituality was “highly important” had higher YMRS total scores compared to those answering “slightly important” (estimated mean YMRS total score and SE: 2.6 ± 0.5 vs. 0.7 ± 0.4 , $p=0.031$).

Spiritual Well-Being and Resilience

The association between participants’ FACIT-Sp and RS total scores according to patient group and country are displayed in Figure 1. Spearman’s rank correlation coefficient showed a strong positive correlation between FACIT-Sp and RS total scores in all patients combined ($n=225$, $r=0.584$, $p<0.001$). Regarding subscales, the Meaning/Peace subscale

1 showed stronger correlations with resilience ($r=0.624$, $p<0.001$) compared to the Faith
2 subscale ($r=0.365$, $p<0.001$). Stepwise linear regression with RS total score as the
3 dependent variable and FACIT-Sp total score, country, patient group, and age categories as
4 explanatory variables was used to confirm this association. A model including spiritual
5 well-being, country, and age showed the best fit ($n=225$, $R^2=0.489$, $p<0.001$), with spiritual
6 well-being remaining the strongest predictor of resilience ($\beta=0.590$, $p<0.001$) among the
7 explanatory variables.

8

9

-----Figure 1-----

10

11 **Results of Exploratory Analysis**

12 The results of the post-hoc analysis investigating associations between religiosity and
13 resilience in Austrian and Japanese cohorts separately are shown in Supplementary Tables
14 S7 and S8, respectively. There was a significant association between attendance and
15 resilience in the Austrian cohort ($F_{[4,187]}=2.783$, $p=0.028$) (Corrected model: $F_{[19,187]}=5.565$,
16 $p<0.001$, $R^2=0.388$), while the remaining effects of religiosity on RS total scores were
17 non-significant ($p>0.05$). Post-hoc Bonferroni tests indicate that Austrian individuals who
18 “never” attend religious services had significantly lower resilience compared to individuals
19 who attend religious services “about once a month” (estimated mean RS total score \pm SE:
20 129.4 ± 2.8 vs. 142.2 ± 3.4 , $p=0.038$).

21

1 Individuals who identified themselves as “non-denominational” more frequently reported
2 “never” attending religious services (75/209 vs. 23/158, $\chi^2(1)=20.912$, $p<0.001$). The
3 results of the analysis regarding associations between religiosity and resilience in
4 individuals with specific denominations and those who were “non-denominational” are
5 shown in Supplementary Tables S9 and S10, respectively. In both subgroups, the effects of
6 attendance and importance on RS total scores were non-significant (all $p>0.05$), while the
7 effects of country and diagnostic group remained significant (all $p<0.05$).
8
9 Results for the analysis regarding associations between religiosity and spirituality are
10 shown in Supplementary Table S11. For the GLM including attendance, the effect of
11 attendance on the dependent variable of spirituality was statistically significant
12 ($F_{[4,361]}=2.628$, $p=0.034$) along with group ($F_{[2,361]}=5.186$, $p=0.006$) (Corrected model:
13 $F_{[26,361]}=4.300$, $p<0.001$, $R^2=0.251$). For the GLM including importance, similar results
14 were obtained with the effect of importance on spirituality being statistically significant
15 ($F_{[3,361]}=10.394$, $p<0.001$). In general, higher religiosity was associated with higher
16 spirituality.

1 **Discussion**

2

3 To our knowledge, this is the first study to investigate the relationship between religiosity
4 and resilience in patients with serious mental illnesses. Contrary to our *a priori* hypothesis,
5 higher attendance and importance of religious/spiritual activities was not significantly
6 associated with higher resilience in patients with paranoid schizophrenia or bipolar I
7 disorder. Furthermore, associations between religiosity and clinical measures did not reach
8 significance, except for a modest association between higher importance of
9 religion/spirituality and residual manic symptoms. In contrast to the negative findings
10 regarding religiosity, spiritual well-being showed a strong positive correlation with
11 resilience in the patient group. Our exploratory analysis investigating each country sample
12 separately suggests that attendance of religious services may have different effects on
13 resilience according to country, with potential benefits observed in the Austrian cohort.
14 Notwithstanding the limitations discussed below, our study suggests that the association
15 between religiosity and resilience in patients with paranoid schizophrenia and bipolar I
16 disorder is more complex than assumed in reality.

