The psychological role of music and attentional control for religious experiences in worship

Yoshija Walter1,2,3 and Andreas Altorfer2

Abstract
This study investigated the psychological dynamics during worship experiences under the influence of different music conditions. In total, 60 believers were recruited to participate in experiments where they were asked to engage in worship and to connect with God while continuously ranking how strongly they sensed the presence of the divine. After each condition, they were asked to rate how well they were able to focus on God during the worship procedure. Based on a previously published Feedback Loop Model that portrays global psychological mechanisms in worship, we deduced two hypotheses: (1) the ability to focus on God is positively associated with how strong the subjective religious experience becomes, and (2) the different musical conditions yield varying degrees in the intensity of the felt presence of God. Our statistical analyses on the current sample demonstrate that both alternative hypotheses can be accepted. For the latter thesis, two further assumptions were at play: (1) we speculated that religious worship songs were associated with stronger divine experiences than with secular ones, and (2) it was assumed that if they could worship to their own selection of songs, the experience would be more powerful than with the ones that were provided by the research team. Whereas upon our investigation the former assumption can be deemed correct, the latter shows a positive but insignificant association.

Keywords
Religion; worship; music; religious experience; psychology of religion

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Introduction
To people who have been in the grasp of a religious experience, it can be a transformative or a life-enriching occurrence. It can provide hope, joy, or the sense of being part of something greater (Bennett & Hacker, 2003). Religiosity may be a larger construct, but experience is a key dimension, as is posited in empirical frameworks such as the centrality of religiosity scale (Huber & Huber, 2012). In such frameworks, religious experience is often conceptualised as having a subjectively perceived encounter with the divine. The idea of the divine is often personified. A religious experience, then, is seen as an occurrence where one believes to be encountering God. A much broader contextualisation of the term is also possible because a believer may think to be experiencing not only God but also angels, demons, jins, and so forth while also referring to them as religious experience. Hence, there is a great difficulty in agreeing on what counts as a religious experience and whether they are comparable between subjects and cultures.

The psychologist Ann Taves (2005, 2009, 2011) has suggested denoting the term religious for things deemed special. Occurrences that are deemed special get singled out via a process called singularisation, which means that these are instances that fall strongly out of the ordinary picture so that they inevitably impose on the person the experience and whether they are comparable between subjects and cultures.

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idea that this must be something non-normal, or, to use theological phraseology, something supernatural. A Christian, for example, will automatically align this experience with his dogmatic concepts and therefore assume that this is an experience with God or the spirit world. To do justice to the plethora of such nonordinary events, an “expanded framework for nonordinary experiences” has emerged (Taves, 2020, p. 669).

When Alister Hardy (1979, pp. 31–81), founder of the Religious Experience Research Centre (RERC), collected a multitude of stories, he was able to classify the instances into several types:

- Sensory experiences: auditory, visual, touch, smell;
- Extra-sensory;
- Superhuman or enhanced powers portrayed by human subjects;
- Cognitive and affective features;
- Dreams.

Cross-cultural studies have further pinned down the notions of religious and spiritual concepts (Badham et al., 2008; Bocking, 2008; Yao & Badham, 2007), although two key criticisms have emerged (Taves et al., 2019, p. 8): (1) that there may be many different types of religious experiences and not just one cross-culturally stable concept, and (2) that different traditions may value or reject certain experiences more than others, thus cultivating them more or less in contrast to one another.

For the present study, the second statement is of greater interest. A believer may have a strong experience which is subjectively deemed as religious even when the cultural tradition by and large does not concur with this interpretation. However, there is not just “one” class of experience that is generally deemed religious, regardless of whether conceptually these things are framed as attributive (Barnard, 1992; Hermans, 2015) or sui-generis events (Eliade, 1960; Pals, 1987; Studstill, 2000). The attribution theory holds that it is the interpretation of a believer that makes an experience religious. Hence, the act of deeming something as “special” and “religious” creates the religious experience. The sui-generis approach claims that it is not the post hoc interpretation that is responsible for the conceptualisation of a religious experience but that there are some inherent qualities in the experience that make for a religious experience. Whenever these phenomenological qualities are present, the experience is a religious one (for a review, consider Taves, 2011). To create conceptual consistency, in this study, we have denoted our empirical experiments to focus on a limited set of religious experiences that are both conceived and experienced in the context of religious worship practices with music. They are collectively described by the participants as sensing the presence of God which is believed to be a pivotal encounter with the divine.

This is in accordance with the Inventory of Nonordinary Experiences (INOE). The inventory is not so strongly interested in a specific definition and operationalisation of an individual religious experience but rather in the value the different theoretical elements have in the context of the framework by and large (Taves, 2020). As such, the present investigation is similarly not interested in making a semantic claim about the term religious and how different believers coincide or differ in their definitions. Moreover, we are interested in the psychological responses around experiences deemed religious from participants with a comparable social background.

