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DOI: 10.1177/0146167204264266

The online version of this article can be found at:
http://psp.sagepub.com/cgi/content/abstract/30/9/1122
The Correspondence Between Attachment to Parents and God: Three Experiments Using Subliminal Separation Cues

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Attachment theoretical studies have increased our understanding of the socioemotional foundations for religious development. However, because these studies have been correlational and based on self-reports, they are vulnerable to concerns of self-presentation bias and lack of basis for causal inference. Three subliminal stimulation experiments were therefore performed, where activation of the attachment system was attempted by way of unconsciously administered separation stimuli. In Experiments 1 and 3 (N = 29 and 89), the separation stimulus alluded to God, and in Experiment 2 (N = 47), it alluded to mother. Responses were moderated by perceived attachment history with parents in all experiments. Participants with secure histories increased in religious attachment behaviors, whereas those with insecure histories decreased following attachment system activation compared with control stimulation. There also were suggestions of experimental group increase in proximity seeking in relation to God. The main conclusion supports correspondence between internal working models of parents and God.

Keywords: attachment; religiosity; normative aspects; individual differences

Attachment theory, as formulated by Bowlby (1969, 1973) and extended by Ainsworth (Ainsworth, Blehar, Waters, & Wall, 1978) and others (see Cassidy & Shaver, 1999), is by now perhaps the leading relationship-oriented paradigm in mainstream social and developmental psychology. Using unconsciously administered stimuli, three experiments were conducted to test the consequences for religiosity of unconscious attachment system activation. To activate the attachment system, participants were subliminally exposed to separation stimuli. Results support current theory on attachment and religiosity but also suggest that refinements to current theory are needed.

ATTACHMENT AND RELIGION: NORMATIVE ASPECTS

In most Western religious traditions and in attachment research, the religious individual’s close relationship with a personal God is central (see Kirkpatrick, 1999). However, according to Bowlby’s normative attachment framework, the term “attachment relationship” does not refer to all types of close relationships but exclusively to relationships that meet four criteria: proximity maintenance, safe haven, secure base, and separation distress (Hazan & Zeifman, 1999). The present study is based on the assumption that these four criteria are reasonably met in the believer’s relationship with God. Hence, it is suggested that aspects of attachment function in a similar way for the believer in relation to God as they do for the child in relation to his or her parents, that is, they serve the function of obtaining/maintaining a sense of felt security in the face of distress (Sroufe & Waters, 1977).

There are several means available for the religious individual to establish a sense of proximity or closeness to God, such as utilizing symbols, engaging in rituals, and prayer (Kirkpatrick, 1999). Regarding the safe haven aspect of attachment, one of the best documented findings in the psychology of religion is that believers turn to God in situations of distress. Such situations are diverse and include loss through death and divorce (Granqvist &
ATTACHMENT AND RELIGION: INDIVIDUAL DIFFERENCES

Empirical studies have investigated religiosity either in relation to individual differences in perceived attachment history with parents (e.g., Granqvist, 1998, 2002; Granqvist & Hagekull, 1999, 2002, 2003; Kirkpatrick & Shaver, 1990) or current romantic attachment orientation (Byrd & Boe, 2000; Granqvist, 2002; Granqvist & Hagekull, 2000, in press; Kirkpatrick, 1997, 1998; Kirkpatrick & Shaver, 1992). Results from these studies have documented more consistent and robust associations between attachment history with parents and religiousness than between romantic attachment and religiousness (see Granqvist, 2002; Granqvist & Hagekull, 2002). Two general hypotheses have been formulated (Granqvist, 2002) to account for this state of affairs.

First, the two-level correspondence hypothesis states that social learning of the attachment figure’s religiousness in the context of a secure attachment relationship is the primary mechanism underlying the religiousness of securely attached individuals (the level of socialized correspondence). Repeated experiences with sensitive caregivers also produce correspondence between a positive model of self/others and an image of God as loving and caring (the level of internal working model [IWM] correspondence; see also Kirkpatrick, 1998, 1999). Accordingly, studies have shown that the religiosity of individuals with a secure history is relatively strongly positively linked to the religiosity of their parents (Granqvist, 1998, 2002; Granqvist & Hagekull, 1999, 2002; Kirkpatrick & Shaver, 1990). Supporting IWM correspondence, the image of God that believers with a secure history have is likely to be one of a loving and caring, as opposed to a distant, God (Granqvist & Hagekull, 2002; cf. Kirkpatrick, 1998; Kirkpatrick & Shaver, 1992; Rohner, 1986). Recent findings indicate stability of attachment (Fraley, 2002) as well as influence of parental attachment on subsequent relationships due to stable memory representations (Roisman, Madsen, Henninghausen, Sroufe, & Collins, 2001), which would be consistent with correspondence between mental models of parents and God.

Second, the emotional compensation hypothesis states that the religiousness of insecurely attached individuals stems from affect regulation strategies to obtain or maintain a sense of felt security, in which God may fill a surrogate attachment function. Previous findings have indicated that the religiosity of individuals with an insecure history tends to fluctuate over time, particularly in stressful life circumstances (Granqvist, 1998, 2002; Granqvist & Hagekull, 1999, 2002, 2003; Kirkpatrick & Shaver, 1990). The image of God held by people with an insecure attachment history is also more distant and less loving, which again may imply IWM correspondence (Granqvist & Hagekull, 2002; Kirkpatrick, 1998; Kirkpatrick & Shaver, 1992; cf. Rohner, 1986).

