[This manuscript was accepted for publication in Emotion]

Bored Like Hell:
Religiosity Reduces Boredom and Tempers the Quest for Meaning

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Word count: 14,035

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All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the studies. The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. All authors consented to the submission of this manuscript. Correspondence concerning this article should be addressed to Wijnand A. P. van Tilburg, Room 2.12, Addison House, Guy's Campus, King's College London; London, United Kingdom, Email: Wijnand.van_Tilburg@kcl.ac.uk

Abstract

Boredom involves a lack of perceived meaning. Religiosity, on the other hand, offers people a sense of perceived meaning. Accordingly, we proposed that by imbuing a sense of meaningfulness religiosity leads people to experience less boredom. Furthermore, we hypothesized and tested that by reducing boredom, religiosity indirectly inhibits the search for meaningful engagement. In Study 1, following boring tasks, religious people experienced lower levels of boredom and were less motivated to search for meaning than non-religious people. We found in Study 2 that religious (vs. non- or less religious) people reported higher perceived meaning in life, which was associated with a reduced tendency to feel bored, and with a reduced need to search for meaning in life. Study 3 confirmed that the meaning in life associated with religiosity was associated with reduced state boredom. Religious participants were again less inclined to search for meaning, which was explained by the relatively low levels of boredom that religious (vs. non-religious) participants experienced.

Keywords: boredom, religion, meaning, self-regulation, existential psychology

Bored Like Hell: Religiosity Reduces Boredom and Tempers the Quest for Meaning

"If I were to imagine Hell, it would be the place where you were continually bored" (Fromm, 1963/2004, p. 150)

Boredom is "the aversive experience of wanting, but being unable, to engage in satisfying activity" (Eastwood, Frischen, Fenske, & Smilek, 2012, p. 482). It is a ubiquitous (Larson & Richards, 1991), comparatively distinct (Van Tilburg & Igou, 2017a), and an unpleasant emotion (Smith & Ellsworth, 1985). Boredom is characterized by low physical arousal (Smith & Ellsworth, 1985; cf. Merrifield & Danckert, 2014), disengagement, lapsed attention (Eastwood et al., 2012), and the strong desire to change the current situation (Van Tilburg & Igou, 2012). It involves a perceived lack of purpose and challenge (Fahlman, Mercer, Gaskovski, Eastwood, & Eastwood, 2009; Van Tilburg & Igou, 2012), and prompts a search for meaningful engagement (Van Tilburg & Igou, 2011b, 2016).

Religious beliefs—"systems that suppose the existence of supernatural entities capable of effecting changes in the natural world" (Vail, Rothschild, Weise, Solomon, Pyszczynsky, & Greenberg, 2010, p. 84)—offer people a perceived sense of meaning. By offering perceived meaning (Steger & Frazier, 2005; Steger, Frazier, Oishi, & Kaler, 2006), religion mitigates the impact of meaning-threats such as mortality salience (Jonas & Fischer, 2006) and fear of death (Soenke, Landau, & Greenberg, 2013). We investigated if, by imbuing life with a sense of meaning, religious beliefs lead people to feel generally less bored. Furthermore, we hypothesized that by reducing boredom, religious beliefs would render meaning search less necessary. We will first review relevant literature on boredom and religiosity before setting out our approach.

The Good, the Bad, and the Bored

Boredom is associated with, and can be a precursor to, a substantial amount of undesirable psychological and physical variables, namely aggression, depression, anxiety, pathological gambling, unhealthy eating behavior, risk taking, attention failures, impulsiveness, disengagement, physical health-symptoms, and many more (Eastwood et al., 2012; Moynihan et al., 2015; Moynihan, Igou, & Van Tilburg, 2017a; Vodanovich, 2003). The picture that this field of research has established is clear: Boredom permeates many life

domains and its consequences range from mildly discomforting to highly problematic (e.g., Eastwood et al., 2012; Van Tilburg & Igou, 2012).

One might be tempted to conclude from the above evidence that boredom is a (proverbial) curse. Indeed, a number of prominent philosophers suggested as much (for a review see Svendsen, 2005): Heidegger accused boredom of being the monstrosity within our *Dasein* (*existence*; cited in Thiele, 1997, p. 491); Schopenhauer perceived people's capacity for boredom as proof of life's emptiness and lack of value (1851, trans. 2009, p. 357); Kierkegaard considered boredom to be "the root of all evil" (cited in Healy, 1984, p. 25); Sartre felt that boredom was a "leprosy of the soul" (Kuhn, 1976; Martin, Sadlo, & Stew, 2006, p. 195); and Fromm believed that boredom is one of the greatest evils of life (1955, p. 202), one of life's greatest tortures, and a hallmark of Hell (1963/2004, p. 150).

Fortunately for humanity, these rather bleak accounts are not entirely precise: empirical examinations indicate that boredom also bears (proverbial) blessings. Notwithstanding the undesirable correlates and consequences that it can have, boredom serves important and adaptive psychological functions. One of these is that boredom sets off a search for meaningful engagement (Van Tilburg & Igou, 2012). In the words of Barbalet (1999), boredom "emotionally registers an absence of meaning and leads the actor in question towards meaning" (p. 631). Thus, boredom signals a lack of meaning, and triggers the pursuit towards a more meaningful activity.

Attesting to the proposition that boredom signals a lack of meaning, a distinguishing characteristic that sets the experience of boredom apart from other negative emotions (e.g., sadness, anger, frustration) is that it features thoughts about an acute lack of meaning in activity (Van Tilburg & Igou, 2012). Furthermore, recent research found that lay conceptualizations of boredom, state experiences of boredom, and individual differences in the tendency to become boredom could be distinguished from those of other negative emotions based on the appraised lack of meaning that boredom involves (Van Tilburg & Igou, 2017a). In addition, Fahlman and colleagues (2009) found that a lack of perceived meaning in life predicted the occurrence of boredom on future occasions, as did experimentally manipulated meaning in life. Furthermore, Moynihan and colleagues (2015)

found that a lack of perceived task-specific meaning involves boredom. Consistent with the proposition that boredom triggers the pursuit towards a more meaningful activity, boredom subsequently increases a search for meaningful engagement (Van Tilburg & Igou, 2012) and a search for meaning in life (Van Tilburg et al., 2013).

The quest for meaning that boredom inspires has a range of impacts, both desirable and undesirable. For example, boredom increases creative task performance (Gasper & Middlewood, 2014; Mann & Cadman, 2014), a likely marker of creating new meaning. Direct tests of boredom's meaning-making potential confirm this picture: Experimentally induced boredom can lead to in-group favoritism and outgroup derogation (Van Tilburg & Igou, 2011b), fosters commitment to political ideologies (Van Tilburg & Igou, 2016), and breeds nostalgic reverie (Van Tilburg et al., 2013), responses that can each provide a sense of meaning (Castano, Yzerbyt, & Paladino, 2004; McGregor, Prentice, & Nash, 2013; Routledge, Wildschut, Sedikides, Juhl, & Arndt, 2012). Furthermore, people who are more prone to boredom show increased commitment to heroes (Coughlan, Igou, Van Tilburg, Kinsella, & Ritchie, 2017), which offer people a sense of direction and purpose (Kinsella, Ritchie, & Igou, 2015a, 2015b). Indeed, the enhanced search for meaning that boredom breeds mediates these various effects (social identity, nostalgia, political ideology, hero affirmation; Coughlan et al., 2017; Van Tilburg et al., 2013; Van Tilburg & Igou, 2011b, 2016). In all, the emerging research on boredom portrays it neither exclusively as curse or blessing. By facilitating a search for meaning in one's activities or life in general, boredom can be functional. Whether or not this process improves the situation for people depends on the availability and attainability of courses of meaningful action (Eastwood et al., 2012; Elpidorou, 2014; Van Tilburg & Igou, 2017b). In this sense, boredom acts as Socrates' proverbial gadfly, whose unpleasant stings can trigger efforts towards finding new purpose.

Religion and Meaning

Religion is a dominant feature of human culture: In 2010, an estimated 83.6% of people worldwide described themselves as religious (Pew Research Center, 2015). In fact, only 16.4% of the world population is estimated to describe themselves as unaffiliated, which includes, but is not strictly limited to, agnostics (people who feel that "nothing is known or

can be known of the existence or nature of God" [or gods], Oxford Dictionary, 2016) and atheists (people "disbelieving or lacking belief in the existence of God" [or gods], Oxford Dictionary, 2016). Clearly, religion is a highly pervasive aspect of human society (Gebauer, et al., 2017).

