God as a Symbolic Attachment Figure:

Normative Processes and Moderating Effects of Internal Working Models

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Abstract

Four studies examined implications of attachment theory for psychological aspects of religion among Israeli Jews. Study 1 replicated previous correlational findings indicating correspondence among interpersonal attachment orientations, attachment to God, and image of God. Studies 2-4 were subliminal priming experiments, which documented both normative and individual-difference effects. Regarding normative effects, findings indicated that threat priming heightened cognitive access to God-related concepts in a lexical decision task (Study 2); priming with “God” heightened cognitive access to positive, secure base-related concepts in the same task (Study 3); and priming with a religious symbol caused neutral material to be better liked (Study 4). Regarding individual differences, interpersonal attachment-related avoidance reduced the normative effects (i.e., avoidant participants had lower implicit access to God as a safe haven and secure base). Findings were mostly independent of level of religiousness. The present experiments considerably extend the psychological literature on connections between attachment constructs and aspects of religion.

Key-words: religion; God; attachment; internal working models; implicit processes
The fundamental idea on which this paper is based was stated around three decades ago by a theologian familiar with attachment theory: “The idea of God is the idea of an absolutely adequate attachment figure” (Kaufman, 1981, p. 67). The fact that religion is essentially universal across historical time and present-day cultures (e.g., Boyer, 2001) indicates that this kind of attachment figure – invisible as he, she, or it may be – is extremely important to many people. We are constantly reminded of this by bumper stickers saying “I love Jesus,” religiously motivated wars and acts of terrorism, and some of the most inspiring acts of altruism known to mankind, many undertaken in the name of God or some other religious figure (e.g., the Buddha).

Along with others (e.g., Kirkpatrick, 2005), we argue that one reason for God being perceived as so important is that, for religious individuals who believe in a personal God, God is an important source of attachment-related “felt security” (Sroufe & Waters, 1977). If this conjecture is true, then believers may have heightened psychological access to their perceived relationship with God as a safe haven when threatened or distressed, just as people do with human attachment figures. They may also have heightened mental access to secure base-related concepts when exposed to stimuli related to God. Furthermore, being exposed to God-related material should have certain predictable effects that transfer to other domains, just as exposure to other security-enhancing attachment figures does. Moreover, individual differences in interpersonal attachment orientations might moderate these effects. The present studies were designed to test these ideas.

**Overview of Attachment Theory and Research**

Attachment theorists claim that most mammals possess a genetically based attachment behavioral system that promoted the inclusive fitness of young and relatively helpless offspring in their (including humans’) environments of evolutionary adaptation (Bowlby, 1982).
Attachment theorists also contend, in line with a large body of research evidence (Cassidy & Shaver, 2008), that human caregivers’ sensitivity to an infant’s or child’s distress signals largely determines the nature of the child’s cognitive and affective mental representations (or “internal working models”; IWMs) of self and others (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1973, 1980, 1982). People who have received reliably sensitive care tend to form generally positive representations of themselves and others, and they come to strike a balance between attachment behaviors and other kinds of behavior. Following activation of their attachment system, secure individuals tend to engage in proximity seeking and other behaviors that foster a sense of closeness to their attachment figures (who provide what attachment theory calls a safe haven). In times of relative tranquillity, however, they typically shift attention to other aspects of the environment, while using an attachment figure as what attachment theory calls a secure base for exploration.

Individuals who have received generally insensitive care tend to form negative mental representations of themselves and/or others, and develop what Main (1991) called “secondary” or “conditional” attachment strategies (the “primary” strategy being confident proximity seeking). These secondary strategies take two fundamentally different forms. First, following experiences of rejection or neglect, insecure/avoidant individuals tend to defensively reduce their attention to attachment issues or figures and avoid relying on these figures if possible, which is particularly notable in situations that normally activate the attachment system and result in proximity seeking. In other words, the avoidant strategy involves relative deactivation of the attachment system (e.g., Mikulincer & Shaver, 2007). Secondly, having learned to expect inconsistently responsive care from attachment figures, insecure/anxious/ambivalent individuals
tend to maximize their attention to attachment-related information, which motivates hyperactivation of attachment behavior (Mikulincer & Shaver, 2007).

Although attachment behavior and individual differences in the organization of such behavior are most readily observable in infancy and early childhood, the attachment system remains active from cradle to grave (Bowlby, 1973, 1982). Over the course of development and due to concomitant cognitive maturation, key attachment figures’ availability and responsiveness (or the lack thereof) are believed to be internalized and generalized to other relationship partners (Bowlby, 1988; Mikulincer & Shaver, 2001, 2007). Moreover, beyond early childhood, attachment can be studied not only in the form of overt physical behavior but also in terms of, for example, cognitive biases, symbolic representations, and linguistic processes pertaining to attachment (Main, Kaplan, & Cassidy, 1985; Mikulincer & Shaver, 2007). Mikulincer, Gillath, and Shaver (2002) found, for example, that even unconscious exposure to distressing (i.e., attachment activating) words increased adults’ cognitive access to attachment figures’ names in a lexical decision task, but these words did not affect the cognitive accessibility of other people’s names. Similarly, Mikulincer, Hirschberger, Nachmias, and Gillath (2001) found that subliminal exposure to the names of adults’ attachment figures infused formerly affectively neutral stimuli (previously unfamiliar Chinese ideographs) with positive feelings, causing the stimuli to be better liked. This latter experiment indicates a secure base effect; being reminded, even unconsciously, of one’s attachment figure generally leads not only to positive affect but also to a spillover of positive reactions even to neutral stimuli.

Research and theorizing have suggested that a romantic partner, close friend, or some other age-mate is typically the principal attachment figure in adulthood (e.g., Bowlby, 1980; Hazan & Shaver, 1987). Consequently, much research on individual differences in adult
attachment has taken interpersonal rather than parental attachment as the theoretical point of departure. Various self-report questionnaires have been devised to study individual differences in interpersonal attachment. The currently most widely used instrument is the Experiences in Close Relationships inventory (ECR; Brennan, Clark, & Shaver, 1998), which yields scores on two orthogonal dimensions – avoidance of intimacy and emotional dependency (i.e., attachment-system deactivation), and anxiety about an attachment figure’s availability and potential abandonment (i.e., reflecting attachment-system hyperactivation) (Mikulincer & Shaver, 2007). Security is inferred from relatively low scores on both dimensions.

As expected based on attachment theory, scores on the anxiety and avoidance dimensions have often been found to moderate typical or normative attachment effects. For example, following a distress induction, individuals scoring high on avoidance have been found to be slower at accessing the names of attachment figures than individuals scoring low on that dimension (Mikulincer et al., 2002).

**Attachment and Religion**

The idea that the felt or imagined relationship between a believer and God often involves attachment dynamics was first systematically explored by Kirkpatrick (e.g., 1992). Since then, a number of studies designed to test the viability of the attachment viewpoint on religion have supported Kirkpatrick’s religion-as-attachment model (for recent reviews, see Granqvist & Kirkpatrick, 2008, in press; Granqvist, Mikulincer, & Shaver, 2010). Although God is presumed to be omnipresent, people are more motivated to experience closeness to God in situations of distress (i.e., involving attachment-system activation). Importantly, this conclusion is not restricted to people’s explicit self-reports or to situations where they are consciously aware of the source of distress and may control their responses accordingly. For example, using a semi-
projective methodology, researchers have consistently found that from kindergarten age onwards, children place a God symbol closer to a fictional child when the fictional child is in attachment-activating situations than when he/she is in attachment-neutral situations (Cassibba, Granqvist & Costantini, in press; Eshleman et al., 1999; Granqvist, Ljungdahl, & Dickie, 2007). In addition, experiments with adult theists have observed an increase in their wish to be close to God following priming with subliminal separation threats targeting their relationship with their mother or with God, which does not happen to participants in attachment-neutral control conditions (Birgegard & Granqvist, 2004).

