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Religiosity and Spirituality in Association with Health and Possible Sources of Heterogeneity of Research Findings

Habilitation Thesis

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Abstract

The aim of this thesis is to investigate the relationship between religiosity/spirituality (R/S) and health, especially within the secular context of the Czech Republic. Additionally, it aims to explore the possible reasons behind the inconsistent research findings in this area. The research examines 11 studies that are, however, put into a broader context of the author's other research. The thesis identifies five sources of heterogeneity that may have an impact on the association between R/S and health. These sources include cultural context, differing R/S measurement tools, causality issues, methodological approaches in variable use, and previously unconsidered confounders such as sensory processing sensitivity. The thesis also highlights the importance of assessing both external (e.g., religious affiliation and attendance) and internal (e.g., spirituality level or attitude toward God) R/S dimensions to obtain more accurate findings. It argues that using only a single aspect of R/S may lead to contradictory results. Moreover, the thesis suggests that a harmonious integration of religiosity and spirituality is associated with better health. On the other hand, a discrepancy between them may pose health risks.

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Content

1 Introduction

Religiosity and spirituality (R/S) are multi-dimensional constructs related to many areas of human life, including health. Recent research reports an exponentially growing number of scientific articles focusing on the associations of R/S with both mental and physical health, with a large proportion of studies reporting positive associations in these areas. Thus, research interest is driven by the potential implications for health care and public health. So far, research findings seem to be quite convincing regarding the direction of the association. However, a minority of studies still report either no significant relationship or mixed or even negative results. There is a lack of systematic research that would cover this contradiction, even though understanding the heterogeneity of these findings could help us understand the nature of the association of R/S and health and the conditions under which R/S might be protective. Therefore, the aim of this thesis is to address this knowledge gap. After the definition of the main constructs and a description of the specific secular environment of the Czech Republic, attention will be paid to the measurement of R/S and the associations of R/S and health, including potential pathways between R/S and health. Lastly, potential reasons for the heterogeneity of research findings in this area will be briefly introduced.

1.1 Religiosity and spirituality, their definition and anchoring in the cultural context of the Czech Republic

This section gives a theoretical overview of the definitions of religiosity and spirituality, which are mostly seen as distinct, though interconnected, constructs that include attitudes, behaviours and beliefs (Hooker et al., 2014). Both of them emphasise a search for the sacred; however, they might differ in the means they use to reach this goal (Hill et al., 2000). After the introduction of these constructs, I will focus on their similarities, as well as differences among them. Lastly, I will briefly describe the cultural context of the Czech Republic, which, due to its high degree of securitisation, represents a unique area for R/S research.

1.1.1 Religiosity

The meaning of the term “religiosity” or “religion” has evolved over time. Originally, it included both individual and institutional dimensions of the connection to the sacred (Hill & Pargament, 2003). In the early modern period, it was often equated with religious piety and devotion and was associated with a strict adherence to religious teachings and moral codes, as reflected in the definition of sociologist Émile Durkheim, who described religion as “a unified system of

beliefs and practices relative to sacred things, that is to say, things set apart and forbidden- beliefs and practices which unite into one single moral community called a church, all those who adhere to them." (Durkheim, 2012, p.47).

In line with this definition, in the last decades, religiosity has started to be more linked with an affiliation to religious institutions, rituals, beliefs and practices, e.g., attendance to religious services and rituals and engagement in spiritual practices such as prayer and meditation (Zinnbauer et al., 1997), that should facilitate closeness to the sacred, the 'Transcendent' or the 'Divine' (God, higher power, or ultimate truth/reality) and community relationships and responsibilities (King & Koenig, 2009). Thus, besides a moral dimension and belief in the supernatural or transcendent, a common thread among recent concepts of religion is also the social aspect. This highlights the importance of shared beliefs and practices within a group rather than an individualistic perspective.

Some authors also focus on the internal dimension of religion, distinguishing between extrinsic and intrinsic religiosity. Others use a more narrow approach, stressing especially the external aspects of religiosity, while the internal ones are explored under the concept of spirituality. This approach was also applied in this thesis. Religiosity was assessed mainly by questions on the frequency of religious attendance, which has strong empirical support for an association with health (Nicholson et al., 2009), or religious affiliation. The internal dimension of religiosity, i.e., intrinsic religiosity, was mostly mapped by questions examining a level of spirituality, as described below.

1.1.2 Spirituality

The word "spirit" derives from the Latin word "spiritus" (spirit or breath). It has its origin in Christianity, where it expressed the inner life of a person, which was initiated and penetrated by the spirit of God (Vojtíšek et al., 2012). Thus, it was initially used to describe a deeply religious attitude. However, with the widespread use in healthcare settings, the development of new religious movements, and the increasing percentage of the population that labels itself as "spiritual but not religious," some non-religious and religious groups have claimed that spirituality must be set apart from religion. This movement has resulted in a broader understanding of the concept of spirituality and represents a growing group in the religious landscape (Upenieks et al., 2022).

Currently, many authors highlight the individual and subjective nature of spirituality and see it as individual and subjective search for peace and harmony (Koenig, 2008) and "ultimate questions about life, about meaning and purpose, and about the relationship with the sacred or transcendent, which may or may not lead to or arise from the development of

religious rituals and the formation of community" (Koenig et al., 2001, p. 17). Thus, in one current view, spirituality may not only involve people from diverse religious backgrounds but even non-religious individuals (Koenig, 2008). In this thesis, spirituality is also understood in this broader sense: as internal individual contentedness, one's perceived closeness to God, one's sense of meaning of life and, in some cases, one's spiritual well-being.

1.1.3 The secular environment of the Czech Republic

The Czech Republic represents a secular environment and, according to an international survey conducted by the Pew Research Center (2014), it is even the country with the highest proportion of religiously unaffiliated people in the world (76.4%), followed by North Korea (71.3%) and Estonia (59.6%). Thus, the Czech environment contrasts greatly to the rest of the world, where in 2010, only 16% of the population did not identify with any religious group and where nearly three-quarters of the population lived in countries where their religious group represented the majority (Pew Research Center, 2018). It is also considerably distinct from its Central European neighbours, who showed a much lower percentage of non-affiliated inhabitants: 5.6% for Poland, 24.7% for Germany, 13.5% for Austria and 14.3% for Slovakia (Pew Research Center, 2014).

This situation is probably a consequence of the longer historical development of the Czech nation. According to Hamplova and Nespor (2009), some key milestones in this development were the Hussite movement in the 14th century and the forced re-Catholicization during the 17th and 18th centuries under the reign of the Austro-Hungarian monarchy. A reaction to the latter situation was a rise of nationalism in the late 19th and early 20th centuries that criticised a so-called "connection of the state and the altar" and associated the broadly opposed monarchy with the Catholic Church. More recently, the country has also experienced hard secularisation during the Communist era in 1948–1989, which has impacted Czech society's attitudes towards religion (Nesporova & Nespor, 2009). The Communist regime actively suppressed religion and systematically persecuted citizens who publicly declared their faith. As a result, the country has a legacy of scepticism towards religion.

In the national census in 1991, 43.9% of the Czech population reported themselves as believers (Czech Statistical Office, 2011). However, a relatively high proportion of these affiliated respondents might have been driven to such a declaration by the fact that this census was conducted only a short time after the collapse of Communist regime, at which time declaring the religious affiliation might have been seen by many as a political rather than a religious statement (Willard & Cingl, 2017). This hypothesis is supported by the fact that in 2011, the percentage of affiliated respondents decreased dramatically to 20.8% (Czech

Statistical Office, 2011). However, it is important to note that this observation could also partly be explained by the fact that in 1991, the question on religiosity became optional and in 2011, it was not answered by 44.7% of the respondents (Czech Statistical Office, 2011). Given that attendance at religious services did not change dramatically between 1991 and 2008 (ISSP Research Group, 2018), the main explanation for this rapid decrease may be that non-practising Christians stopped declaring themselves as religious (Vaclavik, 2014).

This new situation can be seen as a soft secularisation, meaning that people's religious beliefs and practices are increasingly confined to the private sphere. From this point of view, we should rather talk about Czech anticlericalism or religious scepticism than atheism. In fact, in 2016, only 14.7% of the Czech population labelled themselves as "a convinced atheist" (Malinakova et al., 2018) and more than half of the Czech citizens believe in supernatural concepts such as the soul, fate, and miracles (Evans, 2017). Moreover, according to Rican et al. (2007), the Czech society showed a strong tendency to distance itself from the Christian tradition and leans towards what is perceived as non-religious spirituality. This spirituality in Czech conditions, however, also includes aspects of Eastern religions.

1.2 Measurement of R/S

As already noted, both religiosity and spirituality are complex and multi-dimensional concepts (Demmrich & Huber, 2019; Koenig et al., 2015) that have already been studied extensively in the fields of religious studies, psychology, sociology, and health sciences. Researchers use various measures to quantify and understand these concepts. In general, quantitative research on R/S primarily relies on self-reported questionnaires, which typically measure attitudes, emotions, and behaviours in this domain.

1.2.1 Religiosity measures

The most commonly used measure of religiosity, which is also used in the Czech national census, is religious affiliation or membership. This refers to an individual's identification with a concrete Church or religious institution. A disadvantage of this measure is that it does not necessarily overlap with religious practice, which may be more relevant for health research. Therefore, other widely used religiosity measures are questions on religious practices and behaviours. These include frequency of religious attendance and questions on the frequency or importance of prayer or meditation, reading religious texts, and engaging in religious rituals. These measures capture the degree of an individual's engagement with their religion and the level of their involvement in religious activities. A disadvantage is that these measures might suffer from social desirability bias, as individuals may over-report their religious practices to

appear more devout (Finke & Bader, 2017). Another type of religiosity measure is belief in God or a Higher power. A disadvantage of this measure is that it does not capture the diversity of religious beliefs and practices or even individual views of God or a High Power and may not be applicable to all religions.

Some authors stress the multi-dimensionality of religiosity. A leading scientist in the field of R/S and health research, Harold Koenig, states that "There are at least ten major dimensions of religiosity that one should consider in the measurement of religion. The major dimensions of religiosity include belief, religious motivation, organisational religious activities, non-organisational activities, attachment to God, trust in God, religious experience, religious coping, religious maturity, and history of lifetime exposure to religion." (Koenig et al., 2015, p. 530). However, there are still studies that measure the whole R/S concept using, e.g., a single question on religious affiliation. This approach can represent an oversimplification, which can obscure research on R/S and health rather than contribute to the clarification of these associations. Moreover, even more caution is needed, given that religiosity shows great variability among individuals and communities.

1.2.2 Spirituality measures

As already mentioned, spirituality research suffers from a great variance of its definitions. This heterogeneity is reflected in a high number of spirituality measures that are summarised, e.g. by Meezenbroek et al. (2012) and Monod et al. (2011). Some of these measures focus on spiritual experiences and perceived connection to the sacred, while other are broader and focus also on so-called spiritual well-being. Regarding the situation in the Czech Republic, there are several spirituality measures that have already been validated. First, I will present two questionnaires developed in the Czech Republic and subsequently, other internationally widely used meaures that have been validated in the Czech environment.

The first national measure is the Prague Spirituality Questionnaire (PSQ) developed by Rican and Janosova (2005), which was suggested to measure spirituality in a more universal sense, regardless of one´s religious affiliation. This 36-item questionnaire measures spirituality across six dimensions: Mysticism (transcendental experiences), Togetherness, Transcendental-Monotheistic Experience (connectedness with the universe, the ''highest reality'' and beliefs about death), Eco-spirituality (connectedness with nature) and Moral Involvement. The same authors also proposed a second tool, the Test of spiritual sensitivity (TSC; Rican et al., 2007), which uses visual stimuli, i.e., 11 figurative pictures differing in their potential to evoke spiritual experiences, and a list of 21 words designating feelings, part of which may be considered typical for spiritual experiences.

A frequently world-wide used spirituality measure is the Spiritual Well-Being Scale of the Functional Assessment of Chronic Illness Therapy (FACIT-Sp-12; Brady et al., 1999), which is a module of a Quality of Life (QOL) assessment instrument for chronically ill people. It uses 12 items to measure a sense of meaning in life, peacefulness and a sense of strength and comfort from one's faith, as reflected in its two subscales: Meaning/Peace and Faith. A validation in the Czech environment resulted in a shortened 9-item version of the scale (Sarnikova et al., 2018).

Another world-wide used measure is the Spiritual Well-Being Scale (SWBS) (Paloutzian & Ellison, 1982), which consists of 20 items and has already been adapted into 10 languages (Paloutzian et al., 2021), including the Czech. A validation on the Czech population has resulted in a shortened 7-item version of the scale for adolescents (Malinakova et al., 2017) and 11-item version for adults (Tavel et al., 2021). The scale consists of two subscales: the Religious Well-Being Subscale (RWB) provides a self-assessment of one's relationship with God, while the Existential Well-Being Subscale (EWB) gives a self-assessment measure of one's sense of life purpose and life satisfaction.

The Daily Spiritual Experience Scale (DSES) was developed by Underwood and Teresi (2002). This single-factor scale consists of 16 items and measures everyday spiritual experiences, i.e., an individual's sense of connection with God in daily life. It includes items such as "I feel God's love for me" and "I sense the presence of a divine power." This tool has also been validated in the Czech environment, where the assessment resulted into a shortened 15-item version (Malinakova et al., 2018).

Other measures that are available in the Czech environment involve The Santa Clara Strength of Religious Faith Questionnaire (SCSRFQ), the Spiritual Health and Life-Orientation Measure (SHALOM) and the Expressions of Spirituality Inventory (ESI). The SCSRFQ was developed by Plante and Boccaccini (1997) and validated by Babinčák et al. (2015). This 10-item scale assess strength of religious faith. It focuses on a single dimension of religious involvement and was developed to be used with most all faith traditions. The SHALOM is a 20-item questionnaire developed by Fisher (2010) that measures the level of spiritual well-being by comparing each person's ideals with their lived experiences. Its Czech validation has resulted in a shortened, revised 11-item version (Marciniak et al., 2017). The ESI was created by MacDonald (2000) and validated by Machů (2015). This tool consists of 32 items and was developed through factor analysis of various preexisting spirituality-related measures. It comprises five subscales that encompass a broad range of spiritual dimensions: a range of cognitive orientation to spirituality, experiential-phenomenological dimension, existential dimension – well-being, dimension of paranormal beliefs and dimensions of religiosity.

Among other widely used instruments, which, however, to the best of our knowledge, have not been validated in the Czech conditions, we can mention, e.g., the Self-Transcendence Scale (Reed, 1991), the Spiritual Transcendence Scale (Piedmont, 1999), the Spirituality Assessment Scale (Howden, 1993) and the Multi-dimensional Measure of Religiousness/Spirituality (Fetzer Institute, 1999). Finally, another aspect of spirituality that has gained popularity in recent years is the concept of mindfulness, which refers to the ability to be present and non-judgmental in the present moment. An example of a commonly used measure of mindfulness is The Mindfulness Attention Awareness Scale (MAAS) developed by Brown and Ryan (2003).

1.2.3 Measures of negative religious coping and religious and spiritual struggles

Recent research also pays attention to a negative side of religiosity and spirituality, i.e., a negative religious coping and religious and spiritual struggles. For some people, religious experience can be a source of stress, tension, and discomfort (Exline et al., 2000) or they may use negative religious coping strategies to deal with it difficult life situations (Bjorck & Thurman, 2007). A negative religious coping overlaps with religious and spiritual struggles and includes spiritual dissatisfaction, a negative view of God (e.g., as angry or punishing), relational problems within a religious group, or perceived demonic influence (Pargament et al., 1998).

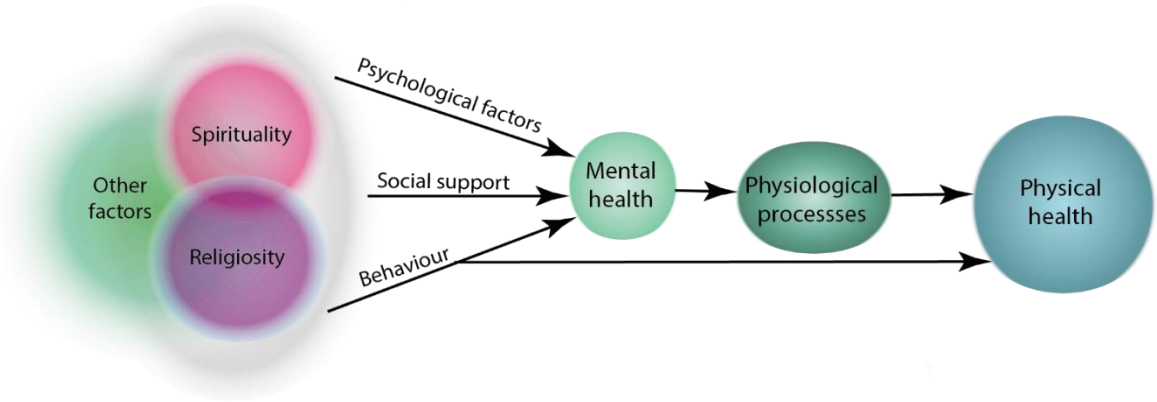
The research instruments focusing on this topic that are validated in the Czech Republic are represented by the Religious and Spiritual Struggles Scale (RSS) and the Negative Religious Coping (NRC) subscale of the Brief Religious Coping Inventory (B-RCOPE). The RSS was developed by Exline et al. (2014). The whole scale is composed of 26 items divided into six subscales: Divine, Demonic, Interpersonal, Moral, Ultimate Meaning, and Doubt. In the Czech environment, it has been validated by Janu et al. (2018). The NRC is a 7-item measure proposed by Pargament et al. (2011) that has been validated by Janu et al. (2019).

1.3 Pathways of interactions of R/S with health

The increasing body of research highlights the positive associations between R/S and health, although the precise mechanisms through which R/S influences health are yet not fully explored. Several theoretical pathways and mechanisms have been proposed by scholars such as Masters (2008), Koenig (2012) and Aldwin et al. (2014). Their models generally suggest that R/S factors impact health outcomes indirectly through three primary pathways: social support, behaviour, and psychological factors. Masters (2008) also hints at the possibility of a direct effect of R/S on health through physiological processes. This hypothesis is supported by studies that report changes in the neurochemistry of the brain during spiritual practices

(Newberg & Waldman, 2009). The proposed model in Figure 1 simplifies the pathways based on the abovementioned theories. It does not depict the interrelationships between social support, behaviour, and psychological factors, although these relationships are presumed to exist.

Figure 1 A proposed simplified model of R/S and health.



1.3.1 Behavioural pathway

The first pathway through which R/S can influence health is by regulating behaviour. R/S are not only linked to personal values but also encompass norms and behavioural expectations. These norms can encourage individuals to prefer certain activities while avoiding others (Tarakeshwar et al., 2003). By adhering to their religious obligations, people may protect their health by steering clear of health-risk behaviours or by intentionally caring for their health. Research has consistently reported that R/S serve as protective factors in both adolescent and adult health-risk behaviours (Yonker et al., 2012). This includes the prevention of smoking, alcohol consumption, cannabis and drug use, as well as responsible sexual behaviour. Additionally, R/S have been associated with a lower prevalence of suicidality (Wu et al., 2015). Religiosity can also act as a buffer against stressors arising from the consequences of specific behaviours, such as gambling and other forms of risk behaviour (Koenig et al., 2012).

1.3.2 Psychological pathway

The second pathway involves psychological mediators. R/S are often reported as enhancing positive emotions and mitigating negative ones. This pathway suggests that R/S functions both as a factor that enriches one's life and as a resource for coping with challenges (Koenig, 2012). Religious beliefs and behaviour foster positive psychological traits, e.g., forgiveness (Raj & Padmakumari, 2023), gratefulness (Bussing et al., 2021), altruism, kindness and compassion

(Koenig, 2012). These emotions have been linked to improved psychological well-being and can contribute to better overall health. Moreover, R/S beliefs can help individuals by providing buffering and coping mechanisms (Abdel-Khalek et al., 2019) to deal with everyday challenges and major life difficulties. R/S has also been associated with higher resilience (Schwalm et al., 2022), which is the ability to recover after adverse life situations or to cope with them. This means that individuals can reframe adversity as an opportunity for growth or as part of a larger divine plan, which can reduce the negative impact of stress and trauma. Furthermore, R/S can lead to positive self-appraisals, such as increased self-esteem (Oates, 2016) and a higher sense of meaning and purpose in life (Stroope et al., 2013).

1.3.3 Social pathway

The third pathway is represented by broader social networks, which are known to positively affect health. R/S has been associated with stronger social connections (Pew Research Center, 2017), including greater social support on an individual level and greater social capital on a community level (Koenig et al., 2012). Religiosity can be associated with social support not only through shared beliefs, values, rituals and a sense of belonging but also through non-liturgical types of activities that the churches and religious institutions often offer to support relationships among church members. Moreover, R/S has been linked with higher satisfaction in marriage (Olson et al., 2016) and higher stability of relationships (Lambert et al., 2012).

1.4 Relationship of R/S with health

Religious practices and their impact on health have been studied for over a century. Early research, like Émile Durkheim's in 1897, suggested a correlation between a population's religious practices and their suicide rate. However, later authors, such as Sigmund Freud and Friedrich Nietzsche, brought attention to the potentially harmful effects of religion (Koenig et al., 2012). Since 1990, more solid research on R/S and health started to develop, and the number of studies focusing on this association grew exponentially (Koenig, 2008).

In a comprehensive review of 21st-century research on religion and health, Harold G. Koenig summarised findings from over 3300 studies. According to this analysis, R/S was positively associated with both mental and physical health (Koenig, 2012), as detailed below. Besides this publication, also several other researchers have attempted to perform a meta-analysis to assess the relationship between R/S and health, especially the mental one. These studies are generally coming to the same conclusions, though they also add some new aspects.

Regarding mental health, meta-analyses report minimal but significant positive association of R/S with better mental health (Hodapp & Zwingmann, 2019), higher resilience

(Schwalm et al., 2022), higher life satisfaction (Sholihin et al., 2022), sense of coherence (Jeserich et al., 2023), higher levels of positive mood and overall well-being, decreased depression, and increased self-esteem, and certain personality traits, i.e., conscientiousness, agreeableness, and openness (Yonker et al., 2012), reduced anxiety (Abdel-Khalek et al., 2019), resources for managing distress and enhancing healthy adaptation in the context of cancer (Salsman et al., 2015), and finally, a lower risk of suicide (Wu et al., 2015) and a buffering effect against health-risk behaviours (Yonker et al., 2012) and sexual aggression, though the latter results were not observed for domestic violence (Gontalves et al., 2023). On top of these, the meta-analysis of Koenig (2012) also adds increased hope, optimism, meaning and purpose, sense of control, positive character traits, lower delinquency, higher marital stability, social support and social capital

R/S have also been linked to better physical health. A study of Libby et al. (2022) assessed self-reported health across 47 European countries and found that higher levels of private prayer, religious importance, and belief in God were linked to lower self-reported health at age 20 in women. A meta-analysis of Shattuck and Muehlenbein (2020) showed an association of R/S with lower blood pressure, decreased cholesterol and C-reactive protein, and better values for markers of vascular health, markers of myocardial infarction and markers of hypertension/stress. Regarding mortality, a meta-analysis of Chida et al. (2009) found an association of R/S with reduced mortality in healthy population studies (independently of behavioural factors, negative affect, and social support), but not in diseased population studies. A reduction in mortality was furthermore described also by Lucchetti et al. (2011). A meta-analysis of Koenig (2012) added to already described associations also a better immune and endocrine function, a lower risk of cancer, and better self-rated health.

1.5 Heterogeneity of research findings in the association of R/S with health

Thus, most research findings emphasise a positive association between R/S and and health. Nevertheless, a smaller portion of studies reveal a blend of results, some even showing adverse links. These less common associations encompass various conditions like depression, anxiety, schizophrenia, high blood pressure, Alzheimer's disease, pain, physical symptoms, and overall physical health (Koenig, 2012). It's essential to explore the underlying reasons for these differing outcomes to understand better the situations in which the well-established relationship between R/S and health can be universally applicable. This final section of the Introduction outlines some potential reasons for this diversity.

1.5.1 Socio-cultural environment

The discrepancies in findings regarding the associations of R/S with health can be partly attributed to the socio-cultural environment. Some authors have observed a protective influence of R/S primarily in religious countries (Okulicz-Kozaryn, 2010; Stavrova, 2015), while others have reported the opposite trend in secular ones (Bjorck et al., 1997; Hayward & Elliott, 2014). Thus, the observed variance in results may arise from the fact that a majority of studies exploring the associations of R/S with health have been conducted in predominantly religious countries (Lucchetti & Lucchetti, 2014) and the results from secular ones may be underreported (Dein et al., 2012). Moreover, in religious society, a positive association between R/S and health may be more evident due to the integral role of R/S in individuals' lives and where it is easier for religious individuals to harmonise their religious beliefs with the cultural environment (Pérez & Rohde, 2022). On the contrary, practising religion in a secular nation represents a bigger challenge, as it may require individuals to navigate a societal context less attuned to their beliefs and practices. In this line, a meta-analysis of Yaden et al. (2022) showed that cultural context can moderate the relationship between religion/spirituality and life satisfaction, and Jeserich et al. (2023) emphasised the impact of cultural embeddedness and social plausibility on the association of R/S and a sense of coherence. Finally, the impact of R/S on health can also vary significantly depending on other cultural aspects. E.g., a study of Abdel-Khalek et al. (2019) found that the relationship between religiosity and anxiety differed in Arabic studies compared to studies conducted in Western industrialised countries.

1.5.2 Measurement issues

A conceptual ambiguity of R/S

As explained in 1.1., recent research on R/S and health suffers from measurement problems related to heterogeneity and multi-dimensionality of R/S. Problems mostly arise from the lack of clarity regarding a common understanding of R/S, as these constructs can have different meanings for different individuals or cultures. This conceptual ambiguity is even stronger in the case of spirituality, which lacks a universally agreed-upon definition. Moreover, previous research has suggested that e.g. lay people see spirituality differently than theologians (la Cour & Gotke, 2012), which may cause a different interpretation of the measurement items. Thus, research questionnaires may have inherent limitations, as the questions may not capture the full complexity of R/S.

A danger of tautology

Some authors also point out a tautological approach that can sometimes be observed in research on R/S and mental health (Koenig, 2008), i.e., the use of spirituality scales that significantly overlap with mental health measures. This is quite common, as proved by (Garssen et al., 2016), who, in their survey of 8 highly cited journals, found that 26 out of 58 studies used a spirituality scale with 25% or more of its items related to well-being when assessing spirituality's impact on well-being or distress.

A type of R/S and its dimensions

Also, the specific ways in which people perceive their R/S can significantly influence the direction of the associations with health. Moreover, these associations can also vary depending on different dimensions of R/S and mental health domains examined (Salsman et al., 2015). Because of the variety of R/S assessment measures, individuals who score high in negative religious coping may also be considered highly religious or spiritual according to other measures. Therefore, also this aspect could contribute to the heterogeneity of research findings in this area. E.g., Forouhari et al. (2019) reported that contrary to internal religiosity, external religious orientation was related to increased depression and suicidal ideation. Negative religious coping was further associated with a higher level of anxiety (Franklin, 2016; King et al., 2017), depression and distress (Rosmarin et al., 2009), disorder eating pathology among adolescents (Latzer et al., 2015), maladjustment (Ghorbani et al., 2017) and substance use (Parenteau, 2017). A negative image of God was also associated with lower self-esteem (Benson & Spilka, 1973), and with increased anger and fear (Exline et al., 2000).

These findings are in line with a meta-analysis of (Pankowski et al., 2023) that showed a negative association between negative religious coping and flourishing, and they also correspond to a meta-analysis of Stulp et al., (2019) that demonstrated the significance of individual God representations, both positive and negative, in influencing various aspects of psychological functioning.

1.5.3 Research bias

Social desirability bias

Another problem is that in assessing R/S, researchers often rely on self-report questionnaires or scales. Thus, the research suffers from a social-desirability bias which is a general problem affecting the validity of research findings in psychology and the social sciences (Nederhof, 1985). This bias has also been proved to distort research in the area of daily spiritual experiences, religious coping and religious orientation (Jones & Elliott, 2017). Especially the well-being aspect of spirituality significantly correlated with social desirability, specifically,

both with its self-deceptive enhancement and impression management aspects (Migdal & MacDonald, 2013). Regarding religiosity, a study of Finke and Bader (2017) found that the accuracy of estimates of church attendance may be influenced not only by a simple recall mistake, but also the respondent's desire to report their identity as a religious and church-going person, rather than actual attendance.

Reporting bias

Similarly, as in other areas of research, also for the area of R/S and health holds that a prevalent concern is a risk of reporting bias that can occur when studies with statistically significant results are more likely to be published or when authors selectively report certain results based on their statistical significance (Salsman et al., 2015). Consequently, published or disclosed effect sizes may not accurately represent all completed studies.

1.5.4 Causality problems

Another source of heterogeneity in research findings can be a causality problem. Many studies are observational, so it is often unclear e.g. "unhealthy spirituality" negatively influences one's health, whether one's health problems, especially mental ones, influence how people experience their R/S, or whether individuals turn to R/S as a coping mechanism when facing life and health challenges. Recent research supports both hypotheses (de Pison, 2022). R/S struggles and negative religious coping contribute to decreased psychological well-being, as described in the meta-analysis of Bockrath et al. (2022), who found that R/S struggles significantly predict worsening psychological adjustment over time. At the same time, under challenging life events, people may encounter a situation where their core principles and convictions are unsettled, which may result in R/S struggles (Pomerleau et al., 2020). Furthermore, we could also imagine that personal uncertainty and negative self-image may influence one's R/S, which may consequently become narrow and prescriptive in order to prevent future failures. This would only strengthen the negative circle.

1.5.5 Confounding factors

The associations of R/S with health are generally influenced by many factors. According to George et al. (2002), in statistical analyses, the optimal covariate selection should involve conventional sociodemographic aspects, socioeconomic status, social stress and, in investigations of mortality, also health status indicators. However, there may also be other factors or latent constructs that are closely related to R/S, and the measurement items may inadvertently tap into these factors instead (Hill & Pargament, 2003). E.g., well-being, existential beliefs, empathy or guilt and shame experiences may be highly correlated with R/S,

which may potentially lead to the assessment of a different construct that is related but not identical to R/S.

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A meta-analytic review. *Journal of Adolescence, 35*(2), 299-314. https://doi.org/10.1016/j.adolescence.2011.08.010

Zinnbauer, B. J., Pargament, K. I., Cole, B., Rye, M. S., Butter, E. M., Belavich, T. G., Hipp., K. M., Scott, A., & Kadar, J. L. (1997). Religion and spirituality: unfuzzying the fuzzy. Journal for the Scientific Study of Religion, 36(4), 549-564. https://doi.org/10.2307/1387689

2 List of original publications

This thesis is based on 11 original publications (see Table 1). These studies are in the Discussion section supplied by other studies of the author.

Table 1 List of original publications.