17

18 A major strength of our study was that we investigated the relationship between religiosity
19 and resilience in two countries with distinct religious backgrounds. Recent statistics show
20 that approximately 60% of the Austrian people are Catholic (37), while a nationwide survey
21 indicates that 72% of the Japanese are “non-religious” (38). These figures are in close
22 agreement with the denominations reported in our sample. Of note, there are historical

1 explanations why the Japanese tend to describe themselves as “non-religious” (39), and this
2 does not necessarily mean that such people do not practice religion. In fact, many Japanese
3 practice a mixture of Buddhism and Shinto in their daily lives without particularly
4 belonging to a religious organization or demonstrating exclusive beliefs to a specific
5 religion (40). Other important differences may include more regular meetings within
6 Western religions which provide emotional and social support (41), and distinct beliefs
7 about the afterlife (42).

8
9 Proposed mechanisms whereby religiosity contributes to positive mental health include
10 symptomatic relief achieved through religious coping, enhanced social and community
11 resources, provision of a sense of belonging, and fostering of hope and meaning (43). All of
12 such mechanisms are anticipated to be relevant for resilience, or the process of positive
13 adaptation in the context of significant adversity (44). Nevertheless, several explanations
14 may account for our negative findings. First, patients in our study were clinically stable for
15 at least six months, and were being treated in developed countries where specialist services
16 are easily accessible. Practical benefits associated with higher religiosity may be the case
17 for patients with more prominent disability, or for those residing in areas where psychiatric
18 treatment and social support are less accessible. Second, while religion and spirituality are
19 generally considered to be related concepts which is also supported by our data, spirituality
20 may be more relevant for resilience in patients with serious mental illness as opposed to
21 religiosity, which was measured in the context of engagement with formal religious
22 traditions. In this regard, the subscales of the FACIT-Sp suggest that the sense of meaning,

1 peace, and purpose in life are most closely linked to resilience. Third, while previous
2 studies show that questions relating to attendance and importance of religious/spiritual
3 services can predict future depression (18, 45) and suicide (19), the questionnaire used
4 herein is not designed for a comprehensive assessment of religiosity or its relation to daily
5 living. For example, the current questionnaire fails to distinguish between beneficial (e.g.
6 access to supportive religious communities) and potentially harmful (e.g. exposure to
7 fundamentalist religious belief systems) effects of religiosity. Fourth, as our exploratory
8 analysis suggests, the effects of religiosity on resilience may be dependent on religious and
9 cultural backgrounds. Taken together, our lack of association between religiosity and
10 resilience should be interpreted with caution.

11

12 Apart from resilience, our study adds to the literature focusing on the clinical relevance of
13 religiosity in patients with schizophrenia and bipolar disorder. Exemplified by our negative
14 findings regarding associations with social functioning and psychopathology, the protective
15 effects of religiosity in these patients have been controversial. For example, in a
16 semi-structured interview of 115 outpatients with schizophrenia or other non-affective
17 psychosis, 71% reported benefits from religious coping including instilled hope, purpose,
18 and meaning, while 14% perceived religion as a source of despair and suffering (46). In
19 another study focusing on outpatients with chronic schizophrenia, 31% of non-adherent
20 patients expressed that the act of taking medications was incompatible with their religious
21 beliefs (47). Moreover, in a report from the USA, Protestant religious affiliation was
22 associated with a longer duration of untreated psychosis in psychotic inpatients (diagnosis

1 not specified) compared to those without religious affiliation (48). With regard to bipolar
2 disorder, one study showed that patients in mixed states were more actively engaged in
3 prayer/meditation compared to those in other states (49), while another study highlighted
4 how spiritual beliefs shape the ways in which patients understand and manage their illness
5 (50). The current evidence including our findings underscores the complex relationship
6 between religiosity and clinical presentation in patients with schizophrenia and bipolar
7 disorder. While many patients may derive benefit from religion, and some may experience
8 it as a burden, its protective effects in terms of psychopathology and clinical outcomes
9 remain equivocal.