Besides the normative religion-as-attachment model, Kirkpatrick (e.g., 1992, 2005) suggested that individual differences in attachment will have important implications for religious development and especially for a person’s perceived relationship with God. Subsequent research has supported this conjecture and helped to delineate two attachment-related pathways to religion (see Granqvist & Kirkpatrick, 2008). One path runs through experiences with sensitive caregivers (called the correspondence pathway by Granqvist & Kirkpatrick, 2008). Based on the correspondence hypothesis, securely attached individuals are expected to develop perceived relations with God that exhibit the attributes of security by virtue of generalizing IWMs of self, parents, and God. This hypothesis has received considerable empirical support (Granqvist & Kirkpatrick, in press). For example, research has linked secure interpersonal attachment with a stable and loving God image (Kirkpatrick, 1998; Kirkpatrick & Shaver, 1992). Similarly, secure interpersonal attachment has been linked to a sense of secure “attachment to God,” where God is viewed as a warm, reliable, and sensitive caregiver (Kirkpatrick & Shaver, 1992). In contrast, insecure/avoidant attachment has been associated with atheism and agnosticism, and with a view of God as distant or controlling (Kirkpatrick & Shaver, 1992).
The other attachment-related pathway to religion begins with controlled or effortful regulation of distress following experiences with insensitive caregivers (the compensation pathway). Individuals on this path tend to have a relationship with God that waxes and wanes over time depending on the current need to regulate distress. For example, individuals with an insecure – and particularly anxious/ambivalent – interpersonal attachment orientation are particularly prone to experience sudden increases in religiousness (Kirkpatrick, 1997, 1998), and these increases are typically embedded in life situations of significant emotional turmoil, most notably relationship-related crises (e.g., Granqvist, 2002; Granqvist & Hagekull, 2003).

A consistent finding from experimental research on the attachment-religion connection is that secure parental attachment and estimated experiences with sensitive caregivers are associated with higher scores on implicit assessments of religion-related constructs, particularly in attachment activating situations. For example, in a study of 5- to 7-year-old children who were asked to place a God symbol at a chosen distance from a fictional child, secure children placed the God symbol closer to the fictional child specifically when the fictional child was in attachment-activating situations (Granqvist et al., 2007). Similarly, across the three experiments conducted by Birgegard and Granqvist (2004), an increase in the use of God to regulate distress was observed following subliminal separation primes among adult believers who had reported experiencing a high degree of sensitive parenting. Findings such as these suggest that secure individuals’ perceptions of God are functional also at an automatic/unconscious/implicit level (cf. Bowlby’s [1973] notion of singular/coherent IWMs and assimilation effects in social cognition research, Wheeler & Petty, 2001).

In contrast, religion-as-compensation for insecure attachment seems to require more controlled/conscious/effortful processing (Granqvist & Kirkpatrick, 2008, in press); for example,
when an anxious individual turns to God as a surrogate figure when his/her habitual insecure strategy has failed following a romantic relationship break-up (cf. contrast effects in social cognition research, Wheeler & Petty, 2001). However, at implicit/automatic levels, the individual might instead shy away from God in line with generalizing IWMs of the self as unworthy of care and others as inaccessible (cf. Bowlby’s [1973] notion of multiple/incoherent IWMs).

**Limitations in the Attachment and Religion Literature**

Although attachment research is rapidly emerging as an important contributor to psychologists’ understanding of religion, there are notable limitations in previous religion-as-attachment research, most of which are true for research in the psychology of religion more generally. First, with the exception of the studies referenced above, previous research has been correlational and has utilized religion assessments that require explicit/conscious processing. This has made it difficult to draw conclusions about the causal direction of connections between attachment and religion variables and to rule out various forms of self-report biases from the assessments of religion constructs.

Secondly, the experimental attachment and religion studies published to date have reported on the potential moderating role of people’s perceived attachment history with parents but not of their current interpersonal attachment. This represents a notable knowledge gap in the literature; as noted, a romantic partner or some other age-mate tends to be the principal attachment figure in adulthood. In addition, and as illustrated by the massive body of research on adult interpersonal attachment (see Mikulincer & Shaver, 2007), one’s current attachment orientation should also be theoretically relevant beyond one’s attachment history with parents.

Third, although the religion-as-attachment model should be applicable across theistic faith traditions that emphasize a personal deity who is portrayed as being personally involved in
the lives of humans, the attachment and religion research conducted to date has almost uniquely involved Christians in the Western world (Granqvist & Kirkpatrick, 2008, in press; for a rare exception, see Pirutinsky, 2009). The extent to which the religion-as-attachment model is, in fact, applicable to other faith traditions, such as Judaism, thus remains largely unknown.

Finally, there is a major conceptual gap in the experimental literature on attachment and religion. The studies published to date have exclusively focused on believers’ proclivity to view and use God as a safe haven when distressed (Birgegard & Granqvist, 2004; Granqvist et al., 2007). If felt security is derived from believers’ attachments to God, then believers should also associate secure base-related attributes with God. Relatedly, no study has addressed whether God-related exposure has positive effects that transfer to other domains, as would be expected if God functions as a secure base (cf. Mikulincer et al., 2001).

**Study 1**

Study 1 was designed to replicate previous correlational findings based on Christian samples in the West, but this time based on an Israeli Jewish sample. In line with the IWM aspect of the correspondence hypothesis, individual differences in interpersonal attachment orientations have been linked to individual differences in attachment to God and image of God. For example, people with a secure interpersonal attachment orientation typically report a secure attachment to God and perceive God as loving and caring, whereas people with an insecure interpersonal attachment orientation typically report an insecure attachment to God and perceive God as more distant or controlling (e.g., Granqvist & Hagekull, 2000; Kirkpatrick, 1998; Kirkpatrick & Shaver, 1992). No relevant study has been published on samples from other countries and faith traditions. Thus, we asked whether previous correlational findings from Christian samples in the West would replicate in a Jewish sample in Israel.
Method

**Participants.** 352 Israeli Jewish students from universities and colleges in the central area of Israel (247 women and 105 men, ranging in age from 17 to 45, $Mdn = 22$) volunteered to participate in the study without monetary compensation. The sample included only participants who believed in God or in any other supernatural entity, because people who did not believe in a supernatural force found it impossible to complete scales concerning image of God or attachment to God. Sixty-one percent of the participants defined themselves as orthodox Jews who observed religious commandments ("mitzvot").

Across the four reported studies, we did not find any significant gender differences on the study variables. Moreover, no significant interaction was found between gender and other predictors in the analyses of participants’ responses across the four studies.

**Materials and procedure.** Participants were randomly approached on various campuses and asked two yes/no questions: (a) whether they believed in God, and (b) whether they believed in any other supernatural entity. Those who agreed to participate and declared belief either in God or in a supernatural force completed the scales on an individual basis (i.e., not in groups). The scales were presented in different random orders to different participants.

Participants’ religiousness was assessed with three different measures: (a) a single-item measure asking participants about their self-definition as religious or non-religious, (b) a 20-item scale (Ben-Meir & Kedem, 1979) that asked participants whether they observed each of 20 major Jewish commandments ($\alpha = .91$), and (c) a 6-item scale (Ben-Meir & Kedem, 1979) that asked participants whether they believed in 6 major Jewish religious beliefs ($\alpha = .85$). We then computed total scores by averaging participants’ answers to the two multiple-item measures, with higher scores reflecting greater religiousness and devotion. Pearson correlations between
the three measures were high, with $r$s ranging from .75 to .89, all $p$s < .01. Thus, we computed a total religiousness score by averaging $z$-scores based on the three measures.

Interpersonal attachment orientations (anxiety, avoidance) were assessed with a Hebrew version of the Experiences in Close Relationships inventory (ECR; Brennan et al., 1998). Participants rated the extent to which each item described their feelings in close relationships on a 7-point scale ranging from “not at all” (1) to “very much” (7). Eighteen items tapped attachment anxiety (e.g., “My desire to be very close sometimes scares people away”) and 18 tapped avoidance (e.g., “I get uncomfortable when someone wants to be very close to me”). The reliability and validity of the scale have been repeatedly demonstrated (see, e.g., Brennan et al., 1998, and studies reviewed by Mikulincer & Shaver, 2007). In the present sample, Cronbach alpha coefficients were high for both the anxiety items (.89) and the avoidance items (.89), so two scores were computed by averaging items on each subscale. The two scores were not significantly correlated, $r(350) = .12, n.s.$

Attachment anxiety and avoidance to God were assessed with a self-report questionnaire constructed especially for this study. Items were generated from Kirkpatrick and Shaver’s (1992) prototypical descriptions of secure, anxious, and avoidant attachment to God, Rowatt and Kirkpatrick’s (2002) 9-item God attachment scale, and items of the ECR scale that were relevant for describing people’s relationship with God. We created 10 items to assess attachment anxiety in relation to God (e.g., “God sometimes seems very warm and at other times seems very cold to me,” “I worry about being rejected or abandoned by God”) and 10 items to assess attachment-related avoidance to God (e.g., “God seems to have little or no interest in my personal problems,” “I prefer not to show God how I feel deep down”). Participants were asked to think about their relationship with God (or any other supernatural force they believed in) and to rate
the extent to which each item described their thoughts and feelings about such a relationship. Ratings were made on a 7-point scale ranging from “not at all” (1) to “very much” (7).