Religions differ in their doctrines and, likewise, individual believers differ in specific interpretations (e.g., Richards & Bergin, 2000). However, from a psychological and sociological point of view, religious belief can be characterized as serving a number of typical functions. Batson and Stocks (2004), for example, group the functions of religious belief into physiological needs (e.g., dealing with disease, utopian visions of plenty), safety needs (e.g., protection against evil), belongingness and love (e.g., being loved by a deity, being a chosen people, belonging to a religious community; see also Ysseldyk, Matheson, & Anisman, 2010), esteem needs (e.g., worth, significance to the world, humility), self-actualization (e.g., creativity, self-transcendence), and epistemic needs (e.g., making sense of the universe). Religious practice offers various paths towards satisfying these needs (e.g., prayer, meditation, ritual; Gervais & Norenzayan, 2012; Richards & Bergin, 2000).[1]

One notable feature of religiosity particularly relevant to the current research is that it can offer people an understanding of life (Batson & Stocks, 2004) and a sense of purpose (Donahue, 1985). These sources of meaning, which religiosity offers to people, likely stem from multiple causes. First of all, many religions entail a prospect of life after death, which offers belief in immortality (Solomon, Greenberg, & Pyszczynski, 2004). Second, some religions endorse the belief that their god(s) has a significant purpose for individuals (Ferris, 2002). Furthermore, religiosity may offer a sense of social identity (Ysseldyk et al., 2010), which in turn can enhance perceived meaning in life through guiding norms, values, and behavior that allow people to make sense of how they should live their lives and treat others (e.g., Castano et al., 2004; Van Tilburg & Igou, 2011b). In addition, the sense of

[1] Whether religion successfully fulfils these needs is another matter; for example, a meta-analysis by Masters and Spielmans (2007) of the effect of distant intercessory prayer found no discernable benefits on health.

belongingness that religiosity can provide (King, 2003) could be a basis for perceived meaning in life (Moynihan, Igou, & Van Tilburg 2017b; Heine, Proulx, & Vohs, 2006).

Indeed, research confirms that religiosity is associated with a heightened sense of meaning in life (Steger & Frazier, 2005). It is likely that this heightened sense of meaning in life encourages religious people to perceive activities as more meaningful. People who attribute greater meaning to life in general subsequently find more meaning in specific elements of their lives (Van Tilburg & Igou, 2011a), and identifying an overarching purpose infuses specific activities with perceived meaning (Van Tilburg & Igou, 2013). As an example, perhaps a religion inspired 'Protestant work ethic' ("achieving personal discipline through the scrupulous use of time and strict self-denial of luxury, worldly pleasure, ease, and so on"; Miller, Woehr, & Hudspeth, 2002, p. 3) or humility (Richards & Bergin, 2000) may cast specific tedious activities as serving the overarching goal of persistence under strain, and hence might make people judge such activities as relatively meaningful and therefore less boring.

The proposition that religiosity is associated with lower levels of boredom is novel; however, it is consistent with existing research on the psychological processes involved in attenuating threats to people's sense of self and meaning (for reviews, see Heine et al., 2006; Proulx & Inzlicht, 2012). Early research on the role of psychological resources to self-threats has, for example, documented that self-affirmations increase self-strength and self-image (e.g., Steele, 1988; Steele, Spencer, & Lynch, 1988), and reduce dissonance (Steele & Liu, 1983; Heine & Lehman, 1997). More recent research shows the impact of mortality salience—a profound meaning-threat—is subdued when people first affirm the self (e.g., Schmeichel & Martens, 2005) and other sources of meaning (e.g., Harmon-Jones, Simon, Greenberg, Pyszczynski, Solomon, & McGregor, 1997), including religious beliefs (Jonas & Fischer, 2006; Soenke et al., 2013). Specifically, religious beliefs can offer a comprehensive framework through which people can make sense of the world they live in (e.g., Heine et al., 2006), for example by explaining its alleged creation and the significance of individuals that live in it (Richards & Bergin, 2000). Other comprehensive systems of belief can also offer a sense of meaning, such as cultural worldviews (e.g., Greenberg et al., 1997), or political

ideologies (Van Tilburg & Igou, 2016). While religion is clearly not the sole source of perceived meaning in life, it is particularly interesting given the central role of supernatural beliefs, and given that it is an ancient, widespread, and vastly influential phenomenon that profoundly affects society and the individuals in it.

The Present Research: Religion, Meaning, and Boredom

Religion offers people a sense of meaning in life (Batson & Stocks, 2004; Steger & Frazier, 2005). Conversely, boredom is an experience that involves lack of meaning and that triggers a search for meaningful engagement (Barbalet, 1999; Fahlman et al., 2009; Van Tilburg & Igou, 2011b, 2012, 2016; Van Tilburg et al., 2013). Accordingly, we proposed that religiosity imbues life with meaning, which in turn makes religious people less bored when performing tasks. Furthermore, whereas dull activities tend to intensify a search for meaning through boredom, religiosity possibly makes this psychological repair process obsolete, given that there is less of a need for meaning repair when boredom is reduced. Effectively, we hypothesized that religiosity reduces levels of boredom, which in turn reduces search for meaning. This proposed role of boredom is important: While, overall, religiosity does not seem to be associated with less or more search for meaning (Steger et al., 2006), we suggest that religiosity nonetheless *indirectly* lessens a search for meaning 'by virtue' of lowering boredom, placing boredom at a pivotal position in the link between religion and search for meaning.

Besides testing if boredom plays a role in the process through which religion relates to people's search for meaning, our research also takes a novel approach to the study of boredom's existential qualities. Prior research indicates that boredom can cause in-group favoritism, nostalgic reverie, more extreme political ideologies, hero idolization, and prosocial tendencies, each at least partly motivated by the attempt to restore a sense of meaning in the face of boredom (Coughlan et al., 2017; Van Tilburg & Igou, 2011, 2016, 2017b; Van Tilburg et al., 2013). Here, we turn the tables around: Instead of testing if boredom causes behavior that offers meaning, we test if a source of meaning (i.e., religion) is associated with lower levels of boredom. To our knowledge, it is the first time that levels of

boredom have been examined as a function of individual differences in religiosity and its role as source of meaning.

In summary, we formulated and tested four hypotheses. Hypothesis 1 (H1): Religious people experience less boredom compared to non-religious (or less religious) people. Hypothesis 2 (H2): Religious people experience less boredom, and because they are less bored they exhibit less search for meaning. Effectively, the relationship between religiosity and meaning search is an indirect association where, *through boredom*, religiosity is negatively associated with meaning search. Hypothesis 3 (H3): Religious people perceive life as more meaningful and this mediates the negative association between religiosity and boredom. Integrating these predictions, we proposed a *sequential* indirect effect, reflected in hypothesis 4 (H4): Religious people perceive life as more meaningful, which is, in turn, associated with less boredom, and subsequently less inclination to search for meaning (i.e., through presence of meaning in life and boredom).[2] We tested the relationship between religiosity, meaning, and boredom in three studies.

Study 1, tested hypotheses 1 and 2; Study 2 and 3 tested all four hypotheses. All studies operationalized religiosity at the level of individual differences. Perceived meaning in life, included in Study 2 and 3, was likewise operationalized as individual difference. In Study 1 and 3, we operationalized boredom and the search for meaning at state level (e.g., experienced boredom, momentary inclination to search for meaning); Study 2 operationalized boredom and meaning search at the level of individual differences instead. While we were primarily interested in boredom and meaning search at state level, operationalizing them as individual differences in Study 2 allowed us to test the generalizability of results across

[2] Following Hayes (2009) and Mathieu & Taylor (2006), we refer to indirect effects (or associations) when there is only an indirect effect of an independent variable on a dependent variable through a mediating variable and no total effect of the independent variable on the dependent variable; mediated effects additionally require this total effect. Thus, all mediated effects are also indirect effects, but not all indirect effects are mediations. Accordingly, H2 and H4, which predict indirect effects, do not anticipate a total effect of religiosity on meaning search. However, H3, which specifies a mediated effect, does predict a total effect of religiosity on boredom.

measurement levels, and to connect the findings to literature on boredom proneness (e.g., Vodanovich, 2003) and people's search for meaning in life (Steger et al., 2006).

Study 1

In Study 1, we exposed religious and non-religious participants to an experimental boredom induction. After this task, we measured experienced (i.e., state) boredom as well as people's (state) search for meaning—operationalized as the inclination to engage in meaningful activity. Study 1 combined two independently collected samples—labeled Sample A and Sample B—that employed identical methods, with the exception that we added a condition featuring particularly low boredom in Sample B.

We proposed that religiosity reduces boredom; that is, those who possess religious worldviews would be less bored after the boredom induction task due to the heightened sense of meaning in life that religious people possess. Accordingly, we predicted that religious people would feel less bored compared to non-religious people (H1).

We included tasks that we expected to elicit different levels of boredom (2 levels in Samples A, 3 levels in Sample B) to verify that the proposed impact of religiosity is not limited to particular levels of boredom but instead generalizes across less and more boring tasks. Based on our proposition that religious people are less likely to get bored, we predicted that the inclination to search for meaning—a consequence of boredom (e.g., Van Tilburg & Igou, 2011, 2016)—would likewise be lower for religious than for non-religious people. Because we hold boredom responsible for initiating this search for meaning, we proposed that the relationship between religiosity and meaning search would be at least in part attributable to experienced levels of boredom, thus represented as an indirect effect of religiosity on meaning search through boredom (H2).