	Publication title	**Author's share**	**Author's contribution**
1	Furstova, J., **Malinakova, K.**, Sigmundova, D., & Tavel, P. (2021). Czech out the atheists: A representative study of religiosity in the Czech Republic. *The International Journal for the Psychology of Religion*, 31(4), 288-306.	20	Research idea, contribution to data collection, contribution to editing the original draft and its supervision and revision
2	**Maliňáková, K.**, Trnka, R., Šarníková, G., Smékal, V., Fürstová, J., & Tavel, P. (2018). Psychometrická analýza Škály každodenní spirituální zkušenosti (DSES) v českém prostředí. *Československá Psychologie*, 62, 100-113.	70	Research idea, writing the original draft, revision, except for statistical processing issues, contribution to supervision
3	Šarníková, G., **Maliňáková, K.**, Fürstová, J., Dubovská, E., & Tavel, P. (2018). Psychometrická analýza Škály The Functional Assessment of Chronic Illness Therapy-Spiritual Well Being (FACIT-Sp) v českém prostředí. *Československá Psychologie*, 62, 114-128.	30	Contribution to writing and editing the original draft, contribution to supervision and revisions except for statistical processing issues
4	Tavel, P., Sandora, J., Furstova, J., Lacev, A., Husek, V., Puzova, Z., Polackova Solcova, I., & **Malinakova, K.** (2021). Czech version of the spiritual well-being scale: Evaluation and psychometric properties. *Psychological Reports*, 124(1), 366-381.	50	Participation in writing and supervision of the original draft and revision of the draft, except for statistical processing issues
5	Janů, A., **Maliňáková, K.**, Fürstová, J., & Tavel, P. (2018). Psychometrická analýza Škály náboženských a duchovních zápasů (RSS) v českém prostředí. *Československá Psychologie*, 62, 2-18.	40	Contribution to writing and editing the original draft, contribution to supervision and revisions except for statistical processing issues
6	**Malinakova, K.**, Cerna, A., Furstova, J., Cermak, I., Trnka, R., & Tavel, P. (2019). Psychometric analysis of the Guilt and Shame Experience Scale (GSES). *Ceskoslovenska Psychologie*, 63(2), 177-192.	70	Research idea, designing of the scale, data collection, writing of the original draft, revision, except for statistical processing issues, contribution to supervision

7	Janu, A., **Malinakova, K.**, Kosarkova, A., & Tavel, P. (2022). Associations of childhood trauma experiences with religious and spiritual struggles. *Journal of Health Psychology*, 27(2), 292-304.	40	Research idea, contribution to statistical analyses and supervision of the original draft, participation in its revision
8	Gabova, K., **Malinakova, K.**, & Tavel, P. (2021). Associations of self-esteem with different aspects of religiosity and spirituality. *Ceskoslovenska Psychologie*, 65(1), 73-85.	50	Research idea, contribution to data collection, statistical analyses and supervision of the original draft, participation in its revision
~~9~~	**Malinakova, K.**, Trnka, R., Bartuskova, L., Glogar, P., Kascakova, N., Kalman, M., van Dijk, J.P., & Tavel, P. (2019). Are adolescent religious attendance/spirituality associated with family characteristics? *International Journal of Environmental Research and Public Health*, 16(16), 2947.	80	Research idea, writing the original draft and its editing, supervision, statistical analyses, a share on a revision
10	Buchtova, M., **Malinakova, K.**, Novak, L., Janu, A., Husek, V., van Dijk, J.P., & Tavel, P. (2022). The associations of experiencing the COVID-19 pandemic with religiosity and spirituality: A cross-sectional study in Czech adults. *International Journal of Public Health*, 67, 1604712.	40	Research idea, contribution to data collection, statistical analyses and supervision of the original draft, participation in its revision
11	Buchtova, M., **Malinakova, K.**, van Dijk, J. P., Husek, V. & Tavel, P. (2024). Sensory processing sensitivity is associated with religiosity and spirituality. *Humanities and Social Sciences Communications,* 11, 244. Manuscript available at [https://doi.org/10.1057/s41599-024-02738-7].	40	Research idea, contribution to data collection, statistical analyses and supervision of the original draft, participation in its revision

3 Aims of the study and research questions

3.1 Aims of the study

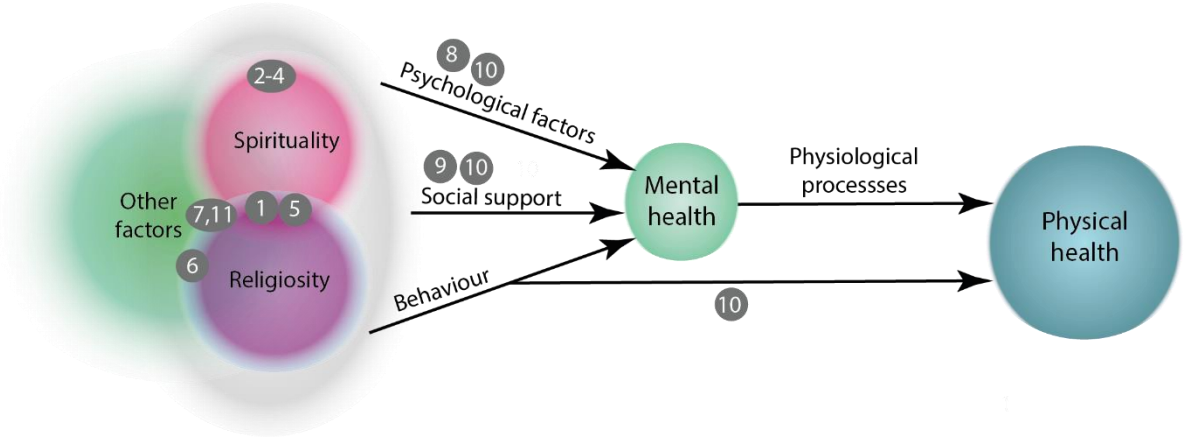
This thesis aims to examine the relationships between R/S and health in the secular conditions of the Czech Republic. A further aim is to explore possible sources of the discrepancies between the findings of various research studies in this area, with a special focus on measurement problematics. Finally, this thesis offers four tools for measuring R/S that have not yet been validated in the Czech environment and one newly developed instrument for measuring guilt and shame experience, i.e., a construct that may interfere with R/S assessment.

Thus, **Study 1** provides an overview of R/S prevalence in the country and the attitudes of Czech inhabitants towards R/S. **Studies 2, 3, 4 and 5** provide the results of validation analysis of four selected R/S measures. **Study 6** describe validation analyses of a new tool for measuring the experience of guilt and shame, a construct closely linked to R/S. Further studies explore possible roots of R/S attitudes (**Study 7**) and pathways of R/S to health: a psychological pathway (**Studies 8 and 10**), social support (**Studies 9 and 10**) and behaviour (**Study 10**). Finally, **Study 11** examines the associations between R/S and sensory processing sensitivity, a potentially overlooked confounding variable, in the associations of R/S with health.

The Discussion aims to integrate all these findings. However, in order to provide a more comprehensive picture, it also aims to integrate the other already published work of the author of this thesis in the field of associations of R/S with health. This approach helps to gather substantial evidence to answer the research questions of this thesis in a greater depth.

The sequence of the research question and the discussion of the findings follows the model of the relationships of R/S and health presented in Figure 2, which depicts the focus of the research studies included in this thesis.

Figure 2 Original publications of this thesis in relation to the proposed model of R/S and health.



3.2 Research questions

Seven main research inquiries, simplistically labelled as research questions, were formulated based on the previously stated aims.

Research question 1 (Chapter 17.1.): What is the prevalence of R/S in the Czech Republic and what are the attitudes of Czech people towards R/S? What impact can the secular Czech environment have on the assessment of R/S and health?

Research question 2 (Chapter 17.2.): Is there any consistent finding linking studies investigating the psychometric characteristics of the newly validated R/S instrument in the Czech context? Can the secular environment of the Czech Republic influence the psychometric characteristics of the R/S measurement instruments?

Research question 3 (Chapter 17.3.): Could the utilisation of diverse instruments for measuring R/S lead to variations in research outcomes within the field of R/S? Is this heterogeneity also observable in sociodemographic associations? Additionally, could a portion of this heterogeneity be attributed to the inclusion of well-being-related items in R/S measurement instruments?

Research question 4 (Chapter 17.4.): How can causality problems contribute to the heterogeneity of research findings in the area of R/S and health?

Research question 5 (Chapter 17.5.): Could the variability in scaling, dichotomisation and different combinations of R/S variables contribute to the observed heterogeneity in the research findings? When combining religiosity and spirituality, which are the most vulnerable groups?

Research question 6 (Chapter 17.6.): How can confounding variables contribute to the heterogeneity of research findings in the area of R/S and health?

Research question 7 (Chapter 17.7.): Do the pathways connecting R/S to health outcomes (i.e., the psychological pathway, social support and health behaviour) exhibit inconsistencies in results that might contribute to the overall heterogeneity of research findings?

3.3 Structure of the thesis

Chapter 1 provides an overview of the core concepts: religiosity, spirituality and their prevalence in the Czech Republic; R/S measurement tools and R/S links with health, including possible reasons for inconsistent findings in this area. The study's aim and the research questions are also formulated in this chapter.

Chapter 2 provides a list of 11 original publications and one additional publication.

Chapter 3 provides an overview of the aims of the study aim and the research questions.

Chapter 4 describes the research samples used in this thesis. It also provides information on the design of the partial studies, measures and statistical analyses.

Chapter 5 presents an overview of the prevalence of R/S in the Czech Republic, the attitudes of Czech inhabitants towards R/S and explores the roots of these attitudes.

Chapter 6 provides the results of a psychometric evaluation of the Daily Spiritual Experience Scale in the Czech environment.

Chapter 7 provides the results of a psychometric evaluation of the Functional Assessment of the Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp) Scale in the Czech environment and offers an adjusted version of the tool.

Chapter 8 provides the results of a psychometric evaluation of the Spiritual Well-Being Scale in the Czech environment and offers an adjusted version of the tool.

Chapter 9 provides the results of a psychometric evaluation of the Religious and Spiritual Struggles Scale in the Czech environment.

Chapter 10 offers a new tool for measuring guilt and shame, the Guilt and Shame Experience Scale, provides its psychometric characteristics and shows its association with religiosity.

Chapter 11 explores possible roots of certain R/S attitudes, i.e., it describes associations of childhood trauma experiences with religious and spiritual struggles.

Chapter 12 explores associations of self-esteem with different aspects of R/S (i.e., religiosity, religious attendance, frequency of prayer, negative religious coping, image of God and spirituality) and their combination.

Chapter 13 explores associations of adolescent R/S with family characteristics, i.e., family communication, perceived emotional support, and parental monitoring.

Chapter 14 assesses changes in relationships, emotions, day structure, thinking and behaviour during the COVID-19 pandemic in association with religiosity, spirituality and their combination.

Chapter 15 explores associations of sensory processing sensitivity with various aspects of R/S (i.e., religiosity, spirituality, image of God, negative religious coping and religious conspiracy theories)

Chapter 16 summarises and discusses the main findings of this thesis.

4 Data sources

This chapter provides a description of the study samples (4.1), measures (4.2) and statistical analyses (4.3) used in this thesis.

4.1 Study samples and Procedures

This thesis is based on nine different samples from four nationally representative surveys and five online surveys. Participation in all the surveys was anonymous and voluntary.

For **Studies 1 and 2**, a nationally representative sample of the Czech population aged fifteen years and older (n=1800; 46.4 ± 17.4 years; 48.7% men) was obtained using a two-step procedure. In the first step, the questionnaire and all further procedures were piloted among 206 participants. This led to the final version of the survey. In the second step, a different sample of 2,184 participants was randomly chosen with the help of quota sampling and asked to participate in a study on the problematics of health, life experiences, attitudes and lifestyle. Of these respondents, 384 (17.6%) did not want to participate in the survey. Non-participants reported a lack of time (39.2%), a lack of interest in or distrust in research in general (24.0%), the personal nature of the questions (17.2%) and the length and difficulty of the questionnaire (11.2%) among the main reasons for their non-participation. Data was collected by professionally trained administrators of the SPIROX company (Prague, Czech Republic) in September and October 2016, through a standardised interview with the respondents (face-to-face).

For **Studies 3, 5 and 7**, a nationally representative sample of the Czech population aged 15 years and older (n=1000; 46.0±17.3 years; 48.6% men) was obtained using a two-step procedure. In the first step, the questionnaire and all further procedures were piloted among 109 participants. This led to the final version of the survey. In the second step, another 1215 participants were randomly chosen with the help of quota sampling and asked to participate in a study focusing on health, life experiences and attitudes and lifestyle. Of these respondents, 215 (17.7%) refused to participate in the survey. Participants reported a lack of time (45.6%), a lack of interest or distrust in research in general (22.1%), the length and difficulty of the questionnaire (19.1%) and the personal nature of the questions (4.4%) among the main reasons for refusal. Data was collected by professionally trained administrators of the SPIROX company in November and December 2014 by means of a standardised interview with the respondents (face-to-face).

For **Study 4**, a nationally representative sample of the Czech population aged 15 years and older (n=1797; 45.9±17.67 years; 48.6% men) was obtained using a two-step procedure. In the first step, the questionnaire and all further procedures were piloted among 228 participants. This led to the final version of the survey. In the second step, another 2089 participants were randomly chosen with the help of quota sampling and asked to participate in a study focusing on health, life experiences and attitudes and lifestyle. Of these respondents, 292 (14.0%) participants refused to take part in the survey. As the main reasons for doing so, they reported that they do not have enough time (49.5%), that they were not interested or did not trust this kind of research (21.4%) and that the survey was too long (13.2%). Data was collected by professionally trained administrators of the SPIROX company in November 2013 by means of a standardised interview with the respondents (face-to-face).

For **Study 6**, an online sample (n=1101; 34.4±13.0 years; 26.9% men) was gathered. In the first step, the questionnaire was piloted on a sample of 324 primary and secondary school students (administration by pencil and paper) and a sample of 316 adult respondents aged over 15 years old (filling in an online questionnaire). Next, the research sample was gathered using a snowball technique through a short online questionnaire (n=705) and a larger online survey (n=306). The data was gathered from June to November 2017.

Study 8 used an online sample of Czech respondents aged 15 years and over gathered by snowball sampling (n=464; 30.7±12.6 years; 27.2% men). This online survey was spread from April 2017 to November 2017 mainly among religious participants (via e-mail, Facebook and advertisement among the students of the St Cyril and Methodius Theological Faculty in Olomouc). Data cleaning involved the exclusion of low-quality respondents who filled in the survey in an extremely short time (i.e. less than 15 minutes for a study lasting about an hour).

For **Study 9**, a nationally representative Czech adolescent sample (n=4182; 14.4±1.07 years; 48.6% boys) was obtained from the 2014 Health Behaviour in School-aged Children (HBSC) study. According to the HBSC study protocol, schools were selected randomly after stratification by region, school size, and type of school. Out of 243 contacted schools, 242 schools agreed to participate (response rate 99.6%). Data from 14,539 pupils were obtained (response rate 89.2%). Most non-response was due to illness or other reasons (10.6%). In the HBSC study, the R/S items belonged to national items that were included only into one of the two versions of the study and only adolescents from the 7th and the 9th grades responded to these questions; so, for the purpose of this paper the dataset comprised 4889 adolescents. Because of incomplete information on age, gender, spirituality, or religiosity, or an age distinctly differing from the rest, 707 questionnaires were excluded, leading to a final sample of 4182 respondents. Data was collected between April and June 2014. The questionnaires

were distributed by trained administrators with no teachers present in the classroom in order to reduce information bias.

Study 10 used an online sample of the Czech population aged 18 years and over gathered by a professional agency (the Czech National Panel, Prague, Czech Republic) to achieve a balanced sample close to national characteristics regarding age and gender. Data was collected in April 2020. The online survey was prepared at the researcher's institution, and the agency ensured their distribution using quota sampling to achieve a balanced sample close to national characteristics in terms of age and gender. To ensure high data quality, the following exclusion criteria were applied: 1) inconsistencies in control questions and 2) a uniform response pattern, i.e., answering a large number of items in the same way. The final sample comprised 1,434 Czech adult respondents (48.3±16.4 years; 50.3% men).

Study 11 utilized data from two online surveys of the Czech population aged 18 years and over gathered by a professional agency (the Czech National Panel, Prague, Czech Republic) to achieve a balanced sample close to national characteristics regarding age and gender. The first data sample was collected in April 2020 and data for the second sample in April 2021. To ensure high data quality, the following exclusion criteria were applied: 1) a very short period filling in the survey and 2) a uniform response pattern, i.e., responding to most of the items in the survey in the same way. Consequently, based on these criteria, 166 problematic subjects were excluded. Thus, the final first sample comprised 1,406 Czech respondents (48.1±16.4 years; 50.6% men), and the final second sample 1,494 Czech respondents (50.7±15.8 years; 55.9% men).

4.2 Measures

This section provides an overview of the R/S variables used in this study. Table 2 presents the R/S variables used in studies 1–12. A detailed description of the treatment of these variables (dichotomised or a scale variable) and their role in the analysis (dependent, independent variable) is provided separately in each study.

Table 2 A summary of R/S variables used in concrete studies.

	Publication title	**R/S variables**
1	Czech Out the Atheists: A Representative Study of Religiosity in the Czech Republic	religious affiliation, religious attendance, amount of time spent in prayer per day, beliefs about going to heaven, religious upbringing, conversion experience, reason for being a nonbeliever, stability of non-religious attitudes, N-RCOPE, God's image (Baylor Religion Survey), DSES
2	Psychometric evaluation of the Daily Spiritual Experience Scale (DSES) in the Czech environment	DSES, religious affiliation
3	Psychometric evaluation of the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (FACIT-Sp) Scale in the Czech environment	FACIT-Sp, religious affiliation
4	Czech Version of the Spiritual Well-Being Scale: Evaluation and Psychometric Properties	SWBS, religious affiliation
5	Psychometric evaluation of the Religious and Spiritual Struggles Scale (RSS) in the Czech environment.	RSSS, religious affiliation
6	Psychometric Analysis of the Guilt and Shame Experience Scale (GSES)	religious affiliation
7	Associations of childhood trauma experiences with religious and spiritual struggles	RSS, religious affiliation
8	Associations of self-esteem with different aspects of religiosity and spirituality	Self-esteem, religiosity, religious attendance, frequency of prayer, N-RCOPE, God's image (Baylor Religion Survey), DSES
9	Are adolescent religious attendance/spirituality associated with family characteristics?	SWBS, religious attendance

10	The Associations of experiencing the COVID-19 pandemic with religiosity and spirituality: a cross-sectional study in Czech adults.	religious affiliation, DSES
11	Sensory processing sensitivity is associated with religiosity and spirituality.	religious affiliation, religious attendance, God's image (Baylor Religion Survey), N-RCOPE, religious conspiracy theories about COVID-19 pandemic

* Multi-Dimensional Fundamentalism Inventory

4.3 Statistical analyses

Several statistical methods were used across this study. All analyses, with the exception of the mediation analysis, were performed using the statistical software IBM SPSS Statistics, versions 21 or 28 and R 3.4.0. Each chapter provides detailed information about the performed statistical analyses.

Study 1 used Bayesian statistical analysis methods. For a comparison of the mean values in the groups of respondents, a Bayesian alternative to the t-test was used. Posterior estimates for group means and their differences and effect sizes were computed with the BEST (Bayesian Estimation Supersedes the t-Test) package in R. The procedure uses a Bayesian Monte Carlo Markov Chain (MCMC) process implemented in JAGS. The minimally informative default priors were used: normal priors with a large standard deviation for the population means, broad uniform priors for standard deviations and a shifted-exponential prior for the common normality parameter. The comparison of the proportions in various groups of respondents was assessed using the Bayesian First Aid package in R. The non-informative *Beta(1, 1)* priors for *Theta* parameters were used. The posterior probabilities were estimated using a Bayesian MCMC process. All analyses were performed using the R 3.6.0 statistical software.

Studies 2–6 provide the results of psychometric assessment of three widely used spirituality measures, i.e., the DSES scale (Study 2), the SWBS (Study 3) and the FACIT-Sp (Study 4), a measure of religious and spiritual struggles, i.e., the RSS (Study 5) and one other measures, i.e., the GSES scale (Study 6). All these studies assessed the normality of the distribution of the observed variable through histograms and normality tests, particularly the Shapiro–Wilk test. As all the data deviated from the assumption of normal distribution, non-parametric statistical methods were consistently utilised. These methods included the Mann–Whitney, Kruskal–Wallis, and Wilcoxon rank-sum tests with Bonferroni correction for multiple

comparisons. The mutual correlation of the individual scale items was evaluated using Spearman's correlation coefficient or polychoric correlations.

The determination of the number of factors involved multiple methods, encompassing Kaiser's criterion, scree plots, parallel analysis and the Minimum Average Partial (MAP) test. They were performed on the polychoric correlation matrix using the random.polychor.pa package in the R programming environment. In the evaluation of data distribution, the main component was the application of factor analysis techniques. Specifically, exploratory factor analysis (EFA) was conducted to unravel the underlying factor structure within the questionnaires. Because of the intercorrelation among scale items, EFA often implemented oblique rotation. Subsequently, confirmatory factor analysis (CFA) was carried out, typically using the lavaan package in R, with estimation of the parameters from ordinal data using the Diagonally Weighted Least Squares (DWLS) method. The evaluation of model fit in CFA encompassed various fit indices, such as the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR), with specific threshold values indicating an acceptable fit. Cronbach's alpha and McDonald's omega were employed to assess the reliability of the scales. Finally, the associations of the score on the scale and its subscales with basic sociodemographic characteristics involved gender, age, marital status, way of life (i.e., with parents, alone, with a partner or with a husband/wife), the highest education achieved, economic activity and religious affiliation.

Studies 7–11 are cross-sectional studies. As the first step, these studies generally assessed the normality of distributions, e.g., by the Shapiro–Wilk test and histograms, and then described the background characteristics of the sample. If this step involved the assessment of differences between sociodemographic groups, the Mann–Whitney U test, a Chi-square test and a Test of Proportions (Z-test) or the Kruskal–Wallis test were performed. For p values from multiple group comparisons, Bonferroni correction was used. If the study explored association between independent variables, Spearman's rank order correlation (r_s) was used because of the non-normal distribution of the data. Consequently, in most cases, binary logistic regression was used to assess the association between independent and dependent variables. Where possible, independent variables were used as scale variables, usually standardised to Z-scores, and the models were first analysed as crude and then adjusted for age, gender, educational level and in some studies also socioeconomic or marital status. All analyses were conducted using the IBM SPSS version 25 or 28 statistical software.

8 Study 4: Czech version of the Spiritual Well-Being Scale: Evaluation and psychometric properties

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Abstract

Spirituality and spiritual well-being are connected with many areas of human life. Thus, especially in secular countries, there is a need for reliable validated instruments for measuring spirituality. The Spiritual Well-Being Scale (SWBS) is among the world's most often used tools; therefore, the aim of this study was its psychometrical evaluation in the secular environment of the Czech Republic on a nationally representative sample (n=1797, mean age 45.9±17.67; 48.6% men). A non-parametric comparison of different sociodemographic groups showed a higher disposition for experiencing spirituality among women, older people and divorced persons. Based on Confirmatory Factor Analysis (CFA), negatively-worded items were excluded using a polychoric correlation matrix. The new version of the scale consisting of eleven items had good internal consistency (Cronbach's $\alpha = 0.85$; McDonald's $\omega_t = 0.91$). The two-factor model of this shortened version, with factors corresponding to the Religious and the Existential subscales of the SWBS, shows a satisfactory fit with the data, where the loadings of all items ranged from medium to high. Thus, this study offered a new version of the tool, convenient for measuring spiritual well-being in secular conditions.

Keywords: SWBS; spirituality; religiosity; psychometric evaluation; Czech

Introduction

In recent years, the need to measure spirituality as a factor influencing health and well-being has arisen in the scientific world, and the construct of spirituality has been broadly examined (Koenig, 2008). Attention towards the concepts of spirituality and religion has intensified, and many empirical studies have been published in recent decades. Nevertheless, as researchers point out, the concepts of religiosity and spirituality are not clearly and uniformly defined in the scientific community, which can make comparing different studies difficult (Hill & Pargament, 2003; Koenig, 2008). Moreover, research instruments used in predominantly religious countries might not be suitable for secular ones.

Among the many tools for measuring spirituality, the Spiritual Well-Being Scale (SWBS) developed by Paloutzian and Ellison (Ellison, 1983; Paloutzian & Ellison, 1982) is one of the most widely used. The scale has been used in different settings on a wide variety of different samples specific for the particular setting (Ellison, 1983). The SWBS measures two dimensions of spiritual well-being: the vertical one, Religious Well-Being (RWB), represents well-being related to God, while the horizontal one, Existential Well-Being (EWB), focuses on a meaning of life and life satisfaction.

Since the psychometric evaluation of the SWBS has been examined in many settings, it has led to different results. The two-factor structure of the scale found by Ellison (1983) was disputed in later studies. As the RWB and EWB subscales correlate with each other and show a high correlation to the overall SWB (Ellison, 1983), it might be considered, as Gorsuch (1984) argued, that they share a single general religious factor. Ledbetter et al., (1991) showed that neither the general factor model nor the two-factor model provided a satisfactory conceptualization of the SWBS factor structure and suggested that the scale might be factorially complex. Further studies suggested different factorial structures of the SWBS, depending on the sample used. Thus, Genia (2001) confirmed the original two-factor structure on a sample of college students, while Miller et al. (1998) found a three-factor structure in Caucasian subjects and a five-factor structure in African-Americans. However, Utsey et al. (2005) did not confirm this five-factor model on a different African-American sample. Scott et al. (1998) and Gow et al. (2011) identified a three-factor structure in their studies. Other language variations of the SWBS did not show a clear structure either. Musa and Pevalin (2012), for example, reported a two-factor structure in a sample of Arabian patients from Jordan, and Martinez et al. (2013) found a three-factor structure of the SWBS in a sample of Portuguese students. Murray et al. (2015) suggested that the additional factors identified in these studies might not reflect substantive constructs, but reveal only the presence of

common variance due to methodological artefacts, such as item wording, item complexity and different understanding of items among religious and nonreligious individuals.

The Czech Republic is an area of special interest in spirituality research, because according to the Pew Research Center (2014), it is the country with the highest percentage of religiously unaffiliated people in the world, and a recent nationally representative study report only 9.4% of respondents affiliating themselves to any church or religion (Malinakova et al., 2018). Therefore, there is a dramatic decrease from 1991, where 44% of the population identified themselves as Catholic. This shift may be related to the history of the country, concretely to the 40 years of the communist regime. This period strengthened already existing negative attitudes towards the church (Nesporova & Nespor, 2009), which are probably linked to the Czech reformation (Hussitism) in the 14th century, a forced re-Catholicisation in the 17th and 18th century and a rise of nationalism in the late 19th and early 20th centuries (Hamplova & Nespor, 2009).

This secular setting could possibly modify the studied associations with spirituality which have been reported in religious countries, i.e. countries where a majority of population identify themselves as believers. Therefore, the aim of this article was to present the translated Czech version of the questionnaire and its validation, i.e., to assess the psychometric properties of the Spiritual Well-Being Scale on a representative sample of the Czech population.

Methods

Participants and procedure

The Czech version of the SWBS was used as a component of a broader nationally representative survey focused on health and a healthy lifestyle of Czech adults. First, in November 2013 the questionnaire was piloted among 228 participants, which resulted into the final version of the survey. Consequently, from November to December 2013, other 2089 participants were randomly chosen using quota sampling. This type of sampling imitates in the sample the known characteristics of the population. In this case were used the criteria that allowed the construction of the representative sample that corresponds to the adult Czech population (aged 15 years in over) with regards to gender, age, education and regional affiliation. However, 292 (14.0%) participants refused to take part in the survey. As the main reasons for doing so, they reported that they do not have enough time (49.5%), that they were not interested or did not trust this kind of research (21.4%) and that the survey was too long (13.2%). Thus, the final

sample consisted of 1797 respondents aged 15 years and over. A process of data collection was carried out by professional administrators using a standardized face-to-face interview.

All procedures were done according to the ethical standards of the institutional and national research committee and the 1964 Declaration of Helsinki and its later amendments.

Measures

The original SWBS was translated into Czech by two independent translators specializing in translations of psychological literature. The two versions, especially the differences in the translation, were discussed in a working group consisting of the translators and researchers in order to create the unified version of the instrument. Consequently, this version was translated back into English by a professional native English translator fluent in Czech. In the next step, the translated version was compared with the original version of the scale. The final version was discussed in a focus group which consisted of both religious and non-religious members representing also different spirituality backgrounds. None of the items were identified as problematic, and the Czech translation of the SWBS was considered suitable for use in further research. The final Czech version was afterwards approved by the author of the scale.

The SWBS consists of 20 items, which can be answered on a 6-point scale ranging from "*strongly agree"* (in our study corresponding to 1 point) to "*strongly disagree"* (in our study corresponding to 6 points). Negatively worded items have reverse scoring. Thus, in this form the higher summary score would correspond to a lower level of spirituality. However, for the purpose of a better presentation of the results, we reverted the score of the positive items, so a higher SWBS score corresponds to a higher level of spirituality.

It takes approximately 10 to 15 minutes to answer the questions. The scores of the odd items are summed up to create a final score for the Religious Well-Being scale. The scores of the even items are intended to measure the Existential Well-Being scale. In each subscale, the final scores can vary from 10 to 60. Consequently, the total SWB Scale score ranges between 20 and 120.

Statistical analyses

Normality of the data distribution was appraised by histograms, and then tested with the Shapiro-Wilk test. The total score of the SWB Scale and its individual items were shown to be non-normal, thus nonparametric tests were applied for statistical comparison of groups: the Wilcoxon rank-sum and the Kruskal-Wallis tests. In case of multiple group comparison, the Bonferroni correction was employed.

Confirmatory Factor Analysis (CFA) was used to assess the factorial structure of the questionnaire. Due to the categorical nature of the scale items, CFA was based on the matrix of polychoric correlations. For CFA, the *lavaan* R Package was used, which employs the DWLS estimator of ordinal items parameters. Several indices of acceptability of model fit were used: CFI and TLI > 0.95; SRMR < 0.07; and RMSEA < 0.06 (Yu, 2002). Cronbach's alpha and McDonald's omega were employed to assess the reliability of the SWB Scale. For sociodemographic comparisons, the SWBS as well as its subscales were used as continuous variables. All statistical analyses were carried out with the R software, version 3.6.0.

Results

Factorial validity

The descriptive statistics of all items of the scale are presented in Table 1. The correlation coefficient used in Table 1 corrects for the overlap of items (R Core Team, 2017). All positively formulated items of the SWB Scale show an acceptable strength of correlation with the scale (emphasized in boldface in Table 1). The correlation coefficients of the positive items range from r = 0.30 to r = 0.50. Most of the negatively formulated items, however, do not show an acceptable correlation with the scale. There are correlations as low as r = 0.20 to r = 0.09. One of the negatively worded items (item No. 13) even has a negative correlation with the scale.

Table 1 Descriptive statistics of the SWB Scale items. Positively worded items are emphasized in boldface.

SWB Scale Items		Mean	SD	Correlation with the SWBS
1	I don't find much satisfaction in private prayer with God.	4.1	1.9	0.02
2	I don't know who I am, where I came from, or where I'm going.	2.4	1.4	0.29
3R	**I believe that God loves me and cares about me.**	**2.8**	**1.7**	**0.53**
4R	**I feel that life is a positive experience.**	**4.4**	**1.4**	**0.32**
5	I believe that God is impersonal and not interested in my daily situations.	3.6	1.8	0.09
6	I feel unsettled about my future.	3.5	1.5	0.20
7R	**I have a personally meaningful relationship with God.**	**2.5**	**1.6**	**0.56**
8R	**I feel very fulfilled and satisfied with life.**	**4.1**	**1.2**	**0.33**
9	I don't get much personal strength and support from my God.	3.8	1.7	0.14
10R	**I feel a sense of well-being about the direction my life is headed in.**	**4.0**	**1.2**	**0.39**
11R	**I believe that God is concerned about my problems.**	**2.6**	**1.6**	**0.58**
12	I don't enjoy much about life.	2.5	1.3	0.25
13	I don't have a personally satisfying relationship with God.	4.0	1.8	-0.03
14R	**I feel good about my future.**	**4.1**	**1.2**	**0.30**
15R	**My relationship with God helps me not to feel lonely.**	**2.6**	**1.7**	**0.55**
16	I feel that life is full of conflict and unhappiness.	2.9	1.4	0.33
17R	**I feel most fulfilled when I'm in close communication with God.**	**2.3**	**1.5**	**0.58**
18	Life doesn't have much meaning.	2.1	1.2	0.30
19R	**My relation with God contributes to my sense of well-being.**	**2.5**	**1.6**	**0.59**
20R	**I believe there is some real purpose for my life.**	**4.3**	**1.3**	**0.34**

Note: R=the item scoring has been reversed; SD = standard deviation; Correlation with the Scale = correlation of the item with the whole scale, corrected for ovelapping

Our data met the standard criteria for using factor analysis as described in Cerny and Kaiser (1977): statistical significance of the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) coefficient > 0.80. The KMO test measures sampling adequacy for each variable in the model and for the complete model, in our case the KMO = 0.91. In CFA, χ^2 assess the overall fit and the discrepancy between the sample and fitted covariance matrices. In our case, χ^2 (190) = 16808.9, p <0.001. A unidimensional (one-factor) model, as well as a two-factor model (with factors RWB and EWB) were considered for the confirmatory factor analysis (CFA) according to the theoretical background of the SWB Scale (Ellison, 1983). In a one-factor CFA model, the loadings of several items are positive, while those of several items are negative. The criteria values of CFI, TLI, SRMR, and RMSEA (see Table 2) show that the model does not have a satisfactory fit to the data. In a two-factor CFA model, the positive items have positive loadings, while the negative items have negative loadings. The two-factor model shows a

better fit to the data than the unidimensional model (CFI and TLI ≥ 0.95), but the residuals are too high (SRMR and RMSEA > 0.1), see Table 2.

