

Malin Larsen Gjerde

Exploring the effects of religious, spiritual and divine beliefs on the relationship between trait openness and synchronicity

A mediation analysis

Bachelor's thesis in Psychology

Supervisor: Leon De Beer

May 2024



Norwegian University of
Science and Technology

Malin Larsen Gjerde

Exploring the effects of religious, spiritual and divine beliefs on the relationship between trait openness and synchronicity

A mediation analysis

Bachelor's thesis in Psychology
Supervisor: Leon De Beer
May 2024

Norwegian University of Science and Technology



Exploring the effects of religious, spiritual and divine beliefs on the relationship
between trait openness and synchronicity: A mediation analysis

Bachelor Thesis in Psychology

PSY2910

Candidate number: 10071

Trondheim, May 2024

Norwegian University of Science and Technology

Supervisor: Leon De Beer

Preface and self-declaration

This project was established as a quantitative investigation primarily on 'synchronicity'. Students in the project were presented a set of variables to choose from for our theses, and inclusion of the synchronicity variable was mandatory. Subsequently, individual research questions were formulated. The project supervisor suggested students to conduct a mediation analysis using JASP software, a recommendation many of us followed. Student contribution included translation of questions and making necessary adjustments to the final survey design. Additionally, we were instructed to recruit at least 30 participants each.

The distribution of the survey to data material were handled by the project supervisor. Subsequent data analyses were conducted independently. Literature introducing the concept of synchronicity was provided by the supervisor, yet the majority of the literature I found myself. I relied heavily on Google Scholar and delved into referenced articles in existing studies, given the limited research available on the topic.

I would like to emphasize that this thesis is the result of my independent efforts. I independently grasped the theoretical concepts, interpreted the results and navigated through the writing process. The guidance was important for the analysis method chosen and for addressment of methodological aspects, yet influence on the final product was limited.

I want to thank my supervisor Leon De Beer for his helpful feedback on submitted parts, assistance with grammar and practical tips and tricks provided on writing skills. I want to thank my bachelor group for their professional and social support throughout the semester. Our supportive space has been immensely appreciative during this journey. Overall, it has been a dynamic process, with challenges at times, but delving deeply into the topic and fully conducting the research project has been highly rewarding.

Abstract

Synchronicity is a concept of experiencing meaningful coincidences that somehow connects your inner and outer world. Synchronicity and its associations has retrieved limited research in the psychological field. This study aims to deepen the understanding of synchronicity by examining its relationship with trait openness and belief in higher principles, utilizing Hayes (2022) parallel multiple mediation model. The research question for the study is “What is the relationship between trait openness, belief in higher principles and synchronicity?”. It was hypothesized that there was a direct effect between openness and synchronicity, and that belief in higher principles mediated this relationship, through religiosity, spirituality or divine control. A sample of 204 participants ($M_{age} = 41.25$, $SD = 14.48$, 72% females) based in Norway, completed a comprehensive baseline survey including several scales. The Ten Item Personality Measure, The Synchronicity Awareness and Meaning-Detecting scale, and three self-developed items for religious, spiritual and divine belief, were employed in the study. Results revealed that there was a direct link between openness and synchronicity, with spiritual belief mediating the relationship. These findings provide comprehensive insight into synchronicity’s determinants, underscoring the need for further research to deepen our understanding of the concept.

Sammendrag

Konseptet om synkronisitet (eng. synchronicity) handler om å oppleve meningsfulle tilfeldigheter som på en eller annen måte sammenkobler din indre og ytre verden.

Synkronisitet og dets assosiasjoner har mottatt lite oppmerksomhet i psykologisk forskning.

Denne studien ønsker å utdype forståelsen av synkronisitet, ved å undersøke forholdet det har til personlighetstrekket åpenhet, og troen på høyere prinsipper, gjennom Hayes (2022) parallelle multiple mediasjonsmodell. Problemstillingen for studien er «Hva er forholdet mellom trekket åpenhet, tro på høyere prinsipper og synkronisitet?». Det ble hypotesert at det var en direkte sammenheng mellom åpenhet og synkronisitet, og at tro på høyere prinsipper medierte dette forholdet, gjennom religiøs, spirituell eller gudelig tro. Totalt 204 deltakere ($M_{age} = 41.25$, $SD = 14.48$, 72% kvinner) som var bosatt i Norge, fullførte en omfattende spørreundersøkelse som inkluderte flere skalaer. For denne studien, ble The Ten Item Personality Scale, The Synchronicity Awareness and Meaning-Detecting scale, samt tre selvutviklede mål på religiøs, spirituell og gudelig tro, benyttet. Resultatene viste at det var en direkte effekt mellom åpenhet og synkronisitet, mediert av spirituell tro. Disse funnene gir omfattende innsikt i synkronisitet's determinanter, og understreker behovet for videre forskning for å utdype forståelsen vår av konseptet.

Humans tend to derive meaning from objects, occurrences or the environment around them, for example by seeing figures and faces in landmarks. As an illustration, mountains of Helgeland seem to be shaped like lions and horses, and are even named accordingly: “The Horseman” and “The Red Eye Lion” (my translations) (Bruaset, 2023). These phenomena can be explained by the concepts of ‘Apophenia’ and ‘Pareidolia’. Pareidolia involves perceiving visual patterns in random objects, while apophenia is the broader tendency to perceive patterns between random things. Individuals vary in the frequency and significance they attribute to such events (Russo-Netzer & Ickeson, 2023). In psychological terms, it refers to as ‘synchronicity’, first introduced by Carl Jung. He described synchronicity as the coincidence of casually unrelated events with similar meaning (Jung, 1972). More specifically, it is “a psychologically meaningful connection between an inner event (e.g. thought or dream) and one or more external events occurring simultaneously” (Jung, 1952/1973, as cited in Roxburgh et al., 2015, p. 147). Often, this is described as a ‘meaningful coincidence’.

Systematic research on the prevalence of synchronicity is underexplored both in general (Russo-Netzer & Ickeson, 2023), and in therapy (Roxburgh et al., 2015). Some studies have demonstrated synchronicity as beneficial in therapeutic settings (Conolly, 2015; Roxburg et al., 2015). It is found to enhance individuals subjective sense of meaning in life (Hicks & Routledge, 2013; Russo-Netzer & Ickeson, 2023; Park, 2010) and overall life satisfaction (Beitman, 2023). Synchronicity experiences could thus serve as a valuable tool for improving mental well-being and existential fulfillment. It is estimated that 22%-84% of the population experience synchronicity at least once (Fach et al., 2013). Whereas the underlying reasons for why individuals experience synchronicity remains unclear, individual differences are pointed out as one factor (Coleman et al., 2009). Notably the Big Five personality trait *openness to experience* is shown to correlate with synchronicity (Blain et al., 2020; Russo-Netzer & Ickeson, 2023). Given the well-established empirical foundation of the

Big Five model (Kennair & Hagen, 2015), it is natural to look at the more abstract concept of synchronicity in relation to this.

While individual personality differences can partly explain synchronicity experiences, it can also be explained by transitions within the cognitive system (Sacco, 2016), or by various beliefs such as in the paranormal (Bressan, 2002), religious commitment or faith in intuition. An overlap between spiritual belief and synchronicity has previously been described, however, a systematic exploration is lacking (Coleman et al., 2009). On the other hand, associations between personality traits and various beliefs are more extensive. The main finding regarding trait openness, is that spirituality correlates with high openness scores, and religiosity does not (Saraglou, 2015). This suggests a potential link between synchronicity experiences and ‘belief in higher principles’ or openness scores. To delve deeper into these connections, a mediation model incorporating these variables will be utilized in the thesis. Previous calls for future studies, emphasize the need to investigate the role of synchronicity and other potential mediators (Russo-Netzer & Ickeson, 2023). Further explications on aspects of religiosity and spirituality that are beyond the Big Five, is also highlighted (Henningsgaard & Arnau, 2008). Such an aspect, deserving further exploration, could be synchronicity experiences.