Especially in modern societies, the individuality of experiences as a motivator for personal faith has become highly relevant (Luhrmann, 2012). Evangelical Christianity has been a favoured environment for case studies due to its strong focus on subjective experiences and the incorporation of Western individualism. This is a landmark environment for these kinds of studies because of the predominance of such experiences as well as the shared values and ideas attributed to them (cf. Bialecki, 2009; J. Bielo, 2009; J. S. Bielo, 2011; Cannell, 2006; Engelke, 2007; Harding, 2018; Jenkins, 2012; Keane, 2007; Robbins, 2003, 2007). Therefore, the present study has deliberately selected an evangelical sample of Christian believers.

Studying religious experiences is difficult because they consist of phenomenologically unique states that cannot be easily assessed and described by ordinary ethnographic means, which historically has been the predominant way to investigate such occurrences (Bowie, 2003). Hence, whereas the topic remains an interesting subject among anthropologists, the focus on these occurrences as a special state of mind has become more contemplated. This is why not only ethnologists, sociologists, and philosophers have had a say but also, in the last decade, psychologists, biologists, and neuroscientists have become interested in these phenomena as well (Andersen et al., 2014; Azari et al., 2005; Beauregard & Paquette, 2008; Bender, 2010; Braun, 2011a, 2011b; Collins & Scott, 2019; Hordern, 2016; Jensen, 2003; McNamara & Butler, 2013; Paloutzian & Park, 2013; Rosado Nunes, 2001; Schnabel, 2018; Walter et al., 2020).

There is one finding that is especially helpful for empirically studying religious experiences as special states of mind under lab conditions—it is the link between music, worship, and perceived divine encounters (Walter, 2021):

Now there is one context in which such “encounters with the divine” are not only specifically sought after but also frequently reported. This is the context of individual and ritual worship devotions, which is often facilitated by music. It has long been known that music can help with the induction of a religious experience, with some authors calling it a “trigger” for such events.
Music appears to transcend the self which may create a connection to religious thought and emotion (Bubmann, 2009; Schumaker, 1995). Even some of the early “classics” of religious studies scholars have discussed the link between music and mystical as well as religious emotions (James, 1902; Otto, 1917). These are instances where a person feels one with the cosmos or with others, senses a divinity or holiness, and/or loses track of time. Thus, music has also been described as a trigger for extraordinary and religious experiences (Argyle, 2000; Demmrich, 2018; Hills & Argyle, 1998; Schumaker, 1995).

Observations have shown that music in the context of ritual worship is a facilitator for emotion and religious experience (Miller & Strongman, 2002). This holds true both in an individual as well as a congregational setting (Ingalls, 2016). In our current era, the forces of globalisation have created a more unifying culture where especially the younger demographic of believers share the songs that they like and commonly worship to Brehm Center (2017). In this spirit, a whole industry propagating “contemporary worship” has sprung about and has become a billion dollar market (Ingalls, 2018; Porter, 2016).

In a previous qualitative study (Walter, 2021), it has been found that there are global mechanisms at play when it comes to the psychology of religious experience in worship. The so-called “Feedback Loop Model for Religious Worship Experiences” (henceforth just called the Feedback Loop Model) postulates that environmental factors, such as the music being used for the devotional practice, influence the mental stimulation of the believer, which either helps or hinders the person to focus on God. This attentional control is key for achieving a state of mind where the participant feels to have a divine encounter, or in other words, senses the presence of God. If the desired state of mind is achieved, it fosters the mental stimulation, and this in turn may help focus on God even better. Upon successful induction of the experience and consequently a deeper focus on God, the interviewed worship experts reported to gain even more intense divine experiences. The opposite is the case when the desired experience did not set in, which sometimes led to frustration or demotivation, hence lessening the focus on God and hindering the believer to “breaking through” into his presence.

The qualitative Feedback Loop Model provoked us to formulate two hypotheses and test them experimentally: (1) the ability to focus on God is positively associated with how strong the subjective religious experience becomes, and (2) the different musical conditions yield varying degrees in the intensity of the felt presence of God. The latter hypothesis was split into two further assumptions: (1) religious worship songs are associated with stronger divine experiences as compared with secular ones, and (2) if participants can worship to their own selection of songs, the phenomenological experiences are more powerful than if they have no control over the selection.

These hypotheses are a direct consequence of the Feedback Loop Model (Walter, 2021) because it states that conditions aiding in the focus on God may lead to stronger religious experiences. Hence, Hypothesis 1 directly asks if this qualitative assertion can be supported experimentally, and Hypothesis 2 tries to shed more light on these dynamics, namely by asking if the different musical conditions indeed show a difference in the felt presence of God. The two further assumptions (or sub-hypotheses) attempt to shed more light on these dynamics by asking (1) whether the religious content of the conditions is relevant for the experience, and (2) whether it makes a difference for the believers’ focus and experience if the songs are selected by the participants themselves or not. Both hypotheses and assumptions enrich the Feedback Loop Model.