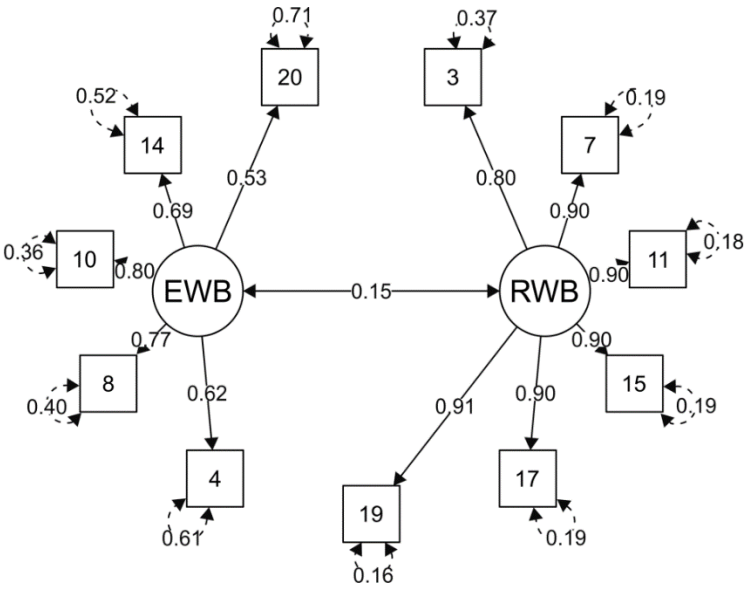
Table 2 Parameters of fit of several CFA models on the complete SWB Scale and on the SWB Scale consisting of positively worded items only.

	1-factor model All items	2-factor model All items	1-factor model Positive items	2-factor model Positive items
DWLS Chi-Square	19122.9 (df 170)	7281.3 (df 169)	7920.2 (df 44)	**314.6 (df 43)**
P-value	< 0.001	< 0.001	< 0.001	**< 0.001**
CFI	0.882	0.956	0.936	**0.998**
TLI	0.868	0.950	0.919	**0.997**
RMSEA (90% CI)	0.249 (0.246–0.252)	0.153 (0.150–0.156)	0.316 (0.310–0.322)	**0.059 (0.053–0.066)**
SRMR	0.168	0.120	0.199	**0.049**

Note: An acceptable model fit was considered CFI, TLI>0.95; SRMR<0.07; and RMSEA<0.06. DWLS: diagonally weighted least squares; CFI: comparative fit index; TLI: Tucker–Lewis index; SRMR: standardized
root mean square residual; RMSEA: root mean square error of approximation; CI: confidence interval. A scaled difference chi-square test p<0.001.

Thus, in the next step we excluded the negatively worded items from the scale and performed the CFA analysis on the eleven positively worded items only. In a one-factor model, several items have low loadings (with values < 0.50). The unidimensional model does not meet the criteria of satisfactory fit to the data (see Table 2). However, the two-factor model consisting of the positive items only shows a satisfactory fit: CFI = 0.998, TLI = 0.997, SRMR = 0.049, RMSEA = 0.059 (90% CI 0.053–0.066). There are medium to high loadings of all items, with values of 0.80–0.92 in the RWB subscale and 0.54–0.80 in the EWB subscale. The correlation between the RWB and EWB subscales is r = 0.15. The structural equation model with two factors on positive worded items is presented in Figure 1.

Figure 1 SEM path model of the SWB Scale with two factors, with positively worded items only.



Reliability

The reliability of the complete and the shortened version of the SWB Scale was verified with the Cronbach's alpha and McDonald's omega coefficients. The complete 20-item scale shows an unacceptably low internal consistency, with α = 0.65 (95% CI 0.63–0.68) and ω = 0.83.

After excluding the nine negatively formulated items, the Czech version of the scale has an acceptable reliability, with Cronbach's α = 0.85 (95% CI 0.84–0.86) and McDonald's ω = 0.91. The reliability of the RWB subscale with positive items is α = 0.94 (95% CI 0.93–0.94) and ω = 0.95; the reliability of the EWB subscale with positive items is α = 0.77 (95% CI 0.76–0.79) and ω = 0.80. Based on the results of CFA and internal consistency, all subsequent analyses were performed on the shortened SWB Scale with eleven positive items.

Sociodemographic differences

Descriptive statistics of the demographic characteristics are shown in Table 3. The total score of the shortened SWB Scale and its subscales was compared among different sociodemographic groups. The scores were not normally distributed; therefore, non-parametric statistics were employed to test the differences. Table 3 shows the results of the non-parametric comparison of the shortened SWB Scale total score (with eleven positive items) and its RWB and EWB subscales (gender differences were tested with Wilcoxon rank-sum test, other comparisons with Kruskal-Wallis test).

Table 3 Descriptive statistics of the data set.

		SWBS Total Score		RWB Score		EWB Score	
	n (%)	Mean (SD)	Significance	Mean (SD)	Significance	Mean (SD)	Significance
Total	1797 (100)	36.2 (10.2)		15.2 (8.4)		20.9 (4.6)	
Gender							
1. male	874 (48.6)	35.4 (9.9)	p < 0.001	14.5 (8.1)	p < 0.001	20.9 (4.6)	n.s.
2. female	923 (51.4)	36.9 (10.4)		15.9 (8.6)		21.0 (4.6)	
Age							
1. 15–19	109 (6.1)	34.5 (9.2)	p < 0.001 (1–6*, 1–7***, 2–6***, 2–7***, 3–7***, 4–6*, 4–7***, 5–7**)	13.2 (7.3)	p < 0.001 (1–6**, 1–7***, 2–5*, 2–6***, 2–7***, 3–6**, 3–7***, 4–6**, 4–7***, 5–7***)	21.3 (4.4)	n.s.
2. 20–29	297 (16.5)	34.4 (9.1)		13.1 (7.6)		21.3 (4.3)	
3. 30–39	299 (16.6)	35.6 (9.3)		14.2 (7.6)		21.4 (4.7)	
4. 40–49	325 (18.1)	35.0 (9.3)		14.4 (7.7)		20.6 (4.5)	
5. 50–59	265 (14.7)	36.2 (9.8)		15.4 (8.1)		20.8 (4.5)	
6. 60–69	325 (18.1)	38.0 (11.6)		17.2 (9.3)		20.8 (4.9)	
7. 70+	177 (9.9)	39.7 (11.7)		19.3 (9.0)		20.5 (4.9)	
Marital Status							
1. single	501 (27.9)	34.5 (9.1)	p < 0.001 (1–2**, 1–4***, 2–4***, 3–4*)	13.3 (7.4)	p < 0.001 (1–2**, 1-3*, 1–4***, 2–4***, 3–4**)	21.2 (4.4)	n.s.
2. married	824 (45.9)	36.3 (10.4)		15.3 (8.5)		21.0 (4.7)	
3. divorced	208 (11.6)	36.3 (9.1)		15.4 (7.9)		20.9 (4.6)	
4. widow/er	196 (10.9)	39.5 (12.1)		19.1 (9.3)		20.5 (5.0)	
5. unmarried mate	68 (3.8)	36.8 (9.7)		16.0 (8.4)		20.8 (4.5)	
Education							
1. primary	160 (8.9)	34.9 (10.4)	n.s.	14.8 (8.5)	n.s.	20.1 (4.6)	p < 0.001 (1-3**, 1–4**, 2–3**, 2–4**)
2. skilled operative	561 (31.2)	36.3 (11.1)		15.9 (8.7)		20.4 (4.9)	
3. high school	737 (41.0)	36.1 (9.9)		14.8 (8.2)		21.4 (4.3)	
4. college/ university	339 (18.9)	36.6 (9.1)		15.1 (7.9)		21.4 (4.6)	
Religiosity							
1. Religious in a church	177 (9.9)	48.2 (10.9)	p < 0.001 (1–2***, 1–3***, 2–3***)	26.2 (7.7)	p < 0.001 (1–2***, 1–3***, 2–3***)	22.0 (4.7)	p < 0.001 (1–3***)
2. Religious outside of church	401 (22.3)	42.7 (9.2)		21.5 (7.2)		21.2 (4.0)	
3. Non-religious	1219 (67.8)	32.3 (7.6)		11.6 (5.9)		20.7 (4.8)	

Note: SD = standard deviation; n.s. = non-significant, ***p < 0.001, **p < 0.01, *p < 0.05.
The p-value denotes all-group comparison, while results in parentheses denote multiple group comparison with the Bonferroni correction.

In the shortened SWB Scale and its RWB subscale, men were found to have slightly lower mean scores than women, where the differences are statistically significant but with a small effect size ($p < 0.001$, Cohen $d = 0.15$, $\eta^2 = 0.006$ in SWBS and $d = 0.16$, $\eta^2 = 0.007$ in RWB). The Wilcoxon rank-sum test showed no significant difference in EWB score between men and women. No statistically significant differences were found in the EWB subscale either in the age groups or the marital status groups. Older people tended to have higher mean scores than

younger participants in the SWBS, as well as in the RWB ($p < 0.001$, $d = 0.32$, $\eta^2 = 0.025$ in SWBS and $d = 0.41$, $\eta^2 = 0.041$ in RWB). According to the post-hoc analyses, the oldest groups of 60–69 and 70+ years and almost all younger groups showed statistically significant differences in both the SWBS and the RWB. In marital status groups, the highest mean SWBS and RWB scores were obtained for widows/widowers, while the lowest mean scores were obtained for single people ($p < 0.001$, $d = 0.27$, $\eta^2 = 0.018$ in SWBS and $d = 0.35$, $\eta^2 = 0.030$ in RWB). No statistically significant differences were found in the education groups in the SWBS and RWB. However, differences were found in the EWB subscale: the groups with higher education had higher mean EWB score ($p < 0.001$), but with only a small effect size ($d = 0.23$, $\eta^2 = 0.013$). Religious subjects were found to have higher mean scores in the SWBS, RWB and EWB than non-religious people ($p < 0.001$, $d = 1.34$, $\eta^2 = 0.31$ in SWBS, $d = 1.55$, $\eta^2 = 0.38$ in RWB and $d = 0.17$, $\eta^2 = 0.007$ in EWB). In both the SWBS and RWB, there were significant differences even between the two groups of religious subjects of those who attended a church and who were not affiliated to a church.

Discussion

We found that while the positively formulated items of the SWB Scale showed satisfactory high positive correlations with the scale, the correlations of the negative items were low or even negative. Neither a one- nor a two-factor model of the full scale showed a satisfactory fit with the data. However, a satisfactory fit was achieved by examining a two-factor model consisting only of the positive items, with the factors corresponding to the RWB and EWB subscales of the SWBS. Problems with negative items also manifested themselves in the fact that the complete 20-item scale showed an unacceptably low internal consistency, while its shortened version consisting of only eleven positive items showed good values.

Our first finding of a multiple factor structure differs from the two-factor structure which proposed the authors of the scale (Ellison, 1983) but corresponds to the results of other authors, who reported finding three (Musa & Pevalin, 2014) or more (Miller et al., 1998) factors. There are several possible reasons for such a multiplicity. First and most important, the factor structure and psychometric coefficients are properties of the data set. The individual researchers used different samples, and so the various results could rather reflect the variability of the research samples and the understanding of the meaning of the scale items by the respondents. Second, the scale has a known ceiling effect, as the data tend to be negatively skewed, especially in religious groups. Consequently, the scale does not differentiate well among people who score above the median (Bufford et al., 1991; Genia, 2001; Ledbetter et al., 1991), and so data are often not suitable for the use of the parametric

correlational techniques (Bufford et al., 1991). The violation of assumptions in statistical procedures could lead to statistical distortions and the resultant potentiality for ambiguous or confounding interpretations (Ledbetter et all., 1991). Third, besides using different samples, factor analytic studies of the SWBS have also employed different statistical techniques (Genia, 2001). A fourth explanation was suggested by Malinakova et al. (2017), who proposed that in some cases the occurrence of other factors could be a consequence of a distortion created by the use of negatively-worded items. The authors based their study on a psychometric evaluation of a shortened 10-item version of the SWBS in a representative sample of Czech adolescents and came to the same conclusions as this study.

Besides, our findings are in line with the results of another study reporting the same effect of negatively-worded items on another scale, the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (Sarnikova et al., 2018) and with the other research in this area, which showed that reverse-worded items could contaminate results due to respondents' inattention and confusion (van Sonderen et al., 2013). The fact, that part of the respondents does not choose the option that corresponds to their real feeling, but because of their lack of focus choose the exact opposite, may naturally lead to the inconsistency in the scale and the consequent lower internal consistency values. Moreover, it is also possible, especially in a highly secular environment, that a respondent's choosing of the option "I strongly disagree" of a negatively-worded item may also be interpreted as their disapproval of the way in which the items were formulated, as these items implicitly assumed the existence of God or some kind of religious belief (Malinakova et al., 2017). The fact that the scale achieved a clear two-factor structure after all the reversed items were removed may support this idea.

Our another finding is that the EWB subscale of the SWBS showed a lower reliability, as well as lower loadings of the items than the RWB subscale. Other authors (Ellison, 1983; Gow et al., 2011; Utsey et al., 2005) have also described a lower reliability. An explanation of our findings could be that the EWB represents a more heterogeneous construct. While all the RWB items are focused on the relationship with God, the items of the EWB cover several different, though related areas, as they refer to life purpose, satisfaction and the vision of the future. Even the respondents with a strong belief in the meaning of their life might feel worried about their future, e.g. due to their difficult life situation. Moreover, it is also possible that these items are formulated in a way that may be understood differently by different people, depending on their cultural background and other factors. Furthermore, some of these items might be more easily influenced by their current emotional state.

Based on the previous findings, subsequent sociodemographic analyses were performed on the shortened version of the SWBS consisting of only positively-worded items.

Compared to other categories, slightly higher SWBS scores were observed among women, older people and divorced persons. Our findings of higher spirituality among women correspond to those published another representative Czech adult samples (Malinakova et al., 2018; Sarnikova et al., 2018) and are in line with other research in this area, which came to the same conclusions (Kim et al., 2016). Given the fact that these studies used different spirituality scales, it seems that this finding could be universal and not associated with a specific research tool. Nevertheless, as Malinakova et al. (2019) described higher spirituality among boys in a representative Czech adolescent sample, further research is needed to conclude whether we can generalise the present findings to the whole population. Besides, the way of assessing spirituality (continuous vs. dichotomised) also has to be considered. Our findings of higher spirituality in the older age category are in line with other studies (Malinakova et al., 2018) and might be possibly explained by the existence of age cohorts (Hamberg, 1991) or by a growing need to review one's life and find its meaning while facing the approaching end of life (Tavel, 2004). Regarding the higher spirituality among the widows/widowers, our research agrees with the findings of other authors, who suggest that these respondents often use religious coping as a way to deal with the loss of a spouse (Michael et al., 2003).

Strengths and limitations

The findings of this study are based on the large and representative sample of Czech adults, which represents its first strength. It is also the first validation of the full version of the SWBS in the secular Czech environment. The other strength is that this study offers a new version of the tool which is convenient for this type of environment.

A limitation of our study could be the fact that a self-reported approach, as used in this study, might be more prone to a social desirable responding. It is also possible that for the non-religious respondents the wording of some questions (especially the negatively worded items asking about the relationship with God) might have been problematic and therefore difficult to answer.

Implications

Our results show that greater attention must be paid to negatively worded questions, which can disrupt the results of psychometric evaluations. Therefore, excluding these items should be considered, especially regarding negatively worded items in a secular environment.

Conclusion

This study presents a successful validation of the Czech version of the SWBS, which can be used for assessing spirituality in various sociodemographic groups of Czech population. We found that the shortened version of the SWBS scale containing 11 positively formulated items (6 RWB and 5 EWB) shows a satisfactory fit with the data and is therefore a convenient tool for assessing both religious and non-religious adult spirituality in a secular setting. Moreover, this study contributes also to a cross-cultural research in spirituality and well-being.

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12 Study 8: Associations of self-esteem with different aspects of religiosity and spirituality

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Abstract

Objectives. Religiosity and spirituality (R/S) are associated with many dimensions of human life and could contribute to one's self-esteem; how- ever, there is no certainty that this is also applicable to non-religious countries. Therefore, the aim of the study was to explore the association of different aspects of R/S with self-esteem in a secular environment.

Participants and setting. An online sample of 464 Czech respondents aged 15 and over (mean age 30.7; SD=12.63; 27.2% men) participated in the survey. Self-esteem, religiosity, religious attendance, frequency of prayer, negative religious coping, image of God and spirituality were measured.

Results. Regular prayer, spirituality (per standard deviation, SD), a low level of religious struggles (per SD) and a positive God image (per SD) were associated with higher self- esteem, with odds ratios ranging from 1.28 to 2.16 ($p<0.05$ to $p<0.001$). In contrast, compared to non-religious respondents, religious respondents had an approximately 60% lower chance of having a high level of self-esteem ($p<0.05$). However, a combination of R and S showed that while religious/spiritual respondents did not differ significantly from non-religious respondents, religious/non-spiritual respondents had approximately 79% lower chance of having good self- esteem ($p<0.001$).

Study limitations. The main limitation of this study is that it did not reach a representative sample, which limits the generalizability of the findings to the whole population. This is also the first study using this kind of research approach, which, however, limits the interpretation of results. Moreover, it is a cross-sectional study, so any conclusions on causality cannot be made, and the questionnary used only self-report mea sures, which could be influenced by a social de sirability bias.

Keywords: self-esteem; religiosity; spirituality; religious attendance; God image; prayer; religious struggle

Issue

Research has revealed that level of self-esteem has a significant effect on an individual's life. A positive association exists between self-esteem and future success in life, and a high level of self-esteem prospectively predicts well-being in multiple life domains, such as relationships, work and health (Orth & Robins, 2014). Level of self-esteem affects occupational achievements (Magnusson & Nermo, 2018) as well as physical and mental health (Lu et al., 2018; Orth et al., 2016; Orth, et al., 2014). Therefore, exploring aspects that determine an individual's self-esteem has considerable social significance.

Among possible factors associated with self-esteem are religiosity and spirituality (R/S). A growing body of research shows that various aspects of R/S are, like self-esteem, associated with better physical and mental health in general and depression more specifically (Cheadle & Schetter, 2017). Recent research shows that self-esteem mediates the relationship between spirituality and subjective well-being (Joshanloo & Daemi, 2015).

Until recently, scientific literature provided few insights into the relation between self-esteem and R/S. Studies have aimed rather to link self-esteem to religiosity in general, but the results have been inconclusive. The reason may be that both religiosity and spirituality are multidimensional constructs (Hooker et al., 2014), and various dimensions may affect self-esteem differently (Francis et al., 2001). These dimensions could include external behaviour, such as church attendance, but also more internal aspects, such as R/S struggles, attachment and God representations (Tung et al., 2018). Perceptions of self differ in how religion is experienced by the particular person. Therefore, R/S should be explored from a broader sense, using multiple dimensions.

Prior research has focused on studying R/S in the context of religious countries. Studies conducted in religious countries have shown that religious affiliation is associated with increased self-esteem (Smith & Crosby, 2017). Our previous studies (Malinakova, Kopcakova, et al., 2019; Malinakova et al., 2020) have shown the benefits of studying R/S also in the context of secular country, as it can add more information to our current knowledge. The Czech Republic is one of the most secular societies in the world (Strielkowski & Cabelkova, 2015), and Czech religious reality has been influenced by a long history of secularization (Fiala, 2009; Spousta, 2002); it thus represents a unique research area.

Therefore, the purpose of our study is to assess the association between self-esteem and different aspects of R/S, such as religious coping, the image of God and prayer in the context of a secular country. Most authors describe spirituality as a concept independent of religiosity (Rican & Janosova, 2010) and prior research has revealed that better health (King et

al., 2013) and higher life satisfaction is associated rather with spirituality than religiosity (Veselska et al., 2018). Moreover, life satisfaction of religiously affiliated individuals is connected to the fact that they belong to a religious congregation with a shared culture (ten Kate et al., 2017). The feeling of belonging, sharing the same worldview and group identity can form a harmonious, collective self-esteem which is interlinked with personal self-esteem. The cultural environment deeply affects how people evaluate themselves (Markus & Kitayama, 1991). Given the fact that in the Czech Republic most people could be defined as religious sceptics who tend to fulfil their spirituality needs outside of the traditional religion (Furstova et al., 2020), we could expect that spirituality will be better accepted than religiosity. Thus, our hypothesis is that the associations of self-esteem with R/S will differ for various aspects of R/S and that spirituality will be more strongly associated with self-esteem than religiosity.

Methods

Participants

As a part of a broader online survey focusing on spirituality and health, we obtained data on an online sample of 533 Czech respondents aged 15 years and over (April 2017-November 2017) using the snowball technique. However, 11 respondents were excluded from the online survey because of the extremely short time they spent filling in the survey (i.e. less than 15 minutes), which presumably did not allow them to fill in the survey thoughtfully. This led to a final sample of 522 respondents. However, the participation in the online survey was fully voluntary and the participants could finish answering the survey at any time. Consequently, some of them dropped out before or during completing the self-esteem questionnaire. These participants were excluded from the survey, which led to a final sample of 464 respondents (mean age 30,7, SD=12,63; 27,2% men). For other variables, the missing values are listed below the corresponding tables. Of these 464 respondents, 437 (83,7%) were religious respondents. This proportion does not correspond to the situation in the Czech Republic, where studies based on nationally representative samples usually report no more than 8% of religiously attending respondents (Malinakova, Madarasova Geckova, et al., 2018). However, as the aim of the study was to focus more closely on different aspects of R/S and their associations with self-esteem, a sample of a few hundred respondents with an adequate percentage of religious respondents corresponding to the situation in the Czech Republic would not be sufficient for the analyses. Therefore, the online survey was spread mainly to religious (via e-mail, Facebook and advertisement among the students of the St Cyril and Methodius Theological Faculty in Olomouc).

Participation in the survey was anonymous and voluntary. The study design was approved by the Ethics Committee of the Olomouc University Social Health Institute, Palacký University Olomouc (No. 2016/4).

Measures

Self-esteem was measured using the Czech version (Blatny & Osecka, 1994) of the RSES scale (Rosenberg, 1965), a widely used 10-item self-report instrument for evaluating individual self-esteem on a four-point Likert scale, with answers ranging from 1 ("Strongly agree") to 4 ("Strongly disagree"). The scoring of the positively worded items was consequently reverted and a total RSES calculated, in which the higher scores indicate higher levels of self-esteem. For the purpose of dichotomisation for the analysis, we assumed participants reaching less than 25 points as having low self-esteem, while those with 25 or above as having high self-esteem. Cronbach's alpha was 0,86 in our sample.

Religiosity was measured with the question: "At present, would you call yourself a believer?", with possible answers: "yes, I am a member of a church or religious society"; "yes, but I am not a member of a church or religious society"; "no"; "no, I am a convinced atheist". For the purpose of a further analysis, respondents who answered "yes", regardless of their affiliation to a church, were considered as *religious*, while the rest as *non-religious*.

Religious attendance was measured only in religious respondents and was assessed by the question: "How often do you go to church or to religious sessions?", with possible answers: "several times a week"; "approximately once a week"; "approximately once a month"; "a few times a year"; "exceptionally"; "never". Sunday attendance is a matter of obligation in most Christian churches/denominations; therefore, the participants who reported attending religious sessions at least once a week were dichotomized as *attending*.

Time for prayer was measured only in religious respondents and was assessed using the question: "How much time do you spend in individual/private praying? (excluding religious meetings)", with possible answers: "at least half an hour every day"; "about 10 minutes every day"; "about 10 minutes a week"; "I pray only occasionally"; "I do not pray". Participants who reported praying 10 minutes a day or more were dichotomized as praying regularly, the rest as *not praying regularly.*

Negative religious coping was measured only in religious respondents and was assessed using the negative religious coping subscale (NRC) of the Brief RCOPE (Pargament et al., 2011), validated for the Czech environment (Janu et al., 2019). It is composed of 7 items rated on a seven-point scale, with possible answers ranging from "not at all" (1) to "a great deal" (4), with the total score ranging from 7 to 28. NRC items reflect religious tensions and

struggles which grow with a less-secure relationship with the divine, for example “I wondered if God had abandoned me.”

For the purpose of our analysis we used the total score on the scale as a continuous variable, where a high score indicated low religious struggles. Cronbach’s alpha was 0,63 in our sample.

Image of God was measured both in religious and non-religious respondents and was assessed with the question “How well do you feel that each of the following words describes God?”, followed by 12 adjectives, 9 of which (critical, distant, ever-present, forgiving, friendly, kind, loving, punishing, wrathful) were taken from the Baylor Religion Survey (2005) and 3 (generous, unpredictable, demanding)were formulated in a similar way on a basis of another of our pilot research. Participants chose from four possible answers: “very well” (1); “somewhat well” (2); “not very well” (3); or “not at all” (4) to mark how well the adjectives describe God (version for religious respondents) or how well these adjectives could describe the God image of a religious person (version for non-religious respondents). The score for the items expressing a positive image of God was reverted, and a total Positive God image score was calculated, with a higher score corresponding to a more positive God image.

Spirituality was measured only in religious respondents and was assessed using the Daily Spiritual Experience Scale (DSES), which measures the frequency of ordinary experiences of connection with the transcendent in daily life (Underwood, 2006). The questions are focused on frequency of spiritual feelings and experiences for example “ I feel God’s presence” or “I experience a connection to all of life “ with possible answers “many times a day”, “every day”, “most days”, “some days”, “once in a whiles” and “never”. An adapted, 15-item version (Malinakova, Trnka et al., 2018) of the scale was used in this study. For the purpose of a larger part of our analyses we used the total score of the scale as a continuous variable. Only for the last analysis the DSES score was dichotomised in the middle, so the respondents with 51 or less points were classified as *non-spiritual*, with the rest as *spiritual*. Cronbach’s alpha was 0,92 in our sample.

Religiosity and spirituality (dichotomised DSES) were finally combined into one composite variable with three categories of respondents: non-religious; religious/spiritual; religious/non-spiritual.

Statistical analysis

First, the background characteristics of the sample were described. The distribution of the score of the RSES questionnaire was evaluated by histograms, and its normality was verified by Shapiro-Wilk’s normality test. Since the data did not meet the assumption of a normal

distribution, non-parametric methods were used for the statistical analyses. In order to evaluate the differences in mean RSES score in different sociodemographic groups, the Mann-Whitney U test or the Kruskal-Wallis test was performed. For p values from multiple group comparisons Bonferroni correction was used. The sociodemographic differences between religious and non-religious respondents were assessed using a Chi-square test and a Test of Proportions (Z-test). In the second step, the mutual relationship between all the independent variables of this study was assessed with the Spearman's rank order correlation (r_s) using binary variables or, where available, scale variables. In the third step, the associations of self-esteem with 6 aspects of religiosity/spirituality were assessed using a binary logistic regression model, first crude and then, based on the comparison of the sociodemographic groups, adjusted for gender, age, marital status and educational level. Logistic regression was chosen because of the non-normal distribution of the RSES scores, which was a contraindication for the use of a classical regression analysis. Each of the independent variables was assessed in a separate model. Finally, the associations of a composite R/S variable were assed using the logistic regression, both crude and adjusted. All analyses were performed using the statistical software package IBM SPSS version 21.

Results

The background characteristics of the sample are presented in Table 1. The average spirituality (DSES) score was 56.4 (SD=12.96); the average N-RCOPE score was 24.4±2.93, and the mean Positive God image score was 38,6±5,26. The groups of religious and non-religious respondents differed significantly in gender, marital status and education ($p<0.05$). The respondents in the non-religious group were also significantly younger (mean age 27.9; SD=11.72) than the respondents in the religious group (mean age 31.3; SD=12.81; $p<0.05$).

The results of the comparison of the mean scores of the RSES scale between sociodemographic groups showed significantly higher levels of self-esteem among men ($p<0.05$), the age categories ($p<0.05$), married participants ($p<0.05$) and groups that differed in education ($p<0.05$). Religious respondents did not differ significantly from non-religious respondents in their mean RSES scores. Similarly, there were no significant differences in RSES scores when we assessed the frequency of religious attendance and the frequency of prayer.

Table 1 Description of the study population.

	Total sample		RSES score			Religious[a]		Non-religious		
	n	%	Mean	SD	*p*-value	n	%	n	%	*p*-value
Gender										
Female	338	72.8	29.31	5.01	p<0.05	289	74.7	49	63.6	p<0.05
Male	126	27.2	28.00	5.49		98	25.3	28	36.4	
Age										
15-29 years old	279	60.1	27.54	5.52		223	57.6	56	72.7	
30-44 years old	109	23.5	29.50	5.14	p<0.01 (1-2*, 1-3*)	98	25.3	11	14.3	
45-59 years old	68	14.7	29.79	4.63		59	15.2	9	11.7	
60-90 years old	8	1.7	29.00	5.81		7	1.8	1	1.3	
Marital status										
Single/Divorced/Widow-widower	333	71.8	28.01	5.55	p<0.05	269	69.5	64	83.1	p<0.05
Married	131	28.2	29.24	4.87		118	30.5	13	16.9	
Highest education achieved										
Elementary school	46	9.9	27.28	5.54		37	9.6	9	11.7	
Secondary vocational school	16	3.4	27.56	6.00		13	3.4	3	3.9	
Secondary school with graduation	222	47.8	27.84	5.65	p<0.05	176	45.5	46	59.7	
Institute of Higher Education	180	38.8	29.34	4.84		161	41.6	19	24.7	
Religious attendance[b]										
Attending			27.90	6.11	*n.s.*	275	59.3			
Non-attending			28.24	5.09		112	24.1			
Prayer[b]										
Praying at least 10 mins a day			27.58	6.05	*n.s.*	249	53.7			
Praying less than 10 mins a day			28.45	4.99		138	29.7			
Total	464	100	28.36	5.39		387	83.4	77	16.6	

Note: [a] Independently from church attendance, [b] Only for religious respondents

n.s. = non-significant; *p < 0.05;**p < 0.01 Missing cases per variable: Religious attendance = 77; Prayer = 77.

Table 2 shows correlations between the independent variables of the study (with the exception of religiosity, which was used as the criterion for asking other R/S questions). The strongest correlations were observed for the DSES. In contrast, the N-RCOPE showed only weak or non-significant correlations.

Table 2 Correlations between the independent variables of the study (includes only religious respondents).