A principal components analysis followed by varimax rotation yielded 2 main factors (with eigenvalues > 1) accounting for 49% of the variance. The first factor included the 10 items designed to tap avoidance toward God and the second factor included the 10 items designed to tap attachment anxiety in relation to God. Cronbach alpha coefficients were high for both dimensions (.90 and .83, respectively). Thus, two scores were computed by averaging items on each subscale. The two God attachment scores were not significantly correlated, $r(350) = -.07$, ns.

God image was assessed with a 15-item questionnaire that included items from three existing measures: Controlling, Loving (Benson & Spilka, 1973), and Distant God (Kirkpatrick & Shaver, 1990). Participants were asked to read a list of 15 adjectives that might be descriptive of God’s qualities (e.g., loving, demanding, rejecting, unavailable, forgiving) and to rate the extent to which each of these adjectives described their own subjective sense of God. Ratings were made on a 7-point scale ranging from “not at all” (1) to “very much” (7).

A principal components analysis followed by varimax rotation yielded 2 main factors (with eigenvalues > 1) accounting for 53% of the variance. The first factor included 10 items depicting security-providing, nurturing, and loving qualities of God (e.g., loving, close, available, comforting, responsive, accepting, forgiving). The second factor included 5 items describing authoritarian, controlling, and demanding qualities of God (harsh, controlling, demanding, strict, bounding). Cronbach alphas for the two scales based on the factors were acceptable (.91 and .70, respectively), allowing us to calculate two scores for each participant by averaging items loading above .40 on a particular factor. Higher scores reflected subjective views of God as a loving and as a controlling figure. The two scores were not significantly correlated, $r(350) = -.11$, ns.
Results and Discussion

To determine the contributions of interpersonal attachment anxiety and avoidance to participants’ image of God and attachment to God, we conducted four 2-step hierarchical regression analyses. In these analyses, participants’ God attachment scores (anxiety, avoidance) and their image of God as loving and controlling were the outcome variables. In the first step of each analysis, we entered religiousness (z-scores) and interpersonal attachment anxiety and avoidance scores as predictors. This allowed us to examine the contribution of interpersonal attachment dimensions beyond a person’s level of religiousness. In the second step, we added the two-way interactions (product terms) between the attachment dimensions and religiousness dimensions.

With regard to attachment to God, religiousness was significantly associated with lower attachment avoidance and higher attachment anxiety toward God (see Table 1). In addition, the two interpersonal attachment dimensions made significant unique contributions to attachment to God. In line with the IWM aspect of the correspondence hypothesis, (a) attachment anxiety in close relationships made a significant positive contribution to attachment anxiety towards God, and (b) attachment avoidance in close relationships made a significant positive contribution to avoidant attachment towards God (see Table 1). Importantly, interpersonal attachment anxiety did not contribute to avoidant God attachment, nor did interpersonal avoidance contribute to anxious God attachment (see Table 1). That is, specific attachment insecurities in close relationships contributed specifically to the corresponding insecurities in participants’ attachment to God. None of the interaction effects were significant.

With regard to image of God, religiousness was significantly associated with an image of God as both more loving and more controlling (see Table 1). In addition, avoidant attachment in
close relationships was significantly associated with lower appraisals of God as loving (see Table 1). No other main or interactive effects were significant (see Table 1).

These findings generally replicate findings from studies of Christian samples in the West (e.g., Kirkpatrick, 1998; Kirkpatrick & Shaver, 1992). In addition, the correlations between interpersonal attachment, attachment to God, and image of God support the IWM aspect of the correspondence hypothesis; internal working models of close relationships seem to be generalized to perceptions of God and one’s perceived relation to God. Another important finding is the relevance of religiousness. Participants who held stronger religious beliefs reported higher levels of God attachment anxiety and lower levels of avoidant attachment to God. They also viewed God as both more loving and more controlling.

**Study 2**

Study 1 showed that previous correlational findings on the attachment-religion connection obtained among Christian samples replicated in a Jewish Israeli sample. However, the findings from Study 1 are open to alternative interpretations in terms of shared-method variance and self-report biases and might reflect conscious processes and controlled responses. In addition, the cross-sectional design of Study 1 prevents us from drawing conclusions about the direction of causality and leaves us unable to rule out extraneous influences.

The aim of Study 2 was to test whether people turn to God as a safe haven following subliminally, experimentally induced distress (i.e., attachment system activation). The reason for using subliminal methodology was to bypass participants’ conscious processes and controlled responses. Birgegard and Granqvist (2004) provided initial experimental evidence for this assumption, finding a modestly increased motivation to be close to God among (mostly) Christian believers who had been primed with subliminal separation threats related to God or
mother. Whether similar effects extend to Jewish (rather than Christian) believers, to actual cognitive access to one’s relationship with God (rather than a mere motivation for closeness to God), and to other distress cues (rather than just separation) are open questions, which the present study was designed to answer.

As Baldwin, Fehr, Keedian, Seidel, and Thomson (1993) have shown, an individual’s dominant schema can be traced by measuring their cognitive accessibility in a lexical decision task (Meyer & Schvaneveldt, 1971). Using such a task, we expected that following priming with distress cues (the words “failure” or “death”), participants would gain cognitive access to God (i.e., words expressing a relation to God were expected to be more easily accessed). We also sought to conceptually replicate findings reported by Mikulincer, Birnbaum, Woddis, and Nachmias (2000), who found that the accessibility of attachment-related and closeness words increased as a function of distress cues.

To estimate whether people’s inclination to turn to God especially in intensely stressful situations (e.g., Pargament, 1997) generalizes to implicit psychological access to God, the experiment included a relatively mild distress prime (“failure”) and a more severe distress prime (“death”). We hypothesized that participants would react faster to words expressing a relationship with God, following priming of distress than following neutral priming. This effect was expected to be especially likely to appear following the severe distress prime.

We also hypothesized that variability in mental access to one’s relationship with God following distress priming would be correlated with the interpersonal attachment dimensions (anxiety, avoidance). Based on the notion of IWM correspondence, participants who are relatively avoidant with respect to interpersonal attachments were expected to react more slowly to words expressing a relation to God following subliminal distress priming, because avoidant
individuals tend to deal with stressful situations by deactivation of their attachment system (e.g., by turning attention elsewhere) and increased self-reliance (e.g., Mikulincer & Florian, 1998; Mikulincer, Florian & Weller, 1993). Regarding attachment anxiety, no predictions were made regarding accessibility during states of distress, because individuals high in anxiety crave emotional support from their attachment figures in many situations, and they also tend to view their attachment figures as insufficiently available when needed (Mikulincer & Shaver, 2007).

Method

Participants. 110 Israeli Jewish students (72 women and 38 men, ranging in age from 17 to 32, $Mdn=23$) participated in the study for course credit or monetary reward. Only participants who spoke Hebrew as their first language and believed in a supernatural entity to some degree were invited to participate. Although it is an interesting question in its own right whether atheists and agnostics also display heightened psychological accessibility to God-related words following threat-priming (this study), or are affected by religious priming effects (Studies 3 and 4, below), we elected to err on the side of caution and include only participants who believed in supernatural personages or entities; for these participants, the relevance of the anticipated priming effects were expected to be more straightforward. Sixty-five percent of the participants defined themselves as orthodox Jewish and as observing religious commandments.

Materials and procedure. After a telephone call, which ascertained that a potential participant met the inclusion criteria (using the same two yes/no questions described in Study 1), he or she was invited to an individual session in a quiet room without distractions, where a computerized lexical decision task was completed. This task was designed to subliminally prime a specific mental representation. In this task, participants read a string of letters and were asked to decide whether or not it constituted a word. The task was run on a Pentium IBM-PC, with an
SVGA color monitor, and was programmed using Superlab software. The letter strings were displayed in black lettering on a white background in the middle of the monitor screen. Participants completed 120 trials. Each trial of the task consisted of a rapid subliminal presentation of the prime (for 20 ms) followed, after a pause of 500 ms, by the presentation of one of 20 target letter strings (for 1000 ms). Participants judged as quickly as possible whether the letter string was or was not a word by pressing “1” on the keyboard number pad if they thought the string was a word or “3” if they thought it was not a word.