Definitions

Trait openness is well-defined as a component of Costa & McCrae’s Five-Factor Model, which stands as one of the most robustly validated psychological constructs (Kajonius & MacGiolla, 2017). Openness encompasses creativity, intellectual interests, a penchant for variety and unconventional values (McCrae, 2010). In contrast, defining spirituality and religiosity is more challenging, as these concepts are complex and overlapping (Lace et al, 2020). Typically, religiosity centers on traditions, rituals and institutional beliefs, whereas

spirituality emphasizes personal connection with the sacred (Piedmont, 1999). Spirituality could however encompass both religious and non-religious experiences and values. Additionally, belief in a higher principle independent of a specific religion is common. When comparing spirituality and religiosity, spirituality's conceptualization may bear closer resemblance to synchronicity, as both prioritize personal connection over traditional religious behavior.

Review of Literature

Openness, religiosity and spirituality

Both recent and elderly studies have examined how personality traits differ between religious and spiritual people. One of the core findings is that high scores of openness correlate with spirituality (Ferrari et al., 2017; Lace et al., 2020; Szcześniak et al., 2019), while openness is negatively correlated or unassociated with religiosity (Lace et al., 2020; Saraglou, 2015; Taylor & MacDonald, 1999). However, other personality traits are also found to be strong predictors, such as agreeableness and conscientiousness for religiosity (Abdel-Khalek et al., 2023; Saraglou, 2015; Szcześniak et al., 2019; Taylor & MacDonald, 1999) and extraversion for spirituality (Ferrari et al., 2017; Labbé & Fobes, 2010; Saraglou, 2002). These studies vary in their focus on religiosity, spirituality or both, utilizing self-classification and dimensional scales to measure the constructs. Different measures may be used due to the variation in research year, or because religious- and spiritual practice often differ in its purposes. Some authors consider the concepts as self-realizing, and others as collective phenomena. Spirituality has also been examined as a religious dimension (Saraglou, 2010). Despite the methodological variations, most studies employ some sort of Big Five measure for personality. Note that before 1980, most studies on the relationship between personality and religiosity relied on Eysenck's three-factor model (Szcześniak et al., 2019).

A meta-analysis from Saraglou (2002), revealed openness as negatively correlated with religious fundamentalism and intrinsic-general religiosity, but as positively correlated with open or mature religiosity, and spirituality. Subsequent analyses indicated that while openness did not correlate with religiosity especially among Christians in the EU, it did predict spirituality. These results are consistent across demographic factors, different religious dimensions and personality measures (Saraglou, 2010). Despite that, replicating Saraglou's meta-analysis has posed challenges (Lace et al., 2020). Some limitations with the previous empirical research, is generally that it is not demographically equivalent, with several studies focusing solely on university students (Abdel-Khalek et al., 2023; Henningsgaard & Arnau, 2008; Taylor & MacDonald, 1999). Furthermore, the operational definitions of religiosity and spirituality vary throughout most of the literature. Although the authors have provided clear definitions of the terms per paper, it has led to a classification of four dimensions where individuals identify as either: religious only, spiritual only, both religious and spiritual, or neither religious nor spiritual (Lace et al., 2020; Vitorino et al., 2018). This categorization lacks a nuanced and continuous explanation of the variables. Regardless of these limitations, the literature provides a presentable picture of how trait openness is associated with religious and spiritual beliefs: Increased openness correspond to increased spirituality but decreased religiousness (Lace et al., 2020).

Openness and synchronicity

The literature on the relationship between trait openness and synchronicity is more scarce, but there exists some evidence pointing it in a direction. Apophenia has shown relation with openness to experience, reflecting a tendency for pattern-seeking inherent in the broader openness domain (Blain et al., 2020). Russo-Netzer and Ickeson's (2023) development of a scale that divides the synchronicity measure into awareness- and meaning detection, finds

positive associations between both dimensions and openness to experience. These authors have also proposed a model to characterize experiences of meaningful coincidences, which highlights receptiveness, exceptional encounters and meaning-detection (REM-model). Receptiveness involves openness to feeling, cognitions and the external environment, suggesting synchronicity moments to happen when an individual has an inner state of openness to and curiosity about the unexpected side of life (Russo-Netzer & Ickeson, 2022). This description aligns with individuals scoring higher on trait openness. Earlier studies also finds openness as beneficial for greater tolerance of ambiguity (Bardi et al., 2009) and for recognition of chance events (Hirschi, 2010), behavior which in turn can explain receptiveness (Russo-Netzer & Ickeson, 2022). Studies on these connections are however lacking, and there is no common synchronicity scale reuniting the existing literature. The understanding of openness is increasingly consistent, encompassing it as a complex personality trait capturing an openness for both cognitive, perceptual, behavioral and sociocultural experiences (Christensen, 2020). This further influence how open people not only see the world differently but engage with it differently, of the type one often have to do to experience meaningful coincidences and synchronicities.

Synchronicity, religiosity and spirituality

A few studies have explored the influence of various beliefs on synchronicity. Coleman et al. (2009) developed a scale to measure the frequency of self-reported coincidence experiences (the “weird coincidence scale”), and incorporated religiousness and spirituality into this scale. Their findings indicated that God and fate were the most endorsed explanations for coincidences, and that individuals who report more coincidences also tend to report more spiritual experiences. In an extended study by Coleman and Beitman (2009), religious commitment emerged as a significant predictor for an upgraded version of the

“weird coincidence scale”. It is highlighted how questions still remains unanswered, such as how these experiences integrate into regular religious practice (Coleman et al., 2009), and whether spiritual individuals actively seek out coincidences or if such coincidences instill spiritual yearnings (Coleman & Beitman, 2009). A study by Costin et al. (2011), utilizing the upgraded weird coincidence scale, identified that the item “God speaks to us through meaningful coincidences” had the highest mean.

In terms of practical implications, Hill and Pargament’s (2008) research on changes in belief system or life direction following synchronicity experiences in bereavement, indicates that synchronicity can have an impact on both therapy, various beliefs and mental well-being. Additionally, willingness to notice coincidences and further take *advantage* of it for e.g. spiritual growth, is highlighted in Coleman et al. (2009). A limitation with this study is that participant recruitment was limited to individuals from a single university. The “weird coincidence scale” also focuses only on the frequency of noticing coincidence events, excluding the meaning-detection part seen in Russo-Netzer and Ickeson’s (2023) scale. Coleman et al. (2009) acknowledges this limitation, underscoring the need for more theoretical attention regarding coincidences at that time.

Furthermore, Russo-Netzer and Ickeson (2022) discovered in their in-depth interviews that participants recounted coincidence experiences as manifestations of a higher order in the universe, where religious participants often viewed these experiences as affirmations of their beliefs. However, the interpretation of synchronicity varied among participants based on their sociocultural backgrounds. Attig et al. (2011) observed in their study that weird coincidences were not a spiritual experience in themselves, but that noticing coincidences is part of being intuitive, which further leads to spiritual experience. Based on Jung’s (1972) perspective, synchronicities reflects a holistic experience encompassing the transcendent and spiritual aspects of human psyches. This may elucidate why individuals associate coincidences with

diverse beliefs. Establishing a direct correlation appears challenging, yet an underlying feeling of “belief” influencing synchronicity, is perceptible. Empirical findings on synchronicity experiences remains scarce in general (Russo-Netzer & Ickeson, 2023), effecting the literature on its relationship with both personality traits like openness, and with various beliefs.

The present study

Given the stability of personality traits over time (Kennair & Hagen, 2015), it is logical to employ openness as predictor variable in the mediation model. Religiosity, spirituality, and a measure of ‘divine’ belief, will be used as the mediators, following Hayes’s (2022) parallel multiple mediation model. These three mediators are collectively termed as ‘belief in higher principles’. Further details regarding the variables division will be provided later in the methods section. Applying three mediators will not only determine whether X (openness) affects Y (synchronicity), but also shed light on *how* and *when* the relationship varies in strength (Hayes, 2022), allowing for a comprehensive exploration of multiple pathways.