10

11 It is important to highlight the challenges and limitations associated with studying
12 resilience. Various factors including personal (e.g. internal locus of control, optimism),
13 biological (e.g. hypothalamic-pituitary-adrenal axis, gene polymorphism), and
14 environmental (e.g. social support, personal relationships) factors may modulate resilience
15 (51), which were not assessed in the current study. Resilience has been conceptualized in
16 distinct ways, with definitions ranging from a personal trait, a dynamic process involving
17 interaction with the environment, a context-specific phenomenon, a benign outcome, or a
18 skill that can be taught and acquired (44, 51). Resilience in the current study was assessed
19 using the RS, which reflects “positive personality characteristics that enhance individual
20 adaptation” (5). While this explanation implies resilience to be a personal trait, there is
21 open debate about whether resilience is trait- or state-dependent, or modifiable through
22 intervention (2). We acknowledge that the use of the RS is only one of many approaches to

1 studying resilience. Additionally, previous reports suggest that the response to RS is
2 culturally sensitive (27, 52), potentially owing to Japanese individuals' tendency to
3 suppress expression of positive affect (53, 54). This cultural bias is also evident in our data,
4 as Japanese subjects scored significantly lower on the RS regardless of being patients or
5 controls, which suggests that the RS may not have captured certain aspects of resilience in
6 the Japanese sample that are qualitatively unique to Western culture.

7
8 Several additional limitations are worth noting. First, our cross-sectional study captures the
9 relationship between religiosity and resilience at a relatively chronic stage of illness. It is
10 possible that religiosity is more relevant during acute stages of illness, which should ideally
11 be explored using longitudinal studies. Longitudinal observation is also required to
12 elucidate the temporal relationship between higher spirituality (i.e. sense of meaning, peace,
13 and purpose in life) and higher resilience. Second, while our study spanned across two
14 countries and included 379 subjects, our sample size may still have been small to determine
15 the significance of religiosity within different denominations. Moreover, it is important to
16 note that religiosity was confounded by country in our sample. While the null findings
17 regarding religiosity and resilience were consistent across Austria and Japan, it should be
18 acknowledged that reported levels of religiosity were different between these two countries.
19 Third, our findings may not be generalizable to patients with other psychiatric disorders, or
20 to countries with largely differing religious cultures. Fourth, the recruitment sites in Austria
21 and Japan were not matched for geographical characteristics (e.g. population, industrial
22 structure), potentially limiting the transcultural interpretation of our findings. Fifth, it is not

1 known whether patients taking part in this study were more or less religious compared to
2 those who did not participate. Sixth, although the RS has been widely used to quantify
3 resilience (3), and previous reports indicate strong correlations between the RS and
4 measures of self-esteem (11, 12) and quality of life (12, 15, 16), it still may not capture the
5 entirety of subjective benefits associated with religiosity. Seventh, we used the M.I.N.I.
6 (23) to confirm clinical diagnoses in patients and to screen for life-time history of mental
7 disorders in healthy controls. It would have been ideal to use the Structured Clinical
8 Interview for DSM-IV-TR Axis I Disorders (SCID-I) (55) as the “gold standard” diagnostic
9 structured interview. Moreover, we were not able to systematically screen for
10 developmental disorders, as this diagnostic category is not available in M.I.N.I. Eighth, in
11 regard to associations between religiosity and psychopathology, our study may have been
12 underpowered to detect associations with small to medium effect sizes. Finally, we did not
13 have *a priori* hypotheses regarding different effects in terms of diagnostic groups or
14 country/nationality. Results that are not related to our *a priori* hypotheses should be
15 considered exploratory in nature and hypothesis generating for future investigations.

16

17 To conclude, associations between religiosity and measures of resilience, social functioning,
18 and psychopathology did not reach significance in clinically stable patients with paranoid
19 schizophrenia and bipolar I disorder. Future studies should elucidate the protective effects
20 of religiosity in various clinical stages, ideally through longitudinal observation. More
21 in-depth investigations relating to the subjective experiences of religiosity/spirituality and
22 resilience are also warranted.