	Religious attendance	Prayer	Positive God image	DSES
Prayer	**.52*****			
Positive God image	**.23*****	**.22*****		
DSES[a]	**.12***	**.33*****	**.37*****	
N-RCOPE[b]	-.09	-.01	**.21*****	.10

Notes: [a] **Daily Spiritual Experience Scale.** [b]**Negative Religious Coping.**
Missing cases per variable: Religious attendance = 77; Prayer = 77. N-RCOPE = 77. DSES = 161.
*p < 0.05. **p < 0.01. ***p < 0.001

Table 3 shows the associations of dichotomized self-esteem with six aspects of R/S. In general, the results were similar both for the crude and adjusted assessment of these associations. There were no significant results for the association with religious attendance. Religious respondents had an approximately 60% lower chance of having good self-esteem; however, the other aspects of R/S showed associations in the other direction. Regular prayer, spirituality, a low level of religious struggles and a positive image of God were associated with higher self-esteem, with odds ratios (ORs) ranging from 1.28 to 2.16.

Table 3 Associations of self-esteem with six aspects of R/S: results of binary logistic regression, both crude and adjusted for age, gender, marital status and education level, leading to odds ratios (ORs) with 95% confidence intervals (95% CI).

	Self-esteem			
	Crude		Adjusted	
	OR	95% CI	OR	95% CI
Religiosity (yes vs. no)	**0.46***	0.23-0.93	**0.40***	0.20-0.83
Religious attendance (yes vs. no)	1.44	0.88-2.35	1.23	0.73-2.07
Prayer (yes vs. no)	**1.93****	1.20-3.09	**1.76***	1.07-2.91
DSES (per SD)[a]	**1.78****	1.28-2.48	**1.83****	1.29-2.59
N-RCOPE (per SD)[b]	**2.16*****	1.67-2.78	**2.16*****	1.66-2.80
Positive God image (per SD)	**1.27***	1.03-1.56	**1.28***	1.03-1.59

Notes: [a]Daily Spiritual Experience Scale. [b]Negative religious coping.

*p < 0.05; **p < 0.01; ***p < 0.001

Missing cases per variable: Religious attendance = 77; Prayer = 77. N-RCOPE = 77. DSES = 161.

Table 4 offers additional information to Table 3 by presenting associations of three combinations of R and S with self-esteem. Compared to non-religious respondents, the religious/spiritual respondents did not differ significantly, while religious non-spiritual respondents had approximately 79% lower chance of having good self-esteem.

Table 4 Associations of self-esteem with a combined R/S: results of binary logistic regression, both crude and adjusted for age, gender and education level, leading to odds ratios (ORs) with 95% confidence intervals (95% CI).

	n	%	Self-esteem			
			Crude		Adjusted	
			OR	95% CI	OR	95% CI
Non-religious	77	20.3	**1**		**1**	
Religious/spiritual	191	50.3	0.62	0.29-1.32	0.57	0.26-1.25
Religious/non-spiritual	112	29.5	**0.27****	0.13-0.58	**0.21*****	0.10-0.48

Notes: **p < 0.01; ***p < 0.001

Discussion

The purpose of our study was to examine the associations of different aspects of R/S with self-esteem. Results showed significantly higher levels of self-esteem among certain sociodemographic groups, such as men, age categories between 30 and 59 years, married respondents and participants with higher education. The main findings of our study correspond to our research hypotheses, i.e., that the associations of self-esteem with R/S will differ in various aspects of R/S and that spirituality will be more strongly associated with self-esteem than religiosity. Our study also showed that regular prayer, high spirituality, a low level of religious struggles and a positive image of God were positively associated with self-esteem. In contrast, participants who declared themselves to be religious were more likely to have lower self-esteem and we found no significant associations among religious attendance and self-esteem. However, a combination of religiosity and spirituality showed that while religious/spiritual respondents did not differ significantly from non-religious respondents, religious/non-spiritual respondents had approximately 79% lower chance of having good self-esteem.

Our findings that men have better chance of having high self-esteem agree with previous studies (Kling et al., 1999; Magee & Upenieks, 2019). Bleirdon (2016) conducted a cross-cultural study across 48 nations and found that across the studied nations, men had higher levels of self-esteem than women. Only a few studies did not observe a significantly higher level of self-esteem among men (Josephs et al., 1992). Sociocultural factors (stereotypes and socially learned gender roles) are the common explanation of men's higher self-esteem (Bleidorn et al., 2016). Some studies have also examined biological sources (hormonal influences) (Williams & Currie, 2000).

Bleirdon (2016) also revealed that self-esteem increases from late adolescence to middle adulthood, as in the case of this study. He ascribes this to biological and socioeconomic factors (health, mastery of social challenges, job). Our other finding, that marital status is also associated with self-esteem, is also consistent with prior research (Macdonald et al., 1987) and can possibly be explained by the perceived success in social roles. Our study affirmed the association of higher levels of self-esteem to higher education. There are two possible explanations for this finding. First, people with higher self-esteem may be more successful in school and later in their profession than people with lower self-esteem (Magnusson & Nermo, 2018). Second, people with higher education may be more successful in their job and thus may often be treated with more respect and consequently also feel higher self-esteem (Twenge & Campbell, 2002).

We found that spirituality was associated with higher self-esteem, which is consistent with the findings of other studies (e.g. Hayman et al., 2007; Cheadle & Schetter, 2018). Spirituality supports a positive worldview and attitudes (Kress et al., 2015) and contributes to better mental health (Dein, 2018). Furthermore, spirituality can provide coping resources (Larson & Larson, 2003) and reduce the negative effect of stress (Yadav et al., 2017). These positive factors lead to more optimistic perception of the world and of the self. However, as in the case of negative religious coping, the causality can also be the inverse. People with higher self-esteem could experience a more intense connection to the self, to others and feelings of happiness, which may lead to a more intense experiencing of spirituality. Further research is needed in this area.

We found that self-esteem is also associated with the God image. This finding is also consistent with prior research on self-esteem and spirituality. A good image of God can be a significant source of high self-esteem (Sherkat & Ellison, 1999), suggesting that perceiving God as loving and empathetic provides emotional support, thus improving the level of self-esteem (Smith & Crosby, 2017). By contrast, perceiving God as critical and distant is related to personal uncertainty, insecurity and doubts.

We found that results on religiosity are not analogous with the results on spirituality, as people declaring themselves as religious had more than a 50% lower chances of having high self-esteem. This discrepancy between findings on spirituality and religiosity has also occurred in some previous studies (Veselska et al., 2018). The explanation of this discrepancy could be a specific environment of the Czech Republic, which is one of the most secular countries in the world (Strielkowski & Cabelkova, 2015). The cultural environment deeply affects how people evaluate themselves (Markus & Kitayama, 1991) a more studies have shown that religious people had a higher level of well-being (Diener et al., 2011), life satisfaction (Okulicz-Kozaryn, 2010), physical health (Stavrova, 2015) and mental health (Van de Velde et al., 2017) only in religious countries and not in nonreligious ones. On the other hand, spirituality represents a concept that is often presented separately from any organised religion and could thus be more acceptable in non-religious countries. Thus, if this presumption is correct, we can expect that religiosity and spirituality may in a secular country also differ in their relationship with self-esteem. Consequently, cohesion to the shared culture has an enhancing effect on self-esteem in general. We can generalize that people living in a culture where being religious does not represent a common framework possibly do not experience the same feeling of sharing key norms and values with their environment and therefore do not benefit from this enhancing effect on self-esteem. Similarly, these reasons could also explain why we failed to find a

significant association of self-esteem with religious attendance. This may be also due to the diversity and heterogeneity of the reasons why people attend church (VanderWeele, 2017).

We also found a positive association between frequency of prayer and self-esteem, similarly as some other authors. Recent research has reported two conflicting theories, both supported by research studies. One theory assumes a positive correlation between self-esteem and prayer, concluding on the evidence that self-esteem is enhanced by positive relationships (Cameron & Granger, 2019) and that prayer reinforces one's relationship with God (Baesler, 2002). Prayer is a form of interaction and communication that provides support and increases self-esteem (Sharp, 2010). The explication could also be that meditation promotes harmony between implicit and explicit self-esteem (Koole et al., 2009). A second theory anticipates a negative correlation, considering prayer as an opportunity to express personal dissatisfaction and disappointment (Francis & Gibbs, 1996). Our findings support the first theory.

Our findings showed that negative religious coping was associated with lower levels of self-esteem. These results are consistent with previous research, which reported that religious struggles correlate with a low level of self-esteem (Ghorbani et al., 2017). The explanation could be that negative religious coping promotes feelings of spiritual unworthiness, which deteriorates individual perception of the self (Latzer et al., 2015) and thus lowers one's self-esteem. However, another explanation could be linked to the fact that low self-esteem can lead to the occurrence of personal religious struggles (Grubbs et al., 2016). As the majority of studies are cross-sectional, we cannot conclude on causality, and longitudinal studies or other types of research are needed to further clarify its direction.

Our results suggest that the distinction of different subgroups in R/S can be a clue to a better understanding of the relationship between self-esteem and R/S. The association of self-esteem with three combinations of religiosity and spirituality has led to different results for each subgroup. Compared to non-religious respondents, the religious/spiritual respondents did not differ significantly, while religious/non-spiritual respondents had significantly lower chances of having good self-esteem. Recent research has reported similar heterogeneity in multiple domains. Religious but non-spiritual adolescents are more likely to show a higher occurrence of a health-risk behaviour then other groups (Malinakova, Kopcakova et al., 2019) and may have more difficult family communication (Malinakova, Trnka et al., 2019). Prior research has also revealed that respondents who were inconsistent in their religiosity and spirituality have more adverse health outcomes (King et al., 2013), especially in the domain of mental health (Malinakova et al., 2020). The explanation could be that disharmony of external religiosity (church attendance) and daily lived spirituality may lead to

disharmony in other domains of life. This research proves the need to study R/S not as one construct, but as a multidimensional concept.

Strenghts and Limitations

The biggest strength of this study is that it provides a unique insight into the relation between self-esteem and R/S in a secular environment. Moreover, it is not limited only to religiosity or spirituality in general, but it takes into consideration the multidimensionality of R/S and therefore includes different aspects of R/S.

Several limitations should also be noted. First, the secular conditions of the Czech Republic make the use of representative samples in research difficult due to the very low prevalence of religious respondents and often reluctance among non-religious respondents to answer questions on R/S. Therefore, our sample is not representative, but was gathered as an online sample using the snowball method, which means that in sociodemographic aspects it differs significantly from the Czech population. Second, the participants could finish answering the survey at any time, which led a relatively high number of missing values for some variables. Third, this study used only self-report measures, which are, when measuring self-esteem, occasionally called into question (Baumeister & Vohs, 2018) and could be influenced by a social desirability bias. Fourth, due to a lack of studies with the same research approach, it is difficult to compare our findings with that of other studies, which consequently limits the interpretations. A last limitation of our study is that it is a cross-sectional study and so we cannot come to any conclusions on causality.

Implications

Our findings provide better understanding of the relation between self-esteem and R/S, which are both beneficiary to an individual's life. Understanding these associations might therefore be important for mental health outcomes. Our study contributes to other studies that prove that religiosity and spirituality are multidimensional concepts and need to be assessed in this way. The results of research on R/S are also strongly influenced by the instrument used.

It is important to distinguish between spirituality and religiosity, especially in secular countries, such as the Czech Republic, where people often declare themselves spiritual but not religious (Malinakova et al., 2019; Zwingmann, Klein, & Bussing, 2011).

As our study was cross-sectional, further longitudinal research could lead to a better understanding of the causality and mechanisms of the formation of high self-esteem.

Conclusion

Our findings suggest that different dimension of R/S are associated with higher levels of self-esteem, with the exception of religiosity and religious attendance and with exception of respondents, who were religious, but not spiritual. The results of our study resonate with previous research in this area, but they identify more precisely the relationship between self-esteem and different aspects of R/S in the context of a secular country. They also point out to a risk of simplification of a research design, as they show that different aspects of R/S lead to different findings, in some cases even contradictory.

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13 Study 9: Are adolescent religious attendance/spirituality associated with family characteristics?

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Abstract

The family environment is associated with religiosity and spirituality as well as many aspects of adolescent lives, including their health behaviour. Therefore, the aim of this study was to assess family environment associations with adolescent religious attendance (RA), i.e., weekly participation in religious services, and spirituality in a highly secular country. A nationally representative sample (n = 4182, 14.4 ± 1.1 years, 48.6% boys) of Czech adolescents participated in the 2014 Health Behaviour in School-aged Children cross-sectional study. RA, spirituality and the family environment, i.e., family communication, perceived emotional support, and parental monitoring, were measured. Higher adolescent RA was associated with lower self-reported easiness of communication with mother (odds ratio (OR) = 0.68; 99% confidence interval (99% CI) = 0.47–0.99; $p < 0.01$). In contrast, spiritual respondents were more likely to report both easier communication with their father (OR per standard deviation (SD) change = 1.12, 99% CI 1.02–1.23; $p < 0.01$) and mother (OR per SD change = 1.38 (1.23–1.55); $p < 0.001$) and higher perceived emotional support (OR per SD change = 1.73 (1.55–1.92); $p < 0.001$). Parents of respondents who attended religious services at least once a week, as well as parents of spiritual respondents, were generally more likely to monitor adolescent behaviour. Thus, this study provides information for parents, mental health workers, and pastoral carers. Further research should assess the association of a lower easiness of family communication with dissonances in adolescent–parent religiosity/spirituality and with higher parental monitoring.

Keywords: adolescent; family; communication; emotional support; parental monitoring; religion; spirituality

Introduction

Religion and spirituality are generally suggested to be associated with the higher well-being of individuals (Lun & Bond, 2013). Religiosity has been found to be a protective factor against risk behaviours such as use of drugs or alcohol in adolescence (Regnerus & Elder, 2003; Van der Meer Sanchez et al., 2008). Furthermore, religious adolescents are less likely to partake in delinquent behaviours (Regnerus & Elder, 2003) and more likely to delay the onset of sexual activity (Miller & Gur, 2002). Given all these positive outcomes, research of religiosity and spirituality within the primary family environment is considered to be exceptionally important. During the sensitive period of adolescence, religiosity and spirituality in the family may have some positive impacts on adolescent health behaviour. However, it is not been clear what role the family environment and family communication play in relation to the development of religiosity and spirituality in adolescents.

Before proceeding to the overview of family communication patterns and parenting styles, the difference between religiosity and spirituality should first be briefly outlined. Religiosity is defined in terms of behaviour, such as church attendance (Good & Willoughby, 2006), whereas spirituality is understood to be an internal individual contentedness, one's perceived closeness to a Higher Power (e.g., God), a sense of the meaning of life, and of spiritual well-being (Paloutzian & Ellison, 1982). Spirituality may also include nonreligious spiritual orientations, i.e., personal beliefs that are not specifically related to organized religion or religious teachings (Good & Willoughby, 2006). Zinnbauer and Pargament (Paloutzian & Park, 2014) summarized the definitions of religiosity and spirituality and concluded that the usefulness of polarizing religiosity and spirituality is unclear and that differences between the two will continue to be identified. In empirical research, religiosity and spirituality are sometimes treated as one factor in order to derive a composite score for general religiosity (e.g., Ebstyne King & Furrow, 2008) and are sometimes compared with each other (e.g., Malinakova et al., 2019). Within the context of health-related outcomes of religiosity and spirituality in adolescents, the study of Malinakova et al. (2019) showed that mere religious attendance and spirituality were associated with a decreased risk of only one or two kinds of health-risk behaviour. In contrast, their multiplicative interaction was associated with a decreased risk of four of the five health-risk behaviours. In other words, high spirituality protects adolescents from health-risk behaviour more if combined with religious practice.

As mentioned above, religiosity and spirituality in the family environment may have positive impact on adolescent health behaviour. For a better understanding of how religious

attitudes and behaviours are shared and communicated within a family, The Family Communication Patterns Theory (FCPT) (Koerner & Schrodt, 2014) provides us with a suitable framework for an operationalization of parent–child communication. According to the FCPT (Koerner & Schrodt, 2014), families can be divided into four types based on their approach to family communication and family (social) conformity: (1) Consensual families with an emphasis on communication and conformity, (2) pluralistic families with an emphasis on communication, but not on conformity, (3) protective families with little emphasis on communication and big emphasis on conformity and respect towards authorities, and (4) laissez-faire families with little emphasis both on communication and conformity.

Despite the lack of research in the area, the communication of spiritual and religious attitudes may be expected to be influenced by the family atmosphere, conformity, or pluralism within family environment. Furthermore, parenting styles may also have a crucial impact on communication and the sharing of religious attitudes and behaviours within the family. Following Maccoby and Martin's initial typology (Roberts et al., 2009), different parenting styles can be distinguished, i.e., indulgent, authoritative, authoritarian, and neglectful. This typology has been widely used by past (Steinberg et al., 1994) as well as by more recent research (Garcia et al., 2019; Garcia & Serra, 2019).

Parental communication and the sharing of attitudes, including spiritual and religious ones, cannot be separated from family emotional support and monitoring. Parenting is closely connected with emotional support and control (Roberts et al., 2009), and parents' emotional characteristics, such as warmth, acceptance, attention, responsiveness, involvement, and support (Huver et al., 2010), are very important for the effective sharing of health-related attitudes and behaviours within the parent–adolescent relationship. Parental control and monitoring may have different qualities and may also be less or more adequate. Adequate parental control includes an adequate level of boundaries, demandingness, protection, and supervision (Roberts et al., 2009), whereas less adequate parental control may include excessively coercive control, intrusion, and rejection.

The present study is focused on adolescence, which is a very sensitive period otherwise highly vulnerable for engaging in various risky behaviours. A lack of adolescent adjustment was found to be related with poor socialization outcomes in adulthood (Garcia & Serra, 2019). Adolescence is also a period during which peers are especially influential. Peer groups may have a negative impact on deviance (Veiga et al., 2015) and even engagement in risky behaviours, such as suicide attempts or self-injury (Young et al., 2006). All these reasons make the investigation of parent–adolescent communication and the supportive role of family during adolescence especially important.

Several previous studies have explored the links between family communication and parents' spirituality and religiosity. The study of Brelsford (Brelsford & Mahoney, 2008) investigated the use of spiritual disclosure and theistic and nontheistic sanctification of the parent in parent–adolescent dyads. Greater nontheistic sanctification and higher levels of spiritual disclosure were significantly related to increased parent–child relationship quality. In the study of Brelsford and Mahoney (2013), the investigation of mother–adolescent dyads revealed that a greater spiritual disclosure was related to higher relationship satisfaction, greater use of collaborative conflict resolution strategies, less dysfunctional communication, less verbal aggression, and increased general disclosure. Hardy et al. (Hardy et al., 2011) explored the socialization of religiousness and spirituality through the parenting styles used by the parents when the adolescents were younger. Family religiousness positively predicted individual religiousness and spirituality in later life, especially in families characterized by authoritative parenting (Hardy et al., 2011). In contrast, frequent, honest, and open communication with parents was more strongly and more significantly associated with adolescent spirituality than any specific parenting style (Burris et al., 2011). Parents' religiosity was also shown to be associated with lower adolescent risk behaviour via higher parental monitoring and higher adolescent self-control and religiosity (Kim-Spoon et al., 2014).

Interestingly, the Czech Republic ranks among those European countries with a high percentage of adolescents perceiving difficulties in communication with parents. In their comparison of 12 European countries, Tabak et al. state that in their 2005/2006 survey, 19.6% of Czech adolescents reported difficulty communicating with their mother and 38.7% difficulty communicating with their father. Higher percentages were reported only for France (22.3% for communication with the mother and 42.8% with father) and Switzerland (35.5% for communication with the father). The situation in the Czech Republic might also be conditioned by historical events and cultural determinants. The same might also be the case for the high percentage of religiously unaffiliated respondents, as the Czech Republic belongs among the most secular countries in the world (Marshall, 2020) This combination makes the Czech Republic an interesting research area. As the majority of research on R/S and the family environment was performed in mostly religious countries, research in a secular country can bring an interesting comparison and can raise questions regarding the generalizability of the previous findings. A better understanding of the associations of R/S with the adolescent family environment can help professionals in the area of adolescent mental health as well as pastoral carers.

To the best of our knowledge, there are only a few studies on this topic in the Czech Republic or in other highly secular countries. Therefore, the aim of this study was to assess the association between some family characteristics (family communication, perceived emotional support, and parental monitoring style) and adolescent religious attendance and spirituality in a highly secular country.

Materials and Methods

Participants and procedure

We obtained data on a nationally representative sample of Czech boys and girls from the 2014 Health Behaviour in School-aged Children (HBSC) study. This cross-sectional World Health Organization collaborative study focused on health and health-related behaviour and their socioeconomic determinants in 11-, 13- and 15-year-old children. More detailed information about the survey can be found in Roberts et al. (Roberts et al., 2009). The HBSC-study has been conducted at 4-year intervals since 1983–1984 and now includes 44 countries across North America and Europe, including the Czech Republic. According to the HBSC study protocol, schools were selected randomly after stratification by region, school size, and type of school (primary schools vs. secondary schools). Out of 243 contacted schools, 242 schools agreed to participate (response rate 99.6%). Then, classes from the 5th, 7th, and 9th grades, in general corresponding to the age categories of 11-, 13- and 15-year-olds, were selected at random, one from each grade per school.

Data from 14,539 pupils were obtained (response rate 89.2%). Most non-response was due to illness or other reasons, e.g., sports or academic competitions (10.6%), and 30 children refused to participate in the survey (0.002%). The HBSC survey consists of mandatory items, which are obligatory for each country, optional items which can be chosen by each country from a common package, and finally a limited number of national items that can be specifically added by each country. Our R/S items belonged to this last category; therefore, due to a limited space, two versions of a survey were created. R/S was included only in version B of the survey, and only adolescents from the 7th and the 9th grades responded to these questions; so, for the purpose of this paper the dataset comprised 4889 adolescents. Because of incomplete information on age, gender, spirituality, or religiosity, or an age distinctly differing from the rest (we decided to include only the participants aged between 12.5 and 16.4, because this age cut-off corresponds to the age range that occurs in 7th and the 9th grade classes under normal conditions), 707 questionnaires were excluded, leading to a final sample of 4182 respondents (mean age = 14.43, SD = 1.07, 48.6% boys).

Data was collected between April and June 2014. The questionnaires were distributed by trained administrators with no teachers present in the classroom in order to reduce information bias. Respondents had one class period (45 min) dedicated to completing the questionnaire. Participation in the survey was anonymous and voluntary.

The study design was approved by the Ethics Committee of the Faculty of Physical Culture, Palacký University Olomouc (No. 17/2013).

Measures

Religious attendance was assessed as an independent variable and was measured by the question "how often do you go to church or to religious sessions?" with possible answers of "several times a week, approximately once a week, approximately once a month, a few times a year, exceptionally, never". This question was added into the survey as a national item. Sunday attendance is a matter of obligation in most of the churches/denominations in the Czech Republic; therefore, the participants who reported attending religious sessions at least once a week were dichotomized as attending.

Spirituality was measured using the adjusted shortened version of the Spiritual Well-Being Scale (SWBS) (Paloutzian & Park, 2014). This scale was added into the survey as a national item. The scale measures the overall spiritual well-being and includes two subscales assessing religious and existential well-being. In the adjusted version (Malinakova, Kopcakova, Kolarcik, Madarasova Geckova, Polackova Solcova, Husek, Kluzova Kracmarova, Dubovska, Kalman, Puzova, van Dijk, and Tavel (2017), the Religious Well-Being Subscale (RWB) consists of four items that provide a self-assessment of one's relationship with God (e.g., "I believe that God loves me and cares about me.") while the other three form the Existential Well-Being Subscale (EWB), which gives a self-assessment measure of one's sense of life purpose and life satisfaction (e.g., "I believe there is some real purpose for my life."). Response possibilities for each item consisted of a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The overall score from the adjusted shortened SWBS is computed by summing the responses to all 7 items and ranges from 7 to 42, with a higher score representing greater spiritual well-being. In the main analysis, spirituality was assessed as a scale variable in order to prevent a loss of information. However, according to previous studies (Malinakova et al., 2018; Malinakova et al., 2019), spirituality was also dichotomized for sensitivity analysis (graphical representation), and participants with a score of 34 or higher (upper quartile of the score) were considered as spiritual, and the rest as non-spiritual. Cronbach's alpha was 0.81 in our sample for the total scale, for the RWB it was 0.93, and for the EWB 0.76.

Family environment was assessed using the following variables: Communication with parents and perceived emotional help from the family. All of these items were assessed as independent variables and represented mandatory items in the survey.

Communication with parents was measured with the question: "How easy it is for you to talk to the persons listed below about things that really bother you?", with the father and mother as separate options. Response options ranged from 1 (very easy) to 4 (very difficult), with a fifth option "I do not have or see this person". According to the latest HBSC report (Inchley, Currie, Young, Samdal, Torsheim, Augustson, Mathison, Aleman-Diaz, Molcho, Weber, & Barnekow, 2016), communication was dichotomized as "Easy" for those who answered "Very easy" or "Easy" and as "Difficult" for the remaining two answers.

Perceived family support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) family subscale (Zimet et al., 1988), which is assessed with four items, e.g., "My family really tries to help me". Response options ranged from 1 (very strongly disagree) to 7 (very strongly agree). In a binary logistic regression analysis, MSPSS was used as a dichotomized variable. According to the latest HBSC report (Inchley et al., 2016), participants with a mean MSPSS score higher than 5.5 were considered to have a high family support, while the others as not having this. Cronbach's alpha was 0.92 in our sample.

Parental monitoring was assessed by using nine statements on different kinds of family rules, where participants reported how often their parents control specific behaviour (parental monitoring of time on the TV, PC, and Internet; time spent out after school; regular breakfast) or allow specific behaviours (eating in front of the screen; sweets and soft drinks consumption; smoking and alcohol use) by using the response categories ranging from 1 (always) to 4 (never). All of these items were assessed as independent variables and represented mandatory items in the survey. For each item, parents reported by participants as being either always or usually controlling certain behaviour, or on the contrary, never or seldom allowing it, were dichotomized as monitoring.

Age, gender and socioeconomic status were considered as potential confounding variables. The socioeconomic status of the respondents' families was used as a covariate and was assessed using the Family Affluence Scale (FAS) (*Health Behaviour in School-aged Children (HBSC) study protocol*, 2014). The scale examines the number of cars owned by the family, having one's own bedroom, the number of computers in the household, the number of foreign family holidays, the number of bathrooms and dishwasher ownership. The summary score ranges from 10 to 13, and following HBSC recommendations (Inchley et al., 2016), it was converted into a fractional rank (ridit) score, leading to transformation of

ordinal data to an interval scale with a normalized range (from 0 to 1, with higher score indicating higher socioeconomic position) and distribution.

Statistical analyses

First, the exploratory data analysis was performed, and the differences in basic characteristics and in the observed categorical variables were assessed using the Chi-Square test, comparing the groups of attending versus non-attending as well as spiritual versus non-spiritual respondents. Then, differences in spirituality levels between attending and non-attending respondents were compared using the Mann–Whitney U test. Consequently, the mutual relationship between all variables of this study was assessed with the Pearson correlation, using binary variables, or where available, scale variables.

In the next step, the associations between religious attendance, assessed as a dichotomized variable (Model 1), and spirituality, assessed as a continuous variable standardized to z-scores (Model 2), and family communication, perceived emotional support and nine types of family rules behaviour (parental monitoring of time on the TV, PC and Internet; time spent out after school; regular breakfast consumption; eating in front of a screen; sweets and soft drinks consumption; smoking and alcohol use) were analysed using a binary logistic regression models. The logistic regression was chosen because of the categorical nature of the dependent variables and because of the non-normal distribution of the spirituality scale. The models were adjusted for gender, age and socioeconomic status, because these variables often represent potential confounders in adolescent research. Each of the independent variables was tested in a separate model. From the whole sample, 402 (9.6%) participants reported that they do not have or see their father, and 86 (2.1%) reported that they do not have or see their mother. These respondents were excluded from the corresponding analyses. Finally, the analyses were also repeated for religious attendance and spirituality mutually adjusted (Model 3) and in interaction (Model 4). In order to reduce the probability of an increased Type II error in multiple testing, the significance level was set to alpha = 0.01. For the sensitivity analysis using the dichotomized spirituality, the prevalence of the easiness of communication with parents and of perceived emotional support were compared with the proportion test (*z*-test). All analyses were performed using the statistical software package IBM SPSS version 21.

Results

The background characteristics of the sample are presented in Table 1. Of the respondents, 296 (7.1%) reported attending church services once a week or more, 399 (9.5%) scored in the upper quartile of the spirituality scale and for the purpose of sensitivity analysis were considered to be spiritual. The average spirituality score in the whole sample was 22.0. (SD = 7.61), a mean MSPSS score was 5.9 ± 1.30 and a mean fractional rank (ridit) score of FAS was 0.5 ± 0.29.

A comparison of the groups of attending and non-attending respondents did not reveal any significant differences regarding age, gender, or perceived emotional support. However, the groups differed significantly in their communication with both parents as well as in 5 of 9 kinds of parental monitoring behaviours. Moreover, the groups of attending and non-attending respondents differed significantly ($p < 0.001$) from each other regarding the level of spirituality. For attending respondents, the mean SWBS score was 32.0 with SD = 8.16 (RWB = 18.0 ± 5.89; EWB = 14.0 ± 3.35), while for non-attending the mean SWBS score was 21.3 ± 6.99 (RWB = 8.2 ± 5.27; EWB = 13.1 ± 3.77).

A comparison of the groups of spiritual and non-spiritual respondents showed a significantly higher prevalence of high spirituality (i.e., the upper quartile of a score) among boys ($p < 0.05$) compared to girls, among 7th grade students compared to the 9th grade ($p < 0.001$), among respondents who reported a high perceived emotional support ($p < 0.001$), and among respondents who reported a higher parental monitoring (6 of 9 behaviours, $p < 0.001$).

Table 1 Sample characteristics by religious attendance and spirituality.