Method

Participants and design. We recruited 514 participants (222 men, 289 women, 3 genderqueer; M_{age} = 37.39, *SD* = 11.99; 275 Christians, 107 Agnostics, 76 Atheists, 11 Buddhists, 6 Jews, 5 Muslims, 2 Hindus, 32 other/unspecified). This overall sample combined two data collection sessions (Sample A: n = 222, Sample B: n = 292; mostly residing in the USA). The study was administered online at www.MTurk.com. Sample B

constituted a replication of the effects of Study A with a larger sample size and a third task condition.[3] The study followed a 2 (religiosity: religious, nonreligious) × 2 [or 3] task (very low boredom [Sample B only], low boredom, high boredom) × 3 (Sample: A, B) between-subjects design. The overall sample size yields corresponding power in excess of $(1 - \beta) = .95$, for effects of $\eta_p^2 = .03$ ($\alpha = .05$, two-tailed) in the corresponding design. Post-hoc estimated power for detecting indirect effects with a single mediator (Schoemann, Boulton, & Short, 2017) was $(1 - \beta) = 0.90$ (1,000 replications with 20,000 Monte-Carlo draws), assuming a type-I error of $\alpha = .05$ (two-tailed). The study was approved by King's College London's Research Ethics Committee.

Materials and procedure. After giving informed consent participants reported demographics, including religiosity. In particular, participants indicated which religious or non-religious category was most descriptive of them (*Christianity*, *Islam*, *Hinduism*, *Buddhism*, *Judaism*, *Agnosticism*, *Atheism*, or *Other*). We dichotomized these responses into a non-religious (atheists and agnostics; $n = 183$) versus religious (the remainder; $n = 299$) variable, excluding 32 participants who selected the ambiguous 'other' category. Participants then completed one of two (Sample A) or three (Sample B) tasks, depending on random assignment. Those in the high boredom task condition transcribed, in writing, 6 references to literature about lawn mowing (e.g., "Hessayon, D. G. (2007) *The Lawn Expert*. Transworld Publishers, London. ISBN 978-0-903505-48-2. p. 28/33."). Those in the low boredom condition transcribed, instead, 1 such reference. Earlier research attested to the effectiveness of boredom induction using reference transcription (Moynihan et al., 2017a; Van Tilburg & Igou, 2016), which does not seem to affect other negative emotions such as anger, sadness, and frustration (Van Tilburg & Igou, 2012). In Sample B, we included a third very low boredom condition. Participants assigned to this condition watched a short Pixar cartoon. Next, we measured the level of participants' state boredom with three items (e.g., "How bored do you feel at the moment?", "How boring would you consider the task you just

[3] We added this 'very low boredom' condition to Sample B after initially discovering that that the other two conditions elicited relatively high levels of boredom. This third condition thus helped to verify if the proposed association between religiosity and boredom occurred at different intensities of boredom.

completed?", "Did you experience boredom during the task?"; 1 = *not at all*, 7 = *very much*), and we measured the (state) desire to engage in meaningful activity using a further five items ("To what extent would you like to do something more meaningful?", "To what extent would you like to do something more purposeful?", "To what extent would you like to do something of greater significance?", "To what extent would you like to do something that makes more sense?", "To what extent would you like to do something that is more valuable"; 1 = *not at all*, 7 = *very much*; Van Tilburg & Igou, 2011b, 2013). Reliabilities of these measures were excellent (α = .93, and, α = .97, respectively) and we therefore computed the corresponding averages.

Results and Discussion

Hypothesis 1: Religious people experience less boredom compared to non-religious people. We entered state boredom as dependent variable into a three-way analysis of variance (ANOVA) with religiosity (nonreligious, religious), task (very low boredom, low boredom, high boredom), and Sample (A, B) as independent variables. Most importantly, the results indicated that the tasks elicited less boredom among religious (M = 3.64, SD = 1.90) versus non-religious (M = 4.24, SD = 1.88) people, $F(1, 468) = 11.312$, $p < .001$, $\eta_p^2 = .024$.

Results further indicated that the tasks elicited different levels of boredom, $F(2, 468) = 55.581$, $p < .001$, $\eta_p^2 = .192$. Participants in the high boredom condition felt most bored (M = 4.67, SD = 1.83), and significantly more so than those in the low (M = 4.02, SD = 1.71), and very low (M = 2.20, SD = 1.35) boredom conditions, $t(505) = 3.881$, $p < .001$, $d = 0.345$, and, $t(505) = 9.222$, $p < .001$, $d = 0.821$, respectively. Also the low and very low boredom conditions differed significantly, $t(505) = 12.089$, $p < .001$, $d = 1.076$. There was no significant main effect of Sample, $F(1, 468) = 0.014$, $p = .906$, $\eta_p^2 < .001$. Sample did not significantly qualify the effects of religiosity, $F(1, 468) = 0.068$, $p = .794$, $\eta_p^2 < .001$, or task, $F(1, 468) = 0.049$, $p = .824$, $\eta_p^2 < .001$. Also the religiosity × task × Sample interaction was

not significant, $F(1, 468) = 0.373$, $p = .061$, $\eta_p^2 = .002$. Consistent with H1, these results indicate that religious people experience less boredom than non-religious people.[4]

Hypothesis 2: Through boredom, religiosity is negatively associated with meaning search. Boredom prompts people to search for meaning (Barbalet, 1999; Van Tilburg & Igou, 2012; Van Tilburg & Igou, 2016), Accordingly, we tested whether religiosity would be associated with a less pronounced inclination to search for meaning through lower levels of boredom. Prior to testing this proposed indirect effect of religiosity on inclinations to meaning search, we examined the interrelations of the three constituent variables. The prior analyses already evidenced that religious people became less bored than non-religious ones. An ANOVA further indicated that, overall, religious ($M = 5.41$, $SD = 1.43$) versus non-religious ($M = 5.49$, $SD = 1.31$) participants did hold significantly different inclinations towards searching for meaning, $F(1, 479) = 0.367$, $p = .545$, $\eta_p^2 = .001$. Boredom was significantly positively correlated with the need to search for meaning, $r = .261$, $p < .001$.

We tested whether an indirect association existed from religiosity (effect coded: -1 = *non-religious*, 1 = *religious*) to inclinations to search for meaning using the PROCESS macro by Hayes (2012; Model 4). Religiosity was specified as independent variable, boredom as mediator, and inclinations to search for meaning as dependent variable. The indirect effect, estimated with 5,000 bias-corrected and accelerated bootstraps (Efron, 1987; Hayes, 2009), was significantly negative, $B = -0.065$, $SE = .022$, 95%CI = [-0.116, -0.029]. Given the absence of a significant total association between religiosity and inclinations to search for meaning, these results suggest a significant indirect, but not mediated, association (Hayes, 2009) of religiosity on meaning search through boredom (H2). Specifically, relative to non-

[4] When analyzed separately, the religiosity main effects in Sample A and B were, $F(1, 203) = 7.556$, $p = .007$, $\eta_p^2 = .036$; and $F(1, 265) = 5.247$, $p = .023$, $\eta_p^2 = .019$, respectively. Task main effects were, $F(1, 203) = 6.226$, $p = .013$, $\eta_p^2 = .030$; and $F(2, 265) = 57.157$, $p < .001$, $\eta_p^2 = .301$, respectively. Religiosity × task interaction effects were, $F(1, 203) = 0.013$, $p = .910$, $\eta_p^2 < .001$; and $F(1, 265) = 1.323$, $p = .268$, $\eta_p^2 = .010$, respectively.

religious people, religious people felt less bored in response to each task, and this relatively low level of boredom corresponded with less of an inclination to search for meaning.[5]

The results of Study 1 confirm that religious people experience less boredom than non-religious people (H1). Furthermore, the lower levels of (state) boredom evident among religious (vs. non-religious) people in turn corresponded to a lower (state) inclination to search for meaning, represented by an indirect effect whereby, through boredom, religiosity is negatively associated with meaning search (H2). Overall, these findings support our hypotheses that religious people feel less bored than non-religious people, and that this effect is indirectly associated with a lower need to search for meaning.