The study of religious and mystical experience is not new (Hood, 1975, 1995; James, 1902), and both cognitive and emotional elements have been discussed (Machoń, 2005). Generally, the discussion has been framed along four disciplines: theology, philosophy, comparative psychology, and measurement-based psychology (Hood & Francis, 2013). In the latter stream of thought, religious experience has also been experimentally linked to music (see Belzen, 2013; Demmrich, 2018). To date, however, not much is known about how the involved cognitive mechanisms work. The effects of music on attentional control and religious experience have only been minimally sketched out and have barely been experimentally studied. Our study adds to the literature by providing further experimental evidence to the understanding on these mechanisms and uses the Feedback Loop Model as an ideal paradigm to theoretically frame these dynamics.

**Materials and methods**

We recruited a total sample of 60 participants from evangelical churches with the requirement that all people were supposed to be proficient worshippers. Christian worship had to be an integral part of their personal faiths, and it was required that they could all induce an experience where they felt the presence of God during the praise sessions under the influence of music. They needed to be confident that they were likely to induce such a phenomenal state of mind in the context of an experiment, and they had to be willing to share such an intimate occurrence with us in a lab setting. The mean age was 27 years (SD = 4.22 years, minimum = 19 years, maximum = 40 years), and the gender ratio was roughly equal with only a slight skew towards the female population (45% male, 55% female). The vast majority was right-handed (87%), whereas likewise a significant majority was highly musical. This was tested by asking them whether they played an instrument at least once a week (70% answered “yes”). The highest education was split evenly across the board (22% had a master’s
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experiment, a hearing test was applied.
graphic variables were covered and upon the start of the
religious experience itself. Furthermore, the key demo-
ationally influenced by the personality structure. This is
because there is some evidence suggesting that personality
items influence a person’s interaction, preferences, and
attentional mechanisms with music (Bonneville-Roussy
et al., 2013; Brown, 2012; Chamorro-Premuzic et al.,
2010; Dunn et al., 2012; Langmeyer et al., 2012; Nusbaum
& Silvia, 2011; Rentfrow et al., 2011; Zweigenhaft, 2008),
but it is not clear yet if it would also covariately influence
the religious experience itself. Furthermore, the key demo-
graphic variables were covered and upon the start of the
experiment, a hearing test was applied.

The experiment itself consisted of a series of songs that
were randomised as to avoid any possible halo effects. For
each song, the participants were asked to engage in wor-
ship and to try to focus on God as best they could. The goal
was to exert a genuine worship experience where the
believers praised God under the influence of music. Each
tune lasted for about 4.5 min and during each one, the sub-
jects had to sit still and let the whole devotional worship
practice occur internally because we wanted to eliminate
any effects that could emerge from differing bodily
engagements.

There were several conditions at play (in a randomised
fashion, Table 1).

During each condition, the participants were asked to
continuously rank with a manual bar slider how strongly
they felt the presence of God at any given moment. The
slider was fixated on their right-hand side, meaning that it
had to be operated with the right hand. They had to engage
in worship and try to connect with God in each condition
anew, even in the secular, the empty, and the 12-tone con-
dition. Hence, the conditions were designed to be maxi-
mally comparable with the main difference being the
selected song. The participants were blind folded during
each condition to reduce the amount of input stimuli. For
this, the participants were able to get accustomed to the
slider before the experiment started by using it with open
and closed eyes until they felt comfortable manipulating it
with closed eyes. In between the conditions, the subjects
had to work on a concentration task where they had to re-
member some letters and were asked whether in a series
of characters the last one was the same as the third-to-last
one. The concentration task ensured that the worshippers
could start each condition anew with a fresh mind-set so
that there were no cognitive or emotional spillover effects
from one condition to the next, making it possible to statistically analyse the different conditions as independent observations. After each condition, the participants had to rate on a separate paper how well they were able to focus on God (on a Likert-type scale from 1 to 4).

The songs were cut at natural breaks and engineered to end at about 4.5 min. The songs that were longer were reduced to this length, and the songs that were shorter were made to start anew with a sound engineering tool so that it naturally sounded like it did not finish at the original end. Eventually, all conditions were made to last for about 4.5 min.

After the data collection, the data were exported from Lab Chart and transformed into a format where they were able to be handled by a standard statistical analytics programme, which in our case was SPSS. Deduced from the theory and the applied hypotheses of our experiments, six consecutive analyses with different analytic measures were performed (Table 2).