At present, the response of people with secure and insecure attachment histories to separation cues is an open question. Based on the emotional compensation hypothesis, separation cues might be expected to lead to attachment system activation and religious attachment behaviors primarily among individuals with an insecure history, insofar as these individuals use God as a surrogate attachment figure to regulate attachment-related affects. On the other hand, the two-level correspondence hypothesis suggests that religious behaviors following attachment system activation will be present pri-
ATTACHMENT AND RELIGION: A CRITIQUE

Two serious methodological concerns can be raised against the attachment and religion studies published to date. First, the early studies were all based on self-report assessments, either of perceived attachment history with parents or of current romantic attachment orientation. Such self-reports are vulnerable to response biases such as social desirability and impression management, and the associations observed in relation to self-reported religiosity may partly reflect shared method variance. To address some of these concerns, the present study used subliminal stimuli to activate the attachment system. The present method entails a few 5-ms exposures of short phrases to participants (e.g., Patton, 1992; Sohliberg, Billinghurst, & Nylén, 1998; Sohliberg, Birgegard, Czartoryski, Ovefelt, & Strömbom, 2000). Used previously to activate relational schemas (Sohliberg & Birgegard, 2003) and associative networks (Sohliberg, Claesson, & Birgegard, 2003), this method is useful for activating associations surrounding relationships, including attachment issues (Gonzalez da Silva, 1998; Nevell, 1999). Subliminal activation of associative networks, such as internal working models, bypasses conscious inhibition of associations and obviates self-presentation biases with regard to the manipulation (Bornstein, 1992, 1999).

Research utilizing subliminal perception methodology also has been undertaken explicitly to activate the attachment system by means of separation primes (Mikulincer, Gillath, & Shaver, 2002). In their study, the mental accessibility of attachment figures generally increased in the context of separation, supporting the normative tenets of attachment theory. However, individual differences in adult romantic attachment moderated these effects so that people with a relatively secure romantic attachment had easier access to their attachment figures than did insecurely (particularly avoidantly) attached individuals (cf. Fraley, Garner, & Shaver, 2000; Fraley & Shaver, 1997, 1998; Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Simpson, Rholes, & Nelligan, 1992).

The second methodological problem is the sole reliance on correlational studies, where the presumed causal relation between attachment and religiosity cannot be inferred. Controlled experiments are necessary to make possible the study of true causal relations. A third, theoretical problem with the attachment and religion research is that it has derived primarily from individual differences’ perspective of attachment theory and has largely neglected normative aspects of the theory. Many of the principal findings in the psychology of religion may be interpreted along normative lines (see Kirkpatrick, 1999), but studies that derive a priori predictions from the normative attachment framework also are needed. As demonstrated by Mikulincer et al. (2000, 2002), normative attachment effects can be meaningfully studied experimentally.

THE PRESENT STUDIES

Three experimental studies were conducted to test effects on religiosity of unconscious attachment system activation. Subliminal separation stimuli were used to activate the participants’ attachment systems. The first and third used God (“God has forsaken me”) and the second used mother (“mother is gone”) as the attachment figure from whom separation was primed.

In Experiment 1, we investigated whether priming separation resulted in attachment behaviors in relation to God (i.e., regardless of individual differences in attachment history). Attachment behaviors were operationalized as emotionally based religiosity (Granqvist & Hagekull, 1999), a construct that captures affect regulation strategies with direct reference to the individual’s relationship with God. We also analyzed interaction effects between attachment system activation and attachment history. Opposing theoretical possibilities have been outlined: Individuals with a secure attachment history may react with increased emotionally based religiosity due to having an image of God as sensitive (i.e., corresponding to their IWMs of self and others). Contrarily, individuals with an insecure history may increase in religiosity in line with the notion of God as a compensatory attachment figure.

EXPERIMENT 1

Method

PARTICIPANTS

Thirty-one participants, recruited from the Department of Theology and a Christian student society, volunteered to participate in the experiment. One of the participants was excluded due to a perceptual threshold value equal to the critical 5-ms exposure time and one declined to go through with the laboratory session, making final N = 29. Fifteen participants were randomly assigned to the “People are walking” (PAW; 10 women, 5 men; Mage = 25.4 years, SD = 5.4) and 14 to the “God has forsaken me” group (GOD; 5 men, 9 women; M age = 23.3 years, SD = 4.5). There were no significant age differences between groups, t(1, 28) = 1.13, p = .27. Partici-
pants were compensated with a cinema voucher worth 50 Swedish crowns (around U.S.$6).

**MEASURES**

*Inclusion measure.* We assessed Theistic Beliefs by letting presumptive participants indicate on a six-step response scale (1 = strongly disagree, 6 = strongly agree) the extent to which they agreed with the single statement, “God is a living, personal being who is interested and involved in human lives and affairs.” This measure was adapted from Kirkpatrick and Shaver (1990). Besides two scores of 5 and one of 4, all respondents scored 6 on this measure (M = 5.8, SD = .45). One participant failed to respond to this scale. Excluding this person from the analyses had no marked effects, and other data, such as the Emotionally Based Religiosity Scale (EBRS) pre (see below), indicated a high degree of religiosity in this individual.

**PREDICTOR MEASURE**

*Attachment history.* Hazan’s (1990) mother and father prototypes were used as measures of perceived attachment history with parents, but instead of forced-choice classifications, we used continuous ratings of each prototype (cf. Granqvist, 2002; Granqvist & Hagekull, 1999, 2002, 2003). As shown in Table 1, the measure consists of four prototypes per parent, describing prototypical parental behavior in each of four child-parent attachment patterns (the fearful prototype is presumed to be the conceptual counterpart of disorganized/disoriented attachment). Each prototype is rated on a 1-to-7 scale (1 does not at all apply, 7 = applies very well).