Study 2

Study 2 assessed the nature of the link between religiosity and boredom in more depth, and this time at the level of individual differences. So far, two of the variables in our hypotheses were operationalized at the level of individual differences: religiosity and perceived meaning in life. For boredom and meaning search we were primarily interested in these variables at the state level (e.g., actually experienced boredom; wanting to do something more meaningful in the moment), however, in Study 2 we operationalized them at the level of individual differences (e.g., the tendency to experience boredom; search for meaning in life) to expand our claims to the literature on individual differences in boredom proneness and meaning in life—the historically dominant approaches to studying boredom and meaning (e.g., Vodanovich, 2003; Steger et al., 2006). Furthermore, testing our hypotheses with different operationalizations of boredom and meaning search would contribute to the generalizability of our findings. Importantly, it seemed appropriate to use such alternative operationalizations of boredom and meaning search at the level of individual differences: If religious people experience less (state) boredom, then they will presumably be less prone to boredom in general, and if people are generally less frequently bored then presumably they will be less frequently searching for meaning in their lives. Indeed, past

[5] We repeated this mediation analysis with task (very low boredom, low boredom, high boredom) as additional dummy-coded independent variable (two dummies; reference: very low boredom). This analysis reproduced the indirect effect of religiosity on meaning search through (state) boredom (H1), B = -0.061, SE = .021, 95% CI [-0.112, -0.027].

research confirms that the meaning-regulating function of boredom (e.g., the negative association between presence of meaning and boredom, and the positive one between boredom and meaning search) has been found when these variables were operationalized at either state level (e.g., Van Tilburg & Igou, 2011, 2017b; Van Tilburg et al., 2013), and at the level of individual differences (e.g., Coughlan et al., 2017; Van Tilburg & Igou, 2016; Van Tilburg et al., 2013).

We evaluated our four hypotheses after adjusting them for individual differences measurement. Specifically, we tested if religious people are less prone to boredom than non-religious (or less religious) people (H1), and if, through lower boredom proneness, religiosity is negatively associated with a search for meaning in life (H2). We further tested if religiosity's association with boredom proneness is mediated by perceived meaning in life (H3), and we also tested if religious people perceive life as more meaningful, which is in turn associated with less boredom proneness and subsequently with less search for meaning in life (i.e., through presence of meaning in life and boredom proneness; H4). We tested these predictions using continuous and categorical measures of religiosity and with two boredom proneness measures. Furthermore, we assessed, and later controlled for, individual differences in need for cognition (Cacioppo, Petty, & Kao, 1984), need for structure (Neuberg & Tewsom, 1993), general affect (Watson et al., 1988), and faith in intuition (Alós-Ferrer & Hügelschäfer, 2012), each representing established (e.g., Vess, Routledge, Landau, & Arndt, 2009) or likely (Van Tilburg & Igou, 2016) correlates of boredom, meaning, or religiosity.

In light of the correlational nature of Study 2, we evaluated the associations specified in our predictions and did not test conclusively their implied causal effects (as in Study 1 & 3). Importantly, correlational tests are instrumental for evaluating causal theories given that predictions can be falsified based on inconsistent correlational patterns (e.g., finding negative correlation where a positive effect was predicted; see Baumeister, Campbell, Krueger, & Vohs, 2003; Mahadevan, Gregg, Sedikides, & De Wall-Andrews, 2016).

Method

Participants and design. We recruited 338 participants residing in the USA (150 men, 176 women, 12 undeclared; M_{age} = 35.01, *SD* = 12.47; 188 Christians, 7 Jews, 3 Buddhists, 2 Hindus, 1 Muslim, 53 Agnostics, 42 Atheists, 42 other/unspecified) for an online correlational study conducted at www.MTurk.com. This sample size would yield a power of $(1 - \beta) > .90$, for correlations of $r = .20$ ($\alpha = .05$, two-tailed). Post-hoc estimated power for detecting an indirect effect (Schoemann, Boulton, & Short, 2017) with two serial mediators (our most complex indirect effect, see H4) was $(1 - \beta) = 1.00$ (1,000 replications with 20,000 Monte-Carlo draws), assuming a Type-I error of $\alpha = .05$ (two-tailed). The study was approved by King's College London's Research Ethics Committee.

Materials and procedure. Participants gave informed consent and reported demographics. They categorically indicated their (non-)religion, which we again dichotomized as non-religious (atheists and agnostics; *n* = 95) versus religious (the remainder; *n* = 201), excluding on this variable 42 participants who selected the ambiguous 'other' category or did not report religion. Participants also completed a five-item religious belief scale developed for this study (e.g., "How strongly do you believe in a higher power?"; 1 = *not at all*, 7 = *very much*; $\alpha = .96$) and a 10-item religious commitment scale ("Religious beliefs influence all my dealings in life."; 1 = *not at all*, 5 = *very much*, or *non-applicable*; $\alpha = .97$; Worthington, Wade, Hight et al., 2003).

We measured individual differences in boredom proneness using the eight-item shortened boredom proneness scale (e.g., "I often find myself at 'loose ends' not knowing what to do."; 1 = *not at all*, 5 = *very much*; $\alpha = .92$; Struk, Carriere, Cheyne, & Danckert, 2015). We were concerned that this measure does not explicitly refer to boredom, and that some items are rather indirect (e.g., "I find it hard to entertain myself."). For that purpose, we created, and included, the *Harthouse boredom proclivity scale* (HBP) scale; a very direct 4-item measure of individual differences in boredom proneness, loosely based on the wording of the Southampton nostalgia scale (Routledge, Arndt, Sedikides, & Wildschut, 2008; Van Tilburg, Sedikides, & Wildschut, 2015). The items were: "How prone are you to feeling bored?", "How often do you experience boredom?", "Generally speaking, how often do you

feel bored? (1 = *not at all*/*never*, 7 = *very much*/*all the time*) and "Specifically, how often do you feel bored? (1 = *once or twice a year*, 7 = *at least once a day*; α = .94). Exploratory factor analysis with (superfluous, as it turned out) oblimin rotation yielded a single factor structure; this factor accounted for 81.68% of variance and correlated strongly with each item (*r*s ≤ .77).

Next, we assessed people's perceived presence of meaning in life with the corresponding five items from the meaning in life questionnaire (e.g., "My life has a clear sense of purpose"; 1 = *strongly disagree*, 7 = *strongly agree*; α = .92; Steger et al., 2006). Participants then completed the need for cognition scale (Cacioppo et al., 1984), which consists of 18 items (e.g., "I would prefer complex to simple problems"; 1 = *completely false*, 5 = *completely true*; α = .92). This was followed by the 12-item faith in intuition scale (e.g., "I am a very intuitive person"; 1 = *completely false*, 5 = *completely true*; α = .91; Alós-Ferrer & Hügelschäfer, 2012). The 5-item *search* for meaning in life scale was included next (e.g., "I am searching for meaning in my life", 1 = *strongly disagree*, 7 = *strongly agree*; α = .97; Steger et al., 2006). They also completed the 12-item need for structure scale ("It upsets me to go into a situation without knowing what I can expect from it", 1 = *completely false*, 5 = *completely true*; α = .78; Neuberg & Tewsom, 1993), and the positive and negative affect scale (e.g., "Indicate the extent to which you feel sad?" 1 = *not at all*, 5 = *very much*; α = .91; Watson et al., 1988). Finally, participants were debriefed, thanked, and rewarded.

Results & Discussion

Hypothesis 1: Religious people are less prone to boredom than non-religious (or less religious) people. Religious participants (as opposed to non-religious ones) were less prone to boredom, evident from negative standardized regression coefficients when associating either measure of individual differences in boredom with religiosity (-1 = *non-religious*, 1 = *religious*; β = -13, p = .021, and, β = -.13, p = .027, respectively; Table 1). The continuous measures of religiosity yielded similar results: Religious belief correlated negatively with both boredom indexes (r = -.17, p = .002, and, r = -.19, p < .001, respectively), as did religious commitment (r = -.21, p < .001, and, r = -.11, p = .043, respectively). Simultaneously, people who were religious (as opposed to non-religious)

reported a greater sense of meaning in life (β = .29, $p < .001$), and both religious belief and commitment correlated positively with perceived presence of meaning in life ($r = .39$, $p < .001$, and $r = .43$, $p < .001$, respectively). Furthermore, religiosity did not correlate significantly with search for meaning in life, whether religiosity was measured as category (β = -.03, $p = .619$), in terms of beliefs ($r = .03$, $p = .625$), or as commitment ($r = .05$, $p = .345$).

The results across the two boredom measures were very similar. Besides the above discussed negative correlations with religiosity, people were more prone to boredom when they were low on perceived meaning in life ($r = -.45$, $p < .001$, and, $r = -.53$, $p < .001$, respectively). Furthermore, boredom was associated with a greater search for meaning in life ($r = .28$, $p < .001$, and, $r = .37$, $p < .001$, respectively).

The correlational results are consistent with our proposition that people with stronger religious beliefs are less prone to boredom. Furthermore, they indicate that religiosity is associated with greater perceived meaning in life and those prone to boredom report lower meaning in life. Even though religiosity and search for meaning in life were not directly correlated, each was related to individual differences in boredom, suggesting that the religiosity and search for meaning in life are indirectly related to each other, through boredom proneness.