Participants were told that each trial would begin with an “x” in the middle of the screen, on which they should keep their eyes focused, followed by a mild flash, which they should ignore, and then, after a brief pause, the target letter string. On each trial, the prime was presented for 20 ms and was then masked with an XXX pattern immediately following its presentation. This was done to counteract the possibility that the afterimage might remain active in peripheral parts of the visual system.

Just before the participants saw the letter string they would judge to be a word or a non-word, they were exposed to one of three primes: a neutral prime (hat), a mild distress prime (failure), or a severe distress prime (death). The target letter strings were divided into three categories: (a) 10 non-words (e.g., tonobkoe, nowdiw), presented in 60 trials; (b) five neutral words (e.g., notebook, window) presented in 30 trials; (c) and five words expressing a relation to God (belief, prayer, devotion, elation and salvation) presented in 30 trials. These words were selected following a pre-test in which 10 participants rated emotional valence and their relevance to their relationship with God. We then chose the words that were most relevant, positive, and without interpersonal meaning. Each word was presented in six trials, twice following each prime. The primes and letter strings were presented in different random orders to different
participants. The words in each category were equally long (in Hebrew). The reaction time in each trial was used as a measure of schema accessibility, with faster reaction time indicating greater accessibility.

We calculated nine RTs for each person according to target word (God-related words, neutral words, and non-words) and prime (severe distress, mild distress, neutral). RTs faster than 300 ms or slower than 1500 ms were omitted, as were erroneous responses (identifying non-words as words or vice versa).

After completing the computerized task, each participant completed some questionnaires. At the end of the experiment, the participants were asked whether they noticed or recognized the prime word. All of the participants were then briefed regarding the study and its main hypotheses.

To assess participants’ religiousness we used the three scales described in Study 1. In the present study, the measures were again found to be reliable (\(\alpha = .92\) and .71) and highly correlated, so we computed a single measure of religiousness by averaging the three z-scores. To measure the two main interpersonal attachment dimensions, we used the ECR (see Study 1) (the \(\alpha\) for both scales was .90). At the end of the experiment, the participants were asked whether they noticed or recognized the prime word. All of the participants were then briefed regarding the study and its hypotheses.

**Results and Discussion**

In examining variations in lexical-decision RTs, we simultaneously considered the unique and interactive effects of priming (severe distress, mild distress, neutral), target word (God-related, neutral, non-word), participants’ attachment orientations (anxiety, avoidance), and religiousness level on participants’ RTs. Because these variables reside at two levels, between-
participants (attachment orientations, religiousness) and within-participants (priming, target word), these effects were examined using Hierarchical Linear Modeling (HLM, Bryk & Raudenbush, 1992). At the lower of the two levels we included two predictors: a dummy variable for priming comparing severe and mild distress primes (+1) to the neutral prime (-1), and a dummy variable for target word comparing God-related words (+1) to neutral words and non-words (-1). Specifically, we looked at the unique and interactive effects of priming and target word on a participant’s RTs. At the upper level of the two-level model we included attachment anxiety, attachment-related avoidance, religiousness, and interactions between each attachment orientation and religiousness. At this level, we examined the contribution of these between-participants variables to (a) variations in a person’s overall RT in the lexical decision task, and (b) the unique and interactive effects of priming and target word. To facilitate interpretation of the results, variables at the upper level (attachment anxiety and avoidance, religiousness) were transformed into z-scores.

In hierarchical linear modeling, the two levels of the analysis are addressed simultaneously in a hierarchically nested data set. This procedure provides independent coefficients for the associations among constructs at the lower level (e.g., within-participant effects of priming, God-related words, and neutral words on RTs) and models them at the upper level (between-participants effects of attachment orientations and religiousness) using maximum likelihood estimation.

At the within-participant level, the HLM analysis revealed a significant interaction between priming and target word, $\gamma = .41, p < .01$. At the between-participants level, a significant avoidance x priming x target word interaction was found, $\gamma = -.34, p < .01$. No other effects were significant. In order to facilitate the interpretation of these effects and provide a more
detailed and systematic examination of our basic predictions, we performed follow-up analyses that separately examined (a) the normative effects of distress priming on accessibility of mental representations of God as a safe haven, and (b) the extent to which attachment orientations and religiousness moderated this effect of distress priming.

**Distress priming and the accessibility of God as a safe haven.** To follow up the examination of within-participant effects and test our predictions about the normative effects of distress priming on the accessibility of God as a safe haven, we conducted a two-way repeated measures ANOVA with prime (severe distress, mild distress, neutral) and target word (God-related, neutral, non-word) as the factors and found the already reported interaction between priming and target word, \(F(4, 218) = 5.24, p < .01, \eta^2 = .07\). Simple main effects tests for repeated measures revealed that prime had a significant effect on RTs only for God-related words, \(F(2, 218) = 18.11, p < .01, \eta^2 = .17\), and not on RTs for neutral words or non-words, \(Fs < 1\). Scheffé post hoc tests for repeated measures revealed that, as compared to the neutral prime, the ”failure” and ”death” primes led to faster detection of God-related words (see Table 2). No significant difference was found between the two distress primes.

Additional simple main effects tests for repeated measures revealed significant differences between target words only following severe (”death”) and mild (”failure”) distress primes, \(Fs = 15.17 \text{ and } 11.84, ps < .01, \eta^2 \text{ of } .15 \text{ and } 10\), and not following a neutral prime, \(F < 1\). Scheffé post hoc tests for repeated measures revealed that participants reacted faster to God-related words than to neutral words and non-words following the severe and mild distress primes but not following the neutral prime (see Table 2).
Overall, the findings support our predictions about God being viewed implicitly as a safe haven. The findings demonstrate that subliminal exposure to distress cues (failure, death) leads to faster recognition of God-related words, but not to non-God-related words or to non-words.

**The contribution of interpersonal anxiety and avoidance.** To follow up the examination of the significant between-participants interactions and test our predictions concerning the moderating role of attachment orientations and distress priming on accessibility of mental representations of God as a safe haven, we conducted a series of regression analyses examining the unique and interactive effects of religiousness and the attachment variables. However, before addressing these predictions, we conducted preliminary regression analyses to determine whether attachment dimensions and religiousness contributed to RTs for neutral words and non-words following each of the three primes (severe distress, mild distress, neutral). These analyses, which were not the focus of the study, revealed no significant effects of the attachment dimensions or of religiousness on RTs for neutral and non-words following any of the primes (severe distress, mild distress, neutral).

To examine the contribution of the attachment dimensions to RTs for God-related words following each of the three kinds of primes (severe distress, mild distress, neutral), we conducted 2-step hierarchical regression analyses similar to those described in Study 1. In each analysis we introduced as covariates RTs for neutral words and non-words following the relevant prime. These covariates were included to control for non-specific individual differences in RTs. Findings indicated no significant main or interactive effects of attachment dimensions or religiousness on RTs for God-related words following neutral primes (see Table 3). However, following severe or mild distress primes, avoidant attachment made a significant contribution to
RTs for God-related words. The more avoidant participants were, the longer they took to detect God-related words. No other main effects or interactions were significant (see Table 3).

In summary, we found a significant contribution of interpersonal attachment orientation to the mental accessibility of God as a safe haven following mild and severe distress primes. The more avoidant participants were, the weaker, or slower, their access to God as a safe haven in the context of implicit distress. Taking all of Study 2’s findings together, we conclude that believers automatically (unconsciously) turn to God following even unconscious reminders of failure and death, but that this self-protective strategy is weakened by an avoidant attachment orientation.

Study 3

Study 2 conceptually extended previous experimental (Birgegard & Granqvist, 2004) and quasi-experimental (Granqvist et al., 2007) findings showing that God tends to be viewed and used as a safe haven in times of distress. However, the provision of a safe haven is only one function provided by an attachment figure. If the attachment-to-God model is valid, then believers should also associate God with other attachment-related functions, such as the secure base function. Bowlby (1973) noted that having an attachment figure with attributes of availability, acceptance, and responsiveness (i.e., a secure base) increases one’s well-being and exploratory inclinations (see also Feeney, 2004, 2010). Study 3 was designed to test whether God priming causes believers to gain implicit, cognitive access to such secure base-related attributes, and whether this is especially marked among people who have a relatively secure interpersonal attachment orientation.