The rationale for selecting ‘belief in higher principles’ as mediators stems from the notion that beliefs are often more stable and influential than experiences of synchronicity, since there is a difference between being aware of and making sense of synchronicity. Previous literature also gives the impression that religiosity or spirituality may exert more influence on synchronicity than vice versa. This notion, along with the explanation of synchronicity as difficult to be aware of, is for example stated in Coleman and Beitman (2009): “An individual who is religiously committed may believe coincidences to be divine messages, but still not experience them in high frequencies” (p. 7). Additionally, religiosity has served as a mediator in a previous study examining the relationship between Big Five traits and life satisfaction (Szcześniak et al., 2019).

While previous research has identified associations between the variables in pairs, there is a gap in understanding how spirituality, religiosity or divine belief might elucidate the relationship between trait openness and synchronicity. After an extensive search on electronic journal databases, no academic research was found on this specific connection.

The research question for the theses is:

What is the relationship between trait Openness, Belief in higher principles and Synchronicity?

This will be tested through the mediation model from Figure 1 and the hypotheses:

H1) There is a direct effect between openness and synchronicity

H2) Belief in higher principles mediates the relationship between openness and synchronicity:

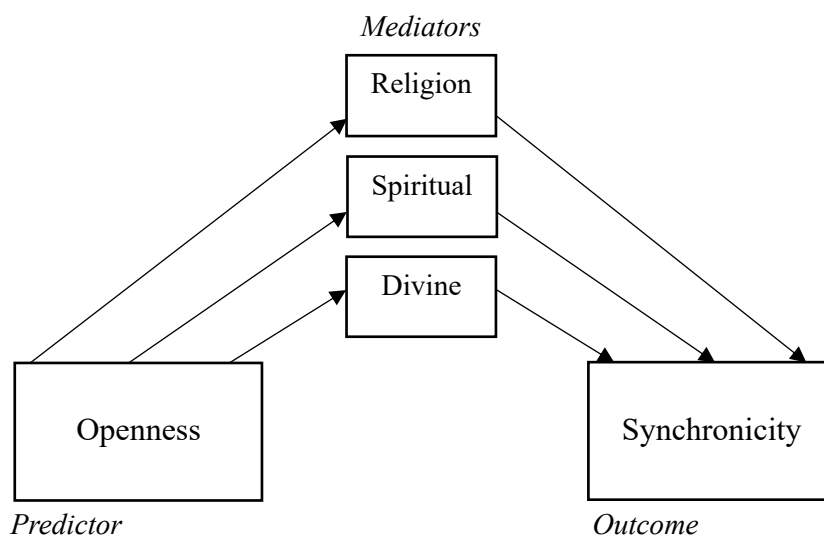
H2a: There is an indirect effect from openness to synchronicity through religion.

H2b: There is an indirect effect from openness to synchronicity through spiritual.

H2c: There is an indirect effect from openness to synchronicity through divine control.

Figure 1

Mediation Model



Note. 'Belief in higher principles' is split into the variables *religion*, *spiritual* and *divine*.

Method

Design

A cross-sectional survey design was applied, where the same sample was used onetime to collect data on different scale-measures. Cross-sectional designs are suitable when relatively little is known about a topic (Spector, 2019). It is therefore appropriate to use on a research project about synchronicity, and especially on the unique relationship between trait openness, various beliefs and synchronicity. This design was also used instead of for example a longitudinal design due to the projects time constraint.

Participants and Procedure

Data was collected in February 2024 through an online questionnaire. A link to the questionnaire was shared on social networks of Instagram, Facebook and Messenger. The survey was advertised as an anonymous study on synchronicity. Participants were also informed that the survey would contain a number of questions on other topics. Information about key aspects of the research, such as grounds of confidentiality and publication of results, were provided before commencing the questionnaire. Respondents had to be based in Norway, and be at least 18 years old, but we aimed for them to preferably be older. The five students in this bachelor project were instructed to recruit 30 participants each, which we succeed. Participants were recruited through a convenient and snowball sampling method, as friends and family were asked to share the survey on their platforms as well. A total of 205 respondents completed the questionnaire, where one of them were excluded due to not having stated an age. Out of 204 participants, 147 (72%) were woman and 57 (28%) were men. No one identified as non-binary. The age of the participants ranged from 20–75. The mean age was 41.25 ($SD = 14.48$). The majority of participants had an undergraduate degree (41%).

Measuring instruments

The baseline survey consisted of numerous scales measuring everything from work engagement to creative self-efficacy. For the present study, the Ten Item Personality Measure (TIPI), and the Synchronicity Awareness and Meaning-Detecting (SAMD) scales, plus three self-developed items for religious, spiritual and divine belief, were employed.

The *Ten-Item Personality Inventory (TIPI)* developed by Gosling et al. (2003) was employed to assess trait openness. This scale offers a brief measure of the Big Five personality dimensions, assessing two items per trait. One item represent the trait's high pole and the other represent the low pole. Each item presents a pair of contrasting descriptors, allowing respondents to rate themselves on a continuum between the two poles. For openness, the high pole descriptors include "open to new experiences" and "complex," while the low pole descriptors encompass "conventional" and "uncreative" (Gosling et al., 2003). The items are rated on a 7-point Likert scale, where 1 represent "disagree strongly" and 7 represent "agree strongly". A Norwegian-translated version of the TIPI scale, developed by Cristina Aicher, was used in the present study. The TIPI has unfortunately demonstrated a limitation of inappropriate internal consistency in previous research (Romero et al., 2012; Thørrisen & Sadeghi, 2023). This is also the case for the present study, measuring $\alpha = .48$. This is not unusual for ultra-short scales, and also appears in e.g. the similar "The Big Five Inventory 10" (BFI-10) scale (Levinsky et al., 2019; Ludeke & Larsen, 2017). The developer of the TIPI highlights how the scale better optimizes content validity than high alphas (Gosling Lab, n.d.).

The *Synchronicity Awareness and Meaning-detecting (SAMD)* scale developed by Russo-Netzer and Ickeson (2023) measures synchronicity experiences in two subscales: (a) synchronicity awareness (SA), and (b) synchronicity meaning-detecting (MD). Together they measure the extent to which individuals are aware of the occurrence on synchronicity events in their lives and make sense of them. The scale is built upon a REM (receptiveness, emotion-

evoking experiences, and meaning-detecting) model (Russo-Netzer & Ickeson, 2022), and other existing conceptual models and surveys. The SA subscale includes questions on awareness of the occurrence of synchronicity events, e.g. “I thought about a person and he/she contacted me unexpectedly shortly afterwards”. A total of 9 items are rated on a 6-point scale (0=never, 1=once, 2=twice or more, 3=rarely, 4=often, 5=all the time). The MD subscale includes questions on the meaning detected in the synchronicity events or experiences, e.g. “I believe that listening to internal and external occurrences enables new discoveries”. A total of 13 items are rated on a 7-point Likert scale (1=not at all to 7=to a high degree). The students in this bachelor project translated all questions to Norwegian using back-translation that was repeatedly reviewed. For the present study, a combined variable of the SA- and MD measure were employed. A better understanding of the construct of synchronicity awareness, is seen by adding the dimension of meaning-detecting (Russo-Netzer & Ickeson, 2023). It is also established that for coincidences to qualify as synchronicity, they have to be meaningful (Coleman et al., 2009). Both of the subscales are therefore considered equally important to include. Reliability for the two-factor SAMD scale was $\alpha = 0.92$, around the same that is reported by Russo-Netzer and Ickeson (2023), $\alpha = 0.87$ for the SA, and $\alpha = 0.93$ for the MD.