The eight items of the Attachment History measure were combined to form a generic measure (with security prototype ratings reversed in coding). There were several reasons for this. A priori reasons were that (a) a p value Bonferroni adjustment for eight analyses with the present sample size would seriously limit statistical power; (b) a similar attachment history questionnaire has previously been found to be unidimensional according to factor analysis (Granqvist, 2002); and (c) both mother and father seem to have affected people’s relationship with God qua attachment figure (see Granqvist, 1998; Granqvist & Hagekull, 1999, 2002, 2003). An additional, post hoc reason was that the combined measure showed satisfactory reliability; internal consistency for the combined Attachment History scale was α = .76. High scale scores denote perceived attachment experiences with insensitive parents in childhood and low scale scores refer to corresponding experiences with sensitive parents.

**OUTCOME MEASURES**

*Emotionally based religiosity.* The EBRS (Granqvist & Hagekull, 1999) was used to tap the affect regulating functions of turning to and maintaining contact with God and religion to obtain/maintain a sense of felt security. This measure conceptually covers the four defining aspects of attachment relationships: proximity seeking, safe haven, separation distress, and secure base. Previous findings have indicated high reliability, in terms of internal consistency, for this measure (Granqvist, 2002; Granqvist & Hagekull, 1999). The EBRS has been validated by findings showing scale scores to increase over time following separation in romantic relationships, although moderated by individual differences in attachment (Granqvist & Hagekull, 2003). Also, meta-analytic results of seven studies show that people who have experienced sudden religious conversions, which typically occur in the context of life stress, score higher on this scale than people who have not (Granqvist & Kirkpatrick, in press). The scale consists of 10 items on 6-point response scale (1 = strongly disagree, 6 = strongly agree). The scale was split into two halves, EBRS pre and EBRS post, both consisting of 5 items per scale (see Table 2). Items were sorted to each scale based on scale scores in previous studies (Granqvist, 2002; Granqvist & Hagekull, 1999), in which no significant mean differences were observed and in which each scale displayed satisfactory internal consistencies. In EBRS pre, Items 4 and 5 in Table 2 were excluded due to low item-total correlations in the present sample. Alphas for the final pre and post EBRS halves were .82 and .76, respectively. In the present study, the pre and post halves were used to compute regression residual change scores (i.e., from pre to post) for each participant, yielding a final EBRS change score (four participants, two in each condition, had missing values on EBRS and were therefore excluded from subsequent analyses).

**TABLE 1:** Hazan’s (1990) Four Attachment History Prototypes Rated on a 1 to 7 Scale

<table>
<thead>
<tr>
<th>Prototype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td>She (He) was generally loving and understanding. She (He) was good at knowing when to be helpful and when to let me do things on my own.</td>
</tr>
<tr>
<td>Dismissing</td>
<td>She (He) was generally fine but not very affectionate. She (He) taught me at an early age to be independent and self-sufficient.</td>
</tr>
<tr>
<td>Preoccupied</td>
<td>She (He) was generally loving but not as understanding as I would have liked. She (He) loved me but didn’t always show it in the best way.</td>
</tr>
<tr>
<td>Fearful</td>
<td>She (He) was generally unpredictable and sometimes even hurtful. She (He) had her (his) own problems and they sometimes got in the way of her (his) ability to take care of me.</td>
</tr>
</tbody>
</table>
Early Memories Test. Participants had 4.5 min to recall and briefly describe memories from before the age of 14. They were then asked to rate each memory for hedonic tone on a scale from –7 to 7. These ratings are used to calculate an indirect mood score, based on findings that people in a positive or negative mood remember more positive or negative events, respectively. This measure has often been used in subliminal activation studies (e.g., Sohlberg et al., 1998) because it has been shown that self-report mood is inappropriate for measuring the effects of subliminal activation stimuli (Weinberger, Kelner, & McClelland, 1997).

PROCEDURE

The Attachment History and the pre-session EBRS scales were given to participants in an envelope at recruitment, with instructions to complete them at home and bring the envelope to the laboratory session. Upon arriving at the laboratory, participants were randomly assigned to receive multiple subliminal exposures to one of two phrases. The stimuli were as follows: “God has forsaken me” (Gud har övergivit mig in Swedish; equivalently translatable as “God has abandoned me”) and “People are walking” (Folk promenerar in Swedish; a standard, relatively neutral control stimulus designed to allude to other people but not to a specific significant other). Tachistoscopic presentation of the stimuli was done by way of a PsyTec tachistoscope (Persona AB, Stockholm, Sweden), an apparatus equipped with a contoured eyepiece connecting directly to a 80 × 55-mm screen onto which the text is projected approximately 100 mm from the participants’ eyes. Optical lenses between screen and slide create a virtual viewing distance of 600 mm. The room was lit with only a dim table lamp during exposures so that a minimum of light would enter if a participant moved his or her head and momentarily lost contact with the eyepiece. Participants were instructed to focus on the center of the screen, aided by faint points of light at the corners. Subliminal exposures were six 5-ms exposures 10 s apart, and the experimenter said “now” before each exposure. Regular projection slides were used to present the stimuli, printed in uppercase letters. The experimenter was blind to which stimulus they presented to individual participants. The Early Memories Test (EMT) was then administered, followed by EBRS post.