A note on the terminology used in this article is advised. In the following pages, the terms “maximal rankings” and “peak experiences” are used synonymously. In the present study, we were most interested in how strong the experience can become and what follows from such a deep religious experience. Because the participants provided continuous ratings on their experience, we selected the maximal value in the ranking of the religious experience. This then served as an indication of the participant’s “peak experience,” which was the highest value of the experience for any given experimental condition. In effect, we had two different kinds of “ratings” that are compared with one another. One of them is associated with the question, “How strongly do you sense the presence of God at the moment?” and the second one is associated with the question, “How strongly have you been able to focus on God during the song you just heard?” To keep these two variables semantically apart and to avoid any confusion, we henceforth refer to the

Table 2. The different analyses performed on the data from the worship experiments.

| No. | Study                          | Analysis                                                                 |
|-----|-------------------------------|--------------------------------------------------------------------------|
| 1   | Exploration                   | The data are analysed on a qualitative level, and it is analysed whether there are valuable and meaningful trends at play. Nonparametric correlations are applied for primary exploratory purposes. |
| 2   | Hypothesis 1: The association between evaluation and experience | Deduced from the Feedback Loop Model in worship (Walter, 2021), we hypothesise that there should be a significant positive relationship from the evaluation’s rating (“How well are you able to focus on God during this condition?”) to the ranking of the currently felt presence of God (indicated with the scroll bar). Spearman’s rho is applied for the main analysis. |
| 3   | Hypothesis 2: Difference in the conditions | In line with the Hypothesis 1, we suppose that there will be a significant difference between the different conditions which can be detected by analysing if the means differ at least between two of the conditions. For this, an analysis of variance (ANOVA) is the favoured method applied. |
| 4   | Hypothesis 2a: Comparing religious with secular conditions | Studies 4 and 5 are moot if there is no significant finding in Study 3. However, whereas Study 3 (Hypothesis 2) can potentially tell us that there in fact is a difference between at least two conditions, it does not tell us which ones actually differ and how so. Hence, a detailed contrast analysis is applied where eventually the religious conditions are discerned from the secular ones. The logic of a contrast analysis works using stepwise two-tailed t tests. |
| 5   | Hypothesis 2b: Comparing given with subjective conditions | Whereas Hypothesis 2a (Study 4) can potentially tell us about a difference between the religious and the secular conditions, it leaves open the question whether there is a significant difference between the given conditions (pre-selected songs by the researchers) and the subjective ones (self-selected songs by the participants which they had to send to the lab beforehand so that they could be integrated in the experimental procedure). Hence, an alternative contrast analysis is performed looking at the difference between the given vs. the subjective conditions. |
| 6   | Mediation and moderation analyses | Three further analyses are performed to better understand the relationship between the focus on God (evaluation) and the religious experience:  
• A mediation analysis  
• (mediator: ability to experience God)  
• A moderation analysis  
• (moderator: importance of worship for one’s faith)  
• A covariance analysis (ANCOVA)  
(covariates: personality dimensions [TIPI]) |

ANCOVA: analysis of covariance; TIPI: ten-item personality index.
first value as “rankings” and to the second as “ratings” (the corresponding questionnaire to evaluate the focus on God is referred as “evaluation”).

Results

Analysis 1: exploration

Figure 1a shows that we were successful in selecting a strong sample of casual worshippers. Many appeared to worship God without music on a very frequent basis but also quite frequently with the help of music. The participants claimed to experience God when worshipping Him with music rather often and no one stated that this never happened. For most of them, worship seemed to be an important and integral part of their personal faiths.

As seen in Figure 1b, when engaging in a devotional worship practice, 46 respondents held that they experienced an emotional reaction. In total, 42 respondents reported that they usually sensed the presence of God, and 41 simultaneously felt very close to Him (almost the same percentage). A third of the participants said that they had a physical sensation when worshipping God (23 participants), and a similar proportion of respondents held that they got happy in the process (22 participants). About a third of them claimed to receive an epistemic gift, namely a message from God (18 participants). Some people reported to get touched in a manner where they got sad because they experience a divine sorrow. This only occurred to three of the participants in the sample.

We see in Figure 2a that the subjective religious song provoked the strongest religious experience, closely followed by the one that was provided to them by the researchers. Next came the worship experience that occurred without a song, which showed higher rankings than the secular songs. For the latter, the subjective songs fared a little better than the pre-selected ones. At the bottom, we found the 12-tone song where apparently it was very difficult for the participants to get into a state where they sensed the presence of the divine. This provided us with a first understanding about the possible order of the experiences in the experimental conditions. Analyses 3 to 5 set out to test which of these differences are in fact significant.

A comparable pattern was visible in Figure 2b. Here, it was seen that the religious songs were the most helpful to focus on God, followed by the empty condition occurring without music. This one, however, had a tremendous variance, suggesting that the believers reacted differently to the condition of worship without music. It seemed that it was somewhat more difficult to focus on God in the secular conditions, and it appeared to be extremely difficult with the 12-tone song.