	Number	%	Missing Cases Per Variable	Religious Attendance				*p*-Value	Spirituality				*p*-Value
				Attending [a]		Non-Attending			Spiritual [b]		Non-Spiritual		
				Number	%	Number	%		Number	%	Number	%	
Total	4182	100		296	7.1	3886	92.9						
Gender								*n.s.*					$p < 0.05$
Boys	2034	48.6	0	131	44.3	1903	49.0		213	53.4	1821	48.1	
Girls	2148	51.4	0	165	55.7	1983	51.0		186	46.6	1962	51.9	
Age								*n.s.*					$p < 0.001$
13 years old (7th grade)	2091	50.0	0	146	49.3	1945	50.1		245	61.4	1846	48.8	
15 years old (9th grade)	2091	50.0	0	150	50.7	1941	49.9		154	38.6	1937	51.2	
Easy communication with parents [c]													
With father	2342	62.8	452	148	55.0	2194	63.4	$p < 0.01$	232	63.9	2110	62.7	*n.s.*
With mother	3290	81.4	138	210	75.5	3080	81.8	$p < 0.05$	318	82.8	2972	81.2	*n.s.*
Perceived emotional support [d]	3092	74.1	7	211	71.3	2881	74.3	*n.s.*	337	84.5	2755	73.0	$p < 0.001$
Parental monitoring [e]													
Watching TV	1122	26.9	17	100	34.0	1022	26.4	$p < 0.01$	149	37.3	973	25.8	$p < 0.001$
Playing PC games	1533	36.9	34	143	49.3	1390	36.0	$p < 0.001$	194	49.1	1339	35.6	$p < 0.001$
Time on the Internet	1191	28.7	35	113	38.6	1078	27.9	$p < 0.001$	159	39.8	1032	27.5	$p < 0.001$
Being out after school	2087	50.3	35	156	53.1	1931	50.0	*n.s.*	211	53.0	1876	50.0	*n.s.*
Obligatory breakfast	1898	45.8	43	166	56.5	1732	45.0	$p < 0.001$	220	55.7	1678	44.8	$p < 0.001$
Eating in front of the screen	1846	44.5	40	162	55.5	1684	43.7	$p < 0.001$	217	54.8	1629	43.5	$p < 0.001$
Sweets and soft drink consumption	2074	49.9	31	159	54.3	1915	49.6	*n.s.*	211	53.1	1863	49.6	*n.s.*
Smoking (9th grade only)	1986	95.7	20	143	96.0	1843	95.7	*n.s.*	145	94.8	1841	95.8	*n.s.*
Alcohol consumption (9th grade only)	1870	90.0	15	141	94.6	1729	89.6	*n.s.*	136	89.5	1734	90.0	*n.s.*

Notes: [a] Attending at least once a week, [b] SWBS score 34 or higher. [c] Only numbers regarding the respondents who reported good communication with parents are presented. [d] Only numbers regarding the respondents who reported high perceived family support (mean MSPSS ≥ 5.5) are presented. [e] Only numbers regarding the respondents whose parents were monitoring for each kind of behaviour are presented

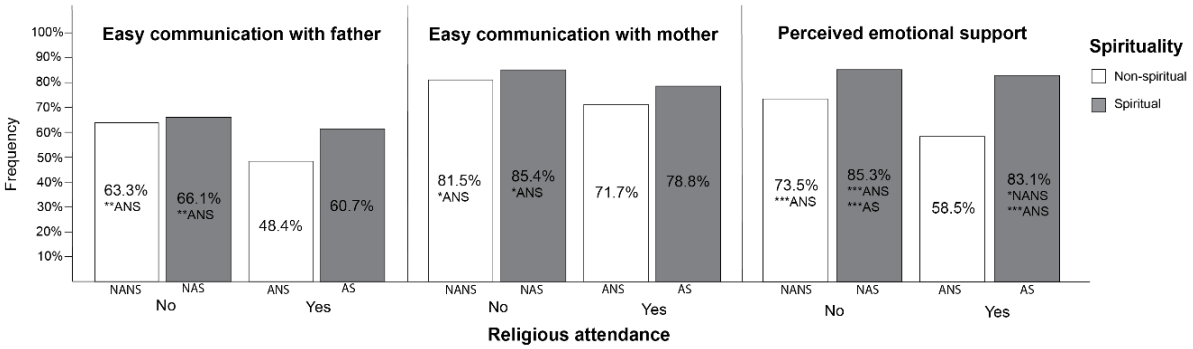
The results of Pearson correlation coefficients are depicted in Table 2. Religious attendance was positively correlated with spirituality ($r = 0.34$, $p < 0.001$), however, it showed only very weak (not exceeding 0.07) and mostly non-significant correlations with the dependent variables of the study. Spirituality showed similarly low values (below 0.16), with the exception of a significant correlation with perceived family support ($r = 0.33$, $p < 0.001$). Communication with mother was positively correlated with communication with father ($r = 0.36$, $p < 0.01$) and perceived emotional support ($r = 0.41$, $p < 0.01$). Communication with father was positively correlated with perceived emotional support ($r = 0.30$, $p < 0.01$). However, correlations of these three variables with the nine types of parental monitoring behaviour were either non-significant or weak, i.e., r did not exceed 0.15.

About 81% of respondents reported the finding their communication with mother easy, the figure being lower for communication with father (about 63%). Approximately three out of four of the participants also reported high perceived emotional support from their families. Parental monitoring ranged for different kinds of behaviour from 26.9% to 95.7%, with the control for smoking being the highest.

Table 3 shows the results of the logistic regression adjusted for gender and age, aimed at the association between both religious attendance (Model 1) and spirituality (Model 2), with the ease of communication in the family and the perceived emotional support. Compared to non-attending respondents, attending respondents were less likely to report easy communication with mother ($p < 0.01$), while the other associations were not significant. In contrast, compared to non-spiritual respondents, spiritual respondents were more likely to report both easier communication with parents ($p < 0.001$) and a higher perceived emotional support (OR per SD change 1.73, 99% CI 1.55–1.92; $p < 0.001$). However, as further analysis showed, easier communication with parents was associated only with adolescents' existential well-being ($p < 0.001$), while no significant results were found for their religious well-being. Both subscales were associated with higher perceived emotional support ($p < 0.001$).

Model 3 shows that after mutual adjustment, both religious attendance and spirituality were significantly associated with all three dependent variables ($p < 0.001$), i.e., communication with father, communication with mother, and perceived emotional support, with the figures decreasing for religious attendance and increasing for spirituality. Nevertheless, the interaction of both variables (Model 4) was not significant in any of the observed variables. Sensitivity analysis using dichotomized spirituality (see Figure 1) suggests that the subgroup which perceived difficulties in communication with parents and a lack of emotional support were the respondents who were attending, but not spiritual.

Figure 1 Prevalence of adolescent communication with parents and of perceived emotional support in groups with different combinations of religious attendance and spirituality.



Note: Notes: *p < 0.05, **p < 0.01, ***p < 0.001
NANS = non-attending/non-spiritual; NAS = non-attending/spiritual; ANS = attending/non-spiritual; AS = attending/spiritual

Table 2 Correlations of the variables in the study.

	Spirituality [a]	Relig. Attendance	Age [a]	Gender	Communication		Perceived Emotional Support [a]	Parental monitoring							
					With Father	With Mother		Watching TV	Playing PC Games	Time on the Internet	Being Out after School	Obligatory Breakfast	Eating in Front of the Screen	Sweets and Soft Drinks Cons.	Smoking [b]
Religious attendance	0.34 ***														
Age [a]	−0.08 ***	0.00													
Gender	−0.06 ***	0.02	−0.05 **												
Easy communication															
With father	0.10 ***	−0.05 **	−0.04 *	−0.19 ***											
With mother	0.16 ***	−0.04 **	−0.03	−0.06 ***	0.36 ***										
Perceived emotional support [a]	0.33 ***	−0.03	−0.06 ***	-0.10 ***	0.30 ***	0.41 ***									
Parental monitoring															
Watching TV	0.06 ***	0.06 **	−0.17 ***	−0.02	0.00	−0.01	0.04 *								
Playing PC games	0.08 ***	0.07 **	−0.22 ***	−0.14 ***	0.04 *	0.01	0.04 *	0.64 ***							
Time on the Internet	0.06 ***	0.04 **	−0.20 ***	−0.06 ***	0.05 **	0.01	0.05 **	0.51 ***	0.56 ***						
Being out after school	0.01	0.02	−0.13 ***	0.14 ***	−0.03	−0.02	−0.03	0.24 ***	0.20 ***	0.22 ***					
Obligatory breakfast	0.12 ***	0.06 ***	−0.11 ***	−0.05 ***	0.10 **	0.08 ***	0.16 ***	0.21 ***	0.21 ***	0.18 ***	0.10 ***				
Eating in front of the screen	0.09 ***	0.06 ***	−0.11 ***	−0.00	0.03	0.02	0.03 *	0.16 ***	0.16 ***	0.15 ***	0.04 **	0.12 ***			
Sweets and soft drink consumption	0.08 ***	0.02	−0.17 ***	0.04 **	0.02	0.04 *	0.05 **	0.16 ***	0.18 ***	0.17 ***	0.06 ***	0.14 ***	0.31 ***		
Smoking [b]	0.05 *	0.00	−0.08 ***	0.02	−0.00	0.03	0.03	−0.00	0.02	−0.03	−0.02	0.06 *	0.04 *	0.08 ***	
Alcohol consumption [b]	0.01	0.04	−0.05 *	−0.02	−0.01	0.00	0.01	0.03	0.07 **	0.02	0.04 *	0.06 **	0.14 ***	0.11 ***	0.30 ***

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [a] Assessed as a scale variable [b] 9th grade only

Table 3 Associations of adolescent perceive easiness of communication with parents and perceived emotional support with religious attendance and spirituality (standardized to *z*-scores), adjusted for age, gender, and socioeconomic status (odds ratios, OR, and 99% confidence intervals, CI).

	Communication with Father	Communication with Mother	Perceived Emotional Support
	OR (99% CI)	OR (99% CI)	OR (99% CI)
Model 1: Religious attendance			
Non-attending	1 (ref)	1 (ref)	1 (ref)
Attending	0.72 (0.51–1.003) *	0.68 (0.47–0.99) **	0.87 (0.61–1.23)
Model MSPSS.2: Spirituality (per SD) [a]			
SWBS [b]	1.12 (1.02–1.23) **	1.38 (1.23–1.55) ***	1.73 (1.55–1.92) ***
RWB [c]	0.97 (0.89–1.06)	1.05 (0.95–1.17)	1.17 (1.06–1.29) ***
EWB [d]	1.33 (1.21–1.45) ***	1.65 (1.49–1.83) ***	2.10 (1.90–2.31) ***
Model 3: Religious attendance and spirituality mutually adjusted			
Attending vs. non-attending	0.55 (0.38–0.80) ***	0.36 (0.24–0.55) ***	0.35 (0.23–0.52) ***
Spirituality (per SD)	1.19 (1.08–1.32) ***	1.54 (1.36–1.74) ***	1.90 (1.70–2.14) ***
Model 4: Interaction of religious attendance and spirituality			
Attendance vs. non-attendance	0.59 (0.35–1.02) *	0.49 (0.28–0.87) **	0.32 (0.19–0.54) ***
Spirituality (per SD)	1.20 (1.08–1.33) ***	1.60 (1.40–1.83) ***	1.88 (1.66–2.13) ***
Attendance x spirituality	0.95 (0.68–1.32)	0.74 (0.51–1.07)	1.11 (0.77–1.59)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Missing cases per communication with father: $n = 503$, communication with mother: $n = 190$, perceived emotional support: $n = 64$. [a] standardized to Z scores; SD = standard deviation; [b] SWBS = Spiritual Well-being Scale; [c] RWB = Religious Well-Being Subscale; [d] EWB = Existential Well-Being Subscale.

Table 4 depicts associations between adolescent parental monitoring of different kinds of behaviour with adolescent religious attendance and spirituality. The parents of attending respondents (Model 1) were more likely to control adolescents' computer games playing, their time on the Internet) ($p < 0.001$), and their regular breakfast consumption ($p < 0.001$), whereas they were less likely to allow eating meals in front of the screen ($p < 0.001$) compared to the parents of non-attending respondents.

Spirituality (Model 2) showed a similar pattern, with a significant increase of the likelihood of parental monitoring in the case of screen-based activities (watching TV, playing computer games, spending time on the Internet) ($p < 0.001$), a regular breakfast consumption ($p < 0.001$), eating in front of the screen ($p < 0.001$), sweets and soft drinks consumption ($p < 0.001$). Regarding the associations with the subscales, the RWB was associated with five of the observed behaviour ($p < 0.001$), whereas the EWB with three of them ($p < 0.05$ to $p < 0.001$).

Mutual adjustment of religious attendance and spirituality (Model 3) revealed, in most cases, similar figures for both variables as previous analyses; however, in some cases it lost significance for religious attendance. The interaction of religious attendance and spirituality was not significant in any of the observed variables.

Table 4 Associations of adolescent parental monitoring (control of behaviour) with religious attendance and spirituality (standardized to z-scores), adjusted for age, gender and socioeconomic status (odds ratios and 99% confidence intervals).

	Watching TV	PC Games Playing	Time on the Internet	Being out after School	Obligatory Breakfast
Model 1: Religious attendance					
Non-attending	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Attending	1.42 (1.00–2.00) *	1.81 (1.29–2.52) ***	1.60 (1.15–2.24) ***	1.10 (0.79–1.52)	1.57 (1.14–2.16) ***
Model 2: Spirituality (per SD) [a]					
SWBS [b]	1.13 (1.03–1.24) **	1.17 (1.07–1.28) ***	1.18 (1.08–1.30) ***	1.05 (0.96–1.14)	1.23 (1.13–1.33) ***
RWB [c]	1.16 (1.06–1.27) ***	1.18 (1.08–1.29) ***	1.22 (1.11–1.33) ***	1.06 (0.97–1.15)	1.13 (1.05–1.23) ***
EWB [d]	1.01 (0.92–1.11)	1.05 (0.96–1.15)	1.03 (0.94–1.13)	1.01 (0.93–1.09)	1.24 (1.14–1.35) ***
Model 3: Religious attendance and spirituality mutually adjusted					
Attending vs. non-attending	1.22 (0.84–1.78)	1.54 (1.07–2.20) **	1.31 (0.91–1.89)	1.03 (0.73–1.46)	1.21 (0.85–1.71)
Spirituality (per SD)	1.11 (1.01–1.23) **	1.12 (1.02–1.23) **	1.15 (1.05–1.27) ***	1.04 (0.95–1.14)	1.21 (1.10–1.32) ***
Model 4: Interaction of religious attendance and spirituality					
Attendance vs. non-attendance	1.05 (0.58–1.90)	1.43 (0.84–2.41)	1.14 (0.65–2.00)	0.92 (0.56–1.53)	1.05 (0.63–1.75)
Spirituality (per SD)	1.10 (0.99–1.22) *	1.12 (1.01–1.23) **	1.14 (1.03–1.26) **	1.03 (0.94–1.14)	1.19 (1.09–1.31) ***
Attendance x spirituality	1.12 (0.79–1.59)	1.07 (0.77–1.47)	1.12 (0.80–1.57)	1.10 (0.81–1.50)	1.13 (0.82–1.54)

	Eating in Front of the Screen	Sweets and Soft Drinks Consumption	Smoking (15 Years Old)	Alcohol Use (15 Years Old)
Model 1: Religious attendance				
Non-attending	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Attending	1.60 (1.16–2.20) ***	1.25 (0.90–1.72)	1.10 (0.36–3.35)	2.09 (0.80–5.45) *
Model 2: Spirituality (per SD) [a]				
SWBS	1.18 (1.09–1.28) ***	1.13 (1.04–1.22) ***	1.16 (0.86–1.57)	1.05 (0.86–1.29)
RWB	1.17 (1.07–1.27) ***	1.07 (0.99–1.16) *	1.04 (0.78–1.40)	1.02 (0.83–1.24)
EWB	1.10 (1.01–1.19) **	1.15 (1.05–1.24) ***	1.24 (0.94–1.63) *	1.08 (0.89–1.31)
Model 3: Religious attendance and spirituality mutually adjusted				
Attending vs. non-attending	1.31 (0.93–1.85) *	1.06 (0.75–1.50)	0.88 (0.27–2.92)	2.13 (0.78–5.83)
Spirituality (per SD)	1.15 (1.05–1.26) ***	1.12 (1.02–1.22) **	1.18 (0.85–1.63)	0.99 (0.79–1.23)
Model 4: Interaction of religious attendance and spirituality				
Attendance vs. non-attendance	1.31 (0.79-2.15)	0.99 (0.60–1.64)	0.57 (0.17–1.86)	1.82 (0.46–7.27)
Spirituality (per SD)	1.15 (1.05–1.26) ***	1.11 (1.02–1.22) **	1.07 (0.76–1.50)	0.98 (0.78–1.23)
Attendance x spirituality	1.003 (0.74–1.36)	1.06 (0.79–1.44)	2.28 (0.83–6.23) *	1.15 (0.46–2.88)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Missing cases per analysis: Watching TV: $n = 73$, PC games playing: $n = 88$, Time on the internet: $n = 86$, Being out after school: $n = 86$, Obligatory breakfast: $n = 96$, Eating in front of the screen: $n = 94$, Sweets and soft drinks consumption: $n = 83$, Smoking (15 years old): $n = 2118$, Alcohol use (15 years old): $n = 2115$. [a] standardized to z scores; [b] SWBS = Spiritual Well-being Scale; [c] RWB = Religious Well-Being Subscale; [d] EWB = Existential Well-Being Subscale.

Discussion

We explored the association between some family characteristics (family communication, perceived emotional support, and parental monitoring style) and adolescent religious attendance and spirituality in a highly secular country. We found that religious attendance was significantly associated with more difficult communication with mother. In contrast, spiritual respondents were more likely to report both easier communication with parents and good perceived emotional support. Regarding parental monitoring, adolescents reported that the parents of attending respondents were in four of the nine observed behaviours more likely to be in control. The same held for spirituality, where the results were significant in five behaviours. The RWB was associated with higher parental monitoring in five behaviours, the EWB in three.

In our study, we did not find any significant differences in religious attendance between genders, and moreover, we found a higher prevalence of a high spirituality among boys. These findings are in contrast with the recent findings of studies on representative Czech samples which reported a higher prevalence of R/S among women in adults. Moreover, yet another study on Czech adolescents came to an opposite conclusion (Lee et al., 2019). However, it is also possible that these discrepancies reflect the use of different measurement tools. The other questionnaires may have used items with a stronger emotional content, and this content might be better accepted by women than by men (Underwood, 2011). However, further research on Czech adolescent samples would be needed to confirm this hypothesis.

Our results showed that attending respondents were less likely to perceive their communication with mother as easy, while no significant results were found for communication with father or perceived emotional support. However, a sensitivity analysis suggests that the group with more difficult family relationships could be represented by attending non-spiritual respondents. Previous research has usually reported a positive association between the religiosity of parents or adolescents and a higher family satisfaction in the relationship (Caughlin, 2003; Smith, 2003), which contradicts our findings. One explanation for this disparity is that family satisfaction might not totally correspond to the level and quality of family communication (Caughlin, 2003). However, it is also important to note that most studies on adolescent R/S have been performed in predominantly religious countries. Therefore, it is also possible that the Czech secular environment may play its role. This might be true especially for adolescents. Within our age group, it is also possible that adolescent religious attendance is still a part of family tradition, and so attending non-spiritual respondents may go to church more to fulfil parental expectations than because of their own

inner convictions. Especially in a secular environment, this situation might be demanding for adolescents who are surrounded by non-religious peers. Therefore, it seems that without a proper inner content, a higher emphasis on rules and maintaining traditions may hinder mutual openness and communication in the family. Some authors have also pointed out that when adolescents become more or less religious than their parents, their mutual communication could be influenced negatively (Kim-Spoon et al., 2012). This explanation could also be supported by the studies which reported a higher risk of estrangement of adult children who hold different values than their mothers (Gilligan et al., 2015) and studies reporting possible deleterious effects of family arguments about religion on child development (Bartkowski et al., 2008). Moreover, our previous research showed that the discrepancy in adolescent religious attendance and spirituality is associated with a higher occurrence of a health-risk behaviour (Malinakova et al., 2019), which could in turn further deteriorate family relationships in traditional religious families.

We also found that although spirituality was generally associated with easy communication with parents, it was only the association with the EWB subscale that was statistically significant. It suggests that the existential aspect of spirituality (a sense of hope and meaning in life) was in the Czech conditions more important in connection with family communication than the explicit relationship with God. Given the recent trend in research that links the attachment theory and the image of God (Birgegard & Granqvist, 2004; Reinert & Edwards, 2009), our results contradict the presumption that respondents who have a close and safe relationship with their parents will also report a positive relationship to God and vice versa. An explanation for these divergent findings could be that the RWB might more reflect the adolescents' set of beliefs and rational knowledge about God, the so-called God concept (Davis et al., 2013), than their emotional experience of that relationship.

Our findings regarding parental monitoring are in line with the general findings in this area, in which higher parental supervision of religious adolescents is reported (Brelsford & Mahoney, 2008), and could also contribute to explaining the lower risk of excessive screen-based activities that have already been described for attending adolescents (Malinakova et al., 2018). A possible explanation of this finding is that religious norms encourage parents to invest into their children in order to "train up a child" (Bartkowski, Xu, & Levin, 2008]. At the same time, the feeling of being controlled could negatively influence the adolescents' communication with their parents, as found in our results.

Based on the family communication patterns theory (Koerner & Schrodt, 2014), Czech religious families, especially those with lower emphasis on the spiritual dimension, possibly might correspond to "protective families", with a high emphasis on obedience to authorities

and a low level of family communication. In contrast, some of the families of Czech spiritual respondents possibly might correspond to the “consensual type”, with a high emphasis on conversation and conformity orientation, where children usually feel strong emotional support.

Strengths and Limitations

This study has several important strengths, the most important being the large and representative sample size of adolescents, the high response rate, and the use of the well-established HBSC methodology. Another strength is that this study extends the knowledge of the adolescents’ family conditions by assessing the role of religious attendance and spirituality. One limitation is that the design of the study did not allow us to measure the religious attendance or spirituality of the parents directly, and, also, the parental monitoring was reported by the adolescents only. Other limitations might be a potential information bias, as our data were based on self-reports of adolescents, which can be inaccurate or influenced by social desirability, and the cross-sectional design of the study, which does not allow us to make conclusions on causality. Moreover, it is also possible that problems in family communication might be influenced by other variables (e.g., quality of parental bonding), which were not assessed in this study.

Implications

Our research suggests that adolescent spirituality, especially some of its positive effects, like a perceived meaning of one’s life, might contribute to good adolescent communication with their parents and emotional support. Adolescents might therefore also be encouraged to develop this aspect of their lives. However, on the contrary, dissonance in this area, i.e., adolescent religious attendance without their own internal convictions, can possibly result in more difficult family communication. Religious parents should be better informed about these risks and the possible negative consequences of a mere maintaining of traditional values without their internal dimension.

Further research should therefore focus on understanding the causes and consequences of discrepancies in adolescent–parent religious and spiritual values. It could also examine the role of the parental religiosity/spirituality in order to complete the present results and should take into account other possible confounding variables.

Conclusions

We found that religious attendance was associated with lower self-reported easiness of communication with parents. In contrast, spirituality was associated with easier communication with parents and more perceived emotional support. Parents of attending as well as of spiritual respondents were in general more likely to control adolescent behaviour. Further research should assess the association of the dissonance of adolescent–parent religiosity/spirituality and higher parental monitoring with the lower easiness of family communication.

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14 Study 10: The associations of experiencing the Covid-19 pandemic with religiosity and spirituality: A cross-sectional study in Czech adults

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Abstract

Objectives: We investigated the associations between religiosity/spirituality and respondents' changes in their relationships, feelings, thinking, and behaviour during the first wave of the Covid-19 pandemic in the Czech Republic.

Methods: A sample of Czech adults (n=1434; 48.3±16.4 years; 49.65% women) participated in the online survey. We measured spirituality, religiosity, self-reported changes in relationships, disrupted feelings, and changes in behaviour during the pandemic.

Results: Spiritual respondents were more likely to report increased physical activity, sex, reading and self-education, with odds ratios (ORs) ranging from 1.26 (95% confidence interval 1.09-1.46) to 1.56 (1.31-1.86). The combination of spirituality and religiosity led to an increase in the range of ORs to 1.57-2.69. Spiritual and religious participants were less likely to feel the decrease of hope by 70%, while mere spirituality significantly reduced the decrease of hope by only 30%. Religiosity itself led to a lower risk of reporting a disrupted day structure with an OR=0.74 (0.58-0.95).

Conclusion: Religiosity and spirituality separately help people during a pandemic in some areas. Especially their combination has a more positive impact on relationships, feelings, and behaviour.

Keywords: Covid-19 pandemic; spirituality; religiosity; experiences; behavior

Introduction

Since its outbreak in December 2019, the new coronavirus SARS-CoV-2 (causing Covid-19) has rapidly spread to become a deadly global pandemic. In addition to the severe threat it poses to human health and to people's lives, Covid-19 has led to emergency interventions being taken, including restricting people in their homes and closing most businesses (Pirutinsky et al., 2020), as the most frequent way of transmission of the virus is by person-to-person contact (Huang et al., 2020). No vaccine was yet available during the studied period.

Evidence suggests that infectious disease epidemics affect not only the physical health of patients but to a large extent also the psychological health and well-being of the non-infected population all around the world (Kumbhare, 2021; Mukhtar, 2020). Many people were worried about their family members' health and safety, financial loss, job loss, and lack of support (Boyraz & Legros, 2020). An infectious disease is also accompanied by stigmatization (Ren et al., 2020), which was experienced by citizens who were perceived as the source of the disease (Pappas et al., 2009). Wang et al. (2020) revealed that about one-third of respondents experienced social discrimination caused by the Covid-19 pandemic. A global socioeconomic crisis commenced. Panic and fear of the unknown, resulting in panic buying, hoarding, overwhelming medical centres and health organizations, were reported, as well as the general impact on education, politics, socioeconomics, culture, environment, and climate (Han et al., 2018; Mukhtar, 2020).

Most of the harmful effects of the Covid-19 pandemic can be regarded as risk factors in the development of anxiety, depression, stress, or panic disorder (Qiu et al., 2020; Wang, et al., 2020; Xiao et al., 2020). Stress has been previously shown to worsen both physical and mental health, often resulting in increased use of alcohol, tobacco, or other drugs (Centers for Disease Control and Prevention, 2020). Social isolation and subjective feelings of loneliness are associated with a higher risk of suicide (Calati et al., 2019), and unemployment and work restrictions are other factors contributing to the risk of suicide during the Covid-19 period (Kawohl & Nordt, 2020).

Furthermore, infectious diseases and a pandemic can represent highly traumatic experiences for some individuals and lead to posttraumatic stress disorder and chronic psychological distress (Boyraz & Legros, 2020). In some individuals, negative experiences associated with the Covid-19 pandemic may increase the risk of developing psychosocial disorders, such as obsessive-compulsive disorder (OCD) (Seçer & Ulaş, n.d.), generalized anxiety disorder (GAD) (Y. Huang & Zhao, 2020), or panic disorder (Javelot & Weiner, 2020), and may increase the occurrence of psychosomatic symptoms (Zidkova et al., 2021).

Taken together, during the Covid-19 pandemic we experienced an undeniable negative psychological impact on the general public, and recently, many studies have explored this particular connection (Luo et al., 2020; e.g., Qiu et al., 2020; Tull et al., 2020). However, fewer studies have focused on the protective social and psychological factors that helped to lower the risk of anxiety, depression, and stress (e.g., Brooks et al., 2020; Gonzalez-Sanguino et al., 2020; Magson et al., 2021). Evidence indicates that religiosity and spirituality (R/S) can help people to deal with difficult life situations. Religious belief and practice are associated with various health aspects, such as the ability to cope with illness, recovery from hospitalization, or a positive attitude in a challenging life situation (Albers et al., 2010; Phelps, 2009; Puchalski et al., 2009). Research shows that religious practices may contribute to managing emotions during difficult situations (Sharp, 2010), and religiosity, in general, can help a person cope with highly stressful or potentially traumatic events (Bjorck & Thurman, 2007; García et al., 2017). In the context of the pandemic, R/S can affect health, alleviate suffering and minimize the consequences of social isolation (Lucchetti et al., 2020). Positive religious coping, inner religiosity, and trust in a Higher Power can reduce the negative impact of the Covid-19 pandemic, as well as stress (Pirutinsky et al., 2020). According to Kowalczyk (2020), faith is one of the survival strategies that allows one to maintain hope and a sense of security during the current pandemic.

However, religiosity and spirituality have ambiguous meanings and their definitions differ (Henningsgaard & Arnau, 2008). Religiosity tends to be conceptualized as a social belief and practice related to a higher power, usually associated with a church or organized group (Peterman et al., 2002). Traditional indicators of religiosity included frequency of church attendance and self-reported levels of religiosity (Henningsgaard & Arnau, 2008). The concept of religion originally included two dimensions, individual and institutional (Hill & Pargament, 2003). However, the individual dimension is now more often labelled as spirituality, that includes the experiences and feelings associated with seeking the sacred, divine, or non-material aspects of life (Good & Willoughby, 2014). On the one hand, these two constructs overlap (Koenig, 2012), and some authors have suggested conceptualizing a single construct of R/S including institutional and personal dimensions of religion (Good & Willoughby, 2014). On the other hand, according to Zwingmann (2011), especially in countries with a more secular background, where people often describe themselves as "spiritual but not religious", it is essential to distinguish between religiosity and spirituality.

Czech Republic is considered one of the most secular societies in the world, and most citizens do not report any religion affiliation (Malinakova et al., 2018; Pew Research Center, 2017). In terms of secularization, the Czech Republic represents a unique environment

compared to other European countries due to the significant weakening of the position of religion in history (Furstova et al., 2021). Rather than religion itself, however, Czechs have a weak relationship with the church as an institution (Buchtova et al., 2020), and those who do not affiliate to any organized church should not be seen as atheists, but rather as skeptics who tend to fulfill their religious/spiritual needs outside the organized church (Furstova et al., 2021). Thus, Czech Republic represents a unique research area, because results in secular countries might differ from those in prevalently religious countries (Malinakova et al., 2020). Therefore, for a more detailed assessment of the effect of R/S on experiences during the pandemic, we decided to explore the associations between R/S and selected variables measuring emotional and behavioural changes, and changes in personal relationships during the first outbreak of the Covid-19 pandemic in the secular environment of the Czech Republic.

Methods

Participants and procedure

We obtained data from an online survey conducted in the Czech Republic during the Covid-19 pandemic in April 2020 to show the current situation in the most stressful period of the first wave of the pandemic. A specialized agency (The Czech National Panel, Prague, Czech Republic) collected data to achieve a balanced sample close to national characteristics regarding gender and age. The inclusion criterion was age 18 years and over. To ensure high data quality, we applied the following exclusion criteria: (1) inconsistencies in control questions relating to participants' religiosity (feeling the God´s presence despite being non-religious) and (2) a uniform response pattern, i.e., answering a large number of items in the same way. The final sample comprised 1,434 Czech adult respondents (age 18 years and over, mean age=48.32, SD=16.44, 49.65% female). From these 1,434 respondents, 1,252 answered all the questions of the online survey.

At the beginning of the survey, respondents were informed in a written form about the purpose of the study and the anonymous and confidential treatment of the data. Specifically, before the survey, they were informed about the content of the survey, their rights and data handling and had to explicitly agree to each of the key points of the informed consent. Electronic informed consent was used because of the nature of the study (an online survey). They then had to click on the appropriate button to indicate their willingness to participate in the survey. The study design was approved by the local Ethics Committee of the Faculty of Theology, Palacký University in Olomouc (No. 2020/06).

Measures

Religiosity was assessed by the question: "Would you call yourself a believer?" Possible answers were: Yes, I am a member of a church or religious organization; Yes, but I am not a member of a church or religious organization; No; No, I am convinced atheist. Respondents who had reported "No" or "convinced atheist" were classified as non-religious; others were considered religious.

Spirituality was measured using the Daily Spiritual Experience Scale (DSES) (Underwood & Teresi, 2002), which measures the frequency of common experiences of connection with transcendence in daily life. An adapted 15-item version of the scale (Malinakova et al., 2018) was used for the present study. Response possibilities for the first 14 items regarded a 6-point scale that ranged from "never" (1) to "many times a day" (6), and for the last item regarded a 4-point scale that ranging from "not close at all" (1) to "as close as possible" (4), leading to total scores from 15 to 88. A higher score of DSES indicates higher spirituality. The reliability (internal consistency) of the DSES was α=0.96 in our sample. For the purposes of our analysis, the DSES score was treated as continuous. For the assessment of different combinations of religiosity and spirituality with experiencing the Covid-19 pandemic, it was also dichotomized: participants with a score of 51 or higher were considered as spiritual, and the rest as non-spiritual. This cut-off point represents a dichotomization of the total score in the middle (a minimal value is 15, a maximal value 88), and was recently used in the Czech environment (Kosarkova et al., 2021).

For the last analysis, a composite variable was created based on religiosity and spirituality variables: 1) Non-religious but spiritual, 2) Religious and spiritual, 3) Non-spiritual but religious, 4) Non-spiritual and non-religious.