After the exposures, participants were asked what, if anything, they had seen in the tachistoscope, and their answers were recorded. Subsequently, an ascending threshold task was used as a second way of ensuring that the critical exposures were not conscious to participants. In this task, stimuli are presented tachistoscopically and the exposure time is gradually increased. Participants are asked to report what they see each time. When they report seeing something structured (e.g., “a line”), no further stimulations are given and the exposure duration is defined as their threshold for supraliminal perception. Exposures well below a “subjective threshold” (Cheesman & Merikle, 1986) appear to satisfy meaningful demands for unawareness; if participants cannot report seeing anything at the critical exposure duration, and only at much longer durations report seeing anything structured, we claim they are unaware of stimulus content. To avoid any lasting effects of the experimental manipulation (cf. Sohlberg & Birgegard, 2003), both subliminal counterexposures (“Secure with God”) and a full debriefing were performed. The latter was done through a letter (to retain double blindness) given to each participant, together with the cinema voucher, at the end of the session. There they were told what they had been exposed to (including counterexposures), as well as the purpose of the study, and they were invited to contact the project leaders if they had any questions. The laboratory session took about ½ hour per participant.

### Table 2: The Split Emotionally Based Religiosity Scale (EBRS), Pre and Post Halves

<table>
<thead>
<tr>
<th>EBRS Pre</th>
<th>EBRS Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel most content when I experience a close communion with God.</td>
<td>6. I turn to God when am in pain.</td>
</tr>
<tr>
<td>2. When I experience situations of crisis I feel that God’s accessibility is important if I am to handle the situation.</td>
<td>7. I may feel worried or insecure when God is not accessible.</td>
</tr>
<tr>
<td>3. When I am under mental stress (e.g., during moments of sadness or anxiety), I may feel an urgent need for God’s support.</td>
<td>8. I strive to maintain closeness to God.</td>
</tr>
<tr>
<td>4. I pray to God particularly when I find myself in difficulties.</td>
<td>9. When I feel lost I find support in my religious faith.</td>
</tr>
<tr>
<td>5. I would experience grief if I knew that I could never get in touch with God again.</td>
<td>10. My religious faith helps me to feel less lonely.</td>
</tr>
</tbody>
</table>

**DESIGN**

A between-subjects design was used where participants were randomly assigned to Stimulus conditions (PAW n = 15, GOD n = 14) with Attachment history as predictor and EMT mood and EBRS Change as outcome variables. The laboratory session was individual for each participant. The experimenter was blind to which stimulus was administered to each participant and lighting was kept low and constant during subliminal exposures. The same information was given to all groups approached for recruitment, and during the session, a manuscript was used to ensure equal treatment of all participants (e.g., if participants asked a question, a standard reply was used to defer any dialogue until the end of the session, or standard instruction replies were given if needed).

**STATISTICAL ANALYSIS**

Interaction hypotheses were evaluated using standard multiple regression analyses. In utilizing all the available information, this approach is superior to ANOVA if continuous moderator variables are included in the design (Cohen & Cohen, 1983). The stimulus conditions were dummy coded (GOD = 1, PAW = 0). The aggregated Attachment History scores were standardized and the Stimulus x Attachment History product was used to carry the interaction information. Regions of significance, where the groups are predicted to be different 95% of the time, were computed (Aiken & West, 1991) to see whether meaningful differences were present at both ends of the Attachment History predictor. Main effects were analyzed using standard t tests. Univariate and bivariate outliers were defined a priori as those having standard scores or standardized residuals, respectively, beyond ±2.5 (StatSoft, 1994). Cohen’s d effect sizes (Cohen, 1988) were calculated for the main effects and compared with the criteria for small (d = .20), medium (d = .50), and large (d = .80) effects. All significance tests were two-tailed.

**Results**

First, there was an unexpected significant difference between groups on the aggregated Attachment History predictor measure such that the GOD group had a lower insecurity score, $t(23) = –2.60, p = .02^3$.

**MAIN EFFECTS**

There was no main effect of Stimulus on EBRS Change, $t(27) = –1.40, p = .17$ (one GOD outlier excluded). Mean for GOD was .34 ($SD = .88$) and PAW $M = –.10$ ($SD = .80$) and the difference represents a medium effect size of $d = .53$ (Cohen, 1988). A near-outlier in the GOD group may have skewed this result, and when that participant was excluded, the effect was slightly smaller, $t(26) = –.97, p = .34$, and $d = .38$, a small effect.$^4$ There was no Stimulus main effect on EMT mood, $t < 1$.

**INTERACTION EFFECTS**

The interaction of Stimulus and Attachment History on EBRS Change, where main effects of Stimulus and Attachment History were partialled out, was significant; Std. Coeff. = –.69, $t(22) = –3.09, p = .006$. One bivariate outlier was excluded from the GOD group. Compared with the PAW condition, higher scores on Attachment History (more insecurity) were associated with decrease in EBRS in the GOD group and lower scores (less insecurity) were associated with an increase in the GOD group (i.e., a crossing interaction, see Figure 1).

We computed regions of significance (Aiken & West, 1991, p. 135) for this interaction and found that scores less than 3.0 and greater than 4.1 in Attachment History were associated with significant differences in EBRS Change as a result of Stimulus. This result should be treated with caution, however, because no participant in the GOD group scored higher on Attachment History than 4.1 in the present sample. There was no Stimulus x Attachment History interaction on EMT mood, $t < 1$.