To evaluate whether this reasoning corresponded to the data, we tested three saturated mediation models using the PROCESS macro by Hayes (2012): First, we tested if, through boredom proneness, religiosity was negatively associated with search for meaning in life (H2). Second, we tested if the greater perceived meaning in life associated with religiosity accounted for the lower boredom proneness of more strongly religious people (H3). Third, we integrated these two models and tested the full proposed pathway: Religiosity is positively associated with perceived meaning, which is associated with lower boredom proneness; boredom proneness in turn is associated with higher search for meaning in life (H4). We estimated these models using the aggregates of the two standardized continuous religiosity

measures (r = .77, p < .001)[6] and the aggregate of the two standardized boredom measures (r = .70, p < .001).[7]

Hypothesis 2: Religiosity's association with boredom proneness is mediated by perceived meaning in life. Religiosity was associated with less boredom proneness, B = -0.178, SE = 0.054, t(318) = 3.295, p = .001. Those who were more prone to boredom reported a greater need to search for meaning in life, B = 0.677, SE = 0.098, t(292) = 6.912, p < .001. The total association between religiosity and the need to search for meaning in life was non-significant, B = 0.065, SE = 0.101, t(318) = 0.643, p = .521; the association between religiosity and inclinations to search for meaning in life search after controlling for boredom was marginally significant, B = 0.185, SE = 0.096, t(317) = 1.933, p = .054. Importantly, the indirect association between religiosity and inclinations to search for meaning in life *through* boredom proneness—was significant, B = -0.120, SE = 0.045, 95% CI [-0.223, -0.042] (5,000 bias-corrected and accelerated bootstraps; Hayes, 2009). The results suggest that religious people are less prone to boredom, and are indirectly (through boredom) less inclined to search for meaning in life.

Hypothesis 3: Religiosity's association with boredom proneness is mediated by perceived meaning in life. Consistent with prior analyses, religiosity was significantly associated with more perceived meaning in life, B = 0.721, SE = 0.081, t(318) = 8.463, p < .001. Perceived meaning in life, in turn, was negatively associated with boredom proneness, B = -0.322, SE = 0.031, t(317) = 10.527, p < .001. Furthermore, religiosity was significantly associated with boredom proneness, B = -0.179, SE = 0.054, t(318) = 3.331, p = .010. After controlling for perceived meaning in life, religiosity was not significantly associated with boredom proneness, B = 0.053, SE = 0.051, t(317) = 1.022, p = .307. We found an indirect association between religiosity and boredom proneness through the proposed mediator; presence of meaning in life, B = -0.232, SE = 0.038, 95% CI [-0.311, -

[6] Results were similar when we tested these models using the (effect coded) dichotomous indicator of religiosity. Details are available on request.

[7] We deemed this aggregation appropriate given their high correlations with each other and their virtually identical relationships with the other variables in the study. Results of the individual indices were similar and their results are available on request.

0.163] (5,000 bias-corrected and accelerated bootstraps; Hayes, 2009). The results of this model are fully consistent with our proposal that religiosity is associated with less boredom proneness through increased perceived meaning in life.

Hypothesis 4: Religious people perceive life as more meaningful, which is in turn associated with less boredom proneness and subsequently with less searching for meaning in life. Next, we tested the full indirect effect (Figure 1). In replication of prior results, religiosity corresponded to more perceived meaning in life, $B = 0.728$, $SE = 0.085$, $t(316) = 8.533$, $p < .001$. Perceived meaning in life was in turn associated with less boredom proneness, $B = -0.325$, $SE = 0.031$, $t(315) = 10.581$, $p < .001$; the association between religiosity and boredom proneness was non-significant, $B = 0.058$, $SE = 0.052$, $t(315) = 1.125$, $p = .261$. A positive association existed between boredom proneness and inclinations to search for meaning in life, $B = 0.467$, $SE = 0.112$, $t(314) = 4.159$, $p < .001$. We also found a significant negative association between presence of meaning in life and people's inclinations to search for meaning in life, $B = -0.249$, $SE = 0.071$, $t(314) = 3.503$, $p < .001$[8], and a significant positive association between religiosity and inclinations to search for meaning in life, $B = 0.336$, $SE = 0.103$, $t(314) = 3.257$, $p = .001$. Importantly, the 'sequential' indirect association between religiosity and inclinations to search for meaning in life through meaning presence and boredom, respectively, was significant, $B = -0.111$, $SE = 0.036$, 95% CI [-0.191, -0.051] (5,000 bias-corrected and accelerated bootstraps). Thus, the results (Figure 1, top regression coefficients) are consistent with our proposition that, by imbuing life with meaning, religiosity obviates the need for meaning search that boredom normally instigates.[9]

[8] This small negative correlation between meaning presence and search is consistent with earlier research that tends to find this correlation to be non-significant (e.g., Steger et al., 2006; 2008), or small and negative (e.g., Steger et al, 2007; Van Tilburg & Igou, 2016).

[9] Theoretically, one could propose an alternative version of this model where the search for meaning predicts religiosity, creating a 'full circle' self-regulatory model (Coughlan et al., 2017). Indeed, changing the direction of the arrow from *religiosity to meaning search* into *meaning search to religiosity* in Figure 1 results in a significant positive association between these variables, $B = 0.126$, $SE = 0.043$, $p = .003$. Further, the 'circular mediation path' in the resultant non-recursive model was significant, $-0.047 \leq B_{95} \leq -0.004$ (5,000 bias-corrected bootstraps). Details are available on request.

Subsidiary mediation analyses. Besides our four variables of main interest (religiosity, presence of meaning in life, boredom proneness, & search for meaning in life), we also measured participants' need for cognition, faith in intuition, need for closure, and affect (Table 1). In subsidiary mediation analyses, we tested whether the relationships reported above held after controlling for these four variables. Doing so was important because several of these correlated with religiosity (faith in intuition & affect), boredom proneness (need for cognition & affect), and meaning in life search or presence (faith in intuition, need for cognition, & affect) and might thus present potential confounds. Our subsidiary mediation analysis therefore included the following variables: (1) religiosity (independent variables), (2) presence of meaning in life (first mediator), (3) boredom proneness (second mediator), (4) search for meaning in life (dependent variable), (5) need for cognition (covariate), (6) faith in intuition (covariate), (7) need for closure (covariate), and (8) affect (covariate). Thus, need for cognition, faith in intuition, need for closure, and affect were all added as covariates in the mediation model using the PROCESS macro by Hayes (2012). We display the regression coefficients corresponding to the full mediation models (Figures 2) *after* controlling for need for cognition, faith in intuition, need for closure, and affect in the bottom position for each constituent path denoted as *B*-prime, or *B*'.

Controlling for the aforementioned variables did not substantially change the results: neither did any of the direct paths *cease* to be significant after including these covariates, nor did any of the direct paths *become* significant due to their inclusion. Furthermore, directions of significant associations (positive vs. negative) did not change in any of the mediation models. More importantly, all of the key indirect paths remained significant in the hypothesized direction: the indirect association between religiosity and search for meaning in life through boredom proneness remained significant, *B*' = -0.086, *SE* = 0.041, 95% CI [-0.182, -0.020] (H2). Likewise, the indirect association of religiosity with boredom proneness through the perceived presence of meaning in life remained significant, *B*' = -0.138, *SE* = 0.033, 95% CI [-0.214, -0.082] (H3). Also the sequential indirect association between religiosity and search for meaning in life through first the presence of meaning in life and then boredom proneness remained significant, *B*' = -0.060, *SE* = 0.024, 95% CI [-0.121, -

0.023] (H4). Thus, the various indirect associations persisted after controlling for need for cognition, need for closure, faith in intuition, and affect.

In Study 2, we tested if religiosity is associated with reduced boredom proneness and, indirectly, a lower inclination to search for meaning in life (H1 & H2). Furthermore, we tested if the negative association between religiosity and boredom proneness could be attributed to the perceived meaning in life associated with religiosity (H3). In addition, we tested a sequential indirect effect in which religiosity was associated with more perceived meaning in life, which was in turn associated with less boredom proneness, and was subsequently associated with less search for meaning in life (H4). The results of our estimated models were fully consistent with these predictions, with or without controlling for the potential influence of need for cognition, need for closure, faith in intuition, and affect. These results indeed suggest that religiosity is associated with less boredom proneness by offering people a sense of meaning, and the inclination to search for meaning seems indirectly reduced among those who are religious, through lower boredom proneness.

Study 3

The previous studies tested and found that religious people feel (Study 1) or tend to feel (Study 2) less bored, and that this lower level of boredom explains why religiosity is indirectly associated with a lower inclination to search for meaning momentarily (Study 1) or in life in general (Study 2). Furthermore, the results of Study 2 in particular suggest that this effect may be attributable to the heightened sense of meaning in life that religious people report, at least at the level of individual differences in boredom proneness and search for meaning in life.

In Study 3, we integrated these two approaches to test hypotheses 1 through 4. In particular, we tested if the heightened sense of meaning in life among religious vs. non-religious people (as in Study 2) predicts the lower *state* boredom and *state* meaning search experienced after working on tasks (as in Study 1). This study thus aimed to bridge the link between individual differences in religiosity and perceived meaning in life on the one hand, and momentary experiences of boredom and meaning search on the other hand. This integration of approaches is important, as it allowed us to test the theoretical assumption that

the heightened perceived meaning in life associated with religiosity modulates the actual experience of state boredom and state meaning search.