23

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2

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16

17

1 Declaration of Interest

2

3 The authors have no financial conflict of interests to disclose.

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- 20
21

1 **Figure Legends**

2

3 Figure 1. Spiritual well-being and resilience in Austrian and Japanese patients with
4 paranoid schizophrenia and bipolar I disorder

5 <Figure>

6 Abbreviations: FACIT-Sp, Functional Assessment of Chronic Illness Therapy-Spiritual
7 Well-Being Scale.

1 **Table 1. Demographic and clinical characteristics of included subjects**

Variables	Austria			Japan			Comparisons
	Paranoid schizophrenia (n = 52)	Bipolar I disorder (n = 60)	Healthy controls (n = 77)	Paranoid schizophrenia (n = 60)	Bipolar I disorder (n = 60)	Healthy controls (n = 60)	
Age (years)	44.1 ± 10.6	43.2 ± 11.0	42.7 ± 12.0	45.9 ± 10.0	50.2 ± 13.8	41.0 ± 17.6	$\chi^2(5) = 16.286$, p = 0.006 ^a
Male	27 (51.9%)	25 (41.7%)	29 (37.7%)	22 (36.7%)	28 (46.7%)	30 (50.0%)	$\chi^2(5) = 5.061$, p = 0.408
Education (years)	12.3 ± 2.9	13.8 ± 3.2	13.8 ± 3.4	14.2 ± 3.2	14.6 ± 2.5	14.0 ± 1.9	$\chi^2(5) = 24.022$, p < 0.001 ^b
Married or living with a fixed partner	10 (19.2%)	28 (46.7%)	44 (57.1%)	14 (23.3%)	35 (58.3%)	32 (53.3%)	$\chi^2(5) = 34.691$, p < 0.001 ^c
Duration of illness (years)	15.1 ± 10.5	11.3 ± 10.3		18.9 ± 10.6	15.8 ± 10.5		$\chi^2(3) = 19.252$, p < 0.001 ^d
Psychopathology							
PANSS positive	12.7 ± 5.3			12.6 ± 5.8			z = -0.667, p = 0.505
PANSS negative	16.1 ± 7.0			15.5 ± 6.9			z = -0.529, p = 0.597
PANSS general	28.6 ± 8.8			27.9 ± 10.5			z = -0.955, p = 0.340
PANSS total	57.4 ± 18.0			56.0 ± 22.2			z = -0.864, p = 0.388
MADRS total		7.4 ± 8.2			4.6 ± 7.2		z = -2.292, p = 0.022
YMRS total		1.4 ± 2.8			1.2 ± 1.9		z = -0.198, p = 0.843
Psychiatric comorbidities (M.I.N.I.)	Alcohol dependence 1, bulimia nervosa 1	Alcohol dependence 2		Alcohol dependence 1	Alcohol dependence 1		$\chi^2(3) = 0.863$, p = 0.834

2 Values are shown as mean ± standard deviation or n (%). p-values of <0.05 are shown in bold. Abbreviations: MADRS, Montgomery-Asberg

3 Depression Rating Scale; M.I.N.I., Mini-International Neuropsychiatric Interview; PANSS, Positive and Negative Syndrome Scale; YMRS, Young

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1 Mania Rating Scale. Post-hoc comparisons with adjusted p-values: ^a Age: Japanese bipolar > Japanese controls (p=0.003) and Austrian controls
2 (p=0.045); ^b Education: Japanese bipolar > Austrian schizophrenia (p<0.001); Japanese schizophrenia > Austrian schizophrenia (p=0.006); Japanese
3 controls > Austrian schizophrenia (p=0.012); ^c Marital status: Japanese bipolar, Austrian controls, and Japanese controls > Austrian and Japanese
4 schizophrenia (all p<0.05); ^d Duration of illness: Japanese schizophrenia > Austrian bipolar (p<0.001) and Austrian schizophrenia (p=0.046).
5