Experiencing the Covid-19 pandemic was introduced by the following question: "Has anything changed in your life related to the pandemic in the following areas?" followed by 23 items focusing on changes in participants' lives during the Covid-19 pandemic: a) life with a partner, children, and other people in the household, b) feelings of loneliness, threat, fear and anxiety, helplessness, and hope, day structure, c) frequency of thinking about existential questions and religion, prayer, smoking or chewing tobacco, drinking alcohol, shopping, food consumption, sex, physical activities, reading, self-education, work, telephoning, online communication. For a) and b) the possible answers were: got worse; did not change; got better; the question does not concern me. For c) the possible answers were: I perform this activity less frequently; frequency of this activity did not change; I perform this activity more frequently. The dichotomization was conducted in the following way: for a) and b) the answers "did not change" and "got better" were classified as "not worse", whereas the answer "got

worse" was classified as "worse"; c) The answers "I perform this activity less frequently" and "frequency of this activity did not change" were coded as "not more frequently" and the answer "I perform this activity more frequently" was coded as "more frequently." The items were chosen based on different life areas and activities that could in general be influenced by the Covid-19 pandemic. Though some of these items might be correlated, we did not expect a mutual relationship between all of them. Therefore, we did not use them as a scale but assessed them as separate variables.

Participants' socioeconomic *status* was determined by assigning them to one of the following categories: student, disabled pensioner, employed, self-employed/entrepreneur, homemaker/voluntarily unemployed, unemployed, old-age pensioner, maternity leave.

Age and gender were obtained using the questionnaire.

Statistical analyses

First, we used median absolute deviation (MED) to detect low-quality responses. Based on this method, 25 subjects responding inconsistently were deleted. Second, a visual inspection of histograms together with the Mardia test of skewness (standardized multivariate skewness coefficient = 717.78 $p < 0.001$) and kurtosis (standardized multivariate kurtosis coefficient = 7.35 $p < 0.001$) indicated that the normality assumption should be rejected. Thus, non-parametric tests were used in our further analysis. Third, in the logistic regression models, variables assessing a self-reported change of a) relationships and emotionality and b) thinking and behaviour (both related to Covid-19 pandemic) were regressed on religiosity (non-religious/religious). Each model was fitted with a different outcome variable. Numeric variables were standardized to z-scores. All models were adjusted for age, gender, and socioeconomic status, because these variables were reported as important factors mediating other associations (e.g., psychosomatic symptoms) during Covid-19 pandemic. Non-adjusted effects were also reported. Finally, the independent variable (religiosity) was replaced in separate steps by spirituality and a composite variable was created from spirituality and religiosity. In more detail, all models initially fitted using religiosity as an independent variable were fitted again with these new predictors. The R (*R Core Team*, 2020) programming software was used for all analyses.

Results

Description of the study sample

The sociodemographic characteristics of the sample are presented in Table 1. Of the whole sample, 34.5% of respondents were considered religious. The mean spirituality score was 27.6.

Table 1 Demographic characteristics of the study sample.

	N	N (%)
Gender	1,434	
Male		722 (50%)
Female		712 (50%)
Family status	1,434	
In a partnership		492 (34%)
Not in a partnership		942 (66%)
Education	1,434	
Elementary school		116 (8.1%)
Vocational school or non-maturity high school		651 (45%)
High school		448 (31%)
Higher vocational school or university bachelor		89 (6.2%)
College		130 (9.1%)
Economic status	1,434	
Employed		705 (49%)
Entrepreneur		70 (4.9%)
In household/without work		54 (3.8%)
Pensioner		455 (32%)
Maternity leave		72 (5.0%)
Student		78 (5.4%)
Religiosity	1,434	
Non-religious, convinced atheist		185 (12.9%)
Non-religious		755 (52.6%)
Religious, not a member of church/religious society		371 (25.9%)
Religious, member of church/religious society		123 (8.6%)

Religiosity

Table 2 shows how the relationships, day structure, emotions, thinking, and behaviour of religious and non-religious participants changed during the Covid-19 pandemic. We found that religious participants had 33% higher odds of deterioration of the feeling of helplessness. On the other hand, they were less likely to report the disrupted structure of the day, with OR=0.74. Moreover, religiosity was not associated with a lower frequency of health-related behaviours, such as alcohol drinking or smoking, during the Covid-19 pandemic. Religious respondents were 1.74-times more likely to report having sex more frequently during the pandemic than non-religious. Religiosity was associated with more frequent praying and thinking about religion during the pandemic.

Table 2 Associations of religiosity and changes in relationships, emotions, day structure, thinking and behaviour during the Covid-19 pandemic, crude and adjusted for age, gender, and socioeconomic status (odds ratios and 95% confidence intervals).

Changes in relationships, emotions, day structure	Relationship with partner	Relationship with children	Relationship with others in household	Loneliness	Threat	Fear and Anxiety	Helplessness	A decrease of hope	A disrupted structure of a day
Crude effect									
Religiosity	1.12 (0.70-1.78)	1.05 (0.59-1.83)	1.00 (0.55-1.75)	1.31 (0.98-1.74)	1.08 (0.85-1.38)	1.26 (0.98-1.62)	1.46** (1.12-1.88)	0.90 (0.62-1.30)	0.76* (0.60-0.97)
Adjusted									
Religiosity	1.16 (0.71-1.87)	0.98 (0.54-1.74)	1.05 (0.57-1.91)	1.25 (0.92-1.67)	1.01 (0.79-1.29)	1.12 (0.86-1.46)	1.33* (1.02-1.73)	0.84 (0.57-1.22)	0.74* (0.58-0.95)

Changes in thinking and behaviour	Thinking about existential questions	Thinking about religion	Prayer	Smoking or chewing tobacco	Alcohol drinking	Shopping new things	Food consumption	Sex	Physical activity	Reading	Self-education	Work	Calls	Other forms of online comm.
Crude effect														
Religiosity	1.06 (0.82-1.36)	11.7*** (6.15-24.5)	13.9*** (7.62-28.1)	0.84 (0.54-1.27)	0.84 (0.55-1.27)	0.61 (0.30-1.14)	0.99 (0.73-1.33)	1.43 (0.93-2.20)	1.32 (0.97-1.78)	1.29 (1.00-1.66)	1.44* (1.05-1.95)	1.41* (1.02-1.95)	1.15 (0.90-1.47)	1.09 (0.86-1.38)
Adjusted														
Religiosity	1.02 (0.79-1.31)	11.2*** (5.85-23.6)	12.9*** (7.01-26.1)	0.94 (0.60-1.44)	0.95 (0.61-1.46)	0.66 (0.32-1.25)	1.02 (0.74-1.40)	1.74* (1.10-2.71)	1.36 (0.99-1.86)	1.20 (0.93-1.56)	1.46 (1.06-2.02)	1.53 (1.09-2.14)	1.04 (0.80-1.34)	1.07 (0.84-1.37)

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Spirituality

In the next step, changes in behaviours, emotions, and relationships were regressed on spirituality. Non-spiritual participants had a 30% higher risk of a decrease of hope. Apart from this, our results indicated that spirituality was not associated with any change in relationships, emotions, or day structure. However, it was associated with increased food consumption, sexual activity, physical activity, reading, self-education, and using various forms of online communication during the Covid-19 pandemic, with odds ratios ranging from 1.22 (1.02-1.47) to 1.56 (1.31-1.86). The odds ratios are reported in Table 3. Lastly, we found that during the Covid-19 pandemic, the odds of thinking about religion and prayer in spiritual individuals were approximately three-times higher than in non-spiritual people.

Table 3 Associations of spirituality and changes in relationships, emotions, day structure, thinking and behaviour during the Covid-19 pandemic, crude and adjusted for age, gender, and socioeconomic status (odds ratios and 95% confidence intervals).

Changes in relationships, emotions, day structure	Relationship with partner	Relationship with children	Relationship with others in household	Loneliness	Threat	Fear and Anxiety	Helplessness	A decrease of hope	A disrupted structure of a day
Crude effect									
Spirituality	0.90 (0.69-1.14)	1.05 (0.79-1.34)	0.94 (0.69-1.23)	1.14 (0.99-1.31)	1.06 (0.94-1.20)	1.08 (0.95-1.22)	1.10 (0.97-1.25)	0.80* (0.64-0.97)	0.93 (0.82-1.04)
Adjusted									
Spirituality	0.78 (0.56-1.05)	1.01 (0.72-1.40)	0.84 (0.57-1.21)	1.05 (0.88-1.25)	1.05 (0.90-1.21)	0.97 (0.82-1.14)	0.94 (0.80-1.11)	0.70** (0.53-0.91)	0.99 (0.85-1.15)

Changes in thinking and behaviour	Thinking about existential questions	Thinking about religion	Prayer	Smoking or chewing tobacco	Alcohol drinking	Shopping new things	Food consumption	Sex	Physical activity	Reading	Self-education	Work	Calls	Other forms of online comm.
Crude effect														
Spirituality	1.03 (0.91-1.15)	2.56*** (2.13-3.09)	3.36*** (2.79-4.09)	0.88 (0.70-1.08)	0.95 (0.77-1.15)	0.97 (0.71-1.28)	1.13 (0.99- 1.29)	1.27** (1.05-1.51)	1.27*** (1.11-1.45)	1.26*** (1.12-1.41)	1.45*** (1.28-1.65)	1.18* (1.02-1.36)	1.11 (0.99-1.24)	1.18** (1.06-1.32)
Adjusted														
Spirituality	1.00 (0.86-1.16)	2.00*** (1.60-2.54)	2.89*** (2.29-3.71)	0.89 (0.67-1.16)	0.97 (0.73-1.26)	1.20 (0.80-1.73)	1.22* (1.02-1.47)	1.30* (1.01-1.66)	1.29** (1.08-1.54)	1.26** (1.09-1.46)	1.56*** (1.31-1.86)	1.12 (0.93-1.36)	1.09 (0.93-1.26)	1.25** (1.08-1.44)

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Spirituality and religiosity: the combination

Table 4 depicts the associations of different combinations of religiosity and spirituality with changes in relationships, emotions, day structure, thinking, and behaviour during the Covid-19 pandemic. Religious/spiritual respondents were less likely to report a worsening of their feeling of hope (a 70% decrease in the risks). In contrast, religious/non-spiritual participants were 1.48-times more likely to report a deterioration in their feeling of helplessness (see Figure 1 for graphical representation), 1.33-times more likely to report worsening feelings of fear and anxiety and less likely (by 25%) to report the disruption of the day structure.

In spiritual and religious participants, we observed higher chances of more frequent sex, physical activity, reading and self-education, with odds ratios ranging from 1.57 (1.04-2.35) to 2.69 (1.37-5.01). Moreover, spiritual and non-religious respondents were 3.3-times more likely to report more frequent self-education, approximately 2.8-times more likely to report alcohol drinking, and three-times more likely to report more frequent work. The frequency of work was significantly increased (by 55%) among religious and non-spiritual participants.

Figure 1 Change in feelings of helplessness in religious and non-religious participants associated with the COVID-19 pandemic (Czech Republic, 2020). (Notes: S.R, spiritual/religious; S.NR, spiritual/non-religious; R.NS, religious/non-spiritual; NS.NR, non-spiritual/non-religious).

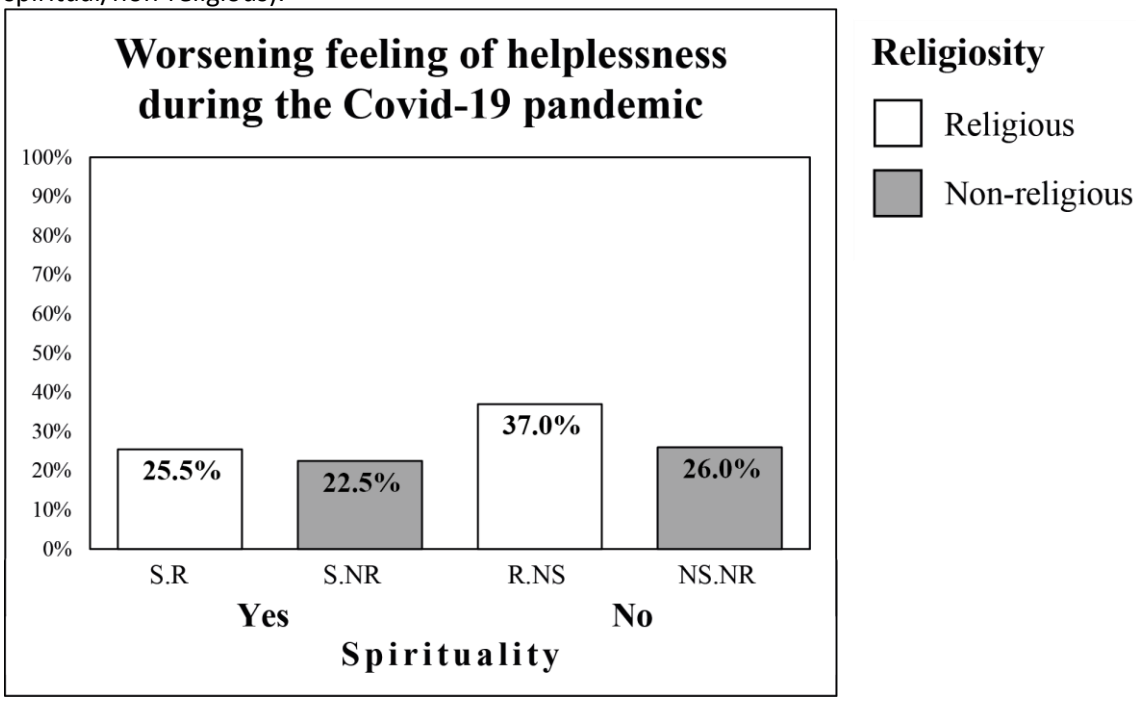

Table 4 Associations of different combinations of religiosity and spirituality with changes in relationships, emotions, day structure, thinking and behaviour during the Covid-19 pandemic, crude and adjusted for age, gender, and socioeconomic status (odds ratios and 95% confidence intervals).

Changes in relationships, emotions, day structure	Relationship with partner	Relationship with children	Relationship with others in household	Loneliness	Threat	Fear and Anxiety	Helplessness	A decrease of hope	A disrupted structure of a day
Crude effect									
NS.NR	1	1	1	1	1	1	1	1	1
S.R	0.84 (0.32-1.87)	1.23 (0.45-2.80)	0.77 (0.23-1.97)	1.01 (0.57-1.71)	0.67 (0.41-1.06)	0.68 (0.39-1.12)	0.96 (0.58-1.55)	0.36* (0.12-0.82)	0.67 (0.44-1.02)
S.NR	1.29 (0.20-4.60)	3.61* (0.81-11.43)	0.92 (0.05-4.62)	0.75 (0.17-2.28)	0.79 (0.30-1.89)	0.99 (0.35-2.47)	0.80 (0.23-2.27)		0.51 (0.17-1.33)
NS.R	1.15 (0.69-1.87)	1.03 (0.52-1.91)	0.99 (0.52-1.81)	1.37* (1.01-1.86)	1.22 (0.94-1.58)	1.49** (1.13-1.95)	1.62*** (1.22-2.13)	1.07 (0.72-1.57)	0.78 (0.60-1.01)
Adjusted									
NS.NR	1	1	1	1	1	1	1	1	1
S.R	0.81 (0.30-1.84)	1.13 (0.41-2.63)	0.70 (0.20-1.89)	0.96 (0.53-1.66)	0.65 (0.40-1.04)	0.59 (0.34-0.99)	0.87 (0.51-1.42)	0.30* (0.10-0.70)	0.66 (0.42-1.00)
S.NR	1.01 (0.16-3.76)	2.76 (0.59-9.30)	0.72 (0.04-3.80)	0.76 (0.17-2.37)	0.81 (0.30-1.97)	1.03 (0.36-2.63)	0.82 (0.23-2.37)		0.47 (0.15-1.22)
NS.R	1.19 (0.71-1.97)	0.97 (0.49-1.82)	1.10 (0.56-2.06)	1.30 (0.94-1.78)	1.13 (0.87-1.47)	1.33* (1.00-1.76)	1.48** (1.11-1.96)	1.01 (0.67-1.49)	0.75* (0.57-0.98)

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. S.R = Spiritual and Religious; S.NR = Spiritual but Non-religious; NS.R = Non-spiritual but Religious. It was not possible to estimate Hope (S.NR) due to the low number of respondents in this category; the regression model did not converge. NS.NR = Non-spiritual and Non-religious.

Table 4 *Cont.*

Changes in thinking and behaviour	Thinking about existential questions	Thinking about religion	Prayer	Smoking or chewing tobacco	Alcohol drinking	Shopping new things	Food consumption	Sex	Physical activity	Reading	Self-education	Work	Calls	Other forms of online comm.
Crude effect														
NS.NR	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S.R	0.74 (0.46-1.15)	27.62 (13.56-61.03)	52.32 (25.85-117.77)	0.97 (0.46-1.84)	1.04 (0.51-1.94)	0.77 (0.23-1.96)	1.41 (0.88-2.20)	2.12* (1.12-3.79)	2.01** (1.27-3.12)	1.71** (1.14-2.54)	2.44 (1.54-3.77)	1.57 (0.91-2.59)	1.06 (0.69-1.60)	1.06 (0.71-1.57)
S.NR	1.21 (0.47-2.83)	23.25 (6.74-72.13)	32.67 (10.10-100.31)	2.23 (0.64-6.04)	3.59** (1.28-8.78)	3.33 (0.76-10.17)	2.11 (0.81-4.95)	3.13* (0.89-8.57)	1.29 (0.37-3.46)	2.04 (0.85-4.60)	3.55** (1.42-8.18)	3.38** (1.29-7.97)	1.48 (0.60-3.37)	1.36 (0.57-3.06)
NS.R	1.20 (0.91-1.58)	6.88 (3.37-15.16)	7.98 (3.84-18.19)	0.79 (0.48-1.26)	0.77 (0.46-1.23)	0.55 (0.24-1.13)	0.85 (0.59-1.20)	1.16 (0.70-1.89)	1.11 (0.77-1.57)	1.16 (0.87-1.54)	1.18 (0.82-1.68)	1.42 (0.98-2.03)	1.19 (0.91-1.57)	1.11 (0.85-1.44)
Adjusted														
NS.NR	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S.R	0.69 (0.43-1.09)	27.15 (13.15-60.67)	51.99 (25.28-118.59)	1.11 (0.52-2.15)	1.13 (0.53-2.19)	0.82 (0.24-2.15)	1.55 (0.93-2.51)	2.69** (1.37-5.01)	2.11** (1.30-3.35)	1.57* (1.04-2.35)	2.38*** (1.48-3.76)	1.67 (0.95-2.81)	0.98 (0.63-1.49)	1.05 (0.69-1.59)
S.NR	1.17 (0.45-2.75)	24.45 (6.95-77.87)	36.96 (11.04-118.48)	1.67 (0.47-4.66)	2.78* (0.94-7.19)	2.76 (0.62-8.79)	1.67 (0.62-4.08)	2.21 (0.61-6.37)	1.05 (0.30-2.87)	2.18 (0.90-4.96)	3.27** (1.28-7.71)	3.09* (1.14-7.56)	1.65 (0.65-3.87)	1.24 (0.50-2.86)
NS.R	1.16 (0.88-1.53)	6.46 (3.14-14.33)	7.13 (3.41-16.35)	0.87 (0.52-1.41)	0.88 (0.52-1.44)	0.60 (0.26-1.25)	0.87 (0.60-1.25)	1.36 (0.80-2.25)	1.15 (0.79-1.64)	1.10 (0.82-1.46)	1.21 (0.83-1.75)	1.55* (1.06-2.25)	1.07 (0.81-1.42)	1.08 (0.82-1.41)

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. S.R = Spiritual and Religious; S.NR = Spiritual but Non-religious; NS.R = Non-spiritual but Religious. It was not possible to estimate Hope (S.NR) due to the low number of respondents in this category; the regression model did not converge. NS.NR = Non-spiritual and Non-religious.

Discussion

This study aimed to assess the associations between R/S and respondents' experiences, behaviour, and relationships during the first outbreak of the Covid-19 pandemic in the Czech Republic in 2020, in the absence of a vaccine. We found that religiosity, spirituality, and their combinations affected experiences, behaviour, and thinking during the pandemic, although the results are heterogeneous. In terms of emotions, R/S had a positive effect on changing feelings of helplessness, hope, a disrupted structure of the day, and fear and anxiety. Regarding behaviour changes, spirituality itself increased the frequency of alcohol drinking, self-education and work. The combination of religiosity and spirituality underlined positive changes in some areas of behaviour and feelings during the pandemic, such as feelings of helplessness, hope, physical activity, sex, reading or self-education.

We found that R/S influenced feelings during the Covid-19 pandemic. Concerning helplessness, fear and anxiety, the absence of spirituality increased these negative emotions. We found that spirituality reduced the odds of decreasing hope. Moreover, in combination with religiosity, the odds were even lower. Our findings seem consistent with Roberto et al. (2020), supporting the positive influence of spirituality on hope during the pandemic. Furthermore, our results are similar to those of Lucchetti et al. (2020), reporting a positive relationship between R/S and a feeling of hope and a negative relationship between R/S and levels of fear during the current pandemic. Despite the different methodological approach, we came to similar results, which underlines the role of spirituality in promoting positive mental health during stressful situations (del Castillo, 2021). Furthermore, religious non-spiritual participants were less likely to report a worsening of the feeling of a disrupted structure of the day. An explanation may be that religious participants are better placed to follow a certain daily and weekly schedule. Religiosity is mostly associated with a system of beliefs, practices and rituals shared in a community (Zimmer et al., 2016), and participation in a religious community is usually associated with regularity. Moreover, prayer can play an important role in the structure of the days of religious people (Johnson, 2004). Thus, religious people may have a more internalized structure of time. In connection with the current pandemic, our study suggests that people who already have some religious attitudes can mobilize them when dealing with difficult circumstances (Molteni et al., 2021).

Furthermore, we found that R/S influenced some behaviours during the Covid-19 pandemic. Religious and spiritual participants reported increased odds of physical activity, reading and self-education. In the context of the current pandemic, a positive impact of

physical activity and R/S on health has been proven. Spirituality is considered one of the protective factors against the deterioration of mental health outcomes during a pandemic (Gonzalez-Sanguino et al., 2020; Lucchetti et al., 2020; Schmitt et al., 2021). To the best of our knowledge, this is the first study that found R/S to be associated with higher physical activity during a pandemic. Because recent research prior to the Covid-19 pandemic has not confirmed this particular relationship (Ansari et al., 2017; Silfee et al., 2017; Waters et al., 2018), we can assume that it is the current pandemic that is playing a role. A possible explanation may lie in the keeping of religious norms, which, among other things, prompt a person to the care of his or her body. It may also be related to the fact that religion gives meaning to life and thus strengthens life satisfaction and self-esteem (Zimmer et al., 2016). Religious norms offer believers an order on which they can rely.

Moreover, adherence to such an order can also be related to significant changes in other domains, such as reading and self-education. On the other hand, self-education with reading during the pandemic could be associated with greater self-enhancement in religious people (Sedikides & Gebauer, 2021).

We found that religious and spiritual respondents reported more frequent sex than before the pandemic. Some studies (e.g., Au et al., 2012) suggest a relationship between spirituality and sexuality during difficult life circumstances. To the best of our knowledge, this is the first study to report an increase in sexual activity in religious and spiritual people during the pandemic. We can assume that this is related to the impossibility of meeting in churches and communities during the Covid-19 pandemic. With the lack of a community, religious people may have had a greater need for close contact, sharing and strengthening relationships in the family, and so they could perceive sex as a form of dealing with this issue.

Concerning spiritual and non-religious participants, we have seen an increase in the odds of drinking alcohol during the pandemic. From the point of view of traumatic situations, this group seems to be more fragile than other R/S subgroups in the Czech environment (Kosarkova et al., 2020). Spiritual and non-religious participants may have a higher tendency to look for self-determination and something to rely on, and can therefore fall into alcohol addiction more easily.

In our study, results concerning religiosity were different from those on spirituality. The discrepancy between results related to religiosity and spirituality or different ways of assessment of these constructs has appeared in some previous studies (Dankulincova Veselska et al., 2018; King et al., 2013; Malinakova et al., 2020). Moreover, our results suggest that the

particular impact of religiosity and spirituality on changes in experience and behaviour during the pandemic was reinforced by the combination of R/S. These findings are in line with some recent research examining differences between R/S subgroups in multiple domains in the Czech environment regarding health-risk behaviour (Buchtova et al., 2020; Malinakova et al., 2019) or self-esteem (Gabova et al., 2021). The results confirm that research on the effect of R/S must be interpreted carefully. Both constructs are multidimensional (Hooker et al., 2014; Kub & Solari-Twadell, 2013) and so far there is no standard delineations of their definition in the literature (Zimmer et al., 2016). A group of religious participants may include respondents with different levels of spirituality and vice versa (Gabova et al., 2021; Malinakova et al., 2019); therefore, to achieve relevant results it is essential to consider individual dimensions when measuring R/S.

Strengths and Limitations

The first strength of this study is that it focuses on the role of R/S during the most critical phase of the first wave of the Covid-19 pandemic. Another strength is a large sample, which is, in terms of age and gender, close to the national sample characteristics. A limitation of our study is its cross-sectional design, so any conclusions on causality cannot be made. Another limitation may be the sampling method, because though the sample was balanced regarding age and gender, some bias is inevitably introduced by the online nature of the questionnaire, which excluded participants without access to the internet. The last limitation can be an information bias, as the survey is based only on the self-report of participants.

Conclusions

Our findings suggest that religiosity and spirituality have a positive effect during a pandemic. It appears to be a protective factory of negative emotions such as helplessness, fear and anxiety and hopelessness. These results confirm the role of R/S as a potential source of inner strength during difficult life situations. However, R/S does not only affect changes in emotions during a pandemic. The authors point to an association between R/S and increased physical activity and sexual activity during a pandemic, and R/S also contributes to increased reading and self-education.

Although both religiosity and spirituality had an impact on changes in experience and behavior during a pandemic, it is the combination of R/S that reinforced changes in some areas of feelings and behavior during the pandemic. The results of the associations of religiosity and

of spirituality with our variables of interest differed among these variables, which means that religiosity and spirituality are not totally overlapping concepts. This idea is also supported by previous studies examining these aspects in secular settings. The results highlight the need to understand R/S as a multifaceted construct and thus eliminate the risk of skewing results by inappropriate research designs.

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15 Study 11: Sensory processing sensitivity is associated with religiosity and spirituality

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Abstract

Sensory processing sensitivity (SPS) has recently been gaining public as well as scientific interest. Evidence is lacking on the relationship between SPS and different dimensions of religiosity and spirituality (R/S). We investigated the associations between SPS and R/S in the Czech Republic. Two samples of Czech adults (N1 = 1,406; 48.1±16.4 years; 49.4% women, N2 = 1,494; 50.7±15.8 years; 44.1% women) participated in the online survey. We measured SPS, religious attendance, religiosity, spirituality, images of God, negative religious coping (NRC) and religious conspiracy theories (RCT). Results of binary logistic regression found SPS significantly associated with religiosity, spirituality, and NRC with odds ratios (ORs) of 1.38 (95% confidence interval [CI] 1.22 – 1.56), 1.61 (95% CI 1.33 – 1.96) and 1.25 (95% CI 1.02 – 1.52), respectively. Higher SPS indicated a greater likelihood of perceiving God as ever-present, fatherly, forgiving, gentle, loving, motherly, punishing, just, and absolute, with ORs ranging from 1.14 to 1.26. No significant association was found between SPS and RCT. Results revealed associations between SPS and various aspects of R/S. The study highlights the relevance of considering SPS in clinical contexts involving religious and spiritual issues. Further research might be aimed at comparing the results with countries with different religious backgrounds, or at exploring the links with other variables that may play a role in these relationships.

Keywords: sensory processing sensitivity; religiosity; spirituality; image of God; religious conspiracy beliefs

Introduction

Sensory processing sensitivity (SPS) is defined as a personal predisposition to be more sensitive to subtle stimuli and easily aroused by external stimuli (Aron & Aron, 1997). This trait is associated with higher activity in brain regions associated with awareness, self-other processing, memory, and empathy (Acevedo, 2020). SPS is a hereditary trait occurring in about 15-20% of the population (Aron, 2013; Assary et al., 2021).

Individuals with increased central nervous system sensitivity are able to process information more deeply than usual (Boterberg & Warreyn, 2016). On the other hand, they are more easily overwhelmed when they are in a highly stimulating environment for too long (Aron, 2013). SPS has been linked to higher levels of stress, anxiety, depression, and neurotic personality traits (Ahadi & Basharpoor, 2010; Liss et al., 2005; Malinakova et al., 2021). Research also suggests that SPS is associated with emotional regulation difficulties (Brindle et al., 2015) and poorer social functioning, especially under demanding conditions like the COVID-19 pandemic (Ahadi & Basharpoor, 2010; Malinakova et al., 2021). Moreover, adverse childhood experiences and poor upbringing may be related to more psychological symptoms in individuals with high SPS (Karaca Dinç et al., 2021; Liss et al., 2005). However, SPS also has a number of advantages, given that highly sensitive persons (HSPs) are aware of subtle nuances in their environment (Rizzo-Sierra et al., 2012). When HSPs adapt to the environment they possess better perception, ingenuity, and imagination (Aron, 2013), are more creative and sensitive to the arts (Bridges & Schendan, 2019), and make better decisions and engage in meaningful work (Aron et al., 2012). These people are often characterized by empathy, caring for others, and are more intuitive (Acevedo, 2020; Acevedo et al., 2018). It could be concluded that SPS provides greater benefits from a positive and supportive environment but increases the risk of stress-related problems in response to negative experiences (Greven et al., 2019; Jagiellowicz et al., 2020).

Currently, there is a lot of public and media interest in the SPS concept. So far, SPS has attracted increasing research interest in various areas of psychology, such as temperament and personality traits and mental health issues (Lionetti et al., 2019). The theory (Aron & Aron, 1997) as well as recent research (Malinakova et al., 2021) also suggests a possible link between SPS and the domains of religiosity and spirituality (R/S). Although the scientific knowledge about this association is still scarce, some facts suggest that these concepts may be related. First, topics such as the soul, spiritual life, relationship to religion or spiritual practice are often observed by psychotherapists when speaking with HSPs (Aron, 2010, 2013). Second, a high

level of sensory sensitivity appears to be a definite prerequisite for a deeper/more intense spiritual experience (Aron, 2013; Wahbeh & Butzer, 2020). Some authors (Acevedo, 2020; Aron, 2010; Rappaport & Corbally, 2018) even report sensitivity as a trait conditioning religious competence. Finally, at the same time, spiritual activity can increase sensitivity through changes in brain regions important for sensory processing as a result of extensive meditation practice (Acevedo, 2020).

Both religiosity and spirituality are highly complex and multidimensional constructs involving attitudes, experiences, and behaviors that refer to a sacred, transcendent, and ultimate domain of existence (Hill & Pargament, 2003; Hooker et al., 2014). Because of their overlap in the literature (Koenig, 2012a) and the consequent potentially biased results due to difficulties in measuring them (Malinakova et al., 2020), an approach that includes both internal and external aspects of R/S is appropriate for capturing the association of SPS with the heterogeneous nature of R/S. E.g., regarding religiosity, although participation in organized religious activities seems to be a basic criterion for measuring religiosity, it is only one of several aspects of religiosity (Koenig et al., 2015). Other important dimensions may include, for example, belief, attachment to God, or religious coping (Koenig, 2012b).

Attachment relationship with God involves a spectrum of emotions, from closeness, love, and affection towards a supportive and protective God to fear of rejection or punishment from a judgmental and powerful God. It may also encompass feelings of anger and disappointment due to the perception of an indifferent God, leaving individuals to navigate their lives independently (Schaap-Jonker, 2018). The way people perceive God is related to mental health outcomes (e.g., Jonker et al., 2008; Silton et al., 2014; Stauner et al., 2016) and is supposed to reflect one's attachment (Granqvist et al., 2020), as described by the correspondence and compensation theories. According to the correspondence theory (Granqvist & Hagekull, 1999), a secure attachment corresponds to perceiving God as loving and supportive, whereas an insecure attachment is related to perceiving God as strict and distant. However, the compensation theory (Kirkpatrick & Shaver, 1990) goes beyond this explanation and suggests that insecure attachment to significant others can be compensated for by developing a secure attachment to God.