Method

Participants and design. We recruited 618 participants (260 men, 355 women, 2 genderqueer; 1 undisclosed; M_{age} = 36.65, SD = 12.64; 328 Christians, 113 Agnostics, 92 Atheists, 14 Jews, 13 Buddhists, 4 Muslim, 4 Hindus, 50 other/unspecified) online using MTurk. The study followed a 2 (religiosity: religious, nonreligious) × 2 task (low boredom, high boredom) between-subjects design. The overall sample size yields corresponding power in excess of (1 – β) = .95 for effects of, η_p^2 = .03 (α = .05, two-tailed) in the corresponding design. Post-hoc estimated power for detecting an indirect effect (Schoemann, Boulton, & Short, 2017) with two serial mediators (our most complex indirect effect, see H4) was, (1 – β) = 0.60 (1,000 replications with 20,000 Monte-Carlo draws), assuming a Type-I error of α = .05 (two-tailed). The study was approved by King's College London's Research Ethics Committee.

Materials and procedure. The study was identical in procedure to that of Study 1 (Sample A), with the exception that we added the perceived presence of meaning in life scale. Specifically, participants gave informed consent and then reported demographics, including their religion. Participants' religiosity was again categorized as non-religious (atheists and agnostics; *n* = 205) versus religious (the remainder; *n* = 363) variable, excluding 50 participants who selected the ambiguous 'other' category. Next, they worked on the reference transcribing task from Study 1; they were assigned at random to the low or high boredom version of this task. They then reported state boredom on three items (e.g., "How bored do you feel at the moment?", "How boring would you consider the task you just completed?", "Did you experience boredom during the task?"; 1 =*not at all*, 7 = *very much*; Van Tilburg et al., 2013; α = .93), and, on five items, the momentary desire to engage in meaningful activity ("To what extent would you like to do something more meaningful?", "To what extent would you like to do something more purposeful?", "To what extent would you like to do something of greater significance?", "To what extent would you like to do something that makes more sense?", "To what extent would you like to do something that is more valuable"; 1 = *not at*

all, 7 = *very much*; Van Tilburg & Igou, 2011b; α = .95). Finally, they completed the perceived presence of meaning in life scale (e.g., "My life has a clear sense of purpose"; 1 = *strongly disagree*, 7 = *strongly agree*; α = .91; Steger et al., 2006).

Results and Discussion

Hypothesis 1: Religious people experience less boredom compared to non-religious people. We entered experienced (state) boredom as dependent variable into a two-way analysis of variance (ANOVA) with religiosity (non-religious, religious) and task (low boredom, high boredom) as independent variables. Consistent with previous results and H1, the tasks elicited less boredom among religious (M = 4.00, SD = 1.88) versus non-religious (M = 4.48, SD = 1.77) people, $F(1, 545) = 7.801$, $p = .005$, η_p^2 .014. Unsurprisingly, the two tasks also elicited different levels of boredom, $F(1, 545) = 13.591$, $p < .001$, $\eta_p^2 = .024$. Participants in the high boredom condition felt significantly more bored (M = 4.54, SD = 1.82) than those in the low boredom condition (M = 3.90, SD = 1.74). There was no significant religiosity × task interaction, $F(1, 545) = 0.301$, $p = .583$, $\eta_p^2 = .001$. Consistent with H1, these results indicate that religious people experience less boredom than non-religious people.

Hypothesis 2: Through boredom, religiosity is negatively associated with meaning search. We tested if religious people, through feeling less bored, indirectly felt less (state) inclined to search for meaning. The above analysis already confirmed that religious people were less bored than non-religious ones. An ANOVA further indicated that, overall, religious (M = 5.34, SD = 1.46) versus non-religious (M = 5.40, SD = 1.48) participants did not significantly differ in their inclinations towards searching for meaning, $F(1, 549) = 0.219$, $p = .640$, $\eta_p^2 < .001$. Boredom and inclinations to search for meaning were significantly positively correlated ($r = .469$, $p < .001$).

We tested whether there was an indirect association from religiosity (effect coded: -1 = *non-religious*, 1 = *religious*) to inclinations towards searching for meaning through (state) boredom using the PROCESS macro by Hayes (2012; Model 4), estimated with 5,000 bias-corrected and accelerated bootstraps (Efron, 1987; Hayes, 2009). This indirect association was significantly negative, B = -0.092, SE = .031, 95% CI [-0.155, -0.035]. Since there was

no significant total association between religiosity and inclinations towards searching for meaning these results are consistent with an indirect (but not mediated) association (Hayes, 2009) between religiosity and inclinations towards meaning search through state boredom (H2). The results suggest that lower inclinations to search for meaning among religious versus non-religious participants occurred indirectly, through lower state boredom.

Hypothesis 3: Religious people perceive life as more meaningful and this mediates the negative association between religiosity and boredom. We argue that religiosity offers people an increased sense of meaning in life relative to those who are non-religious (Steger & Frazier, 2005), and that having a general sense of meaning in life infuses more specific activities with perceived purpose and meaning (Van Tilburg & Igou, 2011a; 2013). Accordingly, we tested, as we did in Study 2, if the presumably higher level of meaning in life among religious (relative to non-religious) people (partly) accounted for the negative association between religiosity and state boredom. Thus, we proposed a mediational sequence in which religiosity is associated with higher perceived meaning in life, and perceived meaning in life is in turn associated with less state boredom. First, we examined the associations between these three variables. An ANOVA confirmed that religious people thought their lives to be more meaningful (M = 4.86, SD = 1.38) than non-religious people (M = 4.24, SD = 1.49), $F(1, 549) = 24.431$, $p < .001$, $\eta_p^2 = .043$. Earlier analysis already confirmed that religious people felt less bored than non-religious people. Further, the more people considered life to be meaningful, the less state boredom they tended to experience, r = -0.119, p = .004.

We proceeded to estimate the proposed mediated effect of religiosity (effect coded: -1 = *non-religious*, 1 = *religious*) on state boredom through perceived meaning in life using the PROCESS macro by Hayes (2012; Model 4). Religiosity was specified as independent variable, perceived meaning in life as mediator, and boredom served as dependent variable. Five-thousand bias-corrected and accelerated bootstraps (Efron, 1987; Hayes, 2009), yielded a significant, negative indirect effect, B = -0.043, SE = .020, 95% CI [-0.093, -0.010]. This effect suggests that the association between religiosity and boredom is indeed mediated by perceived meaning (H3).

Hypothesis 4: Religious people perceive life as more meaningful, which is in turn associated with less boredom and subsequently with less searching for meaning. Next, we integrated the previous findings and tested a sequential mediation model in which religiosity was entered as predictor of perceived meaning in life, which in turn predicted state boredom, and through perceived meaning in life and state boredom predicted a lower inclination to search for meaning (Figure 2) We estimated this model using the PROCESS macro by Hayes (2012; Model 6). In replication of prior results, (effect-coded) religiosity involved more perceived meaning in life, $B = 0.311$, $SE = 0.063$, $t(549) = 4.943$, $p < .001$. Perceived meaning in life was in turn associated with less state boredom, $B = -0.138$, $SE = 0.055$, $t(548) = 2.498$, $p = .013$, and also the association between religiosity and state boredom was significant, $B = -0.208$, $SE = 0.083$, $t(48) = 2.507$, $p = .012$. A positive association again emerged between state boredom and momentary inclinations to search for meaning, $B = 0.376$, $SE = 0.030$, $t(547) = 12.569$, $p < .001$, accompanied by a significant positive association with presence of meaning in life, $B = 0.103$, $SE = 0.039$, $t(547) = 2.657$, $p = .008$, and a non-significant association with religiosity, $B = 0.032$, $SE = 0.058$, $t(547) = 0.549$, $p = .584$. Importantly, the 'sequential' indirect association between religiosity and inclinations to search for meaning through perceived presence of meaning in life and state boredom, respectively, was significant, $B = -0.016$, $SE = 0.008$, 95% CI [-0.034, -0.003] (5,000 bias-corrected and accelerated bootstraps). These results are consistent with our theoretical proposition that, by imbuing life with meaning and lessening boredom, religiosity obviates the need for meaning search.[10]

Study 3 integrated the approaches of previous studies by directly linking the theorized elevated perceived presence of meaning in life among religious (vs. non-religious) people to

[10] We repeated all three mediation analyses with task (low boredom, high boredom) as additional dummy-coded independent variable (reference: low boredom). This analysis reproduced the indirect effect of religiosity on meaning search through (state) boredom (H1), $B = -0.089$, $SE = .020$, 95% CI [-0.149, -0.032], the mediated association between religiosity and (state) boredom through perceived meaning in life (H3), $B = -0.040$, $SE = .020$, 95% CI [-0.090, -0.008], and the indirect association between religiosity and meaning search through perceived meaning in life and then (state) boredom (H4), $B = -0.015$, $SE = .007$, 95% CI [-0.034, -0.003].

state experiences of boredom and resultant inclinations towards state meaning search. The results indicate that religious people experience less boredom than non-religious people (H1), and that religiosity is indirectly (through lower state boredom) associated with the inclination to search for meaning (H2). We also found support for the hypothesis that religious people report less boredom, mediated by the higher levels of perceived meaning in life that religious people report (H3). Finally, a sequential indirect association occurred, suggesting that religiosity is indirectly associated with a lower state inclination to search for meaning, through higher perceived meaning in life and lower state boredom, respectively (H4). Overall, these findings are consistent with our theoretical proposition that religiosity reduces boredom, and that search for meaning is in turn reduced through the lower levels of boredom.