Nonparametric correlations using Spearman’s rho showed that the mean experience of God during the experimental conditions were negatively correlated with the believers’ extraversion, \( r_s(347) = –.132, p = .014 \), and agreeableness, \( r_s(353) = –.201, p < .001 \). Although both genders reported to have divine experiences, females had a higher proclivity to exert a deeper experience, \( r_s(353) = .132, p = .013 \).

Analysis 2: Hypothesis 1—the association between evaluation and experience

Our Hypothesis 1 was interested in whether there was an association between how well a person could concentrate and focus on God (here referred to as “evaluation”) and the eventual religious experience when engaging in a devotional worship practice. The qualitative findings in the Feedback Loop Model (Walter, 2021) suggested that this was the case, and we set out to test it experimentally. For this, it made sense to look at the association between the maximal values of the rankings (the “peak experiences”) and compare it with how well they could focus on God for each condition (the ratings of the “evaluation”).

We detected a positive correlation of the peak experience with the evaluation of the focus on God during each experimental condition, namely the subjective secular song \( s_s(59) = .600, p < .001 \), the religious subjective song \( s_s(59) = .575, p < .001 \), the secular given condition \( g_s(59) = .489, p < .001 \), the religious given one \( g_r(59) = .392, p = .002 \), and even in the empty condition where no song was played, \( r_s(59) = .371, p = .004 \). Only the distraction condition, which was the 12-tone song, yielded no significant correlation by conventional standards, \( r_s(59) = .225, p = .087 \).

Overall, due to the main associations displayed in the nonparametric correlations, Hypothesis 1 can be accepted.

Analysis 3: Hypothesis 2—difference in the conditions

In our Hypothesis 2, we asked if there were statistical differences between the experiences in the conditions. For this, we compared the sample means of the maximal rankings (the “peak experiences”) through a unifactorial analysis of variance (ANOVA). The maximal rankings were taken as the dependent variable, and they were tried to be explained by the fixed factor that consisted of the experimental conditions.

There was a significant difference in the peak experiences of the six worship conditions, \( F(5, 348) = 27.8, p < .001 \). The statistical model had an average-sized explained variance of around 30%, \( \eta^2 = .286, 95\% \) confidence interval (CI) = [0.201, 0.349].

The model did not depict which two conditions in fact significantly differed and how the individual conditions contributed to the overall dynamics. Hence, a subsequent planned contrast analysis was performed, attempting to
Hypotheses 2a and 2b. Because Levene’s test on the model was significant, $F(5, 348) = 6.421, p < .001$, it meant that the contrasts were to be worked out under the assumption of unequal variance.

When observing the cumulative statistical model of the ANOVA, Hypothesis 2 can be accepted. There was, however, the need for further analyses in this area (hence Hypotheses 2a and 2b).
Figure 2. (a) Maximal rankings of how strongly the participants sensed the presence of God during each condition through the scroll bar visualised in box plots. (b) After each condition: evaluation of how strongly the participants were able to focus on God visualised in box plots. Figure 2a: Continuous values from 0 to 10 (0 = no presence felt, 10 = divine presence felt very strongly). Figure 2b: Discrete values from 1 to 4 (1 = I could not concentrate on God at all, 4 = I was able to concentrate on God very well).

**Analysis 4: Hypothesis 2a—comparing religious with secular conditions**

The means between the peak experiences differed more or less depending on the worship conditions, see Figure 3. Whether there were significant differences under the observation of the total variance of each condition could be detected either through post hoc tests or through a planned contrast analysis. Because we already had theoretical assumptions of how the conditions might compare
to one another based on the Feedback Loop Model and because we wanted to gain more information than was possible with classic post hoc tests, planned contrasts were applied.

Hypothesis 2a made the claim that there were significant differences between the religious and the secular songs. Relevant splits in the variance of the model were performed to analyse the different groups, see Figure 4.

First, the analysis started out with the initial position, which was the variance of the model as a whole. This was already dealt with under the headings of Hypothesis 2 where the ANOVA was applied. The first contrast discerned the distraction condition (12-tone song) from the other songs where we could assume that the believers had no trouble focusing on God. The second contrast split the empty condition from the remaining variance. The empty condition was a 4.5-min section where no song was played but where the participants were still asked to focus on God and worship him, trying to make the same connection with God as with the other songs. Contrast 2 could tell whether the empty condition differed from the focused songs. The third contrast split the religious from the secular songs, giving us the answer to Hypothesis 2a. Within the remaining groups (religious vs. secular songs), Contrasts 4 and 5 provided information whether it made a difference if the songs were pre-selected or self-selected.