**SUBLIMINALITY**

In controlling for subliminality, two measures were taken. Participants were first asked to report what, if anything, they had seen in the tachistoscope during the critical exposures. No participant reported having seen anything resembling the critical stimulus, then an ascending threshold task was used to investigate at what exposure duration participants see anything resembling the critical stimulus. The threshold for the PAW group was 99 ms ($SD = 179$) and for the GOD group it was 50 ms ($SD = 40$), well above...
the 5-ms critical exposure duration. There was no significant difference between groups, \( t(26) = 1.01, p = .32 \).

**Discussion**

Although the small sample size demands that results be replicated before any real interpretation can be forwarded, there were some notable findings. First, no significant main effect on EBRS Change was found, but a small-to-medium effect size (depending on near-outlier exclusion) was found for an increase in the GOD group. We decided to test the theoretically important idea of normative attachment system activation again in a larger sample and we decided to examine a different dependent measure. The emotionally based religiosity scale was originally created to tap trait-like aspects of the individual’s affect regulatory use of God, referring not only to the immediate goal of attachment system activation (i.e., proximity) but also to other aspects of attachment, such as the secure base phenomenon. Given the separation stimulus used here, proximity seeking should be the prototypical attachment behavior, whereas the general view of the attachment figure as reliable or not is better conceptualized as trait-related. Therefore, in our second experiment, we included an additional outcome measure designed to more specifically capture state proximity seeking in relation to God. A main effect increase in such proximity seeking would imply that God may validly be seen as serving the function of an attachment figure.

The second finding of the present study was the significant Stimulus \( \times \) Attachment History interaction. In the GOD condition compared to the PAW condition, individuals with low (less insecure) Attachment History scores reacted with EBRS increases, and persons with insecure scores reacted with decreases. The latter specification should be treated with caution because the present GOD group contained participants who reported relatively low levels of insecurity. This result nevertheless points to the two-level correspondence hypothesis, which states that individuals with a secure history may have developed IWMs of self as worthy of care and of God as reliable in times of need. As noted in the Introduction, the image of God that people with insecure attachment histories have has been shown to be less loving as well as more distant and unstable (e.g., Granqvist & Hagekull, 2002; cf. Kirkpatrick, 1997, 1998). Evidence of IWM correspondence in response to unconscious separation cues may thus be present at both ends of the Attachment History scale.

The emotional compensation hypothesis may explain results using self-reports, for example, people with insecure attachment characteristics increase more in religiosity following romantic attachment relationship dissolution (Granqvist & Hagekull, 2003). Unconscious provocation, however, may prevent the use of God as a reliable attachment-like figure for individuals with an insecure attachment history. Emotional compensation for an unreliable attachment relationship with the parents may be a strategy that demands controlled processing. In the present context, the well-learned IWMs of individuals with a more secure history may automatically and even in response to unconscious provocation effectively allow them to regulate affect through attachment behaviors directed at God. People with a more insecure history, however, may not have internalized God as a “good enough” attachment figure. This does not mean that God is less of an attachment-like figure for individuals with insecure histories. Indeed, the fact that attachment-related attributes are affected (EBRS) implies that such attachment themes capture important aspects of God for such individuals. It does appear to mean, however, that the possibility for unconscious affect regulation through God is moderated by attachment history.

Results did not show effects of Stimulus or the Attachment History \( \times \) Stimulus interaction on EMT mood. A suggestion could be that whereas mood-congruent autobiographical recall is a robust finding in sad or depressed states, findings concerning anxiety are more mixed (Eich & Macaulay, 2000; Levy & Mineka, 1998; Macaulay, Ryan, & Eich, 1993). Attachment system activation, which is hypothesized to produce primarily anxiety (e.g., Bowlby, 1969), may therefore not be well targeted by a mood measure. Fear/anxiety has been reported instead to cause perceptual vigilance but to have no consistent memory effects (Macaulay et al., 1993). Previous studies using EMT have not been specifically aimed at activating anxiety (e.g., Sohlberg et al., 1998).

In our second study, we chose to attempt a design aimed at the main theoretical suggestion: the idea of overlapping God- and parent-IWM’s affecting responses to unconscious attachment system activation. As noted above, a different experimental stimulus was therefore used, targeting a parent IWM instead of God. Mother was chosen as the target figure in Experiment 2, even though father may be equally interesting in future studies. If it could be shown, then, that similar effects in relation to God were produced by a parental separation stimulus, the idea that childhood attachment and the relationship with God are connected through related IWMs would receive further support.

**EXPERIMENT 2**

A second, slightly larger experiment was carried out with a conceptually similar aim, namely, to study effects on the use of God to regulate separation-related affects, but with attachment system activation targeting participants’ relationships with their mothers rather than their
relationships with God. Parental IWMs guide responses in relation to God following a subliminal phrase designed to activate the attachment system. If that is the case, then a subliminal stimulus activating the attachment system in relation to the parents should yield similar results as one activating the attachment system in relation to God. If attachment history with the mother was insecure, then God should not be available for affect regulation of unconscious threat. Instead, as in Experiment 1, such participants should inhibit attachment behaviors in relation to God (i.e., EBRS decrease). For participants with a secure history, however, an increase should be observed, similar to Experiment 1, that is, a crossing interaction between Stimulus and Attachment History. For the new Wish for Proximity to God measure (WPG), the same interaction pattern was expected, and we also tested a main effect of Stimulus condition.