More specifically, Study 3 examined whether individuals with different interpersonal attachment styles have different degrees of access to words describing God as providing a secure base (positive/loving words) or its opposite (negative/controlling words), following priming with
the word “God.” On the basis of hypothesized IWM correspondence, we predicted that participants with a secure interpersonal attachment orientation would show faster reaction times (RTs) to positive/secure base-related words, whereas participants with an insecure interpersonal attachment orientation would show faster RTs to negative/controlling words.

Beyond the effects of interpersonal attachment orientations, we tested whether there is a normative effect of God priming. If the majority of participants view God as a secure base, they should, on average, react faster to positive, secure base-related words following God priming, compared to neutral priming. If they hold a generally negative/controlling image of God, they should react faster to negative words following God priming compared to neutral priming.

**Method**

**Participants.** 79 Israeli Jewish students participated in the study (62 women and 17 men, ranging in age from 20 to 35, $Mdn = 23$) in exchange for a monetary reward. Only participants who spoke Hebrew as their first language and believed in a supernatural entity (see Note 1) to some degree were invited to participate in the experiment. Seventy-seven percent of the participants defined themselves as orthodox Jewish persons who observed Jewish religious commandments.

**Materials and procedure.** After a telephone call, in which we ascertained that a participant met the inclusion criteria (using the two yes/no questions described in Study 1), he or she was invited to an individual session in a quiet room without distractions, where he or she completed a computerized lexical decision task.

This task was programmed like the one described in Study 2. Participants completed 180 trials. On half of the trials, the prime word was “God,” and on the other half of the trials, the prime was a neutral word (“ton”). The target letter strings were divided into four categories: (a)
15 non-words (e.g., tonobkoe, nowdiw), which were presented in 90 trials; (b) five neutral words (e.g., notebook, window), presented in 30 trials; (c) five positive, secure base-related words (e.g., loving, responsive, accepting), presented in 30 trials; and (d) five negative words, related to control and punishment (e.g., controlling, harsh, strict), presented in 30 trials. The words in categories c and d were selected from the God image scales described in Study 1. The primes and letter strings were presented in different random orders to different participants. The words in each category were of equal length (in Hebrew). The reaction time on each trial was used to measure the accessibility of the schema, with faster reaction times indicating greater accessibility.

We calculated eight RTs for each participant, based on type of target word (positive/secure-base words; negative words; neutral words; and non-words) and prime (God; neutral). RTs faster than 300 or slower than 1500 ms were omitted, as were erroneous responses (identifying non-words as words, or vice versa).

After completing the computerized task, each participant completed two scales. In order to assess participants’ religiousness, we used the three scales described in Study 1. In this study as well as in that one, the measures were reliable (αs = .87 and .72, respectively) and highly correlated, so we created a single measure by averaging the three z-scores. In order to assess interpersonal attachment orientations, we had participants complete the ECR scales (see Study 1). Cronbach alphas were high for both avoidance (.88) and anxiety (.90). At the end of the experiment, participants were asked whether they had noticed or recognized the prime word. All participants were then debriefed regarding the study and its main hypotheses.

Results and Discussion
In examining variations in lexical-decision RTs, we simultaneously considered the unique and interactive effects of God (versus neutral) priming, target word (positive, negative, neutral, non-words), participants’ attachment orientations (anxiety, avoidance), and religiousness on participants’ RTs. As in Study 2, because these variables reside at two levels, between-participants (attachment orientations, religiousness) and within-participants (priming, target word), these effects were examined using HLM.

At the lower of the two levels we included three predictors: priming (God, neutral) and two dummy variables for target word, one comparing positive words (1) to neutral words and non-words (-1), and the other comparing negative words (1) to neutral and non-words (-1). All of these variables were nested within participants. Specifically, we looked at the unique and interactive effects of God (versus neutral) priming, positive words, and negative words on a participant’s RTs. At the upper level of the two-level model we included attachment anxiety, attachment-related avoidance, religiousness, and interactions between each attachment orientation and religiousness. At this level, we examined the contribution of these five between-participants variables to (a) variations in a person’s overall RT in the lexical decision task, and (b) the unique and interactive effects of priming, positive words, and negative words on RTs. To facilitate interpretation of the results, variables at the upper level (attachment anxiety and avoidance, religiousness) were transformed into z-scores.

The HLM analysis revealed that both within-participant and between-participants variables contributed significantly to RTs. At the within-participant level, the analysis revealed significant main effects for positive words and negative words, $\gamma$s of -.41 and -.47, $p < .01$, and a significant interaction between priming and positive word, $\gamma = .32$, $p < .01$. At the between-participants level, a significant attachment anxiety x priming x positive words interaction wasa
found, $\gamma = -.29, p < .01$, as was a significant avoidance x priming x negative words interaction, $\gamma = -.24, p < .05$, and a significant avoidance x religiousness x priming x negative words interaction, $\gamma = .21, p < .05$.

To facilitate the interpretation of these effects and provide a more detailed and systematic examination of our basic predictions, we performed follow-up analyses that separately examined (a) the normative effects of God priming on accessibility of positive and negative mental representations, and (b) the extent to which attachment orientations and religiousness moderated these effects of God priming.

Normative effects of God priming. To examine the within-participant effects and test our predictions about the normative effects of God priming, we conducted a two-way repeated measures ANOVA for priming (God, neutral) and target word (positive, negative, neutral, non-word) and found the already reported significant interaction between priming and target word $F(3, 234) = 2.76, p < .05, \eta^2 = .06$. Simple main effect tests for repeated measures revealed that prime had a significant effect on positive/secure-base words, $F(1, 234) = 9.38, p < .01, \eta^2 = .12$. Participants reacted faster to positive/secure base words following the God prime than following the neutral prime (see Table 4). No significant prime effect was found for negative words, $F(1, 234) = 0.09$, neutral words $F(1, 234) = 1.94$, or non-words $F(1, 234) = 0.03$. Overall, the findings imply that the implicit cognitive presence of God (God priming) elicits positive, secure-base-related associations in a believer’s associative memory network.

The contribution of interpersonal attachment anxiety and avoidance. To examine the significant between-participants interactions and test our predictions concerning the role of attachment orientations in moderating the effects of God priming on accessibility of positive and negative mental representations, we conducted a series of regression analyses examining the
unique and interactive effects of the attachment variables and religiousness. However, before addressing these predictions, we conducted preliminary analyses to determine whether the attachment dimensions contributed to RTs for words and non-words following the neutral prime as well as to RTs for neutral words and non-words following God priming. These analyses, which were not the focus of the study, revealed no significant effects of the attachment dimensions or of religiousness.

To examine the key relation between interpersonal attachment scores and RTs for positive and negative target words following God priming, we conducted two 2-step hierarchical regression analyses examining the unique and interactive effects of the attachment variables and religiousness on RTs for positive and negative words following the God prime. The regressions were similar to those described in Study 1. In each analysis, we also included the following covariates: RTs for neutral words and non-words following the God prime, and RTs for words from the same category (positive or negative) following the neutral prime. These covariates were included to control for non-specific individual differences in RTs.

The regression for RTs on positive/secure-base related words revealed significant unique effects of attachment anxiety and avoidance. The more avoidant or anxious participants were, the slower were their RTs to positive/secure-base related words following God priming (see Table 5). No other effects or interactions were significant.

The regression for RTs for negative words revealed a significant unique effect of avoidant attachment. The more avoidant participants were, the faster were their RTs to negative words following God priming (see Table 5). In addition, the interaction between avoidant attachment and religiousness was significant in predicting RTs to negative words. No other effects were significant (see Table 5).
To examine the source of the significant 2-way interaction, we adopted Aiken and West’s (1991) suggestions and computed two regression lines for RTs for negative words as a function of attachment-related avoidance, separately for participants with relatively high religiousness (1 SD above the mean) and participants with relatively low religiousness (1 SD below the mean). When religiousness was high, the unique contribution of avoidant attachment to RTs for negative words following God priming was significant, $\beta = -0.37, p < .01$. When religiousness was low, however, the contribution of avoidant attachment was not significant, $\beta = -0.05, n.s.$

In summary, the findings indicate that more secure individuals (indicated by lower scores on anxiety and/or avoidance) have faster access to a positive/secure-base God schema, whereas avoidant individuals, and especially highly religious avoidant individuals, have faster access to a negative/controlling God schema. Thus, it seems that religiousness strengthens the link between avoidant attachment and access to negative features of God.