Three self-developed items for religious, spiritual and divine belief were employed to measure ‘belief in higher principle’. For religiosity, participants were asked on a 7-point Likert scale “To what degree do you consider yourself a religious person?” (1=not religious at all to 7=very religious). Similarly, spirituality was assessed by “To what degree do you consider yourself a spiritual person?” (1=not spiritual at all to 7=very spiritual). Divine belief was measured within the statement “I believe that a higher, supernatural power can be in control of occurrences” (1=absolutely not and 7=yes absolutely). All items were in Norwegian. The objective of the self-developed items was to evaluate religiosity and spirituality in a short and effective way, and also to capture individuals who believe in

something without necessarily being religious, through the ‘divine’ measure. The variables combined score (‘belief in higher principle’), demonstrated passable reliability ($\alpha=.78$).

Statistical analyses

Data-analyses were performed in JASP version 0.18.3. First, mean scores for the variables were created. An independent samples t-test was so applied to investigate any potential gender differences. The t-test showed no significant differences between the genders, and there was thus no need to further control for these variables. Descriptive statistics and correlations for the variables and internal consistency for the scales, were so calculated. The correlation effect sizes analyzed were categorized as small (± 0.1), medium (± 0.3) and large (± 0.5) effects, following Field’s (2018) proposed criteria.

A process model (Hayes, 2022) was employed with the combined score of participants religious, spiritual and divine belief as mediator. An analysis testing for the variables separately, thus adopting three mediators, was so run. Model no. 4 from Hayes (2022) was utilized for both mediation analyses, allowing up to 10 mediators to operate concurrently. When employing more than two mediators, Hayes (2022) refers to it as a ‘parallel multiple mediator model’. Here, the mediators function independently, enabling the examination of multiple specific indirect paths within the same model. The results of the parallel multiple mediator model is what’s reported and interpreted further in the theses.

Ethics Approval

Respondents gave informed consent by accepting the voluntary nature of participation before the online survey commenced and were free to cease participation at any time. Due to online anonymity and a limited set of background information, it was not possible for the

researchers to identify who was responding to the survey. The project therefore followed the requirements of the Norwegian Centre for Research Data (NSD).

Results

Correlation analysis

Descriptive statistics (i.e. means and standard deviations) and correlation coefficients are reported in Table 1. Several of the variables showed relations with each other. For openness, positive small correlations was found with spirituality, $r = .21, p < .01$, and medium with synchronicity, $r = .31, p < .001$. Synchronicity correlated further positive with all dimensions of beliefs; medium with religiosity, $r = .37, p < .01$, strong with spirituality, $r = .58, p < .01$, and strong with divine belief, $r = .52, p < .01$. For religiosity, a strong positive correlation was found with spirituality, $r = .51, p < .01$, and divine belief, $r = .63, p < .01$. Divine belief also correlated strong and positively with spirituality, $r = .55, p < .01$.

Table 1

Descriptive Statistics for and Correlations Between the Study Variables (N = 204)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Openness	5.18	1.04				
2. Synchronicity	4.59	0.97	.31***			
3. Religiosity	2.43	1.52	.03	.37***		
4. Spirituality	2.60	1.68	.21**	.58***	.51***	
5. Divine belief	2.19	1.23	.08	.52***	.63***	.55***

Note. ** $p < .01$, *** $p < .001$.

Mediation analysis

An analysis with the combined ‘belief in higher principles’ variable as mediator, showed a meaningful mediation effect if the confidence interval of the indirect estimate did

not include zero. This was further explored utilizing ‘religious’, ‘spiritual’ and ‘divine belief’ as mediators in a parallel multiple mediation analysis.

The parallel multiple mediation analysis’s direct effects are presented in Table 2. The indirect effects and final mediation effect is presented in Table 3. A summary of the results can be found in Figure 2. All relationships are presented by standardized estimates.

Bootstrapping procedures of 10,000 samples were employed, in accordance to Hayes (2022) criteria where 5,000 to 10,000 is considered sufficient in most applications.

Results shows that there was a direct effect between openness and synchronicity ($\beta = 0.21, p < .001$), openness and spirituality ($\beta = 0.21, p = .003$), spirituality and synchronicity ($\beta = 0.38, p < .001$) and divine belief and synchronicity ($\beta = 0.31, p < .001$) (table 2).

Table 2

Mediation Analysis, Direct Effects Summary

Relationship	Estimate (β)	SE	z-value	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
OP – SYN (<i>c</i>)	0.21	0.05	3.84	<.001*	0.10	0.31
OP – R	0.03	0.07	0.40	.691	-0.11	0.18
OP – S	0.21	0.07	3.00	.003*	0.06	0.33
OP – D	0.08	0.07	1.17	.243	-0.05	0.22
R – SYN	-0.03	0.05	-0.53	.598	-0.16	0.09
S – SYN	0.38	0.05	7.08	<.001*	0.24	0.51
D – SYN	0.31	0.05	5.91	<.001*	0.17	0.45

Note. * Significant result.

There was a significant, small indirect effect of trait openness on synchronicity through spirituality, $\beta = 0.08$, 95% BCa CI [0.03, 0.15], $p < .01$. The total indirect effects of religious, spiritual and divine belief on the relationship between openness and synchronicity,

was significant, $\beta = 0.10$, 95% BCa CI [0.02, 0.18], $p < .01$. The models total effect, including total indirect effects and direct effects, was significant, $\beta = 0.31$, 95% BCa CI [0.18, 0.43], $p < .01$ (table 3). According to Cohen's (1988) R^2 , it is estimated that openness accounts for 4.2 % of the variance in spiritual ($R^2 = 0.042$). A small partial mediation effect is detected. Together, openness and spirituality explains 37.1 % of the variance in the outcome ($R^2 = 0.371$), indicating a moderate level of model fit.

Table 3

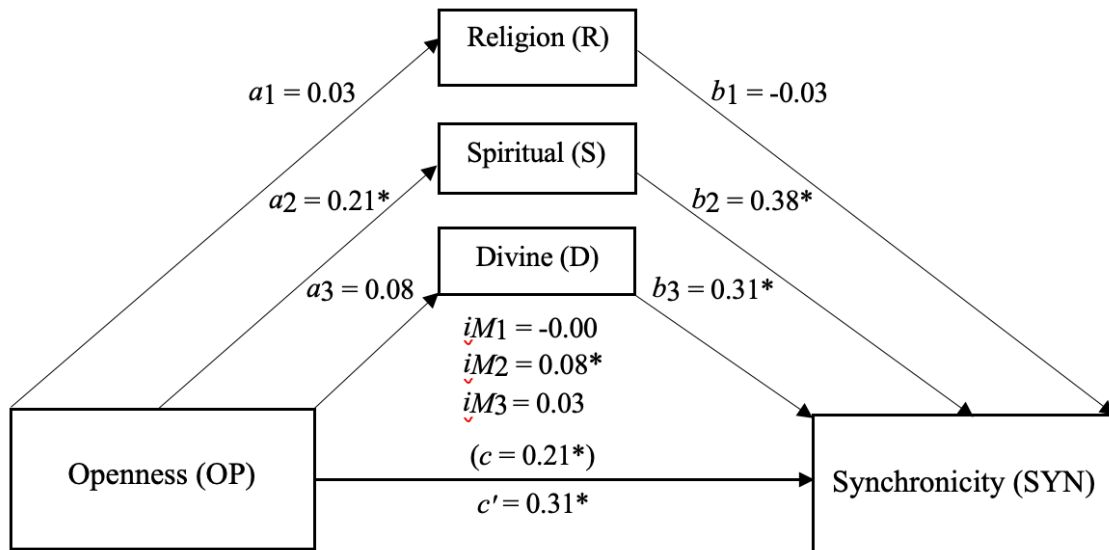
Mediation Analysis, Indirect Effects & Mediation Effect

Effect	Relationship	β (SE)	z-value	95% Confidence Interval	
				Lower Bound (bootstrap)	Upper Bound (bootstrap)
Indirect (iM_1)	OP – R – SYN	-0.00 (0.00)	-0.32	-0.02	0.01
Indirect (iM_2)	OP – S – SYN	0.08 (0.03)**	2.76	0.03	0.15
Indirect (iM_3)	OP – D – SYN	0.03 (0.02)	1.15	-0.01	0.08
Total indirect	OP - SYN	0.10 (0.04)**	2.85	0.02	0.18
Total (c')	OP - SYN	0.31 (0.06)***	4.95	0.18	0.43

Note. ** $p < .01$, *** $p < .001$.