**Method**

**PARTICIPANTS**

Sixty-three people volunteered for this study from the Theological Department at Uppsala University, from a theological college, from a local church student union, and from a church choir. Nine people either chose not to go through with participation or could not be reached to schedule the laboratory session. Of 54 participants who took part in the laboratory session, 2 were excluded due to technical problems and 5 due to a Theistic beliefs’ score of less than 4. The remaining 47 participants were 30 women and 17 men with an average Theistic beliefs’ score of 5.68 (SD = .59). Twenty-three participants were randomly assigned to the experimental group (n = 23; 13 women, 10 men; M age = 24.5 years, SD = 5.4) and 24 to the control group (n = 24; 17 women, 7 men; M age = 26.9 years, SD = 8.3). There was no significant age difference between the groups, t(45) = 1.17, p = .25.

**MEASURES, MATERIALS, PROCEDURE, AND STATISTICAL ANALYSIS**

The measures, procedure, materials, and statistics were the same as in Experiment 1, with four differences. First, only Attachment History with mother was used in analyses (although father also was rated as part of data collection) because mother was the attachment target alluded to in the experimental stimulus. Cronbach’s alpha for the combined Attachment History with mother scale was .71. Second, the EMT mood measure was not included in this experiment because no difference was found in Experiment 1 and because, as discussed above, this measure may be inappropriate in the present context. Third, an additional measure designed to operationalize proximity seeking in relation to God was included both pre- and postexperimental stimulation, yielding residual change scores. This measure was expressly designed to be a state measure, with the instruction asking participants to think about how they felt at that moment. They were asked to rate completions to the sentence, “Right now I feel that . . .” with, for instance, “. . . I want to seek closeness with God” for how closely they described what the participant was feeling. Pretesting 14 items on 16 people with a belief in a personal God, and homogeneity testing in the present sample, yielded a scale consisting of 12 items (see Table 3), scored on 7-point response scales (1 = strongly disagree, 7 = strongly agree). One item was excluded in the present sample due to low item-total correlation and the final 11-item scale was used in analyses. The measure achieved high alphas of pre = .91 and post = .92. The postadministration of this measure was inserted immediately after tachistoscopic exposures. One participant filled out the preadministration of this measure incompletely and was therefore dropped from analyses concerning WPG Change.

Finally, given the theoretical foundation of the correspondence hypothesis and the support for it in Experiment 1, tests were one-tailed for the interaction in Experiment 2. Alphas for EBRS pre and post were .75 and .81, respectively. EBRS pre consisted only of four items in this experiment because one item (Item 4 in Table 2) had a low item-total correlation and was therefore dropped.

**DESIGN**

The design was identical to Experiment 1 apart from the differences noted above. The experimental stimulus was “mother is gone” (Mamma är borta in Swedish; “mamma” is translatable as either “mommy” or “mother”) and the control phrase was again “people are walking.” Participants completed the same questionnaires prior to the laboratory session, with the addition of the WPG measure. The postexperimental counter-exposures were “I am secure” (jag är trygg in Swedish), and the reward was the same: a cinema voucher.

**Results**

**MAIN EFFECTS**

Similar to Experiment 1, there was no significant main effect of Stimulus on EBRS Change, t(45) = 1.52, p = .14, two-tailed. The MOTHER group mean was .15 (SD = .70), and PAW M = -.15 (SD = .64), representing a small effect size of d = .44. On the new WPG measure, the MOTHER stimulus produced marginally higher change scores, t(41) = 1.94, p = .06, two-tailed, with an effect size of d = .61. Mean for MOTHER was .24 (SD = .47), and PAW M = -.24 (SD = 1.07).

**INTERACTION EFFECTS**

As in Experiment 1, the interaction of Stimulus and Attachment History on EBRS Change was significant,
Std. Coeff. = –.32, \( t(42) = –1.79, p = .04 \), one-tailed (one outlier excluded from the MOTHER group). Again, higher scores on Attachment History (more insecurity) were associated with EBRS decrease, and lower scores with EBRS increase, in the MOTHER group compared with the PAW group, a crossing interaction (see Figure 2). Computing regions of significance, we found that scores less than 2.7 and greater than 3.4 in Attachment History are associated with significant differences in EBRS Change as a result of Stimulus. Both cutoff scores are within the observed ranges for the MOTHER and PAW groups. The independent interaction between stimulus and Attachment History on WPG was not significant, \( t < 1 \).

**SUBLIMINALITY**

No participant reported seeing anything resembling the stimuli at the critical exposures. Mean threshold for PAW was 61 ms (\( SD = 46 \)) and for MOTHER was 69 ms (\( SD = 60 \)).

**Discussion**

The attempt to activate similar concerns in participants as in Experiment 1 using a different stimulus was largely successful. The Stimulus × Attachment History interaction on EBRS Change was found again. Thus, a relatively secure attachment history allows for the use of God as an attachment-like figure, whereas a more insecure history is linked to inhibition of attachment in relation to God. Even though mother was the abandoning figure in Experiment 2, effects ensued in relation to God. The new WPG measure showed a marginally significant main effect increase in the experimental group. This result is consistent with the assumption in attachment theory that separation from an attachment figure should occasion attachment system activation, of which the prototypical manifestation is proximity seeking. Taken as a whole, the present findings imply that abandonment themes activate state-like proximity seeking regardless of attachment history but affect emotional regulation in times of stress differently depending on attachment history.