1 **Table 2. Denominations in Austrian and Japanese subjects**

Denominations	All Austrian subjects (n = 189)	All Japanese subjects (n = 180)	Overall comparison, Statistic / p-value
Reported specific denominations			$\chi^2(8) = 321.438, \mathbf{p} < \mathbf{0.001}^a$
Roman Catholic	104 (55.0%)	6 (3.3%)	
Protestant	8 (4.2%)	9 (5.0%)	
Other Christian sects	5 (2.6)		
Buddhist		21 (11.7%)	
Shinto		3 (1.7%)	
Muslim	2 (1.1%)		
No specific denominations			
Agnostic	1 (0.5%)	97 (53.9%)	
Atheist		43 (23.9%)	
Unspecified reasons	69 (36.5%)	1 (0.6%)	

2 Values are shown as n (%). p-values of <0.05 are shown in bold. ^a Post-hoc comparisons with adjusted p-values: Roman Catholic, Other Christian sects,
3 and Unspecified reasons: Austria > Japan; Buddhist, Agnostic, and Atheist: Japan > Austria (all p<0.05).

4

1 **Table 3. Resilience according to attendance in Austrian and Japanese patients with paranoid schizophrenia, bipolar I**
 2 **disorder, and healthy controls**

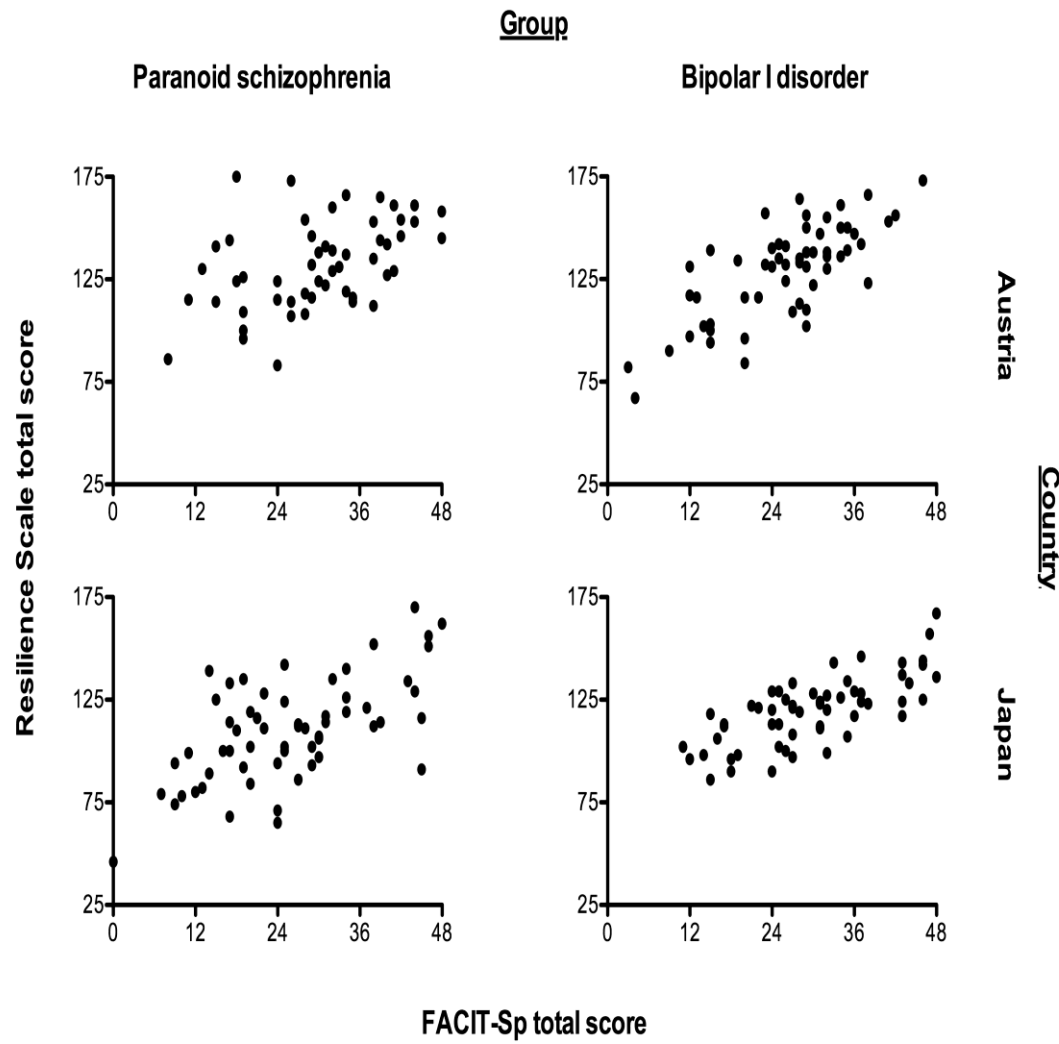
Country	Group	Resilience Scale total score according to attendance of religious services					Comparisons
		Never	Less than once a year	Once or twice a year	About once a month	Once a week	Statistic / p-value
Austria	Paranoid schizophrenia	129.2 ± 19.4	138.6 ± 27.9	129.8 ± 16.7	133.6 ± 30.9	138.4 ± 24.9	For country: F = 48.5, p < 0.001 ^a
	Bipolar I disorder	105.8 ± 25.1	125.9 ± 17.3	136.6 ± 16.1	139.4 ± 19.9	137.0 ± 24.6	
	Healthy controls	155.5 ± 12.6	151.0 ± 13.9	147.5 ± 14.2	155.1 ± 12.0	126.7 ± 6.4	For group: F = 11.6, p < 0.001 ^b
Japan	Paranoid schizophrenia	110.1 ± 25.5	105.0 ± 36.8	110.6 ± 26.7	104.8 ± 24.3	112.4 ± 21.6	For attendance: F = 0.827, p = 0.509
	Bipolar I disorder	121.2 ± 18.8	122.2 ± 16.7	114.5 ± 13.1	116.0 ± 28.3	118.7 ± 23.5	
	Healthy controls	132.6 ± 19.5	129.4 ± 18.0	114.0 ± 14.1	130.8 ± 15.7	144.0	