Figure 2

Model Diagram



Note. Theoretical model of the mediators role in the relationship between trait openness and synchronicity. * Significant result.

Discussion

Summary and interpretations of results

The present study sought to explore the relationship between trait openness, belief in higher principles and synchronicity. The first aim was to assess the direct effect between openness and synchronicity, while the second purpose was to investigate whether belief in higher principles mediated this relationship, through religiosity, spirituality or divine control. Results revealed a direct effect between openness and synchronicity (supporting H1), with spiritual belief mediating the relationship (supporting H2b). A sufficient amount of correlations and direct effects among the study variables were also observed.

The direct effect between openness and synchronicity aligns with suggestions from prior research, linking openness to synchronicity (Russo-Netzer & Ickeson, 2022; Russo-Netzer & Ickeson, 2023) and to apophenia (Blain et al., 2020). It also aligns with openness

being linked to behavior associated with synchronicity (Bardi et al., 2009; Hirschi, 2010). However, scarce research on this connection has been acknowledged, making the present findings valuable and affirmative. As described by Hayes (2022), “a positive direct effect means that the case higher on X is estimated to be higher in Y ” (p. 85), indicating that people who score higher on openness, correspond to scoring higher on synchronicity.

A small-scale mediating effect of spirituality on the relationship between openness and synchronicity was also established, indicating that spirituality accounts for a small percentage of openness’s effect on synchronicity. This finding is consistent with prior research demonstrating positive correlations between openness and spirituality (Ferrari et al., 2017; Lace et al., 2020; Saraglou, 2002; Saraglou, 2010; Szcześniak et al., 2019), as well as between spirituality and synchronicity (Coleman et al., 2009; Russo-Netzer & Ickeson, 2023). A mediating effect of this relationship has previously not been detected and is unique for the present study. Although it was a small effect, it contributed findings that will be of interest to investigate further. There might be other factors than spirituality linking openness to synchronicity. Since the present study assessed a parallel multiple mediator model, one specific indirect effect controls for all other mediators in the model (Hayes, 2022). The effect of spirituality on the relationship between openness and synchronicity, therefore, controls for religiosity and divine belief as well. Both religiosity and divine belief showed no correlation or direct effect with openness. It is thus conceivable that the effect of spirituality could have been larger if it was tested in a simple mediation model.

Despite the small mediation effect, the total indirect effect and total effect of the model were significant. This is natural when these also included all the direct effects, and the analyses contained several significant direct effects. In addition to the ones between openness, synchronicity and spirituality in several of the paths, a direct effect between divine belief and synchronicity was identified. Although religiosity and divine belief did not significantly

mediate the relationship between openness and synchronicity individually, their combined influence, along with spirituality, had a significant impact when considered together. In most circumstances of a parallel multiple mediator model, the mediators are further likely to be correlated (Hayes, 2022).

Overall, the analysis indicated that higher levels of openness, spirituality and divine belief are associated with higher levels of synchronicity. Further interpretations and plausible explanations on what this mean for practice, will now be presented.

Practical implications

It is highlighted in previous research that synchronicity experiences are associated with a subjective increase in life satisfaction or meaning in life (Beitman, 2023; Datu, 2015; Russo-Netzer & Ickeson, 2023). This is also represented for spiritual belief and well-being (Hill & Pargament, 2003; Ivtzan et al., 2013; Vitorino et al., 2018). Koenig and colleagues (2012), specifies how spirituality *is* to seek for a meaning in life. Spirituality and synchronicity can, therefore, work as sources for improved aspects of mental health. A possible explanation for this has to do with how both of them are central to human individuation: Synchronicity is suggested to display purposive guidance of the unconscious that serves to advance the process of individuation (Sacco, 2016). This relation between meaning and individuation is significant and reflects some sense of *purpose*, “otherwise we might believe each unconscious compensation is merely an attempt to restore some preexisting balance” (Sacco, 2016, p. 206). Here, the meaning behind synchronicity events, measured as meaning-detecting (MD) in the present study, contributes to the experience of subjective purpose or meaning. And just as synchronicity events can work as a source of deeper insight into oneself, this is often the goal in spiritual practice as well. In spirituality

individuals seek and express meaning and purpose, e.g. to self, to others or to the moment (Puchalski et al, 2009).

However, excessive interpretation of either oneself or one's perceived meaning of occurrences could lead to unfortunate experiences as well. A positive association between the two synchronicity subscales and depression has been acknowledged (Russo-Netzer & Ickeson, 2023). Furthermore, coincidence experiences could lead to psychopathology processes as paranoia or magical thinking (Beitman et al., 2010). Individuals with higher spirituality levels and lower religiousness levels, are also found to be more susceptible to magical beliefs, fantasy and dissociations (Saucier & Skrypinksa, 2006). It is therefore important to further assess whether synchronicity experiences and spiritual belief contributes positively or negatively to individuation, subjective well-being and life satisfaction, as these factors appear to be important parts of both variables.

The notable direct link between openness and synchronicity may potentially be clarified by Christensen's (2023) exploration of trait openness. According to Christensen, openness's connection to biological constructs renders open individuals less prone to disregarding irrelevant stimuli due to their reduced latent inhibition. This broadens the scope of associations for stimuli, potentially leading to overinclusive associations where individuals perceive meaningful patterns and connections (apophenia), even in the absence of such correlations. Christensen (2023) further underscores how these overinclusive associations are a notable characteristic of schizophrenia-spectrum disorders. It remains imperative to delve deeper into whether the impact of *openness* on synchronicity could positively or negatively influence human experiences, as discussed for the broader context of synchronicity experiences and spiritual belief as well.

The present study is not free from non-significant results. The lack of significance regarding religiosity as a mediator prompts exploration into various theoretical explanations.

What practical significance lies in the interplay between religiosity and non-openness?
(compared to spirituality and openness).

First and importantly, prior research has consistently shown that religiousness does not correlate with openness (Abdel-Khalek et al., 2023; Lace et al., 2020; Saraglou, 2015; Szcześniak et al., 2019). Hence, it is natural that when using religiosity as a mediator variable on the connection between openness and synchronicity, non-significant results will appear. Lace et al. (2020) suggest that the relationship between religiosity and openness remains ambiguous compared to religiosity's association with other personality traits. A study by Saraglou (2009), posits that religiousness is culturally adapted by agreeableness and conscientiousness, meaning "these two personality factors can be seen as universal determinants of individual variability in religiousness" (p. 118). Saraglou's study reveals that while religiousness correlates positively with nearly all facets of conscientiousness and agreeableness, only one facet of openness (values) exhibits a significant correlation with religiosity. This indicates that openness is not inherently part of the culturally adapted personality traits for religiosity.

Elderly studies on the relationship between personality and religiosity, have also predominantly focused on Eysenck's three-factor model (Szcześniak et al., 2019), which openness is not a part of. Research on openness is thus deficient compared to traits in Eysenck's model that correspond with traits in Costa & McCrae's five-factor model. This is for example low psychoticism, which is described to blend agreeableness and conscientiousness (Costa & McCrae, 2003), and further is related to religiousness (Saraglou, 2009).

Compared to other traits, openness has received limited attention in studies on personality's relation with religiosity, due to its non-significant results. It is important to recall that more statistical significance is not synonymous with more important (Meltzoff & Cooper,

2018), thus calling future studies to address the ‘unclear relationship between religiosity and openness’ comprehensively.