Some caveats are in order, however. First, a different experimental stimulus was used and different sets of ratings comprised Attachment History. The finding that the central results are reproduced may be seen as a source of robustness in the general interpretation of related IWMs, but nonetheless, both studies should be replicated before firm conclusions are warranted. Furthermore, the WPG measure did not yield the expected interaction, only a marginal main effect. The obvious first objection to the measure was that it was new and untested. Although high alphas were found for both pre- and post scales, we have no independent means of investigating the validity of the measure. The correlation between premeasures of WPG and EBRS was \( r = .41 \) (\( p < .01 \)), and between EBRS Change and WPG Change it came out at \( r = .39 \) (\( p < .01 \); data not shown). This may suggest both some validity and yet a meaningful difference, but what exactly is tapped by WPG cannot be fully

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<td>a. Items are reversed.</td>
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<td>b. This was excluded in Experiment 1 due to low item-total correlation.</td>
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| 3. I want to share my thoughts with God. |
| 4. I want to seek closeness with God. |
| 5. I feel independent in relation to God.a |
| 6. I want to show affection toward God. |
| 7. I want to turn to God for solace. |
| 8. I want to share my feelings with God. |
| 9. I want to show God my love. |
| 10. I don’t have a very strong need for support from God.a |
| 11. I want to ask God for protection. |
| 12. I don’t have a very strong need for contact with God.a |
| 13. I want to seek security with God. |
| 14. It feels uncomfortable to seek contact with God.b |

**Table 3:** The Wish for Proximity to God (WPG) Scale in Its Final Form

**Figure 2** Regression slopes for Attachment History and EBRS Change for the PAW and MOTHER groups of Experiment 2.

**NOTE:** Regions of significance are within the scale range: \(<2.7\) and \(>3.4\) on Attachment History; significant differences can be expected as a function of Stimulus. EBRS = Emotionally Based Religiosity Scale, PAW = “People are walking.” MOTHER = “Mother is gone.”

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ascertained using the present data. Speculatively, perhaps the immediate state need for proximity seeking is, as Bowlby (1969) states, a universal mechanism, whereas individually different ways of relating to attachment figures are better conceptualized as trait factors. For individuals with secure attachment histories, both proximity seeking and increasing other attachment components in relation to God are available as affect regulation mechanisms in response to unconscious provocation. In individuals with insecure histories, the latter is unavailable. Proximity seeking, being a primary and prototypical consequence of attachment system activation, may thus still ensue for individuals with insecure histories, while at the same time they evidence their attachment insecurity by perceiving God as less reliable. Although preliminary, these speculations point to possible distinctions between mechanisms in reaction to unconscious stimuli.

EXPERIMENT 3

In the third experiment, the same basic question was addressed, with a few additions. The experimental stimulus was “God has forsaken me” (GOD) as in Experiment 1, but unlike Experiment 1, the WPG measure was included, enabling study of the normative hypothesis with this stimulus. Furthermore, two additional control groups were included besides “people are walking” (PAW) to investigate the specificity of the necessary stimulus characteristics for the obtained findings. Is the entire phrase, “God has forsaken me” necessary or does the mere (unconscious) mention of God or separation alone suffice to activate the attachment system, with resulting attachment-related effects in relation to God? The control “God has many names” (NAMES) was chosen to include God but not activate the attachment system because no separation cue is present. We assumed such a phrase to be nonthreatening to a theistic believer, containing a cue as to God’s presence but not provoking anxiety. The second new control was “Nothing has forsaken me” (NOTHING), which we assumed to be sufficiently impersonal to be nonthreatening even though a separation cue is present. These phrases were included to see if the entire phrase, including reference both to the attachment figure and to separation from that attachment figure, are necessary to account for our findings. Hypotheses followed the previous results and the rationale developed to account for them. Crossing interactions were predicted concerning the effect of Stimulus × Attachment History on EBRS Change, where each Experimental group versus Control group contrast was analyzed separately, making for three multiple regressions. EBRS also was tested for main effects, although we had no firm expectation of such findings. For the WPG measure, no interaction was predicted for each Experimental versus Control contrast, but main effects were analyzed.

Method

One hundred and thirteen participants volunteered at recruitment from the Department of Theology and two different Christian student organizations in Uppsala, Sweden. Eight of the recruited chose not to go through with the laboratory session, 10 were excluded due to technical problems, 2 due to procedural errors, and 4 due to Theistic beliefs’ scores less than 4. Final N was 89, with 51 women and 38 men with a mean Theistic beliefs’ score of 5.8 (SD = .53). The participants were randomly assigned into four groups: 23 in the “God has forsaken me” group (GOD, 10 men, 13 women; M age = 24, SD = 4.7); 23 in the “people are walking” group (PAW, 10 men, 13 women; M age = 25.9, SD = 7.3); 22 in the “God has many names” group (NAMES, 10 men, 12 women; M age = 26, SD = 6.7); and 21 in the “nothing has forsaken me” group (NOTHING, 8 men, 13 women; M age = 25, SD = 6.7). There was no significant age difference between the groups, F(1, 88) = .045, p = .75. The experiment was carried out similar to Experiment 2 with the exception of the stimuli used and the postexperimental counterexposures, which were “Secure with God” as in Experiment 1. Also, for WPG, all 12 original items were included in analyses and internal consistencies were pre = .86 and post = .87. EBRS had consistencies of pre = .69 (Items 4 and 5 excluded due to low item-total correlation) and post = .71 (Item 2 excluded) and the Attachment history predictor (again including both parents as in Experiment 1) had alpha = .75.