3 Values are shown as mean ± standard deviation. Attendance of religious services increases from left to right. Statistical test: univariate general linear
 4 model including main effects and all two-way interactions for fixed factors, age groups included as a covariate (main effect). p-values of <0.05 are
 5 shown in bold. Japanese healthy controls reporting “once a week”: n=1. Post-hoc comparisons with adjusted p-values: ^a Country: Austria > Japan
 6 (p<0.001); ^b Group: Healthy controls > Paranoid schizophrenia (p<0.001) and Bipolar I Disorder (p=0.002).
 7

1 **Table 4. Resilience according to importance in Austrian and Japanese patients with paranoid schizophrenia, bipolar I**
 2 **disorder, and healthy controls**

Country	Group	Resilience Scale total score according to personal importance of religion				Comparisons
		Not important at all	Slightly important	Moderately important	Highly important	Statistic / p-value
Austria	Paranoid schizophrenia	136.6 ± 13.8	131.4 ± 22.3	131.2 ± 17.6	132.2 ± 25.8	For country: F = 56.3, p < 0.001 ^a For group: F = 29.0, p < 0.001 ^b
	Bipolar I disorder	115.4 ± 23.7	134.3 ± 21.9	130.0 ± 21.8	138.9 ± 20.7	
	Healthy controls	147.5 ± 16.9	150.4 ± 13.6	151.0 ± 14.8	153.6 ± 11.5	
Japan	Paranoid schizophrenia	105.2 ± 29.9	112.0 ± 26.8	111.3 ± 20.7	113.6 ± 16.3	For importance: F = 1.513, p = 0.211
	Bipolar I disorder	120.2 ± 19.1	120.5 ± 15.4	111.5 ± 14.0	120.9 ± 17.2	
	Healthy controls	131.1 ± 19.5	124.5 ± 16.0	133.7 ± 17.1	131.0 ± 11.3	

3 Values are shown as mean ± standard deviation. Personal importance of religion increases from left to right. Statistical test: univariate general linear
 4 model including main effects and all two-way interactions for fixed factors, age groups included as a covariate (main effect). p-values of <0.05 are
 5 shown in bold. Post-hoc comparisons with adjusted p-values: ^a Country: Austria > Japan (p<0.001); ^b Group: Healthy controls > Paranoid schizophrenia
 6



1
2 **Figure 1**