A plausible explanation for the association between low openness scores and religiosity may stem from how individuals low in openness tend to derive meaning. Lavigne et al. (2013) discovered that respondents with high levels of openness are more inclined to derive meaning through questioning, learning, and creative, non-traditional means. In contrast, religiousness emphasizes traditions and institutionalized beliefs (Piedmont, 1999), which may not align with the assumption that individuals seek meaning from non-traditional sources. This is in behalf of that religiousness also influence subjective well-being, with religious individuals generally reporting higher levels of happiness regardless of their specific faith (Berthold & Ruch, 2014; Dolan et al., 2008; Habib et al., 2018). For spirituality, one emphasizes personal connections with the sacred more than routinized ritual behavior (Piedmont, 1999), complementary to deriving meaning from questioning and learning to a higher degree. Consequently, when considering religiosity without the spiritual components, one may only be left with the traditional facets that do not correlate with openness.

Despite the non-significant mediating effect of religiosity, all off the 'belief in higher principles' variables exhibited correlations with synchronicity. Many of the common denominators observed for spirituality and synchronicity also apply to religiosity. However, openness inhibits significant results for religiosity and divine belief as mediators. There is an overlap between religiosity and divine belief in this study, with divine belief also showing no significance with openness. A limited contribution of the ‘divine’ variable on its own, is recognized. Further discussions on implications associated with the ‘belief in higher principles’ variables will be mentioned in the next section.

Strengths and limitations

A strength of the present study lies in its utilization of the combined synchronicity variable, encompassing both "awareness" and "meaning-detection." This comprehensive approach addresses both the frequency and subjective perception of synchronicity events, enhancing our understanding of the synchronicity concept (Russo-Netzer & Ickeson, 2023). Such an exploration is particularly beneficial for a topic that is relatively under-researched.

The use of a parallel multiple mediator model is also considered a strength of the study. This model allows exploration of several mediators simultaneously without their mutual influence, which is advantageous over estimating multiple simple mediation models (Hayes, 2022). It enables an comparison of the sizes of the indirect effects through different mediators, providing a comprehensive understanding of the impact of different 'belief in higher principles' variables on the relationship between openness and synchronicity, which was the study's intended focus.

Regarding the sample and survey of the study, a notable strength is the recruitment of participants spanning various age groups. Unlike several previous studies focusing on students, the present study encompassed a broader demographic, which is beneficial for generalizability. Additionally, while the survey covered various topics, the scales relevant for this study were deficient on sensitive questions. This could reduce social desirability bias. The use of online questionnaires with ensured anonymity, also mitigates the risk of social desirability (Podsakoff et al., 2003). Furthermore, the study did not suffer from any technological issues and collection of data went expeditiously.

The present study is also subject to several limitations that should be taken into consideration. The TIPI-scale employed for openness exhibited a lower reliability than typically accepted. Assessing only two items per trait, it may provide an incomplete measure of openness. However, given it was a comprehensive survey to complete, adopting an extended personality measure would have prolonged the survey duration, potentially reducing

the sample size. It is worth noting that in early stages of research, reliability values as low as 0.5 are considered acceptable (Nunnally, 1978). The reliability of the TIPI scale is therefore not a decisive limitation of the study, but future research are encouraged to utilize a more concentrated measure when assessing personality in relation to synchronicity.

Regarding the study's sample size, the requirement for mediation models vary significantly depending on the complexity of the model. As suggested by Sim et al. (2022), a simple mediation model should have a sample size of 253.3, whereas a more complex model (utilizing two mediators in their study), requires 392.5. This indicates that the present study had a smaller sample size than recommended, but it is not considered crucial due to the study's time constraint.

A limitation regarding the measurement of religiosity and spirituality is undoubtedly seen, particularly considered these variables major part in the thesis. Unlike other studies utilizing measures such as 'the Personal Religiousness Scale' or 'the Spiritual Transcendence Scale', this study relied on three single self-developed item for assessing 'religious', 'spiritual' and 'divine' belief. This raises concerns about universality and credibility. Even though previous studies have assessed more complementary scales for measure, the operational definitions of spirituality and religiosity vary across the literature, mirroring the situation off the present study. The inclusion of the 'divine' variable aimed to capture individuals who believe in something without necessarily being religious, but its utility was limited as it correlated more strongly with religiosity than anticipated.

Furthermore, the sample was not randomized as it was collected through a convenience and snowball method, making it vulnerable to volunteer bias. Women were significantly overrepresented and potential gender differences could have received more attention. The cross-sectional design that was applied, made it unobtainable to evaluate causation in the relationships studied. There is ongoing debate regarding the suitability of a

cross-sectional design for studying mediation (Arguinis et al., 2017). Additionally, while the study has been argued not to be characterized by social desirability bias, the survey yet consisted of numerous items which could decrease the accuracy of responses towards the end.

Future research

The present study's identification of a link between openness and synchronicity, with spiritual belief mediating the relationship, highlights the need for comprehensive exploration in future research. Further investigation should confirm the recurrence of the direct effect between openness and synchronicity, and ascertain whether spirituality indeed mediates this relationship. Additionally, it is relevant to explore potential alternative factors linking openness to synchronicity. It would be interesting to investigate the impact of synchronicity on religious and spiritual belief, as opposed to vice versa done in this study. It would also be of interest to assess synchronicity in a serial multiple mediation model, to get a better grip of whether 'awareness' influence 'meaning-detection' or the opposite. This could further help validate and refine the synchronicity measure.

Moreover, there is a pressing need for in-depth research into the effects of synchronicity experiences and spiritual belief, on human individuation, subjective life satisfaction, and overall well-being. It is crucial to determine whether these constructs positively or negatively influence human experiences, particularly considering their increasing societal focus. This is relevant in especially the context of the Western world's growing emphasis on individualism and innovative therapy approaches, such as integrating synchronicity experiences into therapy (Roxburgh et al., 2015).

The "unclear relationship between religiosity and openness" also warrants further investigation. The suggestion of religiosity as culturally adapted by agreeableness and conscientiousness (Saraglou, 2009), raise questions about openness's role in this dynamic.

Exploring e.g. whether open individuals raised in religious families exhibit lower openness scores, despite personality being a stable construct, could shed light on this relationship.

Lastly, future research should take into consideration some of the limitations of this study, including its design and the absence of gender differences exploration. Lace et al. (2020) underscores the infrequent examination of gender differences in research on personality, religiousness and spirituality, and this is not, as known of, explored for synchronicity either. The cross-sectional design presents a limitation, and as proposed by Russo-Netzer and Ickeson (2022), future studies could advocate for longitudinal design for e.g. exploration of individuals emotional states before and after synchronicity experiences. Laboratory experiments could enhance causal inference, and the use of daily diary methods could further refine the synchronicity measure (Russo-Netzer & Ickeson, 2023). Given the scarcity of literature on synchronicity, future research should prioritize this area.

Conclusion

This study revealed a positive link between openness and synchronicity, with spiritual belief mediating the relationship. The mediating effect was small, yet the total effect of ‘belief in higher principles’ was more extensive. Religiosity and divine belief correlated with synchronicity, but not with openness, providing several interpretations into the variables relationship. It remains important to further explore the aspects of synchronicity, “belief in higher principles” and their potential contributions. This study is among the first to employ a parallel multiple mediator model on synchronicity research, providing a comprehensive understanding of several factors influencing the relationship between openness and synchronicity. Given the underexplored nature of coincidence experiences and synchronicity, future research should examine additional factors that could contribute to a more nuanced understanding of the concept.