Religious coping includes positive religious coping (PRC) and negative religious coping (NRC) (Pargament et al., 1998). Whereas PRC involves a secure connection with God, spiritual interconnectedness, and a sense of life's meaning, NRC is marked by spiritual tension, negatively perceived relationship with God and conflicts with fellow community members

(Pargament et al., 2011). The significance of investigating NRC stems from its negative impact on health, as numerous studies have demonstrated that NRC is associated with adverse effects on mental well-being, including increased stress, depression, and anxiety (Holloway-Friesen, 2023; Pargament et al., 2004).

Taken together, it is evident that R/S factors can have both positive and negative impacts on health (Koenig, 2012a). However, certain associations within the domain of R/S exhibit inconsistency, which may not necessarily be attributed to conceptual ambiguity but could be indicative of confounding variables. These factors may involve overlaps with personality traits or other characteristics that are not yet adequately explored. Among these unexplored dimensions, SPS emerges as a potential area of interest. Despite its potential relevance, there is a scarcity of research addressing the interplay between SPS and R/S factors. Moreover, given the above-mentioned dual influence of R/S on health, our aim was to comprehensively examine both the positive and negative facets of R/S, including, for example, NRC and negative God images. Therefore, we decided to assess the associations between SPS and religious attendance, faith, NRC, God image, spirituality, and religious conspiracy beliefs.

Methods

Participants and procedure

For this study, we used data from two online surveys of the Czech population aged 18 to 97 (respectively 92). The first data sample was collected in April 2020, and data for the second sample was collected in April 2021. Both data collections were carried out by a specialized agency (The Czech National Panel, Prague, Czech Republic) to achieve a balanced sample close to national characteristics regarding age and gender. In the second data collection, we applied the following exclusion criteria to ensure high data quality: 1) a very short period filling in the survey and 2) a uniform response pattern, i.e., responding to most of the items in the survey in the same way. We excluded 166 problematic subjects based on these criteria. Thus, the final first sample comprised 1,406 Czech respondents (age 18 years and over, mean age = 48.05, SD = 16.42, 49.4% female), the final second sample comprised 1,494 Czech respondents (age 18 years and over, mean age = 50.67, SD = 15.79, 44.1% female).

At the beginning of each survey, participants received written information on the purpose of the study and the anonymous and confidential treatment of the data and were made familiar with the system. Participation in the survey was completely voluntary, with the option to leave the study at any time before or during the survey without giving any reason.

Respondents had to explicitly give their informed consent to participate in the survey before the study began. The study design was approved by the local Ethics Committee of the Faculty of Theology, Palacký University in Olomouc (No. 2020/06).

Measures

Religiosity was measured by the question: “Would you call yourself a believer?” with possible answers: Yes, I am a member of a church or religious organization/Yes, but I am not a member of a church or religious organization/No/No, I am convinced atheist. Respondents who had reported “Yes” were classified as religious; others were considered non-religious.

Religious attendance was assessed by the question: “How often do you go to church or religious sessions?” Possible answers were: I don't visit at all/Occasionally/Often, but not every week/I try once a week/More than once a week. Participants reporting at least one religious meeting a week were dichotomized as attending, as used in previous studies in the Czech environment (Buchtova et al., 2020).

Spirituality was measured using the Daily Spiritual Experience Scale (DSES) (Underwood & Teresi, 2002), which measures the frequency of everyday experiences of connection with transcendence. In this study, we used an adapted 15-item version of the scale validated for a Czech environment (Malinakova et al., 2018). For the first 14 items, respondents were given the option of answering on a Likert scale graded according to the intensity of their experience of the phenomenon, ranging from "never" (1) to "many times a day" (6). Response possibilities for the last item regarded a 4-point scale that ranged from "not close at all" (1) to "as close as possible" (4). Higher DSES scores indicate higher spiritual experience. The total score of DSES ranged from 15 to 88 points. For the purposes of our analysis, the score was dichotomized: the respondents with a score of 51 (the middle of the total score) or higher were considered spiritual, and the rest as non-spiritual.

Images of God were assessed both in religious and non-religious respondents by the question “How well do you feel that each of the following words describes God?” followed by 12 adjectives (critical, distant, ever-present, fatherly, forgiving, gentle, loving, motherly, punishing, wrathful, just, absolute) adapted from the Baylor Religion Survey (Baylor University, 2005). Respondents chose from four possible answers: "very well" (1); "somewhat well" (2); "not very well" (3); "not at all" (4). Religious respondents (those who identified themselves as believers) were asked how well they thought the adjectives described God. Non-religious participants (not identifying themselves as believers) described how well they thought the adjectives described the religious respondents' views. For the purpose of statistical analysis,

we dichotomized each item as follows: those who answered "very well" and "somewhat well" were considered to perceive God in this way.

Negative religious coping was measured using the Czech version (Janu et al., 2019) of the NRC subscale of the Brief RCOPE (Pargament et al., 2011). It is composed of seven items reflecting a religious struggle that grows from a less secure relationship with God. Examples of these items include statements such as “I'm wondering whether God had abandoned me” or “I feel that God is punishing me for my lack of devotion”. Each item is rated on a four-point scale with possible answers ranging from "not at all" (1) to "a great deal" (4), leading to a total score ranging from 7 to 28. Since the NRC was assessed as a dependent variable in the analysis, each of the item scores was dichotomized. Responses of 1 or 2 were recoded to "0" (did not use NRC) and responses of 3 and 4 were recoded to "1" (used NRC). To determine the NRC summary, a dichotomous variable was created with a value of "1" if any of the seven NRC items had a value of "1", as recently used in the Czech environment (Kosarkova et al., 2020, 2022).

Religious conspiracy theories were assessed using six statements capturing common religious beliefs about the COVID-19 pandemic and related vaccinations. These statements were retrieved by searching the Internet and social media in the first weeks of the COVID-19 pandemic to identify the most commonly held views. While our approach may not be entirely comprehensive, our goal was to encompass the most prevalent theories related to religious themes during a given time. The assessed statements were: “Rejection of the COVID-19 vaccine is an act of true faith and trust in God”; “Some of the vaccines contain modified RNA that changes the human genome, which is a crime against the human race and its Creator”; “Vaccination is a sign of the end of the world”; “The pope and false church prophets are fulfilling the intentions of world elites and spreading the ideas of modernism, which contradicts true tradition”; “The current coronavirus pandemic is God’s punishment”; “Vaccination with the COVID-19 vaccine is morally unacceptable because tissues from aborted foetuses were used for its development”. Participants were asked to rate the extent to which, in their opinion and available information, the following statements correspond to the truth. Respondents chose from five possible answers: "does not correspond at all" (0); "somewhat do not correspond" (1); "I do not know" (2); "somewhat corresponds" (3); "completely corresponds" (4). When any of the statements were marked as "3" or "4", the respondent was classified as believing in the religious conspiracy theory (RCT). Consequently, to determine the

RCT Summary, a dichotomous variable was created with a value of "1" if any of the six RCT items had a value of "3" or "4".

To assess *sensory processing sensitivity*, we used the Sensory Processing Sensitivity Questionnaire (SPSQ), a tool recently developed and validated in Czech settings (Malinakova et al., 2021). It has been demonstrated that in the Czech environment, the SPSQ scale exhibits a high positive correlation ($r_s = 0.61$, $p < 0.001$) with the Highly Sensitive Person Scale (HSPS), an established instrument for measuring SPS (Malinakova et al., 2021). The initial question was worded as follows: “Please indicate to what extent you think that compared to other people you are sensitive to the following stimuli”. Each item was rated on an eleven-point scale with possible answers ranging from "compared to others, I am not sensitive to them at all" (0), through "about the same as the people around me" (5) to "much more sensitive than the people around me" (10). This initial question was followed by a set of 8 sensory items (light; sounds; smells; taste; tactile stimuli – touch, clothing, etc.; hunger; heat; and cold) and a set of 8 other sensitivity items (your emotions; emotions of other people; sudden changes; your inner world; the need to do many things at once; criticism; the need for harmony in life; and the need to make decisions). This led to total scores from 0 to 160. A higher score of SPSQ represents higher sensitivity. In the same way, we also used the Sensory Sensitivity subscale (Malinakova et al., 2021) of the SPSQ questionnaire.

Sociodemographic characteristics, such as age, gender, education level, marital and economical status, were obtained from the questionnaire.

Statistical analyses

As the first step, we described the background characteristics of both samples. Second, based on the Shapiro-Wilk test, we rejected the assumption of normal data distribution. Then we assessed the associations of SPS and its sensory subscale (both standardized to Z-scores) with religious attendance, religiosity, spirituality, and NRC using binary logistic regression models. All models were adjusted for age, gender, and education level. In the next step, the dependent variables were replaced by 12 images of God, and the described steps were repeated. Finally, variables assessing a belief in RCT were regressed on the sensory subscale of the SPSQ. All analyses were performed using the statistical software package IBM SPSS version 21 (IBM Corp., Armonk, NY, USA). All the data files are available at https://osf.io/z8pfv/.

Results

Description of the sample

The sociodemographic characteristics of the samples (the first sample mean age 48.1; SD = 16.4; 50.6% men, the second sample mean age 50.7; SD = 15.8; 55.9% men) are presented in Table 1. Approximately one-third of respondents (exactly 34.1% in the first sample and 31% in the second sample) were considered religious.

Table 1 Demographic characteristics of the study samples.

Demographic characteristics	First sample		Second sample	
	N	%	N	%
Gender				
Male	712	50.6	835	55.9
Female	694	49.4	659	44.1
Age				
18–34 years	349	24.8	266	17.8
35–49 years	407	28.9	493	33.0
50–65 years	372	26.5	370	24.8
66–99 years	278	19.8	365	24.4
Marital status				
In a partnership	926	65.9	950	63.6
Not in a partnership	480	34.1	544	36.4
Highest education achieved				
Elementary	118	8.4	91	6.1
Secondary vocational	636	45.2	572	38.3
Secondary with graduation	439	31.2	451	30.2
College	213	15.1	380	25.4
Economical status[a]				
Employee	698	49.6	720	48.2
Entrepreneur	70	5.0	89	6.0
In household[b] / without work	125	8.9	117	7.8
Student	78	5.5	55	3.7
Disabled / old-age pensioner	435	30.9	503	33.7
Religiosity[a]				
Religious, member of a church / religious society	121	8.6	132	8.8
Religious, not a member of a church / religious society	358	25.5	331	22.2
Non-religious	746	53.1	680	45.5
Non-religious, convinced atheist	181	12.9	262	17.5
Religious attendance[a]				
Attending	53	3.8	44	2.9
Non-attending	426	30.3	413	27.6
Total	1406	100	1494	100

[a]Number of missing cases per variable in the first sample: Religious attendance: 927, number of missing cases per variable in the second sample: Economical status: 10, Religiosity: 89, Religious attendance: 1037. [b]Including maternity leave.

Sensory processing sensitivity, religious attendance, religiosity, spirituality, and negative religious coping

Table 2 shows the associations between SPS and religious attendance, religiosity, spirituality, and NRC. Both the total SPSQ score and the sensory SPSQ subscale score were used. In our sample, we found no significant association of SPS (as measured by both the total SPSQ score and the sensory SPSQ subscale score) with religious attendance. The results indicate that with one standard deviation increase in the SPSQ total score, the odds of being religious or spiritual increased by 38% and by 61%. A similar but weaker relationship was found between religiosity and spirituality and the sensory SPSQ subscale scores: 29% (respectively 57%). Moreover, one standard deviation increase in the SPSQ total score increased the risks of NRC by 25%.

Table 2 Associations of sensory processing sensitivity (standardized to Z-scores) with religious attendance, religiosity, spirituality and negative religious coping, crude, and adjusted for age, gender, and education level (odds ratios and 95% confidence intervals).

Variable		Religious attendance	Religiosity	Spirituality	NRC Summary
SPSQ	Crude	1.14 (0.85, 1.53)	1.43 *** (1.27, 1.62)	1.59 *** (1.32, 1.92)	1.19 (0.98, 1.45)
	Adjusted	1.06 (0.78, 1.43)	1.38 *** (1.22, 1.56)	1.61 *** (1.33, 1.96)	1.25 * (1.02, 1.52)
SPSQ-S	Crude	1.13 (0.84, 1.51)	1.34 *** (1.18, 1.51)	1.56 *** (1.29, 1.90)	1.20 (0.98, 1.46)
	Adjusted	1.07 (0.79, 1.45)	1.29 *** (1.14, 1.45)	1.57 *** (1.29, 1.92)	1.25 * (1.02, 1.53)

Note. SPSQ = Sensory Processing Sensitivity total score; SPSQ-S = Sensory Subscale score of Sensory Processing Sensitivity Questionnaire; NRC = negative religious coping.
*p < .05, **p < .01, ***p < .001.

Sensory processing sensitivity and images of God

The results of regression analysis assessing the associations of SPS with the specific images of God are presented in Table 3. We found that SPS (as measured by the total SPSQ score) was associated with ever-present, fatherly, forgiving, gentle, loving, motherly, just, absolute, and punishing images of God. The strongest adjusted associations (standardized to Z-scores) of the SPSQ total score were found for forgiving, gentle and loving images of God, with odds ratios (ORs) ranging from 1.22 (95% confidence interval, CI, 1.10-1.37) to 1.26 (95% CI 1.13-1.42). One standard deviation increase in the SPSQ total score increased the likelihood of perceiving God as ever-present (by 19%), motherly (by 18%), and fatherly, just, and absolute (by 17%). Moreover, SPS (as measured by the total SPSQ score) was positively associated with perceiving God as punishing, with an OR of 1.14 (95% CI 1.02-1.27). Similar but weaker relationships were

found between these images of God (except for the punishing image of God) and the sensory SPSQ subscale score, with ORs ranging from 1.13 to 1.22.

Table 3 Associations of sensory processing sensitivity (standardized to Z-scores) with different images of God, crude and adjusted for age, gender, and education level (odds ratios and 95% confidence intervals).

Variable		Images of God					
		Critical	**Distant**	**Ever-present**	**Fatherly**	**Forgiving**	**Gentle**
SPSQ	**Crude**	1.07 (0.96, 1.19)	1.06 (0.96, 1.18)	1.24 *** (1.12, 1.39)	1.22 *** (1.09, 1.35)	1.34 *** (1.20, 1.50)	1.26 *** (1.13, 1.40)
	Adjusted	1.07 (0.96, 1.20)	1.06 (0.96, 1.18)	1.19 ** (1.07, 1.33)	1.17 ** (1.05, 1.31)	1.26 *** (1.13, 1.41)	1.22 *** (1.10, 1.37)
SPSQ-S	**Crude**	1.08 (0.97, 1.20)	1.07 (0.96, 1.19)	1.20 ** (1.08, 1.34)	1.17 ** (1.05, 1.30)	1.29 *** (1.15, 1.45)	1.21 ** (0.08, 1.35)
	Adjusted	1.09 (0.97, 1.21)	1.07 (0.96, 1.20)	1.16 * (1.03, 1.29)	1.13 * (1.01, 1.26)	1.22 ** (1.09, 1.37)	1.17 ** (1.04, 1.31)
		Loving	**Motherly**	**Punishing**	**Wrathful**	**Just**	**Absolute**
SPSQ	**Crude**	1.33 *** (1.19, 1.49)	1.21 *** (1.09, 1.35)	1.12 * (1.01, 1.25)	1.03 (0.92, 1.16)	1.22 *** (1.10, 1.36)	1.21 *** (1.09, 1.34)
	Adjusted	1.26 *** (1.13, 1.42)	1.18 ** (1.05, 1.32)	1.14 * (1.02, 1.27)	1.08 (0.96, 1.21)	1.17 ** (1.05, 1.30)	1.17 ** (1.05, 1.31)
SPSQ-S	**Crude**	1.26 *** (1.13, 1.42)	1.17 ** (1.05, 1.30)	1.10 (1.00, 1.23)	1.05 (0.93, 1.18)	1.21 ** (1.08, 1.35)	1.17 ** (1.05, 1.31)
	Adjusted	1.20 ** (1.07, 1.35)	1.13 * (1.01, 1.27)	1.12 (1.00, 1.25)	1.09 (0.97, 1.23)	1.16 ** (1.04, 1.30)	1.14 * (1.02, 1.27)

Note. SPSQ = Sensory Processing Sensitivity total score; SPSQ-S = Sensory Subscale score of Sensory Processing Sensitivity Questionnaire.
*p < .05, **p < .01, ***p < .001.

Sensory processing sensitivity and religious conspiracy theories

Table 4 depicts the results of the binary logistic regression assessing the associations of the sensory SPSQ subscale score with RCT beliefs. The results revealed that SPS was not significantly associated with RCT beliefs around COVID-19.

Table 4 Associations of sensory processing sensitivity (standardized to Z-scores) with religious conspiracy theories, crude and adjusted for age, gender, and education level (odds ratios and 95% confidence intervals).

Variable		RCT Summary	RCT 1	RCT 2	RCT 3	RCT 4	RCT 5	RCT 6
SPSQ-S[a]	Crude	1.06 (0.90, 1.25)	1.23 (0.78, 1.94)	0.98 (0.70, 1.39)	1.19 (0.75, 1.87)	1.17 (0.88, 1.55)	1.01 (0.74, 1.37)	0.92 (0.75, 1.13)
	Adjusted	1.07 (0.91, 1.26)	1.29 (0.83, 2.00)	1.03 (0.73, 1.46)	1.23 (0.80, 1.90)	1.27 (0.95, 1.70)	1.02 (0.75, 1.40)	0.94 (0.77, 1.15)

[a]Only the sensory subscale of the SPSQ questionnaire was included in the data collection.

Discussion

This study aimed to assess the associations between SPS and R/S, i.e., religious attendance, religiosity, spirituality, NRC, God image, and religious conspiracy beliefs in the secular environment of the Czech Republic. The results, adjusted for age, gender, and education level, showed that SPS was associated with religiosity and spirituality, or rather with some of their domains. Higher SPS predicted higher religiosity and spirituality, but not regular religious attendance. SPS was also associated with a higher proneness to NRC but did not appear to affect belief in RCT. HSPs were also more likely to see God in a positive way, for example, as forgiving, loving and ever-present.

We found strong associations between SPS and R/S. The findings of higher religious and spiritual attitudes in association with increasing SPS are in line with the theory and previous research (Acevedo, 2020; Aron & Aron, 1997). HSPs are more sensitive to their environment, situations, and feelings of other people (Acevedo et al., 2017; Jagiellowicz et al., 2011), and thus tend to be overstimulated by their surroundings (Acevedo, 2020; Aron & Aron, 1997; Malinakova et al., 2021). Many studies have already reported that spirituality-based techniques, e.g., meditation or mindfulness, could alleviate stress (e.g., Hartwick & Kang, 2013; McClintock et al., 2019). Thus, we can presume that HSPs may benefit from R/S practices, especially those focusing on reflection and awareness and that these practices may help them deal with overstimulation. Another explanation may lie in the deeper thinking (Aron, 2013; Aron et al., 2012; Li et al., 2022) and search for meaning (Acevedo, 2020; Aron & Aron, 1997) among HSPs, which is often considered an aspect of spirituality. By seeking a deeper meaning in life, HSPs may be more inclined to spiritual experiences, and the search for something beyond themselves. Furthermore, previous research has indicated associations between SPS and poorer adaptation to adverse life events, including trauma (Karaca Dinç et al., 2021; Marshall et al., 2010). While our study did not specifically measure traumatic experiences, we hypothesize that spirituality might provide a source of support for HSPs facing adversity. Further research incorporating measures of trauma and spirituality is essential to validate this hypothesis.

However, we found no significant association between SPS and religious attendance. It is possible that highly sensitive individuals may experience spirituality and a relationship with the transcendent internally (Aron, 2010), and they do not necessarily need to associate these experiences with participation in organized religion (Aron, 2013). However, our findings also suggest a trend towards higher religious attendance among HSPs. Therefore, our results

may be non-significant due to a generally low prevalence of attending respondents in secular environments, which may have affected our power to detect differences.

Our findings reveal an association between HSPs and an increased risk of employing NRC strategies. To the best of our knowledge, there is no research describing this relationship. However, previous studies showed that SPS is associated with poorer mental health, i.e., heightened levels of anxiety, depression, and neuroticism (Ahadi & Basharpoor, 2010; Benham, 2006; Engel-Yeger & Dunn, 2011; Liss et al., 2005). The same holds for NRC, which can furthermore both reflect one's mental health problems and contribute to their development or worsening (Ano & Vasconcelles, 2005; Martínez de Pisón, 2023; Pargament et al., 2004).

Furthermore, increasing levels of sensitivity were associated with a mostly positive perception of God as forgiving, gentle, loving, ever-present, motherly, fatherly, just and absolute, but less strongly also with an image of punishing God. Research shows that positive God-image characteristics are associated with better psychological well-being as well as higher self-esteem (Gabova et al., 2021; Stanford et al., 2021), while negative God-image characteristics are related to greater psychological distress, poorer well-being, and worse mental health outcomes (Jonker et al., 2008; Silton et al., 2014; Stauner et al., 2016). Because of the heightened sensitivity of HSPs to adverse life experiences (Karaca Dinç et al., 2021), their heightened interpersonal sensitivity (Acevedo, 2020), and their higher prevalence of insecure attachment style (Kerley et al., 2023), we can also suppose that, in line with a compensation theory (Kirkpatrick & Shaver, 1990), HSPs may tend to see God as a safe haven while facing life difficulties. Furthermore, these positive images of God may help them to deal with negative feelings about themselves and their perception of the world (Greenway et al., 2003). However, more research that would integrate the attachment style into the analysis is needed to support this hypothesis.

In our study, we did not observe any significant associations between SPS and belief in RCT. A possible explanation may lie in the tendency of HSPs to think more deeply about information and the world around them (Aron, 2020; Aron et al., 2012). As a result, they may not be inclined to turn to the shortcuts and simple solutions that conspiracies offer (Goertzel, 1994). At the same time, SPS does not appear to be a protective factor for belief in conspiracy theories either, given that a negative relationship between these constructs has not been demonstrated.

Strengths and Limitations

This study has several important strengths. First, to the best of our knowledge, this is the first study to examine the relationship between SPS and the domains of R/S in such depth and extent. Second, we examine a wide range of aspects of R/S (including self-reported belief, spirituality, images of God, NRC, and RCTs), which is uncommon in studies. Third, the sample size is close to the characteristics of the national sample regarding age and gender. Despite the study's contribution to a deeper understanding of associations between SPS and R/S, it also has several limitations. One of these is the cross-sectional design of the study, which does not allow us to make any conclusions about causality. Another limitation may be information bias, as our data is self-reported and may be influenced by social desirability. Moreover, some bias is inevitably caused by the online nature of the questionnaire, which excluded respondents without internet access. Additionally, the data for this study were collected during the COVID-19 pandemic. The unique circumstances of this global health crisis may have increased respondents' predisposition towards R/S, as proposed by research suggesting that under the specific conditions of a secular environment, the psychological burden of a difficult life situation like the pandemic can contribute to heightened religious and spiritual inclinations (Malinakova et al., 2020).

Implications

We found that SPS was related to R/S. This information may be useful for psychologists, psychotherapists, social workers, and others in the helping professions, as well as in spiritual care. When working with people exhibiting high sensitivity, professionals in the aforementioned fields should take into account their greater tendency to think more deeply about topics of faith, spirituality, or the meaning of life, while also mitigating or eliminating the impact of stressful situations due to intense experience and overload. For HSPs, faith can represent inner security, a resource to rely on. Spirituality can help them in many life situations. Those who work with HSPs can assume that these people tend to be spiritual and engage more with themes of spirituality and the meaning of life. When working with spiritual HSPs, professionals can tailor therapeutic approaches by incorporating spiritual topics and encouraging the use of spiritual practices, e.g., meditation or mindfulness. Additionally, our study underscores the importance of therapeutic work with NRC in order to guide HSPs toward healthier coping strategies. Moreover, the positive link between SPS and perceptions of God as loving, gentle, or forgiving suggests avenues for enhancing psychological well-being, with

interventions focusing on fostering positive images of God that may bring feelings of security and peace.

Due to the specific character of the Czech Republic as a highly secular environment, it is appropriate to compare the results with research in prevalently religious countries. Further research is needed to investigate other concepts that may be related to the relationship between SPS and R/S, such as self-esteem, attachment style, or other personality traits, as well as variables related to emotions. For a deeper understanding of the association between SPS and R/S, it would also be useful to assess these concepts on the basis of neural correlates.

Conclusions

Our results suggest that SPS is related to aspects of R/S. An increase in sensory sensitivity scores was related to higher odds of self-reported religiosity and spirituality. On the other hand, we found no association of SPS with regular religious attendance. Increased sensitivity was related to perceiving God as ever-present, fatherly, forgiving, loving, motherly, just, absolute, and punishing. A slight trend can be seen in the association between SPS and increased odds of using NRC strategies. We found no significant association between SPS and belief in RCT about the COVID-19 pandemic.

Our results suggest that high sensitivity is associated with different dimensions of religiosity and spirituality, which may have both positive and negative consequences on the experience, well-being, and, to some extent, the overall health of HSPs. Religiosity and spirituality can play an important role in the lives of there individuals, and it seems that experiencing faith itself is more important than going to church. The study also offers suggestions on the possible risks and consequences of this trait in relation to R/S aspects.

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16 General Discussion

The aim of this thesis was to further explore the association between R/S and health. Special attention was paid to methodological issues, i.e., the assessment of the six measurement tools' psychometric characteristics and the identification of possible reasons for the heterogeneity of research findings in the area of R/S and health. This thesis summarises the findings 11 studies; however, their results are more meaningful when interpreted in the context of other studies of the author of this thesis focusing on this problematic. Therefore, to provide a more comprehensive picture and concrete examples of possible sources of this heterogeneity, the Discussion also refers to these other studies. Rather than connecting each research question with a concrete study, I preferred to present broader research questions and, in answering them, to integrate the findings of more studies. Thus, the Discussion follows the order of research questions as summarised in Chapter 3. Each section and subsection is preceded by a short summary of research findings related to the explored topic.

16.1 The secular context of the Czech Republic

16.1.1 The prevalence of R/S and attitudes of the Czech people towards R/S

The prevalence of R/S was similar across various samples used in the studies described in this thesis. Regarding the percentage of non-believers, nationally representative adult samples show 67.8% in 2013 (**Study 4**), 72.3% in 2014 (**Study 3**) and 70.5% in 2016 (**Study 2**). These figures correspond approximately to the percentages of non-believers reported in the Pew Research Center surveys, i.e., 76.4% (Pew research Center, 2014). However, they are higher by almost 17% compared to the national census in 2021 (Czech Statistical Office, 2021). This difference is probably due to the optionality of the question in the census, which was left unanswered by 30% of the respondents. Regarding religious practice, only about 5% of Czech adults reported at least 10 minutes of daily prayer and weekly religious attendance. This figure almost explicitly involved only church members or religious congregations (**Study 1**). Similarly, compared to other European countries, these figures in the Czech Republic are rather low but stable (Brenner, 2016).

An assessment of these figures in combination with trends in religious practice supports the suggestion of Vaclavik et al. (2018) that Czech inhabitants are not real atheists but rather religious sceptics who tend to fulfil their spiritual needs outside traditional religious institutions. However, while on the one hand, Czech believers are in many aspects similar to

those in Western Europe, on the other hand, Czech non-believers show some differences (**Study 1**), and we may suppose that in some aspects they would be closer to religious respondents in other European countries who are not members of the church or religious congregations. It seems that they share many values with believers but, for historical reasons, do not identify with any organised religion.

Study 1 also found that 66.5% of those raised with a religious affiliation were believers, and 90.6% of participants without religious upbringing were non-believers or convinced atheists. This finding supports the claims of other authors that religious socialisation and associated religious education are essential factors for adult religious affiliation (Willard & Cingl, 2017). However, **Study 1** also reported that 48.7 % of non-religious respondents were unstable non-religious, i.e., non-believers who reported that their attitude could change in the case of need and distress. As also further described in a study of *Malinakova, Tavel et al. (2020)* that was based on the same sample, of all respondents, 3.3% were converts, with most of these (70%) reporting that a difficult life situation contributed to their conversion. These findings suggest that a shift towards religiosity could be expected in a substantial portion of non-religious respondents in problematic times. These findings align with those of other authors who have previously highlighted that religious coping mechanisms are frequently employed during periods of stress. For example, in a study of Schuster et al. (2001), 90% of participants within a representative US sample turned to religious practices to address the psychological aftermath of the September 11, 2001, terrorist attacks. However, health research implications differ depending on whether participants who turned to religion are already religious or non-religious.

16.1.2 What impact can a secular Czech environment have on the assessment of R/S and health?

The idea that Czech non-believers may be in some aspect close to believing respondents without a concrete religious affiliation in other countries suggests a problem with the categorisation of the respondents. This issue may hinder a comparison of these groups across countries, which could consequently obscure the results of the associations of religiosity and health. Moreover, in general, results could also be distorted by the mere fact that the respondents who declared being religious without any religious affiliation seldom showed any religious practice, e.g., religious attendance or regular prayer (**Study 1**), which also reduces the possible impact of some pathways to health, as proposed in Figure 1 (see 1.3). Lastly, the fact that Czech non-believers seem to use church attendance and prayer as a coping

mechanism rather than a pathway to R/S and a shift towards religiosity could in problematic times be expected to be seen in a substantial part of non-religious respondents (**Study 1)** calls for caution when interpreting the results of cross-sectional studies, because we cannot conclude on causality (see also 16.4.). Moreover, we can also think of the influence of the cultural setting. Research shows that religious individuals report higher levels of spiritual well-being within societies where religiosity is esteemed and aligns with social norms, because they can derive well-being benefits from harmonising with the cultural milieu, referred to as the "person-culture fit" (Pérez & Rohde, 2022). Therefore, being religious in a secular country represents a bigger demand than in predominantly religious countries and can have a psychological cost, which can also manifest itself in physical health.

16.2 Psychometric assessment of R/S instruments in the Czech environment

Among the key studies are four directly focused on a psychometric evaluation of R/S instruments (the DSES – **Study 2**, the FACIT-Sp – **Study 3**, the SWBS – **Study 4** and the RSS – **Study 5**) and one more that assess measuring guilt and shame, i.e., a related construct **(Study 6)**. In the Discussion, the findings of these studies are supplied by the findings of other studies of the author focusing on psychometric assessment of R/S tools (the SWBS on an adolescent sample, the EBA and the NRC) and scales measuring related constructs (the GSES on an adolescent sample, the TEQ for measuring empathy and the SCBSC for measuring compassion). As the detailed characteristics of these validations are described in the concrete studies, I will rather focus on findings that summarise the results of more studies.

16.2.1 Problems with negatively formulated items

The most important finding is the problem with negatively formulated items observed in all the validation studies that used this way of wording individual statements, i.e., **Studies 3 and 4**, but also studies of *Malinakova* et al. *(2017)* and *Novak, Malinakova, Mikoska, van Dijk et al. (2021)*. In general, these items did not show an acceptable correlation with the scale or even had a negative correlation, so they had to be excluded from the measurement instruments. The inclusion of negatively worded items into the set of positive ones is a common strategy to reduce the so-called response effect, i.e., biasing effects which can distort survey responses. These biasing effects involve, e.g., acquiescence bias, extreme responding or a tendency to select the middle category (Mayerl & Giehl, 2018). However, using these items has its costs,

as they have been documented to influence the factor structure of psychological scales and can decrease their homogeneity and reliability (Dodeen, 2023). Including a few negative items in a predominantly positively worded questionnaire can lead to a tendency to misinterpret the negative items. This situation happens because respondents are required to shift their mental processing when encountering these items, which can potentially lead to errors in comprehension (Roszkowski & Soven, 2010). Some studies have even demonstrated that when scales include both positive and negative items, factor analyses often reveal the emergence of an additional factor that is specifically associated with the negatively worded items (DiStefano & Motl, 2006), which is in line with the observations of *Malinakova et al. (2017)*.