In the planned contrast analysis (see Figure 4), there were two significant differences, namely in Contrasts 1 and 3. Contrast 1 showed that the peak experience was significantly different between the distraction condition (12-tone song) and the conditions where participants could be more focused on God (empty, Rs, Rg, Ss, Sg), $T(135) = 12.5, p < .001, d = 6.4$. Cohen’s $d$ implied that the experience was not as intense in the 12-tone song as with the other conditions. Likewise, we learned from Contrast 3 that the religious songs yielded deeper religious experiences than the secular ones, $T(226) = 7.1, p < .001, d = 2.0$. Contrasts 4 and 5 were nonsignificant, which implied that there were probably no significant differences between the given and the subjective songs. However, this had to be further tested in the alternative contrast analysis with Hypothesis 2b.

The first contrast analysis demonstrated that Hypothesis 2a can be accepted.

**Analysis 5: Hypothesis 2b—comparing given with subjective conditions**

Although within the religious and secular conditions it did not make a difference if the songs were given or subjectively selected, one may ask whether this would also be true the other way around. This would mean that the given and the subjective conditions were compared with one another before they were split into religious and secular ones. This was tested with Hypothesis 2b. The main difference here was that Contrast 3 did not compare religious versus secular songs but it compared given vs. subjective ones. Consequently, Contrast 4 compared secular subjective with religious subjective songs (Ss vs. Rs), and Contrast 5 compared secular given with religious given songs (Sg vs. Rg).

For this, an alternative contrast analysis was performed whereas Contrasts 3, 4, and 5 were modified (there was no need to make changes at the level of Contrasts 1 and 2). Hence, the weights of the contrasts from Contrast 3 upwards were changed and the steps rearranged so that the contrast coding changed as well.

Results showed that there was a significant difference in the maximal experiential values (the rankings of the peak experiences) of Contrasts 1, 4, and 5.

The results showed that there was a significant difference in the maximal values for the religious experience in Contrast 1, $T(135) = 12.5, p < .001, d = 6.4$. Contrast 4, $T(112) = 5.1, p < .001, d = 1.0$, and Contrast 5, $T(116) = 5.0, p < .001, d = 0.9$. This corroborated the finding from before that there was a positive relationship with the experience for the religious worship songs, but it did not seem to make a significant difference if the songs were selected by the participants themselves or if they were pre-selected for them. Hypothesis 2b therefore must be rejected.

**Analyses 6a to 6c: mediation, moderation, and covariance analyses**

There appeared to be a positive association between the evaluation (focus on God) to the maximal rankings (peak religious experience). The three following analyses (6a–6c) attempted to clarify if this correlation could be explained by further associations (see Figure 5). Upon the foregoing theoretical reflections, they tried to answer the following questions:

Analysis 6a: Is the association mediated by the general ability to focus on God? (Hence, a mediation analysis was applied).

Analysis 6b: Is the association moderated by how important worship is for one’s personal faith? (Hence, a moderation analysis was applied).

Analysis 6c: Is the association further explained by the personality structure of the believers? (Hence, an analysis of covariance was applied).

**Analysis 6a: mediation analysis.** The mediation analysis looked at the interaction between the focus on God (the “evaluation”) and the general ability to experience God in worship. The “ability to experience God” was a variable that stemmed from the questionnaire the participants filled out before the experiments began. It asked how much they
generally sensed the presence of God in their everyday lives. These associations were then projected onwards to the peak experience during the worship practice by means of regression analyses. In other words, this mediation analysis asked if the religious experiences in our study due to a function of their attentional control (“focus on God”) could be explained by how strongly they were usually able to experience God. The analyses were performed through an SPSS toolbox called PROCESS by Hayes and Rockwood (2020).

The sample was bootstrapped 5,000 times, and the regression models eventually showed a significant direct
association, $R^2 = .06$, $F(2, 351) = 12.01$, $p < .001$, but a nonsignificant indirect relationship consisting of the association between the evaluation and the ability to experience God, $R^2 = .002$, $F(1, 352) = .75$, $p = .386$, and between the ability to experience God and the peak experience, $R^2 = .06$, $F(2, 351) = 12.01$, $p = .323$. This means that there was no mediation effect detectable in our model.

Analysis 6b: moderation analysis. Because there was a clear association between the focus on God and the experience, perhaps it was moderated by the fact that worship may be important for believer’s faith. The question of how important worship is to a believer was also asked in the questionnaire that was filled out before the experiments started.

Nonparametric correlational analyses confirmed the direct association, $rs(353) = .238$, $p < .001$, and also the association between the focus and the importance, $rs(412) = .255$, $p < .001$, however not between the importance and the maximal rankings, $rs(353) = -.016$, $p = .767$. Hence, the moderation effect overall was questionable. Using PROCESS (Hayes & Rockwood, 2020) which ran a series of regression analyses, it was seen that neither the association between importance and the experience, $R^2 = .071$, $F(3, 350) = 8.930$, $p = .354$, nor the effect of the interaction term (which was a function consisting of evaluation and importance) was significant, $R^2 = .071$, $F(3, 350) = 8.930$, $p = .374$. Hence, there was no significant moderation effect at play.