Notably, in this study, we did not test whether God-related priming increases believers’ well-being or exploratory inclinations (i.e., reflecting a use of God as a secure base; cf. Feeney, 2004, 2010). Rather, we tested whether God-related priming increases believers’ psychological access to secure-base-related attributes themselves (i.e., reflecting an implicit view of God as a secure base). In Study 4, we tested an additional corollary of the proposition that God functions as a secure base for many believers (by arousing positive affect that can be transferred to a previously neutral stimulus).

**Study 4**

Study 3 showed that participants, especially relatively secure participants, gained access to secure-base-related attributes following God priming. However, as many studies in the field of attachment have shown, internal working models of attachment are not merely cognitive. They
also carry an affective load, which is activated when the IWMs are activated in memory (Collins, 1996). This has been referred to as the affective component of the secure base schema by Mikulincer and colleagues (2001). If God functions as a secure base for believers, then being exposed to God-related material might give rise to positive affect that transfers to other stimuli. The goal of Study 4 was to examine more directly the affect aroused in participants when their relation to God becomes accessible through a Jewish-religious symbol. In contrast with other religions that use visual symbols of God and other spiritual figures (e.g., Jesus, the Virgin Mary) to arouse religious emotions and concretize religious figures, the Jewish religion strictly forbids the use of such symbols, and requires believers to refer to God in abstract terms only. Still, there are sacred objects (e.g., the Torah scroll) and places (e.g., the Temple) through which the believing Jew may feel closer to God.

Study 4 was designed to examine the effect of subliminal priming with a Jewish-religious symbol (a Torah scroll) on participants’ affective state, using an affective priming paradigm (Murphy & Zajonc, 1993). In this task, participants are asked to rate their feelings for neutral stimuli (Chinese ideographs) following affective or neutral priming. Murphy and Zajonc (1993) found that participants rated Chinese ideographs as more likeable when the participants had been primed with positive stimuli. Priming of secure-base providers and symbols related to a secure base has yielded the same kind of effect (Banse, 1999; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). In Study 4 we explored the possibility that a religious symbol, the Torah scroll, would have the same kind of effect on liking for Chinese ideographs, and that this effect might be influenced by interpersonal attachment orientations and religiousness. We predicted that highly religious participants would react more positively following priming with a religious symbol and thus would rate Chinese ideographs more favorably. On the grounds of
IWM correspondence (i.e., generalization of positive IWMS), the same prediction was made for participants with a relatively secure interpersonal attachment orientation.

Method

Participants. 78 Israeli Jewish students participated in the study (59 women and 19 men, ranging in age from 18 to 29, \( Mdn = 22 \)), and received course credit or a monetary reward for participating. Only participants who believed in a supernatural entity to some degree were invited to participate. Fifty-six percent of the participants defined themselves as orthodox Jewish and as observing Jewish religious commandments.

Materials and procedure. After a telephone call, which ascertained that a participant met the inclusion criteria (using the same two yes/no questions described in Study 1), he or she was invited to an individual session in a quiet room without distractions, where he or she completed a computerized affective priming task (Murphy & Zajonc, 1993). The task consisted of 45 trials and was run on a Pentium PC, with an SVGA color monitor. Brightness and contrast were set low and the primes and target figures were displayed in black on a white background in the middle of the screen.

Each trial consisted of a subliminal presentation (22 ms) of one of three picture primes (religious, neutral, no picture) that was immediately followed by the presentation of a randomly selected Chinese ideograph (for 2000 ms). Participants rated the extent to which they liked the ideograph on a 7-point scale, ranging from “not at all” (1) to “very much” (7). Ratings were indicated by pressing a number from 1 to 7 on a keyboard number pad. When a rating was entered, the corresponding ideograph vanished and, after a 2-sec pause, the next trial began.

The primes were a picture of a Torah scroll for religious priming, and a neutral book for neutral priming. Both pictures were rated in a pretest as positive, but the Torah scroll picture
aroused feelings of sanctity, spirituality, joy, and awe whereas the book picture aroused feelings of seriousness, studying, and interest. The pictures were drawn in simple black lines, and were taken from an illustrated dictionary for children. Each prime was presented in 15 successive trials. The order of the three primes was random. The primes were followed by backward masking with an abstract drawing, which appeared for 500 ms immediately following the subliminal primes.

After completing the computerized task, each participant completed two questionnaires. To assess participants’ religiousness we used the three scales described in Study 1. In the present study as well, the measures were reliable (αs = .91 and .76) and highly correlated, so we computed a single measure of religiousness by averaging the three z-scores. To assess interpersonal attachment orientations, we again used the ECR (see Study 1) (αs were .89 and .90 for anxiety and avoidance). At the end of the experiment, the participants were asked whether they noticed or recognized the prime word. All of the participants were then debriefed regarding the study and its hypotheses.

Results and Discussion

In examining variations in liking ratings, we simultaneously considered the unique and interactive effects of priming (religious, neutral, no prime), participants’ attachment orientations (anxiety, avoidance), and level of religiousness. Because these variables reside at two levels, between-participants (attachment orientations, religiousness) and within-participants (priming), these effects were examined using an HLM analysis similar to that reported in Study 2. At the lower of the two levels we included two predictors of liking ratings: a dummy variable comparing religious prime (+1) to no prime (-1), and a dummy variable comparing neutral prime (+1) to no prime (-1). At the upper level of the two-level model we included attachment anxiety,
attachment-related avoidance, religiousness, and interactions between each attachment orientation and religiousness. At this level, we examined the contribution of these between-participants variables to (a) variations in a person’s overall liking rating, and (b) the effects of religious and neutral priming.

At the within-participant level, the HLM analysis revealed a significant effect for the dummy variable comparing the religious prime to no prime, $\gamma = .31, p < .01$. No significant effect was found for the dummy variable comparing neutral prime to no prime, $\gamma = .14$. Participants liked the Chinese ideographs presented after the religious prime better than those presented after the neutral prime or no prime (see Table 6). That is, priming with a religious symbol aroused positive affect in religious participants, and this positive affectivity was projected onto previously neutral Chinese ideographs.

At the between-participants level, a significant interaction between avoidance and religious prime was found, $\gamma = -.29, p < .01$. No other effects were significant. Simple Slope Effects tests revealed that participants liked the Chinese ideographs presented after the religious prime better than those presented after no prime only when attachment-related avoidance was relatively low ($-1SD$), $\gamma = .60, p < .01$, but not when avoidance was relatively high, $\gamma = .02$. In addition, these tests revealed that more avoidant participants were less prone to like the Chinese ideographs following religious priming, $\gamma = -.43, p < .05$, but not following no prime, $\gamma = .15$.

In summary, the findings indicate, first, that subliminal priming with a religious symbol (a Torah scroll) automatically elicited positive affect (as indicated by greater liking of previously neutral stimuli). Second, there was a significant link between interpersonal avoidance and affective reactions to an implicitly presented religious symbol, suggesting that positive responses to the religious symbol were weaker among more avoidant individuals.
**General Discussion**

Our findings support the application of attachment theory to religion in Jewish samples. This support included both normative (i.e., general) and individual-difference aspects of attachment. Regarding normative aspects, priming with threat heightened participants’ mental access to their relationship with God (Study 2), priming with the word “God” heightened their mental access to positive, secure-base-related concepts (Study 3). Finally, subliminal priming with a religious symbol heightened participants’ liking of previously neutral stimuli (Study 4).

Regarding individual differences in interpersonal attachment, the findings from all four studies supported the IWM aspect of the correspondence hypothesis (Granqvist & Kirkpatrick, 2008) and were in line with Bowlby’s (1973) idea that working models based on a few close relationships generalize. First, based on the correlational data in Study 1, avoidance in interpersonal relations was associated with avoidance in relation to God and to a relatively unloving conception of God, whereas anxiety in interpersonal relationships was associated with anxiety in relation to God. Secondly, the interpersonal attachment dimensions moderated the normative effects in our experiments (Studies 2-4). Specifically, more avoidant individuals had slower mental access to God as a safe haven following mild and severe threat priming (Study 2); slower access to positive, secure-base-related words but faster access to negative (controlling) words following God priming (Study 3); and lower liking of previously neutral stimuli following priming with a religious symbol (Study 4). In sum, and in line with the idea of avoidance as a deactivating attachment strategy, interpersonal avoidance reduced the normative effects described above. In contrast, the predictive power of attachment anxiety was limited to slower access to positive, secure-base-related words following God priming (Study 3).
All of these effects withstood statistical controls for level of religiousness and responses to theoretically irrelevant material (e.g., RTs to neutral priming and RTs on neutral target words). In addition, with one exception (discussed below), the results were not qualified by interactions (e.g., with religiousness). Viewed across studies, the results support the idea that God is generally experienced as a safe haven (Study 2) and a secure base (Studies 3 and 4) even in believers’ implicit processing. These findings are highly similar to those previously reported in the adult attachment literature with reference to people’s relationships with human attachment figures (e.g., Mikulincer et al., 2001, Mikulincer et al., 2002). The present studies thus constitute an important extension of the general adult attachment literature in social psychology (Mikulincer & Shaver, 2007). Based on our findings, we concur with Kaufman (1981) that the idea of God is indeed the idea of an absolutely adequate attachment figure, although the extent to which a relationship with God provides an implicit safe haven and secure base is reduced by interpersonal attachment insecurities, especially avoidance.