References

- Abdel-Khalek, A. M., Bakhiet, S. F. A., Osman, H. A., & Lester, D. (2023). The associations between religiosity and the Big-Five personality traits in college students from Sudan. *Acta Psychologica*, 239, 104013–104013.
<https://doi.org/10.1016/j.actpsy.2023.104013>
- Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving Our Understanding of Moderation and Mediation in Strategic Management Research. *Organizational Research Methods*, 20(4), 665–685. <https://doi.org/10.1177/1094428115627498>
- Attig, S., Schwartz, G. E., Figueredo, A. J., Jacobs, W. J., & Bryson, K. C. (2011). Coincidences, Intuition, and Spirituality. *Psychiatric Annals*, 41(12), E1–E3.
<https://doi.org/10.3928/00485713-20111104-08>
- Bardi, A., Guerra, V. M., Sharadeh, G., & Ramdeny, D. (2009). Openness and ambiguity intolerance: Their differential relations to wellbeing in the context of an academic life transition. *Personality and Individual Differences*, 47, 219–223.
<https://doi.org/10.1016/j.paid.2009.03.003>.
- Berthold, A., & Ruch, W. (2014). Satisfaction with life and character strengths of non-religious and religious people: it's practicing one's religion that makes the difference. *Frontiers in Psychology*, 5, 876–876.
<https://doi.org/10.3389/fpsyg.2014.00876>
- Blain, S. D., Longenecker, J. M., Grazioplene, R. G., Klimes-Dougan, B., & DeYoung, C. G. (2020). Apophenia as the disposition to false positives: A unifying framework for openness and psychoticism. *Journal of Abnormal Psychology*, 129(3), 279–292. <https://doi.org/10.1037/abn0000504>

- Bressan, P. (2002). The connection between random sequences, everyday coincidences, and belief in the paranormal. *Applied Cognitive Psychology, 16*(1), 17–34.
<https://doi.org/10.1002/acp.754>
- Bruaset, O. (Writer & Director). (2023, December 10). Gjerdøyhamn (Season 22, Episode 6) [TV series episode]. In T. Bjellaas, & N. Pedersen (Executive Producers). *Der ingen skulle tru at nokon kunne bu*. NRK; NRK TV.
- Christensen, A. P. (2023). Openness to experience. *The palgrave encyclopedia of the possible. Cham: Springer International Publishing.* 941-947.
- Cohen J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge.
- Connolly, A. (2015). Bridging the reductive and the synthetic: some reflections on the clinical implications of synchronicity. *Journal of Analytical Psychology, 60*(2), 159–178.
<https://doi.org/10.1111/1468-5922.12142>
- Coleman, S. L. & Beitman, B. D. (2009). Characterizing High-frequency Coincidence Detectors. *Psychiatric Annals, 39*(5), 271. <https://doi.org/10.3928/00485713-20090423-01>
- Coleman, S. L., Beitman, B. D. & Celebi, E. (2009). Weird Coincidences Commonly Occur. *Psychiatric Annals, 39*(5), 265-270. <https://doi.org/10.3928/00485713-20090421-03>
- Costa, P. T. & McCrae, R. R. (2003). *Personality in adulthood : A five-factor theory perspective* (2nd ed.). New York: Guilford Press.
- Costin, G., Dzara, K., & Resch, D. (2011). Synchronicity: Coincidence Detection and Meaningful Life Events. *Psychiatric Annals, 41*(12), 572–575.
<https://doi.org/10.3928/00485713-20111104-04>
- Datu, J. A. D. (2015). Validating the Revised Self-Concept Scale in the Philippines. *Current Psychology (New Brunswick, N.J.), 34*(4), 626–633.

- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29(1), 94–122.
<https://doi.org/10.1016/j.joep.2007.09.001>
- Fach, W., Atmanspacher, H., Landolt, K., Wyss, T. & Rössler, W. (2013). A comparative study of exceptional experiences of clients seeking advice and of subjects in an ordinary population. *Frontiers in Psychology*, 4, 65–65.
<https://doi.org/10.3389/fpsyg.2013.00065>
- Ferrari, J. R., Reed, J., & Guerrero, M. (2017). Personality as Predictor of Religious Commitment and Spiritual Beliefs: Comparing Catholic Deacons and Men in Formation. *Journal of Spirituality in Mental Health*, 19(1), 20–33.
<https://doi.org/10.1080/19349637.2016.1193405>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37(6), 504–528.
[https://doi.org/10.1016/S0092-6566\(03\)00046-1](https://doi.org/10.1016/S0092-6566(03)00046-1)
- Gosling Lab, University of Texas at Austin. (n.d.). A note on alpha reliability and factor structure in the TIPI. Retrieved from <https://gosling.psy.utexas.edu/scales-weve-developed/ten-item-personality-measure-tipi/a-note-on-alpha-reliability-and-factor-structure-in-the-tipi/>
- Habib, D. G., Donald, C., & Hutchinson, G. (2018). Religion and Life Satisfaction: A Correlational Study of Undergraduate Students in Trinidad. *Journal of Religion and Health*, 57(4), 1567–1580. <https://doi.org/10.1007/s10943-018-0602-6>

- Hayes, A. F. (2022). Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach (3th ed.). Guilford Press.
- Hicks, J. A., & Routledge, C. (2013). *The Experience of Meaning in Life: Classical Perspectives, Emerging Themes, and Controversies* (2013th ed.). Springer Netherlands. <https://doi.org/10.1007/978-94-007-6527-6>
- Hill, P. C., & Pargament, K. I. (2008). Advances in the Conceptualization and Measurement of Religion and Spirituality: Implications for Physical and Mental Health Research. *Psychology of Religion and Spirituality*, *S*(1), 3–17.
- Hirschi, A. (2010). The role of chance events in the school-to-work transition: The influence of demographic, personality and career development variables. *Journal of Vocational Behavior*, *77*, 39–49. <https://doi.org/10.1016/j.jvb.2010.02.002>.
- Henningsgaard, J. M., & Arnau, R. C. (2008). Relationships between religiosity, spirituality, and personality: A multivariate analysis. *Personality and Individual Differences*, *45*(8), 703–708. <https://doi.org/10.1016/j.paid.2008.07.004>
- Ivtzan, I., Chan, C. P. L., Gardner, H. E., & Prashar, K. (2013). Linking Religion and Spirituality with Psychological Well-being: Examining Self-actualisation, Meaning in Life, and Personal Growth Initiative. *Journal of Religion and Health*, *52*(3), 915–929. <https://doi.org/10.1007/s10943-011-9540-2>
- JASP Team (2024).
- JASP (Version 0.18.3) [Computer software].
- Jung, C. G. (1972). *Synchronicity: an acausal connecting principle*. Routledge & Kegan Paul.
- Kennair, L. E. O. & Hagen, R. (Eds.). (2015). *Personlighetspsykologi*. Fagbokforlaget.
- Kajonius, P., & Mac Giolla, E. (2017). Personality traits across countries: Support for similarities rather than differences. *PloS One*, *12*(6), e0179646–e0179646. <https://doi.org/10.1371/journal.pone.0179646>

- Koenig, H. G., King, D. E., & Carson, V. B. (2012). *Handbook of religion and health* (2nd ed.). Oxford University Press.
- Labbé, E. E., & Fobes, A. (2010). Evaluating the interplay between spirituality, personality and stress. *Applied Psychophysiology and Biofeedback*, 35(2), 141–146. <https://doi.org/10.1007/s10484-009-9119-9>.
- Lace, J. W., Evans, L. N., Merz, Z. C., & Handal, P. J. (2020). Five-Factor Model Personality Traits and Self-Classified Religiousness and Spirituality. *Journal of Religion and Health*, 59(3), 1344–1369. <https://doi.org/10.1007/s10943-019-00847-1>
- Lavigne, K. M., Hofman, S., Ring, A. J., Ryder, A. G., & Woodward, T. S. (2013). The personality of meaning in life: Associations between dimensions of life meaning and the Big Five. *The Journal of Positive Psychology*, 8(1), 34-43.
- Levinsky, M., Litwin, H., & Lechner, C. (2019). Personality traits: The ten-item Big Five Inventory (BFI-10). *SHARE Wave Methodology*, 7, 29-34.
- Ludeke, S. G., & Larsen, E. G. (2017). Problems with the Big Five assessment in the World Values Survey. *Personality and Individual Differences*, 112, 103–105.
- McCrae, R. R. (2010). The Place of the FFM in Personality Psychology. *Psychological Inquiry*, 21, 57-64.
- Meltzoff, J. & Cooper, H. (2018). *Critical thinking about research: Psychology and related fields* (2nd ed.). American Psychological Association.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Park, C. L. (2010). Making Sense of the Meaning Literature: An Integrative Review of Meaning Making and Its Effects on Adjustment to Stressful Life Events. *Psychological Bulletin*, 136(2), 257–301. <https://doi.org/10.1037/a0018301>