A study of *Novak, Malinakova, Mikoska, van Dijk et al. (2021)* points out that it is also possible that a specific language environment may support this undesired effect because it may not occur in the original English language (Spreng et al., 2009). Thus, our concern may be more about Czech and similar language environments, e.g., Slovak or Polish. This suggestion is supported by the study of Tavel et al. (2022), which assessed the characteristics of the shortened version of the SWBS on a nationally representative Slovak sample and came to the same conclusions as previously mentioned Czech studies. A suggested solution is to change negatively worded items to their positively directed equivalent, which proved to yield better psychometric parameters *(Novak, Malinakova, Mikoska, van Dijk et al., 2021)*, or to not include negative items into the scales as original items, but rather as fillers that are not included in any data analysis (Dodeen, 2023).

16.2.2 Influence of the secular environment of the Czech Republic on the psychometric characteristics of R/S measurement instruments

Our research suggests that the specific secular environment of the Czech Republic may even add to the already described complications in psychometric assessment. **Study 4** described problems with a negatively formulated statements “I don’t have a personally satisfying relationship with God.” And “I don’t get much personal strength and support from my God” (SWBS, items 13 and 9 in the original scale). Problems with item 9 were further explored in a study of *Malinakova et al. (2017)* suggesting that when non-religious respondents chose the option “I completely disagree”, they may have wanted to show their overall disagreement with the question that implicitly assumed the existence of God they did not believe in. However, due to the negative wording of the item, their response was misinterpreted as a perceived receiving of maximum support from God. Another example of a possibly disruptive

effect of the Czech secular environment is described in **Study 5**, i.e., a psychometric assessment of the RSS scale. In this study, we did not find the expected factor structure of the RSSS. Specifically, instead of separate "Divine" and "Demonic" factors, we found only one factor, the "Supernatural". It seems that in the conditions of the Czech secular environment, respondents do not distinguish between their relationship to God and the devil/evil spirits and perceive them only as supernatural forces in general, to which they mostly do not have any personal relationship. We presume that we would reach a clearer distinction in a religious society, as described in the original study of Exline et al. (2014).

16.3 Using different spirituality measures

16.3.1 Sociodemographic differences in spirituality measured by various instruments

All the validation studies presented in this thesis offer a comparison of sociodemographic groups. Regarding gender differences, women showed higher spirituality in most of the studies that assessed this question, i.e., **Studies 2 and 3** and also a study of *Malinakova, Korinek et al. (2021)*. However, a study of *Malinakova et al. (2017)* found slightly higher spirituality values among boys, as compared to girls, and we also did not observe any significant gender differences in religious and spiritual struggles **(Study 5)** or negative religious coping *(Janu et al., 2019)* and The higher spirituality scores among women found in our studies are consistent with the results of studies on American samples (Kalkstein & Tower, 2009; Kim et al., 2016; Underwood, 2011) and a Croatian sample (Rakosec et al., 2015). However, they differ from research published by authors in other countries who found no gender differences (Bailly & Roussiau, 2010; Ng, et al., 2009). Regarding the Czech environment, a closer look at the gender differences presented in *Malinakova et al. (2017)* shows that they are caused by slightly higher values in existential well-being. Thus, this represents a non-religious spirituality that reflects, e.g., one's satisfaction with life and good feelings about the future. From this point of view, our findings correspond to a meta-analysis of Chen et al. (2020), which described that life satisfaction appears to be similar in gender groups, with a slight advantage for male children and adolescents. Accordingly to this observation, we also found a higher tendency towards experiences of guilt and shame among Czech girls *(Malinakova, Furstova et al., 2020)*.

The fact that the same results regarding spirituality were reached by different spirituality measures as well as the finding that women also showed higher religiosity **(Study 1)** tends to suggest that this is an instrument-independent phenomenon. Moreover, our other studies showed that women also scored higher in the concepts related to R/S, i.e., empathy *(Novak, Malinakova, Mikoska, van Dijk et al., 2021)* and compassion *(Novak, Malinakova, Mikoska, Furstova et al., 2021)*, but also in Sensory Processing Sensitivity (SPS) *(Malinakova, Novak et al., 2021)*. These personal characteristics may be reflected in the higher spirituality scores. Future research could integrate these findings with already known factors that may contribute to a higher R/S among women, i.e., sociological, historical, cultural and economic factors (Pew Research Center, 2016). Our finding of no gender differences in religious and spiritual struggles and negative religious coping and suggests that this tendency towards higher spirituality is more related to its use as a positive coping strategy.

In contrast, associations with age were less consistent across the research instruments assessed in this thesis. For example, **Study 2** described the trend of spiritual experiences, measured by the DSES scale, increasing with age. **Study 3** reported this increase only in the Faith subscale of the FACIT-Sp, while, in contrast, values for the Meaning/Peace subscale decreased with age. Similarly, **Study 4** showed only an increase in the RWB subscale of the SWBS scale, but no significant differences were observed for the EWB subscale, though there was an insignificant, slightly decreasing trend. Finally, **Study 5** found significantly higher mean values in the "Divine struggles" among older respondents. A study of Steptoe et al. (2015) documented that in Eastern European countries, well-being decreases with age, so, possibly, the inclusion of questions assessing one's well-being and the share of these questions in the total scale may impact its associations with age. The observed increase in faith/religious spirituality and importance of relationship with God (including a higher presence of struggles in this area) with age could potentially be attributed to the presence of age cohorts (Hamberg, 1991) or to a growing inclination to reflect on one's life and search for its meaning as individuals approach the end of their lives (Tavel, 2004).

Similarly, the other sociodemographic factors also differed in the consistency of their associations with spirituality measured by different instruments. For example, **Studies 2 and 4** found higher spirituality among widows/widowers, which also corresponds to a lower occurrence negative religious coping in this group *(Janu et al., 2019)*. It is possible that these people tend to use religion as a positive coping strategy, which may help them deal with their situation through their personal relationship with God, who might be perceived as a close and

always present figure, and possibly also through their relationship with other religious people. This relationship may be strengthened by a shared religious practice, which may, in turn, strengthen their spirituality. However, results differed when a way of life was assessed instead of marital status. In that case, **Studies 3 and 4** found lower spirituality among respondents living alone and among single people. Accordingly, **Study 5** described a higher prevalence of religious and spiritual struggles among people living alone. An explanation may be that a group of respondents living alone may be more heterogenous than a group of widows/widowers and may include people who are alone as a consequence of problems more related to their personality, which may lead to worse mental health and a higher risk of negative religious coping. These findings suggest that even sociodemographic groups that have a partial overlap may show contrasting results in their associations with R/S.

Finally, **Study 3** found that the FACIT-Sp subscale Meaning/Peace values were lower in the group of respondents with lower education levels. Similarly, **Study 4** described lower existential well-being and **Study 5** a higher prevalence of religious and spiritual struggles among these respondents. A positive effect of higher education on well-being has already been documented (Jongbloed, 2018); therefore, this relationship may also interfere with associations of spirituality and education, if the aspect of well-being is included in the spirituality measure. These findings thus complement those on the association of spirituality and age.

The strongest implication for assessing the association of R/S and health is the finding described in *Malinakova, Korinek et al. (2021)***,** which aimed to suggest a new approach for measuring implicit attitudes, i.e., an Emotion Based Approach (EBA). This approach was applied in the presented EBA spirituality tool. A comparison of this tool with the DSES scale showed not only the potentially disruptive role of a social desirability bias, which was more associated with the DSES, but also strongly differing associations with cortisol levels. The DSES showed only negligible non-significant correlations, while the EBA spirituality tool showed strong significant correlations. However, this difference might be attributed to a different way of functioning of the tool rather than to a different conceptualisation of spirituality, as proposed by the fact that even the BSI-53, a classical instrument for measuring psychosomatic distress, did not reveal any significant correlations with cortisol levels.

16.3.2 Problems related to the aspects of well-being included in R/S measurement instruments

As described in the previous sub-chapter, we noticed that R/S research instruments may differ in their sociodemographic associations with age and education depending on whether they include the aspect of well-being. Furthermore, as described in the introductory part, some of these tools have limitations for their use in mental health research. In their review of spirituality measures, Meezenbroek et al. (2012) point out that FACIT-Sp (assessed in **Study 3**) was designed as a scale for assessing (spiritual) well-being. In their view, the Meaning/Peace subscale addresses aspects that are believed to be associated with well-being, and even the Faith subscale inquires specifically about the comfort and strength derived from one's faith, rather than solely focusing on the intensity of one's faith. Similarly, they suggest a potential for confusion regarding well-being when using the SWBS, because there are several items that inquire about positive affect, such as feeling that life is a positive experience or how one's relationship with God contributes to the sense of well-being.

Consequently, though the proposed adjusted versions of the instruments show good psychometric characteristics and are helpful in exploring associations of R/S and physical health or health behaviour, using the FACIT-Sp, the SWBS and other instruments that contain aspects of well-being should be avoided in mental health research.

16.4 Causality problems in R/S measurement

One of the problems related to the assessment of the association of R/S and health is that most of the research conducted in this area are cross-sectional studies (as are the studies presented in this thesis) that do not allow us to conclude on a direction of causality. On the one hand, recent studies found that R/S struggles lead to declining psychological well-being over time (Bockrath et al., 2022). This direction is also reflected in Figure 1 and may be expected in **Study 6** that described higher experiences of guilt and shame in religious adults as well as in the study of *Malinakova, Furstova et al. (2020)* that came to the same conclusions on adolescent sample. On the other hand, these feelings might also result from R/S that is too prescriptive and focused on norms and one's perfection. This perfection is, however, impossible to achieve, which may lead to repeated experiences of failure and connected feelings of guilt and shame. This explanation is in line with the study of Koenig (2009), stating that religious doctrines can cause guilt, self-blame and frustration, leading to neurotic and

psychotic disorders. In the two above-mentioned studies, our data did not allow us to explore the latter perspective. However, this thesis aimed to do so in other studies.

Though, as noted above, it is difficult to conclude on causality in the absence of longitudinal studies, the direction might be more intuitive in some cases. For example, childhood experiences may be more negatively interpreted in the light of one's present mental health problems, including R/S struggles. However, a more likely direction would be that adverse childhood experiences influence not only one's present mental health and how an individual relates to the world, but also the adult R/S, including a tendency towards negative religious coping. The association of childhood trauma with adult R/S was further explored in **Study 7**. This study found that each childhood maltreatment was associated with all six types of R/S struggles (i.e., divine, demonic, interpersonal, moral, ultimate meaning, and doubt), with the highest values for demonic struggles, which means a perception of demonic influence. Furthermore, childhood maltreatment was also associated with other areas of R/S: adult negative religious coping (Kosarkova *et al.,* 2020a), increased chances of being "spiritual but non-religious" *(Kosarkova, Malinakova, et al., 2020)* and with a less positive God-image *(Kosarkova et al., 2020b)*.

These findings support the notion that mental health problems observed in association with R/S may not only be the consequence of a pathological spirituality, but also its cause. This suggestion is supported by the works of other authors, who have associated childhood trauma with divine struggles, e.g., feelings of abandonment and a lack of love from God, fear and anger towards God (Maltby & Hall, 2012) and interpersonal struggles (Proctor et al., 2019). A possible explanation for these results is that childhood trauma leads to adult attachment insecurity (Mikulincer & Shaver, 2018), and since individuals can perceive God as an attachment figure (Granqvist et al., 2010), the experiences of trauma and associated struggles may also affect the relationship with God. Paternal abuse has been found to have a particularly negative impact on religious involvement (Bierman, 2005), as the relationship between an individual and God can mirror the parent-child relationship.

Nevertheless, even if a difficult life situation does not directly negatively influence one's R/S, it can still distort the results of the cross-sectional studies on associations of R/S and health. As already noted in section 16.1.1, **Study 1** and the study of *Malinakova, Tavel et al. (2020)* showed that even in the secular Czech environment, nearly 40% of Czech non-believers would engage in personal prayer or participate in a religious service in a difficult life situation (e.g., an illness, the death of a close person, or financial problems) or if they experienced

anxiety, depression or other psychological problems. Similarly, 70% of participants who had experienced a religious conversion reported that a difficult life situation was one of the key factors or at least partially contributed to it. If the assessment of one's present life difficulties is not integrated into the model (which usually does not happen), one's negative mental health might be erroneously attributed to R/S, which is, however, only a coping mechanism in the given situation. Moreover, this shift towards religion may even indicate poorer mental health associated with a tendency to seek external sources of strength and support during challenging times. This suggestion is again supported by the study of *Malinakova, Tavel et al. (2020)*, which showed that non-believers who reported that their attitude could change in times of need and distress were already more likely to report worse mental health.

16.5 Influence of variable scaling, dichotomisation and the combination of religiosity and spirituality

16.5.1 A divergency of research findings

One of the strongest findings of this thesis is a pattern that has occurred in 14 of the presented studies: a divergency of the findings based on the way R/S is treated as a variable and how it is conceptualised. **Study 8** and a study of *Malinakova, Tavel et al. (2020)* specifically focused on this methodological issue, showing that a mere handling of a statistical analysis may lead to contrasting findings on the same sample.

Study 8 found that regular prayer, high spirituality, a low level of religious struggles and a positive image of God were positively associated with self-esteem, while religiosity showed a negative association, and religious attendance had no significant association. However, a combination of religiosity and spirituality revealed that while religious/spiritual respondents did not differ significantly from non-religious respondents, religious/non-spiritual respondents had approximately a 79% lower chance of having good self-esteem. Moreover, the associations of religious attendance and the frequency of prayer with self-esteem were first assessed using the Mann-Whitney U test and secondarily by binary logistic regression, treating self-esteem as a dichotomised dependent variable. Interestingly, while there were no significant differences in both variables in the first case, in the second case, the frequency of prayer turned out to be significantly associated with better self-esteem. Similarly, a study of *Malinakova, Tavel et al. (2020)* found that the use of different approaches to assess R/S, such as using various ways of categorising respondents, led to various, sometimes even contrasting, findings; e.g., religious affiliation in association with selected aspects of mental health, as

measured by the BSI-53, yielded different results when the stability of religious attitudes, perceived closeness to God and their combination were included in the model.

Other studies bring similar observations and show that the results of R/S and their combination are often quite contrasting: **In Study 8**, no significant associations were observed between religious attendance and mental health, while spirituality was associated with worse mental health. **Study 10** found three significant associations of changes in relationships, emotions, day structure, thinking and behaviour during the COVID-19 pandemic with religious affiliation. It also found seven associations with spirituality and nine with their combination. Other relevant studies showed that childhood trauma was associated with increased chances of being "spiritual but non-religious", while there were no significant results for other combinations of R/S *(Kosarkova, Malinakova, Koncalova et al., 2020)*, that religiosity changed the associations between childhood trauma and God-image *(Kosarkova et al., 2020b)*. In a study of *Kosarkova et al. (2021)*, spiritual respondents were more likely to refuse the COVID-19 vaccination. However, a closer look showed that this concerned only those who were not religious. Regarding adolescent samples, in **Study 9** spirituality showed much better (in some cases even opposite) results regarding the easiness of communication with parents and good perceived emotional support than religious attendance. The interaction of these two variables was, in most cases, non-significant. In a study of *Malinakova et al. (2019)*, it was especially a multiplicative interaction of religious attendance and spirituality that was protective in health-risk behaviour, while much weaker results were observed for religious attendance and spirituality assessed separately or only mutually adjusted. Similarly, a study of *Buchtova et al. (2020)* found that religious attendance did not protect adolescents from health-risk behaviour unless it was combined with participation in church activities. *Malinakova et al. (2018)* reported that both religious attendance and spirituality were protective against excessive screen activities; however, only a combination of both was protective in the case of excessive Internet use. Finally, a study of *Zidkova et al. (2020)*, spirituality was more protective in the case of adolescent health complaints than religious attendance, and non-spiritual/attending respondents were the most vulnerable group.

Taken together, these findings offer substantial evidence that assessment of at least two R/S aspects, i.e., an external aspect (e.g., religious affiliation, religious attendance or participation in church activities) and an internal aspect (spirituality level or the attitude to God) are of key importance in getting more precise results and that including only one of these aspects may sometimes even lead to contradictory findings.

16.5.2 A discrepancy in religiosity and spirituality

Our research shows that a combination of religiosity and spirituality (equivalent to an internalised religiosity) seems protective. The same held in some cases for non-religious/non-spiritual respondents. Surprisingly, the most vulnerable categories of respondents were those in whom religiosity and spirituality showed a discrepancy. This observation has several explanations: 1) a lack of coherence and an internal conflict between differing value systems leading to higher stress and anxiety levels; 2) potential isolation, a sense of alienation and a lack of community support flowing from a challenge to fit in with purely religious or non-religious social circles; 3) a search for identity and belonging, leading to a higher susceptibility to peer pressure; 4) a lack of clear guidance from either a religious or non-religious perspective leading to uncertainty about the consequences of certain behaviours; 5) rebellion or exploration of health-risk behaviours as a way to assert and show one's independence; and 6) psychological factors, i.e., already present higher psychological vulnerability that manifests itself in R/S inconsistency.

16.6 Confounding variables in R/S measurement

The relationship between R/S and health can be influenced by multiple factors (confounding variables). This thesis usually uses the adjustment to the standard variables, i.e., age, gender and socioeconomic status/education. However, it proposes that the socio-cultural environment *(Malinakova et al., 2020a)*, childhood trauma **(Study 7;** *Kosarkova et al., 2020a; Kosarkova et al., 2020b and Kosarkova, Malinakova, Koncalova et al., 2020*), and SPS **(Studies 11 and 12)** may also contribute to these associations.

While some of these potentially confounding factors have already been addressed by cross-cultural research or by use of longitudinal studies, in simple cross-sectional research performed in one country they limit the generalisability of the findings. Moreover, the role of other factors may not be fully explored. This might be the case of SPS, as already mentioned. The relationship between SPS and R/S has already been documented by *Malinakova, Novak et al. (2021)* and is also proposed by the originator of the SPS concept, Elaine Aron (2003). **Study 11** was the first study altogether, that explored this association to a greater depth and described that highly sensitive respondents were more likely to be religiously affiliated and spiritual and to perceive God in a positive way, but there was no significant association for religious attendance. Furthermore, SPS was also associated with a higher proneness to NRC. Besides these two articles there is a lack of studies documenting this association. However,

there are some indirect connections to consider that could support our observation: an association between SPS and openness to new experiences (Lionetti et al., 2019), which could also include R/S experiences; a documented association of SPS with empathy (Tabak et al., 2022); a positive effect of R/S practice, e.g. prayer or meditation on managing overstimulation (Bakker & Moulding, 2012); and a rich inner life of HSP people (Aron, 2003) that may facilitate resonance within the frameworks provided by R/S.

A hypothesis that SPS may modify associations of R/S with health was tested in a study of *Malinakova et al. (2024)*, where the results supported this idea. If SPS were not taken into account, a conclusion of the study would be that religiosity shows no significant association with mental health and that spirituality is even associated with more adverse outcomes. However, adding SPS into the model changed this interpretation in many cases, or at least decreased the strength of the associations, which implies that the moderating effect of SPS could partly explain our observations. This observation is a significant contribution of this thesis to the research of R/S and health. If adjusted to SPS, other associations might change as well, and so further research in this area should take SPS into consideration.

16.7 Pathways of R/S to health

16.7.1 Psychological factors

Psychological factors through which R/S may influence mental health are represented in this thesis especially by personality factors, i.e., feelings of guilt and shame **(Study 6)** and self-esteem **(Study 8)**. Two studies focusing on guilt and shame in adults **(Study 6)** and adolescent *(Malinakova, Furstova et al., 2020)* samples found higher feelings of G/S among religious respondents. Our findings did not allow us to conclude causality, as discussed in 16.4. According to other studies in this area, R/S can both have a protective effect, e.g., as help in recovery after trauma (Emmerich, 2022), and a negative effect, when it deepens the feelings of worthlessness and negative self-image. At times, R/S can be non-functional, seeking social control through fear, guilt and shame (Belgum, 1992) and the manipulation of people. Nevertheless, in the context of the Czech Republic, which represents a highly secular society, religious people face another challenge that may contribute to their feelings of shame. As the Introduction outlined, due to historical reasons, especially the communist regime, the popularity of religious institutions is very low. For many decades, being affiliated with a Church or religious institution was often associated with persecution and a devaluation of believers. Because, at present, affiliated respondents still represent a minority, as described in 16.1, it

may even now be difficult to openly state their affiliation, as it may be perceived as a potentially socially shaming situation due to reactions of their environment. On the other hand, if they do not openly acknowledge their religious affiliation, they may experience feelings of guilt and shame for denying their faith.

Study 8 described that some aspects of R/S were associated with better self-esteem, while the others were not associated or even showed an opposite relationship. These findings align with current research, which, similarly as in case of shame and guilt, proposes that R/S can be both positively and negatively associated. While a developed religious faith encompasses the whole human experience and promotes self-acceptance and confidence in one's identity (Belgum, 1992), the concept of morality and sin might represent a challenge in self-acceptance for others (Watson et al., 1985).

Regarding other psychological aspects, **Study 10** demonstrated the association of R/S on emotions amid the COVID-19 pandemic. The absence of spirituality was associated with increased helplessness, fear and anxiety. Conversely, spirituality contributed to maintaining hope. These findings are consistent with those of other authors, e.g., of Lucchetti et al. (2021), who described higher levels of optimism and decreased fear, anxiety and sorrow among R/S individuals during the pandemic. This contradicts the findings of the study of Jaspal et al. (2020), which described a higher level of COVID-19 fear, but this discrepancy could be an illustration of the above-mentioned shortcomings of studies on R/S and health, because this study did not use adequate statistical methods that would allow adjusting to age, which may have served as a mediating variable. In our study, we further found that a protective R/S effect was even stronger when spirituality was combined with religiosity, which clearly shows that a combination of these two variables brings a new quality, as noted in 16.5.1. This effect will also be demonstrated on other studies.

16.7.2 Social support

Social support is considered an important pathway of R/S to health. However, R/S does not necessarily have a positive effect on one's whole social network. **Study 10** assessed changes in experiencing close relationships during the COVID-19 pandemic and did not report any significant improvement in relationships with the partner, children or other people in the household among spiritual respondents, religious respondents or the combination of these groups, though we found that religious and spiritual respondents reported more frequent sex than before the pandemic. Even more, **Study 9** assessed the adolescent family environment and found that adolescent religious attendance was associated with lower easiness of

communication with the mother. In contrast, spirituality was associated with easier communication with both father and mother and higher perceived emotional support. At the same time, parents of attending respondents were, in some cases, more likely to control adolescent behaviour, which may have contributed to a perceived emotional distance and relational problems. In contrast, a protective role of peer spirituality groups against adolescent health-risk behaviour was observed by *Buchtova et al. (2020)*.

On the one hand, it seems clear that R/S can connect people and offer them a sense of belonging and social support within religious and spiritual communities. At the same time, our results show that it can also become a means of division, especially when there is a discrepancy in moral values or if the R/S is too strictly imposed. A study of *Malinakova et al. (2019)* was based on the same research sample as Study 9 and observed a higher prevalence of some risk behaviours among adolescents who were attending but not spiritual. These adolescents may attend church services without an adequate internal conviction; thus, their religious practice could be more the result of external pressure, e.g., from the family. This experienced discrepancy could result in a desire to rebel in some way, in our case by health-risk behaviour. Moreover, the level of faith-based social support is likely to differ in religious and secular countries, and if religious adolescents in secular countries are in the minority in their environment, they may meet with various prejudices from their peers (Moulin, 2016). Fear of devaluation because of their faith may then lead some adolescents to "play the hero" and display even more risky behaviour than their non-religious peers. This presumption would also explain a protective effect of religious supportive peer groups in these behaviours, as described by *Buchtova et al. (2020)*.

16.7.3 Health behaviour

The findings of the last-mentioned studies already overlap with the third pathway – health behaviour. Our findings in this area generally showed better health-related behaviour, but in some cases, it considered only respondents who were both religious and spiritual, i.e., had their religiosity internalised. Other combinations of religiosity and spirituality were protective only in some cases, while in other they were even more risky.

More specifically, **Study 10** described that during the COVID-19 pandemic, religious/spiritual participants were more likely to report physical activity compared to non-religious/non-spiritual ones. For other groups, there were no significant results. On the contrary, this study described a higher risk of alcohol drinking among spiritual/non-religious participants. In a similar way, a study of *Kosarkova et al. (2021)* reported that non-

religious/spiritual respondents were more likely to refuse a COVID-19 vaccination. In adolescent samples, religious attendance and spirituality were associated with a lower risk of weekly smoking, and higher spirituality was also associated with a lower risk of weekly drinking *(Malinakova et al., 2019)*. A multiplicative interaction of these two variables was associated with a lower risk of weekly smoking, weekly drinking, recent cannabis use and lifetime drug use. Moreover, in comparison with non-attending adolescents who also did not participate in any Church activities, attending adolescents who participated in these activities were less likely to report early sexual intercourse and compared to non-attending adolescents who participated in Church activities, they were less likely to report weekly smoking and recent cannabis use *(Buchtova et al., 2020)*. Finally, compared to non-attending and non-spiritual respondents, both attending and spiritual respondents were less likely to watch television and play computer games excessively *(Malinakova et al., 2018)*. Only attending and only spiritual respondents were more likely to use the Internet excessively, but this was not the case for those who were both attending and spiritual.

A possible explanation is that religious individuals with internalised religiosity may be inclined to exhibit less health-risk behaviour due to the alignment of their beliefs, values, and practices with healthier lifestyles. Their R/S convictions may emphasise virtues like self-discipline, self-control, and stewardship of the body, which contribute to a healthier lifestyle. Healthier choices may also be supported by a sense of purpose and positive coping mechanisms derived from their faith and by community support and moral guidelines. Further explanations regarding the groups with inconsistent religiosity and spirituality are offered under 16.5.2.

16.8 Health outcomes

16.8.1 Mental health

None of the studies of this thesis directly assessed mental or physical health. However, to complete the picture, other publications of the author of this thesis focusing on this problematic are briefly mentioned. A study of *Malinakova et al. (2024)* focused on several mental health aspects - selected mental health difficulties, anxiety, depression and neuroticism in association with R/S. It did not find any significant associations between religious attendance and mental health, while spirituality was associated with worse mental health. This discrepancy was, however, partly explained by another factor, i.e., SPS, as described in 16.6. Thus, this study suggests that R/S may, in fact, play a protective role in the

negative effect of SPS on mental health by providing highly sensitive people with coping strategies and additional resources.

Regarding other aspects of mental health, a study of *Malinakova, Tavel et al. (2020)* found that individuals with fluctuating religious beliefs, especially non-believers open to changing their views under stress, had higher attachment anxiety and were more likely to experience a range of mental health issues, as indicated by the BSI-53 symptoms and the and the BSI global severity index. The study also noted the highest mental health risks among converts who felt God was distant. Thus, the key factors affecting mental health were the stability of religious attitudes and perceived closeness to God. Furthermore, negative religious coping as well as religious conspiracy theories were associated with paranoia, anxiety and depression *(Kosarkova et al., 2022)*.

Thus, rather than offering consistent findings on the associations of R/S with mental health, this thesis proposes that while the associations of negatively experienced R/S, i.e., R/S struggles and negative religious coping, are, in line with recent research, quite consistently associated with negative mental health (Bockrath et al. 2022), the other R/S associations are less consistent and depend on the categorisation of respondents and the presence of confounding factors. Furthermore, it also suggests that already present psychological fragility can lead to negative associations in this area.

16.8.2 Physiological processes and physical health

A study of *Malinakova, Korinek et al. (2021)* examined cortisol levels and their reactivity in relation to mental health (BSI-53), spirituality (DSES), and a novel Emotion-Based Approach (EBA) applied as the EBA Spirituality Tool, including its non-religious spirituality subscale (SPT-NRS) and a God-image subscale. The most significant findings were with the SPT-NRS, which covers broad spirituality aspects like meaning of life and forgiveness. These results imply that a lifestyle embracing transcendent perspectives and values may positively influence physiological functioning through modulation of sympathetic nervous system activity towards a more relaxed state.

Physical health was assessed by a study of *Jaksicova et al. (2021)* that in comparison to the representative sample, members of Czech and Slovak religious institutes had a higher risk of reporting minor pelvic pain, thyroid problems and obesity and also poorer general health, though they had a reduced risk of diabetes. These findings contrast with those of the other countries (Rogowska & Dolega, 2022). An explanation may be the secular nature of the country, as already discussed in 16.1.2. For historical reasons, Czech congregations seem to

be more performance-oriented and rigid in their rule and less respecting of individual needs than congregations in countries that have a longer experience of religious freedom and could better adapted to changes proposed since the Second Vatican Council in 1965. Consequently, all these characteristics may create a more demanding environment.

Finally a study of *Zidkova et al. (2020)* explored adolescent health complaints and found that religious attendance was not associated with any adolescent health complaints, while spirituality was negatively associated with them. Moreover, non-spiritual/attending respondents were more likely to report a higher occurrence of stomach ache and had significantly worse overall health. Thus, these findings are in line with our other research that found more adverse results in groups inconsistent in their R/S, as described in 16.5.2.

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17 Summary

Religiosity and spirituality (R/S) are multi-dimensional constructs related to many areas of human life, including health. Most research shows positive associations of R/S with physical and mental health. However, some studies still report mixed or negative associations and there is a lack of systematic research that focuses on this contradiction. Moreover, a majority of studies exploring the associations of R/S with health have been conducted in predominantly religious countries and the results from secular ones may be underreported. Therefore, the aim of this thesis was to explore the relationships between R/S and health in the secular environment of the Czech Republic. A further aim was to explore possible sources of the discrepancies between the findings of various research studies in this area, with a special focus on measurement problematics. Finally, this thesis offers four tools for measuring spirituality that have not yet been validated in the Czech Republic and one newly developed instrument measuring the experiences of guilt and shame, i.e., a construct that may interfere with R/S assessment.

This thesis summarises the findings of 11 supplied by other studies of the author and reports concrete examples of five potential sources of heterogeneity in research findings in the area of R/S and health. First, it documents the role of a cultural context, i.e., a secular Czech environment, showing a specific dynamic of change of religious beliefs under challenging conditions and potential confusion in understanding questionnaires on spirituality. Second, it demonstrates how various R/S instruments can differ even in their associations with basic sociodemographic factors. Third, it points to causality problems. Fourth, it shows how variable scaling, dichotomisation and the combination of religiosity and spirituality can lead to considerably differing results. Fifth, it also reports the substantial role of confounding variables, specifically the sensory processing sensitivity, that so far has not been assessed in this context.

Regarding the relationship between R/S and health, this thesis explores the pathways connecting R/S and health and presents selected associations of R/S with mental health. Based on other studies by the author, it also offers some additional insights into the associations with physical health. In general, the thesis shows that the associations can vary from negative to positive in the Czech environment and can be significantly influenced by the abovementioned factors. It also offers substantial evidence to state that assessment of at least two R/S aspects, i.e., an external aspect (e.g., religious affiliation, religious attendance or participation in church activities) and an internal aspect (spirituality level or the attitude to

God) is of key importance in getting more precise results and that including only one of these aspects may sometimes even lead to contradictory findings. Furthermore, it also indicates that a harmonic combination of religiosity and spirituality (equivalent to an internalised religiosity) seems to be protective, while, on the contrary, their discrepancy seems to be a risky combination. Thus, this thesis supports the findings of other authors on the mechanisms leading to associations of R/S with health, offers additional insights into these mechanisms, and provides methods for further research on R/S.