Interestingly, although belief in a supernatural entity was an inclusion criterion in all of our studies, implying that the range of differences in religiousness was likely somewhat restricted compared to the range in the general population, religiousness was still associated significantly with some of the dependent variables. For example, more religious participants reported lower avoidance but higher anxiety in their relationship with God, and perceived God as both more loving and more controlling than less religious participants. These findings suggest either that self-reports of one’s relationship with God and one’s God image are somewhat confounded by level of religiousness (cf. Cassibba et al., in press), or that highly religious participants have a more nuanced, perhaps even conflicted, relationship with and representation of God (cf. Cassibba et al., 2008). In addition, the link between avoidance and faster access to
negative/controlling concepts following God priming was observed only among highly religious participants (Study 3). Not surprisingly, these findings suggest that high religiousness strengthens attachment-related differences in responses to religious priming, as would be expected if religiousness indicates high salience of religious schemas (e.g., McIntosh, 1995).

However, unlike interpersonal attachment security, high religiousness did not facilitate cognitive access specifically to God as a safe haven following threat primes (Study 2) nor to positive, secure-base-related concepts following God priming (Study 3), nor did it affect the liking of previously neutral material following priming with a religious symbol (Study 4). Also unlike attachment security, being raised in a religious vs. a secular home does not predict children’s sense of closeness to God specifically in attachment-activating situations (Cassibba et al., in press; Granqvist et al., 2007). This is presumably because some religious individuals harbor negative working models of attachment. Like other attachment figures, God is presumably implicitly perceived as inaccessible when needed (Study 2) and as controlling and negative rather than supportive (i.e., unsatisfactory as a secure base, Studies 3 and 4) by these religious individuals.

Like other studies on connections between attachment and religion that have focused on implicit processes (e.g., Birgegard & Granqvist, 2004; Cassibba et al., in press; Granqvist et al., 2007), our studies consistently supported the IWM aspect of the correspondence hypothesis. These findings contrast with what would be expected if the compensation hypothesis were relevant to the situations we studied. As previously noted (Granqvist & Kirkpatrick, 2008, in press), insecure individuals seem to have psychological access to God primarily when engaging in explicit/controlled processing, and particularly when facing distress at such high levels of intensity that it causes their fragile insecure/conditional strategy to break down – that is when
God may become an appealing surrogate attachment figure for them. For people scoring higher on avoidance, this may occur, for example, in the context of emotional crises or when a romantic relationship breaks up (e.g., Granqvist & Hagekull, 2003), whereas subliminal priming seems to encourage avoidant individuals’ implicit use of habitual deactivation strategies.

Although studies of implicit processes are still infrequent in the scientific study of religion, they have gained increasing importance in recent years – for example, in studies of religion-related forms of terror management (i.e., managing fear of death; see Vail, Rotschild, Weise, et al., 2010) and studies of altruistic behavior (e.g., Pichon, Boccato, & Saroglou, 2007; Shariff & Norenzayan, 2007). Along with previous experiments (Birgegard & Granqvist, 2004), the present studies provide evidence for the relevance of attachment-related mechanisms and mental representations. The present studies also indicate that attachment may function both as a cause (e.g., when attachment activation triggered by a threat causes heightened accessibility of one’s mental representation of God) and an effect (e.g., when religious priming causes heightened access to secure base-related concepts and positive affect) in relation to religious constructs.

Regarding methodological considerations, the present studies have some notable strengths. First, being performed in Israel (rather than in the US or Europe) with Jewish (rather than Christian) participants, these studies provide new evidence of external (cross-cultural and cross-religion) validity of the attachment-religion connection. Second, the use of experimental designs (Studies 2-4) and inclusion of appropriate covariates made it possible to disentangle causal relations and to address the specificity of effects. Thus, we may conclude that threat priming increases mental access to one’s relationship with God, that God priming increases one’s psychological access to positive/secure-base-related concepts, and that priming with a religious
symbol causes previously neutral stimuli to be better liked. Third, the use of subliminal priming and lexical decision tasks counteracts tendencies for desirable responding and controlled processing, allowing us to address the unconscious, unadjusted workings of believers’ minds.

Naturally, given our efforts to assure the internal validity of our experimental studies (Studies 2-4), questions may be raised about external and ecological validity. These issues suggest additional research. Regarding external validity, for example, it is an open question whether our particular findings would replicate in populations with comparatively low base rates of threat and/or religiousness (e.g., in some European welfare states; cf. Gill & Lundsgaarde, 2004). The Israeli situation, with notably high base rates on both parameters, may have amplified the effects under consideration. The operative mechanisms linking religion to secular aspects of attachment may be activated particularly frequently in the Israeli context, and thus may become sensitized and particularly “trigger happy” within this context. Thus, we encourage researchers to discover whether our findings are replicable in other contexts and populations, including non-Judeo-Christian populations and participants who explicitly deny beliefs in supernatural agents (i.e., atheists and agnostics).

Similarly, questions may be raised about the representativeness of subliminal priming effects in an individualized lab setting. Messages pertaining to attachment and religion perhaps occur most often supraliminally and in interpersonal contexts. Other researchers are therefore encouraged to use supraliminal priming and to design field experiments to test the reproducibility of our findings in ecologically valid contexts. However, as supraliminal priming may facilitate controlled rather than automatic/implicit processing, such studies might lend support to the compensation hypothesis rather than the hypothesis that IWMs are often
generalized across kinds of relationships (contrast vs. assimilation effects; Wheeler & Petty, 2001).

Although we placed great emphasis on internal validity, some of our findings are open to alternative explanations. For example, Study 2’s effect of death priming and access to God-related concepts along with Study 3’s effect of God-priming and access to positive, secure base-related concepts, could be explained in terms of semantic priming (Neely, 1977) rather than affective priming (Murphy & Zajonc, 1993). (That is, semantic activation of mental categories related to life after death and God’s alleged traits might have influenced our results.) Because death reminders increase mortality salience, which in turn might motivate people to think of God in order to achieve immortality (Vail et al., 2010), the effect of death priming in Study 2 could reflect a terror management rather than an attachment activation mechanism.

However, neither of those alternative explanations would seem to account for Study 2’s "failure-God” association, because failure is not semantically tied to God, nor should it increase mortality salience. In addition, control (e.g., the Ten commandments) and punishment (e.g., hell) are also among God’s alleged traits. The fact that God-priming did not lead to generally faster detection of negative/controlling concepts in Study 3 goes against the alternative semantic priming explanation. Moreover, no alternative, non-attachment account would predict a moderating or inhibiting effect of interpersonal avoidance, or that avoidance would facilitate access specifically to negative/controlling concepts following God priming. Thus, while encouraging future research that is explicitly designed to pin alternative explanations against one another, we conclude that an account based on attachment-related mechanisms and mental representations provides the most parsimonious explanation of our findings as an integrated whole.
In the present studies, we investigated the predictive implications of individual differences in interpersonal attachment orientations. We encourage research on the predictive implications of individual differences in other attachment relationships. For example, perceived attachment history with parents has yielded conceptually similar results to our findings based on threat priming (Birgegard & Granqvist, 2004). Attachment to parents may also produce the effects of interpersonal attachment on psychological access to secure-base-related concepts and the liking of previously neutral material following religious priming. Regarding attachment to God, and although narrowing the conceptual frame, the predictive implications of individual differences in one’s perceived attachment to God would seem particularly relevant for studies of the attachment-religion connection.

Regarding the measurement of attachment, scores on attachment questionnaires may partially reflect self-report biases and limited self-awareness. However, as illustrated in these studies and elsewhere, such measures may still be used to predict theoretically relevant implicit responses to unconscious priming, suggesting that they are not limited to self-report biases and the like (relatedly, see Mikulincer & Shaver, 2007). Nevertheless, other researchers may wish to replicate our findings with more implicit modes of attachment assessment as well, such as the Adult Attachment Interview (Main, Goldwyn, & Hesse, 2003).