General Discussion

Religiosity can offer people a sense of perceived meaning or purpose (Batson & Stocks, 2004; Steger & Frazier, 2005), while boredom steers people towards the pursuit of meaning in its absence (Barbalet, 1999; Fahlman et al., 2009; Van Tilburg & Igou, 2011b, 2012, 2016, 2017b; Van Tilburg et al., 2013). Accordingly, we hypothesized that, by providing people with a sense of meaning (H2), religious people felt less boredom than non- (or less) religious people (H1; H3 for the mediation). Furthermore, we theorized that search for meaning would be less prevalent among religious versus non-religious people indirectly through boredom (H4). We tested these proposed effects and relationships (H1 – H4) in three studies.

In Study 1, non-religious participants felt more intensely bored after working on a task than religious participants (H1). Further, non-religious participants reported higher state inclinations to search for meaning indirectly through their lower state boredom, compared to religious participants (H2).

Study 2 further examined our hypotheses using a correlational study that utilized multiple measures of individual differences in religiosity, boredom proneness, meaning in life presence and search, and a number of control variables (need for structure, need for cognition, faith in intuition, affect). Confirming our predictions, religiosity was associated with lower levels of proneness to boredom (H1), and this association was mediated by the

greater sense of meaning in life among those who were (more) religious (H3). Further, religiosity was indirectly associated with a reduced need to search for meaning in life through perceived meaning in life and boredom proneness (H2 & H4). The result of these various mediation models emerged before and after controlling for need for structure, need for cognition, faith in intuition, and affect.

Finally, Study 3 confirmed that the reduced levels of state boredom among religious participants could be attributed to the higher levels of perceived meaning in life compared to non-religious participants. Specifically, perceived meaning in life mediated the negative association between religiosity and (state) boredom, as predicted (H3). Also a full indirect sequence, where religion was indirectly associated with lower inclinations to search for meaning through enhanced perceived meaning in life and lower state boredom, respectively, was supported (H4). Importantly, this study showed that the mediating role of perceived meaning in life that we found in Study 2, which dealt with individual difference level variables, also acted as mediator in context of momentary experiences of (state) boredom and (state) inclination towards meaning search. This integration demonstrates how relatively stable individual differences in religiosity and meaning in life affect contextualized, momentary experiences of boredom and meaning search. Together, the results are consistent with our theoretical argument that, by imbuing life with perceived meaning, religiosity makes people less bored and thereby indirectly reduces the search for meaning.

Contributions and Implications

Our research contributes to a deeper understanding of the functions and utility of religiosity and boredom in the context of people's quest to find meaning and purpose in their lives—an area of research that has recently received increasing interest (e.g., Markman, Proulx, & Lindberg, 2013; Maher, Igou, Van Tilburg, in press; Maher, Van Tilburg, & Van den Tol, 2013; Van Tilburg & Igou, 2011a, 2011b, 2012, 2013). Our research contributes to this area of enquiry by showing how the common, perhaps even mundane, experience of boredom elucidates the everyday regulation of meaning perceptions. We believe that this is an important and interesting direction: research on 'existential threats'—challenges towards people's perceptions of meaning—has typically focused on experiences that, while impactful,

are perhaps less frequent in everyday life, such as mortality salience (Greenberg, Solomon, & Pyszczynski, 1997), ostracism (Nezlek, Wesselmann, Wheeler, & Williams, 2012), and social exclusion (Stillman, Baumeister, Lambert, Crescioni, DeWall, & Fincham, 2009). In contrast, boredom is experienced regularly (e.g., Russell, Lewicka, & Niit, 1989), yet, it seems unduly trivialized in psychological science (see Eastwood et al., 2012; Van Tilburg & Igou, 2017a). In that sense, our research suggests that the processes by which people seek, obtain, and protect a sense of meaning are part of everyday life.

We found that religiosity and meaning search (whether operationalized as individual difference or state) were not directly associated, and some readers may find this surprising. However, this finding is consistent with earlier work on the topic (Steger et al., 2006). Perhaps, people who search for meaning may turn to religiosity as meaning source (Steger & Frazier, 2005), while religiosity may in turn satisfy this search for meaning. Overall, this may result in contextually variable or null-association only. When this association between religiosity and meaning search is further teased apart, for example by examining the association between religiosity and meaning search through a particular, theoretically crucial variable, then significant indirect relationships may nonetheless emerge. Indeed, our research documents an association between religiosity and meaning search: through boredom.

Our finding that religiosity acts as a resource against boredom experiences, can be judged as positive in that religiosity obviates existential processes that may be disruptive and unpleasant. However, it also seems to undermine potential change that could arise from boredom. That is, although boredom is an unpleasant experience and correlates with a host of undesirable variables (e.g., Eastwood et al., 2012; Moynihan et al., 2017a; Vodanovich, 2003), boredom seems also to be a functional experience: it helps people to reconsider their behaviors in favor of more meaningful ones (Van Tilburg & Igou, 2012).

Limitations and Future Directions

In Study 2, we found relatively small associations between need for cognition on the one hand, and meaning presence, meaning search, and boredom on the other hand. Intuitively, it may seem that people high in need for cognition might more easily feel bored and meaningless, and may search for meaning more. Yet, our findings suggest otherwise and

are consistent with previous observations. That is, earlier research found similarly small (and null) correlations for need for cognition with boredom (Van Tilburg & Igou, 2016) and with meaning (Cantarero, Van Tilburg, Gąsiorowska, & Wojciszke, 2018). Perhaps, this relatively weak association reflects that need for cognition, which involves a tendency to "engage in and enjoy thinking" (Cacioppo & Petty, 1982, p. 116), occurs in relative isolation of establishing or searching for meaning. Instead, these people may find a challenging task itself fulfilling, regardless of whether it is meaningful or not, a possibility that future research may investigate.

In Study 3, the post-hoc estimated power of the serial indirect effect (the association between religiosity and state meaning search through presence of meaning in life and state boredom, respectively) was comparatively low $(1 - \beta) = 0.60$, especially in comparison to that of Study 2, $(1 - \beta) = 1.00$, where we examined all variables at the level of individual differences. Therefore, we advise future replications of Study 3 to adopt a larger sample size. More generally, this finding suggests that the associations between religiosity and meaning presence with boredom and meaning search may be more pronounced if these variables are represented at the same (e.g., all individual differences vs. all state) as opposed to different (e.g., some individual differences, some state) levels of operationalization.

How unique is boredom's role in linking religiosity to meaning search? It is probable that other variables besides boredom can link religiosity to meaning search, given that religiosity and meaning search are likely complex, multi-causal, and multi-consequential phenomena. Indeed, in our studies a substantial proportion of variance in religiosity and meaning search was not explained by boredom, suggesting that other variables may play a role. This does not trivialize the role of boredom. For one, our results indicate that examining specific experiences, here boredom, may reveal consequences of religiosity previously unknown. Furthermore, the finding that a seemingly minor, everyday life, and mundane experience as boredom connects (among other possible connectors) two variables of such existential and cultural significance as religiosity and meaning in life is, in our view, profound. The finding that boredom links these two variables showcases how relevant 'mundane' emotions are in people's quests for making sense of their existence,

simultaneously further grounding the psychology religiosity and meaning in ‘mundane’ life and revealing boredom as actor with a more significantly role than it is traditionally given. While examining a large range of potential variables that might link religiosity and meaning search is beyond the score of the present research, we hope that our present investigation offers a basis for doing so in the future.

Related to the above, we found in Study 2 that several other variables related to our measures of meaning presence, religiosity, boredom, and meaning search. In particular, general affect related to all of these; it correlated positively with meaning presence and religiosity, and negatively with boredom and meaning search. Might our findings in general, or the specific role of boredom in particular, be attributable to affect instead? We believe that this is unlikely. Studies show that, while boredom is indeed a state of negative affect, its association with meaning is especially strong compared to other negative affective states (Van Tilburg & Igou, 2017). Furthermore, subsidiary mediation analysis in Study 2 did not show that boredom’s mediating role was subdued after we controlled for affect. Nonetheless, future research will do well to investigate the association between boredom and affect, and especially what distinguishes boredom, in further detail. Especially experimental approaches to this topic may prove beneficial, as past research that differentiates boredom from negative affect has done so mostly using correlational approaches (e.g., Goldberg, Eastwood, LaGuardia, & Danckert, 2011; Smith & Ellsworth, 1985; Van Tilburg & Igou, 2012).