Analysis 6c: covariance analysis. It was interesting to understand how much of the variance in the association between the focus on God (the “evaluation”) and the experience (the “maximal rankings”) may be due to the personality structures of the worshippers. As such, an analysis of variance could be enriched by inserting covariates that would co-explain the associations at hand and the personality variables from the Big 5 (as discussed before) therefore came as valuable covariates.

As such, an analysis of covariance (ANCOVA) was performed with the personality dimensions from the TIPi as covariates. As a precursor, an ANOVA of the maximal values grouped by the evaluation demonstrated significant statistical differences, $F(24, 329) = 3.0$, $p < .001$. Because the Levene test was marginally significant, $F(24, 329) = 1.6$, $p = .036$, Welch and Brown-Forsythe tests were applied that do not require the homogeneity assumption. They demonstrated that there was a significant relationship—Welch: $F(24, 73.6) = 6.2$, $p < .001$; Brown-Forsythe: $F(24, 292) = 3.4$, $p < .001$—and analysis of covariance was thus not performed with a regular ANCOVA but with two more adequate measures given the assumption of non-homogeneity. The first of these measures was the omnibus test with a likelihood-ratio chi-square (dependent variable: peak experience [also known as “maximal rankings”], model: evaluation [also known as “focus on God”], covariates: personality dimensions [from the Big 5]), $X^2(29) = 88.3$, $p < .00$. It confirmed that there were significant associations at play. They were disentangled by the Wald Chi-Squared test, which showed that the association between the focus on God and the religious experience in worship was also influenced by three personality dimensions. These were agreeableness, $X^2(1) = 7.4$, $p = .006$, emotional stability, $X^2(1) = 4.3$, $p = .038$, and openness to experiences, $X^2(1) = 4.9$, $p = .027$.

In other words, people with significant attentional control, who thus have a deeper religious experience, are most likely to get along with others, do not have a neurotic constitution, and are generally open to experience something new.

Discussion

To summarise, over the span of these six analyses, we discovered some interesting relationships about the nature of religious experiences during worship with music. These findings were by and large intuitive. It seemed like most respondents in our sample appeared to experience God during devotional practices in an emotional fashion, whereby sensing his presence and feeling close to him was a key feature thereof. Sometimes, in a little more than one third of the cases, there were also physical sensations accompanying the experience, and there was the perception of receiving epistemic access to knowledge one would otherwise not have. Mostly, sensing the divine was attributed as a pleasant and happy occurrence, whereas in minor cases, there was a melancholy that may have been

![Figure 5. Conceptual diagram of (a) the mediation analysis, (b) the moderation analysis, and (c) the covariance analysis.](image-url)
associated. Perhaps some believers may have felt sorry that not all their peers had the privilege to be equally close to God and therefore they got a little sad—but we did not further investigate on these dynamics. Females reported somewhat deeper experiences during our experiments than males.

In the present research, we were able to test and validate the global mechanisms in worship stemming from the Feedback Loop Model (Walter, 2021), which earlier predicted that the focus on God played a significant role in achieving a divine experience in worship with music and vice versa. The empirical validation came from being able to accept our Hypothesis 1 on the grounds that there were significant positive associations between the evaluation of their focus on God and the eventual experience during each condition. In other words, the better one was able to concentrate on God during the worship ceremony, the deeper the divine experience where his presence was felt became.

This finding was further strengthened by the contrast analysis, which illustrated that it was significantly more difficult to dive into such a religious experience during the distraction condition (the 12-tone song). There was an influence of whether the songs were religious worship songs or secular ones that had no sacral background concerning their lyrics. A worship song with deliberately religious lyrics worked a lot better for getting into an experience with the divine than a song with no intrinsic religious value. However, contrary to what was expected, it did not make a huge difference if the songs were self-selected and provided by the participants themselves as opposed to whether they were pre-selected by the researchers. There was plenty of research done beforehand to pre-select songs that fit well with the recruited sample. This suggests that if the fit between the self-selected (subjective) and the pre-selected (given) songs was high enough, the experience did not necessarily differ.

The positive association between the focus on God and the peak experience during worship neither appeared to be mediated by the general ability to experience God nor was it moderated by the importance of worship for one’s faith. It was, however, co-dependent on three dimensions of a believer’s personality structure, namely agreeableness, emotional stability, and openness to experience.

These findings strengthen existing concepts and add new knowledge to the present literature. Qualitative research has highlighted that the sensation of God’s presence during worship rituals may be strongly influenced by the attentional control, namely the ability to focus on God (Walter, 2021). Our statistical analyses now corroborate these findings as there was a direct and significant correlation between the two variables. It has also been known that music can trigger spiritual and religious experiences (Machoń, 2005) and that a vital predictor is the presence of positive emotions that is felt while listening to the music (Demmrich, 2018). However, it has been unclear what role the music plays, what kind of songs may be most helpful, how it is connected to attentional control, whether the experience is strongest when believers can worship to their own selection of music, and if the association could be explained by mediating, moderating, or covariate relationships such as a believer’s personality structures. In these areas, the present study makes some interesting contributions.