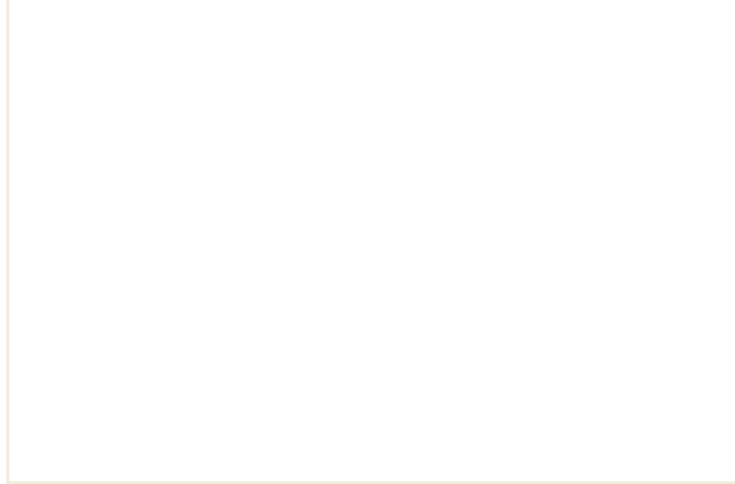
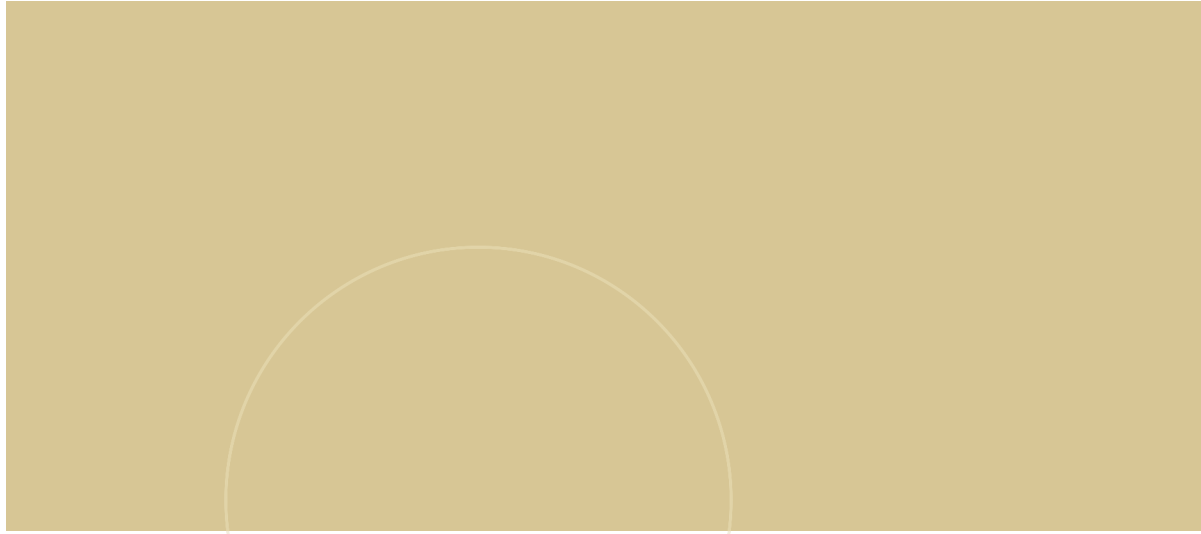
- Piedmont, R. L. (1999). Does spirituality represent the sixth factor of personality? Spiritual transcendence and the five-factor model. *Journal of Personality*, 67(6), 985–1013. <https://doi.org/10.1111/1467-6494.00080>.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
- Puchalski, C., Ferrell, B., Virani, R., Otis-Green, S., Baird, P., Bull, J., & Sulmasy, D. (2009). Improving the quality of spiritual care as a dimension of palliative care: the report of the Consensus Conference. *Journal of palliative medicine*, 12(10), 885-904.
- Romero, E., Villar, P., Gómez-Fraguela, J. A., & López-Romero, L. (2012). Measuring personality traits with ultra-short scales: A study of the Ten Item Personality Inventory (TIPI) in a Spanish sample. *Personality and individual differences*, 53(3), 289-293.
- Roxburgh, E. C., Ridgway, S. & Roe, C. A. (2015). Exploring the meaning in meaningful coincidences: An interpretative phenomenological analysis of synchronicity in therapy. *European Journal Of Psychotherapy & Counselling*, 17(2), 144–161. <https://doi.org/10.1080/13642537.2015.1027784>
- Russo-Netzer, P., & Icekson, T. (2023). An underexplored pathway to life satisfaction: The development and validation of the synchronicity awareness and meaning-detecting scale. *Frontiers in Psychology*, 13, 1053296–1053296. <https://doi.org/10.3389/fpsyg.2022.1053296>
- Russo-Netzer, P. & Icekson, T. (2022). Engaging with life: Synchronicity experiences as a pathway to meaning and personal growth. *Current Psychology (New Brunswick, N.J.)*, 41(2), 597–610. <https://doi.org/10.1007/s12144-019-00595-1>

- Sacco, R. G. (2016). The Fibonacci Life-Chart Method (FLCM) as a Foundation for Carl Jung's Theory of Synchronicity. *Journal of Analytical Psychology*, *61*(2), 203–222. <https://doi.org/10.1111/1468-5922.12204>
- Saroglou, V. (2015). Personality and religion. *International encyclopedia of the social & behavioral sciences*, *2*, 801-808.
- Saroglou, V. (2009). Religiousness as a Cultural Adaptation of Basic Traits: A Five-Factor Model Perspective. *Personality and Social Psychology Review*, *14*(1), 108–125. <https://doi.org/10.1177/1088868309352322>
- Saroglou, V. (2002). Religion and the five factors of personality: a meta-analytic review. *Personality and Individual Differences*, *32*(1), 15–25. [https://doi.org/10.1016/S0191-8869\(00\)00233-6](https://doi.org/10.1016/S0191-8869(00)00233-6)
- Saucier, G., & Skrzypińska, K. (2006). Spiritual But Not Religious? Evidence for Two Independent Dispositions. *Journal of Personality*, *74*(5), 1257–1292. <https://doi.org/10.1111/j.1467-6494.2006.00409.x>
- Sim, M., Kim, S.-Y., & Suh, Y. (2022). Sample Size Requirements for Simple and Complex Mediation Models. *Educational and Psychological Measurement*, *82*(1), 76–106. <https://doi.org/10.1177/00131644211003261>
- Spector, P. E. (2019). Do not cross me: Optimizing the use of cross-sectional designs. *Journal of Business and Psychology*, *34*(2), 125–137. <https://doi.org/10.1007/s10869-018-09613-8>
- Szcześniak, M., Sopińska, B., & Kroplewski, Z. (2019). Big Five Personality Traits and Life Satisfaction: The Mediating Role of Religiosity. *Religions (Basel, Switzerland)*, *10*(7), 437. <https://doi.org/10.3390/rel10070437>

Taylor, A. & MacDonald, D. A. (1999). Religion and the five factor model of personality: An exploratory investigation using a Canadian university sample. *Personality and Individual Differences*, 27(6), 1243–1259. [https://doi.org/10.1016/S0191-8869\(99\)00068-9](https://doi.org/10.1016/S0191-8869(99)00068-9)

Thørrisen, M. M., & Sadeghi, T. (2023). The Ten-Item Personality Inventory (TIPI): a scoping review of versions, translations and psychometric properties. *Frontiers in Psychology*, 14, 1202953–1202953. <https://doi.org/10.3389/fpsyg.2023.1202953>

Vitorino, L. M., Lucchetti, G., Leão, F. C., Vallada, H., & Peres, M. F. P. (2018). The association between spirituality and religiousness and mental health. *Scientific Reports*, 8(1), 17233–17239. <https://doi.org/10.1038/s41598-018-35380-w>



 **NTNU**

Norwegian University of
Science and Technology