Although two of our studies (Studies 3 and 4) were designed to test implicit secure-base-related effects, at least one key aspect of God as a secure base remains for future experimental studies to test, namely whether believers actually explore more freely, autonomously, and confidently following exposure to God-related material (cf. Feeney, 2004, 2010). Correlational research suggests that they might. For example, intrinsic religiousness (or religion as one’s main motive in life) has been linked consistently to a sense of personal mastery and control (Batson,
Schoenrade, & Ventis, 1993). However, the direction of effects and whether this conclusion holds also at implicit levels of processing cannot be determined from that research.

As demonstrated in the present studies and elsewhere, there is now sufficient evidence to conclude that many believers’ relationships with God function as symbolic attachments, even at implicit levels of processing. Therefore, the time is ripe for researchers to flip the research task around from studying the effects of ”secular” attachment on religiously relevant outcomes, which has been typical of most prior research, to studying the effects of religious attachment on secular aspects of functioning. Given the centrality of religion for many important interindividual and intergroup processes, ranging from conflicts to altruistic behavior, we especially encourage researchers to investigate effects of attachment-related religious priming on antisocial and prosocial behaviors. Such priming may profitably emphasize either rejecting/authoritarian or sensitive/nurturant attributes of God to help illustrate the great variety of psychological effects that religion, including its attachment-related components, is likely to have also on secular aspects of functioning.
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Table 1

Regression Model for God Attachment and God Image as Predicted by Religiousness, Interpersonal Attachment Dimensions, and Their Interactions

<table>
<thead>
<tr>
<th></th>
<th>God Attachment Anxiety</th>
<th>God Attachment Avoidance</th>
<th>Loving God</th>
<th>Controlling God</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>β</td>
<td>r</td>
<td>β</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religiousness</td>
<td>.18**</td>
<td>.17**</td>
<td>-.54**</td>
<td>-.53**</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.38**</td>
<td>.40**</td>
<td>.13</td>
<td>.03</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.15**</td>
<td>.10</td>
<td>.16**</td>
<td>.14**</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety x Avoidance</td>
<td>.05</td>
<td>.04</td>
<td>-.04</td>
<td>.02</td>
</tr>
<tr>
<td>Anxiety x Religiousness</td>
<td>.01</td>
<td>.11</td>
<td>-.11</td>
<td>.09</td>
</tr>
<tr>
<td>Avoidance x Religiousness</td>
<td>.09</td>
<td>.06</td>
<td>-.06</td>
<td>.04</td>
</tr>
<tr>
<td><strong>F (6, 345)</strong></td>
<td>11.64**</td>
<td>24.13**</td>
<td>15.98**</td>
<td>8.04**</td>
</tr>
<tr>
<td><strong>R² (%)</strong></td>
<td>19.2</td>
<td>33.1</td>
<td>25.1</td>
<td>14.4</td>
</tr>
</tbody>
</table>

Notes: ** p < .01
Table 2

Means and SDs for Lexical Decision RTs as a Function of Target Stimuli and Prime Category

<table>
<thead>
<tr>
<th></th>
<th>God-related words</th>
<th>Neutral words</th>
<th>Non-words</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutral prime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( M )</td>
<td>640.75</td>
<td>632.97</td>
<td>646.51</td>
</tr>
<tr>
<td>( SD )</td>
<td>82.73</td>
<td>81.47</td>
<td>72.84</td>
</tr>
<tr>
<td><strong>Mild Distress (&quot;Failure&quot;) Prime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( M )</td>
<td>598.63</td>
<td>636.37</td>
<td>634.57</td>
</tr>
<tr>
<td>( SD )</td>
<td>79.94</td>
<td>86.79</td>
<td>73.74</td>
</tr>
<tr>
<td><strong>Severe Distress (&quot;Death&quot;) Prime</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( M )</td>
<td>593.33</td>
<td>643.32</td>
<td>637.99</td>
</tr>
<tr>
<td>( SD )</td>
<td>76.12</td>
<td>74.92</td>
<td>77.71</td>
</tr>
</tbody>
</table>
Table 3

Regression Model for RTs for God-Related Words Following Different Primes as Predicted by Religiousness, Interpersonal Attachment Dimensions, and Their Interactions

<table>
<thead>
<tr>
<th></th>
<th>Neutral Prime β</th>
<th>Mild Distress Prime β</th>
<th>Severe Distress Prime β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT neutral word</td>
<td>.29**</td>
<td>.23*</td>
<td>.28**</td>
</tr>
<tr>
<td>RT non-word</td>
<td>.08</td>
<td>.05</td>
<td>.03</td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religiousness</td>
<td>-.10</td>
<td>-.11</td>
<td>-.14</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.08</td>
<td>-.07</td>
<td>-.06</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.05</td>
<td>.37**</td>
<td>.29**</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety x Avoidance</td>
<td>-.05</td>
<td>-.10</td>
<td>-.12</td>
</tr>
<tr>
<td>Anxiety x Religiousness</td>
<td>-.01</td>
<td>.01</td>
<td>-.06</td>
</tr>
<tr>
<td>Avoidance x Religiousness</td>
<td>.09</td>
<td>-.02</td>
<td>.06</td>
</tr>
<tr>
<td>F (8, 101)</td>
<td>1.77</td>
<td>2.42*</td>
<td>2.14*</td>
</tr>
<tr>
<td>R² (%)</td>
<td>12.6</td>
<td>16.1</td>
<td>14.5</td>
</tr>
</tbody>
</table>

Notes: * p < .05; ** p < .01
Table 4
Means and SDs for Lexical Decision RTs as a Function of Target Stimuli and Prime Category

<table>
<thead>
<tr>
<th>Prime</th>
<th>Target Stimuli</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive</td>
<td>Neutral</td>
<td>Negative</td>
</tr>
<tr>
<td>God prime</td>
<td></td>
<td>601.79</td>
<td>640.74</td>
<td>658.96</td>
</tr>
<tr>
<td></td>
<td>$M$</td>
<td>601.79</td>
<td>640.74</td>
<td>658.96</td>
</tr>
<tr>
<td></td>
<td>$SD$</td>
<td>126.80</td>
<td>108.62</td>
<td>122.35</td>
</tr>
<tr>
<td>Neutral prime</td>
<td></td>
<td>625.23</td>
<td>630.20</td>
<td>661.39</td>
</tr>
<tr>
<td></td>
<td>$M$</td>
<td>625.23</td>
<td>630.20</td>
<td>661.39</td>
</tr>
<tr>
<td></td>
<td>$SD$</td>
<td>105.99</td>
<td>110.92</td>
<td>107.95</td>
</tr>
</tbody>
</table>
Table 5

Regression Model for RTs in Relation to Positive and Negative Words Following God Prime as Predicted by Religiousness, Interpersonal Attachment Dimensions, and Their Interactions

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Positive Words</th>
<th>Negative Words</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>β</td>
</tr>
<tr>
<td>RT neutral word/God priming</td>
<td>.27*</td>
<td>.44**</td>
</tr>
<tr>
<td>RT non-word/God priming</td>
<td>.05</td>
<td>.11</td>
</tr>
<tr>
<td>RT target word/neutral priming</td>
<td>.45**</td>
<td>.27*</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religiousness</td>
<td>-.11</td>
<td>-.02</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.18**</td>
<td>.03</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.34**</td>
<td>-.21**</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety x Religiousness</td>
<td>.09</td>
<td>-.03</td>
</tr>
<tr>
<td>Avoidance x Religiousness</td>
<td>.12</td>
<td>-.16*</td>
</tr>
</tbody>
</table>

\[ F (8, 70) = 25.54^{**} \]
\[ R^2 (%) = 22 \]
\[ R^2 (%) = 19 \]

Notes: * p < .05; ** p < .01
Table 6

Means and SDs for the Likeability of Chinese Ideographs as a Function of Prime Category

<table>
<thead>
<tr>
<th>Prime</th>
<th>Religious</th>
<th>Neutral</th>
<th>No prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likeability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>3.96</td>
<td>3.72</td>
<td>3.61</td>
</tr>
<tr>
<td>$SD$</td>
<td>0.94</td>
<td>0.94</td>
<td>0.89</td>
</tr>
</tbody>
</table>