**Conclusion, limitations, and future research**

Consonant with previous studies, our analyses showed that music can help facilitate a believer’s focus on God, which in turn may be associated with a person diving into a deep religious experience, here operationalised as sensing God’s presence. Depending on the respective song, music may either help or hinder the induction of such an experience. However, we did not find any evidence that music provided deeper experiences than worship that was done without the help of music because our contrast analysis did not find a difference between the two. We have speculated that religious songs could aid the attentional control because they may supplant a worshipper’s dogmatic faith concepts, which are both cognitive elements that eventually might contribute to an inherently special emotional state of mind. The present data showed that indeed religious songs worked better in facilitating the experience than secular songs do, even though the participants set out to worship to both types of music. Although we assumed that self-selected songs would work better in the induction of deep experiences of the divine, we found no difference between the pre-selected songs by the research team and the self-selected ones by the participants. This may, however, have been due to the fact that intense research was done in the churches of the recruited cohort before the study started so that adequate songs would be selected. It might hence be the case that this insignificant association could be a testament to the fact that we have pre-selected the songs well. Eventually, it was seen that agreeableness, emotional stability, and openness to experience were psychological facilitators of a religious experience. These are new findings that may add valuable insight to the body of literature.

It is generally difficult to study religious experiences on an empirical level—let alone by clear-cut experimental measures in the lab. One cannot invite a believer to the lab, hook him or her up to a machine for particular measurements, and then count to three: “now, give me a religious experience.” This is not how it works. Such occurrences start with the problem of what people deem to be a religious experience and it gets further exacerbated by the difficulties of how to induce, experimentally manipulate, and then measure the event. At first sight, it appears like such phenomenological experiences might be beyond the reach for empirical and experimental research because they seem
to be too spontaneous in nature to capture and analyse in the lab.

We have tried to make this problem manageable by constructing variables that can be manipulated in the lab, which at the same time count as proxies for the experience of interest in question. This can be achieved through the incorporation of worship practices with the help of music. Music is a feature that can be handled eloquently in the lab: its duration, start, end, and sequence can be directed strategically. At the same time, worship has the ideal feature that it acts as a method for many believers to get into a connection with God, and it often occurs with music. This is why we have narrowed our experimental scope to study the religious experience in the context of worship and which is at least partly governed by the music involved. The divine experience itself has been operationalised to denote the state of mind where the believer senses the presence of God and thus feels close to him during the procedure. As such, we have been able to construct an experimental design that circumvents the classical problems in the study of these experiences, which so often hinders researchers to actually study such phenomena. That being said, we have made some interesting discoveries in the lab, but they also have some limitations.

We have tried to capture a genuine religious experience that can be handled in the lab. Although the experiments were successful, the stringent operationalisation may count as the biggest limitation in this line of research. We have studied religious experience by asking about the sensation of God’s presence, although it has been argued that there is a panoply of different phenomenal occurrences that may be deemed religious—e.g., sensory experiences (auditory, visual, touch, smell), emotions, extrasensory ones, cognitive, and affective features (Hardy, 1979; James, 1902; Taves, 2005, 2009, 2020; Taves et al., 2019; Walter, 2021).

Apart from the difficulty concerning the operationalisation of a construct as complex as religious experience, a major limitation in the present study was the strong focus on (evangelical) Christians. This is not a problem in itself, but we cannot from this make any claims about the generalisability of the dynamics we discovered to a markedly distinct population. It is possible that a non-Christian sample would react differently to the experiment and would yield different results. However, the conceptual difficulty is broader than the differential reactions to the experimental conditions. It lies in the concern that other denominations would have a vastly different conceptualisation of what believers deem to be a religious experience.

Hence, future studies working on the empirical dimensions of religious states of mind should try to work on more interreligious analytics where more than just an evangelical Christian sample is tested. However, this needs to take the problem seriously of how individual groups conceptualise the idea of religious experiences. Likewise, perhaps other researchers would find a way to experimentally test further types of experiences that are deemed religious. There have been attempts to do so (e.g., Demmrich, 2018), but there is a long way to go because to date this is still an understudied topic.

We have now seen that the present experimental design works quite well for studying the experience of sensing the presence of God in the lab. This means that future studies could add biometric measurements to the conditions for analysing the biological correlates of such divine experiences—a topic currently gaining popularity.

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Note

1. The degrees of freedom are constituted by the 60 participants minus missing values and multiplied by the six experimental conditions because they are treated as independent observations.

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