Recent work by Kurzban, Duckworth, Kable, and Myers (2013) showed how subjective effort (and perhaps boredom) is shaped by people’s representations of the costs and benefits corresponding to the task performance. Their ‘opportunity costs’ approach then describes people’s efforts and performance. How might these processes relate to boredom and our focus on meaning in particular? When people are bored, they might want to engage in meaningful activities to compensate for the meaning they lack. Possibly, this perceived meaninglessness can be framed in terms of opportunity costs. High opportunity costs may come with perceptions of meaninglessness, and the motivated process associated with boredom involves a search for new opportunities (e.g., tasks perceived as more meaningful).

Thus, both the opportunity costs and our meaning-regulation approach relate to unfulfilled goals, either in the moment or in general.

The idea that an opportunity costs account of effort motivation (Kurzban, Duckworth, Kable, & Myers, 2013) and our meaning-regulation account of boredom (Van Tilburg & Igou, 2011b, 2012) could be integrated into one theoretical framework is broadly consistent with our past research on people's conceptualizations of teleological meaning (perceptions of purposefulness or usefulness of life and/or behaviors). Specifically, in a number studies we found (Van Tilburg & Igou, 2013) that two key features of perceived (teleological) meaning are the perceived instrumentality of an action (low to high) and the value assigned to the its goal (low to high). People perceive activities as meaningful if they are considered to be high on both dimensions (highly instrumental towards a highly valued goal); activities low on either or both are instead deemed meaningful. We suspect that this self-regulatory perspective of meaning may integrate the opportunity cost approach on the one hand, and our meaning-regulation approach on the other. 'Meaningless' can then be considered the experiential quality that accompanies behaviors that are relatively costly, while 'meaningfulness' accompanies behaviors that present opportunity. The relationship between opportunity costs and meaning remains could, in our view, be tested empirically. We encourage future research to examine how meaning-regulation and opportunity costs approaches can be integrated with a dedicated set of experimental studies.

Research on religiosity sometimes makes the distinction between intrinsic and extrinsic religious orientations (e.g., Donahue, 1985). People with an extrinsic religious orientation "are disposed to use religiosity for their own end" (Allport & Ross, 1967, p. 434), serving, for example, as source of sociability and status. This is different from those adopting an intrinsic religious orientation, who instead see religiosity as "their master motive" (p. 434), seeking to adhere to the specific religious beliefs as a goal in itself. These different orientations hold distinct implications for people: whereas the strength of intrinsic religiosity correlates with altruism, for example, extrinsic religiosity does not seem to do so (Chau, Johnson, Bowers, Darvill, & Danko, 1990). Interestingly, Steger and colleagues (2006) found that intrinsic religiosity in particular correlated positively with perceived meaning in life,

whereas extrinsic religiosity did not. We did not make any explicit distinctions between these concepts in the present research. However, based on these earlier findings, it is likely that the associations between religiosity, meaning, and boredom will be moderated by the type of religious orientation. In particular, we would expect that intrinsic religiosity reduces boredom more than extrinsic religiosity, given the former's greater capacity to imbue life with a perceived sense of meaning.

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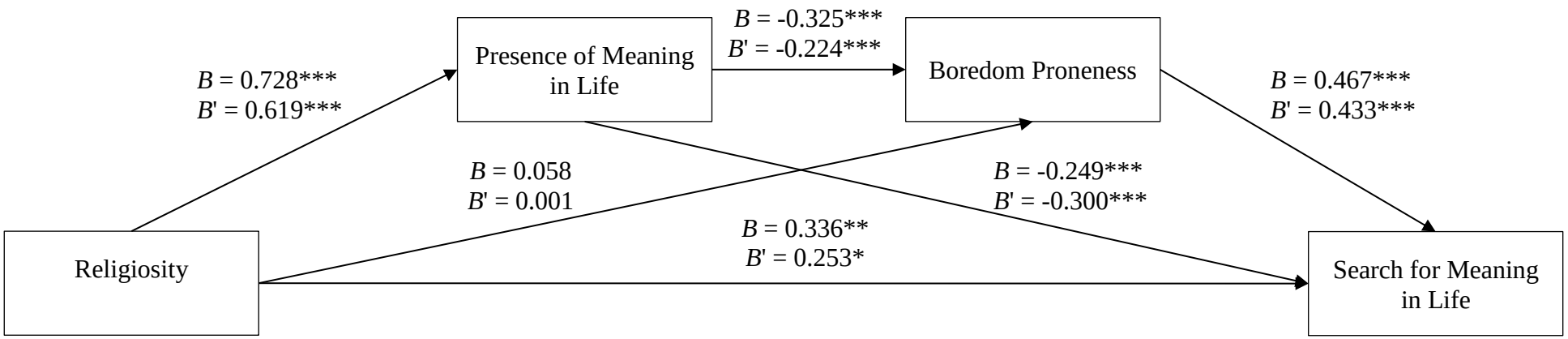
Table 1: *Correlation Matrix of Measures in Study 2*

		2		3		4		5		6		7		8		9		10		Affect[b]	
		r	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*	*r*	*N*
1	Religiosity[a,b]	.75**	296	.61**	290	-.13*	296	-.13*	296	.29**	294	-.03	293	-.08	294	.19**	294	.10	293	.10	293
2	Rel. belief	-	-	.77**	318	-.17**	324	-.19**	324	.39**	320	.03	320	-.01	320	.32**	320	-.00	320	.19**	320
3	Rel. commitment			-	-	-.21**	318	-.11*	318	.43**	314	.05	314	.04	314	.22**	314	-.02	314	.14*	314
4	Boredom proneness					-	-	.70**	324	-.45**	320	.28**	320	-.08	320	.03	320	.07	320	-.43**	320
5	Harthouse boredom proclivity scale							-	-	-.53**	320	.37**	320	-.17**	320	.03	320	.01	320	-.54**	320
6	Meaning presence									-	-	-.29**	318	.14*	320	.17**	320	-.07	318	.46**	318
7	Meaning search											-	-	.14*	318	.23**	318	-.05	320	-.17**	320
8	Need for cognition													-	-	.15**	320	-.39**	318	.13*	318
9	Faith in intuition															-	-	-.068	318	.17**	318
10	Need for structure																	-	-	-.06	320

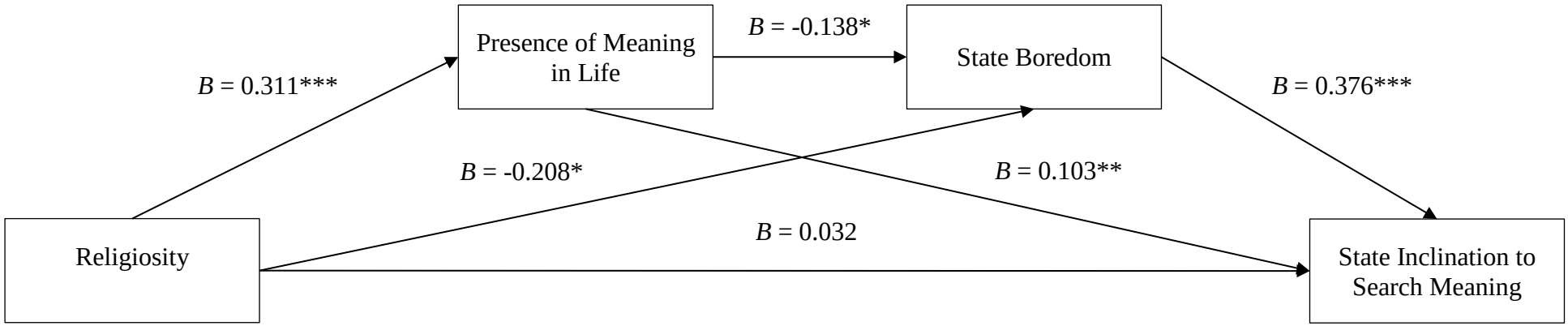
Note: * $p \leq .05$, ** $p \leq .01$; [a] -1 = nonreligious, 1 = religious; [b] Correlations reflect standardized regression coefficients. [b] Higher score indicate more positive (and less negative) affect.

Figure 1: *Religiosity, Presence of Meaning in Life, Boredom Proneness, and Search for Meaning in Life (Study 2)*



Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; sequential indirect effect: B = -0.111, SE = 0.036, $-0.191 \leq B_{95} \leq -0.051$, or B' = -0.060, SE = 0.024, $-0.121 \leq B_{95} \leq -0.023$.

Figure 2: *Religiosity, Presence of Meaning in Life, State Boredom, and State Inclination to Search for Meaning (Study 3)*



Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; sequential indirect effect: B = -0.016, SE = 0.008, 95%CI = [-0.034, -0.003]