Results

MAIN EFFECTS

There was no significant main effect of Stimulus on EBRS compared with any of the three control groups; t’s ranged from .00 to .14 and ps from .89 to 1.00. Mean for the GOD group was –.02 (SD = .47), PAW M = .00 (SD = .40), NAMES M = .02 (SD = .52), NOTHING M = .00 (SD = .77), and no effect size was greater than d = .04. Thus, the GOD stimulus did not produce a main effect increase in emotionally based religiosity.

There was no significant main effect found for stimulus condition on the WPG change when the GOD group was compared to each of the other groups. In the GOD versus PAW comparison, GOD M = .11 (SD = .59), PAW M = −.12 (SD = .72), t(43) = −1.16, p = .22 (two-tailed), and thus, the participants in the GOD group did not show a significantly greater change in desire to seek closeness with God compared to the participants in the PAW group. Descriptively, however, the result is in line with the hypothesis with a small effect (d = .35). Similarly, the analysis of GOD versus NAMES groups was not signifi-
cant, NAMES $M = −.14$ ($SD = .88$), $t(41) = −1.10$, $p = .30$ (two-tailed) but again was in the direction of the hypothesis with a small effect size ($d = .34$). When comparing the GOD group to the NOTHING group, the result was in the wrong direction, that is, NOTHING had higher change scores than GOD, $M = .18$ ($SD = .53$), $t(41) = .79$, $p = .43$. Effect size for this difference was within the “no effect” range, however ($d = −.24$).

**INTERACTION EFFECTS**

The Stimulus × Attachment History interaction for the GOD versus PAW contrast again produced a significant crossing interaction on EBRS Change, $Std. \text{Coeff.} = −.41$, $t(41) = −2.178$, $p = .02$ (one-tailed). Regions of significance were within the observed range on Attachment History: scores less than 2.1 and greater than 3.8. In this experiment also, higher scores on Attachment History (i.e., more insecurity) were associated with downward change in EBRS, and lower scores with upward change after the GOD stimulus compared to PAW. The same pattern was found for the GOD versus NAMES contrast, although only marginally significantly, $Std. \text{Coeff.} = −.29$, $t(41) = −1.36$, $p = .09$ (one-tailed). Finally, the GOD versus NOTHING contrast showed the same pattern also, but the effect was not significant, $Std. \text{Coeff.} = −.15$, $t(39) = −.569$, $p = .28$, one-tailed (see Figure 3). There were no significant effects of the Stimulus × Attachment History interaction on WPG, with $t$s ranging from $−.779$ to $.890$ and $p$s from $.38$ to .49.

**SUBLIMINALITY**

No participant reported having seen anything resembling the critical stimulus. Mean threshold for the PAW group was 108 ms ($SD = 129.8$), for the GOD group the mean was 88 ($SD = 173.6$), for the NAMES group the mean was 77.18 ($SD = 57.2$), and the NOTHING group had a mean of 76 ($SD = 136.0$). There was no significant difference between groups, $F(3, 85) = .292$, $p = .85$, ns.

**Discussion**

In the third experiment, the individual differences’ hypothesis gained significant, trend significant, and nonsignificant but descriptive support in relation to the three control conditions. Again, compared with the PAW group, more insecure attachment history was associated with a decrease in emotionally based religiosity following a subliminal separation-from-God stimulus. This was true with trend significance when GOD was compared with the “God has many names” group, which suggests that the mention of God in the stimulus is not sufficient to activate the attachment system. When GOD was compared with “nothing has forsaken me” the hypothesis was not significantly supported. Nonetheless, it is possible that including an abandonment cue in this stimulus did activate the attachment system to some degree and that this control stimulus was therefore not as neutral as we intended. Relatedly, Mikulincer et al. (2002) found increased accessibility of names of attachment figures following unconscious exposure to separation cues (the word separation being used as stimulus), implying that the threat of separation in itself is sufficient to activate the attachment system. A more general conclusion from our studies could be that following an abandonment stimulus, attachment system activation occurs and responses are moderated by security of the individual’s history of attachment to parents. Of importance, this possibility does not alter the theoretical conclusion of these experiments but rather perhaps increases their generality. An unconsciously perceived threat of abandonment need not be as specific as to indicate both God and separation from God to result in attachment dynamics in relation to God that are predictable from the individual’s parental attachment. In summary, we again found support for the idea that God validly can be seen as an attachment figure and that the attachment relationship with God is influenced by attachment history.

The normative hypothesis concerning proximity seeking was not supported with significance. Small effects were found in the direction of the hypothesis in the GOD versus PAW and GOD versus NAMES comparisons but NOTHING appeared to mimic the effect of the GOD stimulus. At sample level, this may again imply that the NOTHING stimulus activated the attachment system, contrary to expectations.
GENERAL DISCUSSION

The crossing interaction of Stimulus and Attachment History was present in all three experiments despite stimulus and predictor measure changes. When the attachment system is unconsciously activated in relation to God or mother, an individual with a secure history turns to God, whereas an individual with an insecure history turns away from God. This picture implies that the IWMs of parents have substantial importance for affect regulation through religiosity and that the God-IWM and the IWM of parents overlap significantly. The parental IWM thus appears to determine the degree to which God is available and functional as an attachment figure and thus as a source of affect regulation in response to unconscious stress.

The compensation form of religiosity, where insecure attachment is compensated for by the use of God, thus appears to have its limits. Individuals with an insecure history cannot rely on God for security when unconsciously provoked to the same extent as people with a secure history can, which is much like the situation where the attachment relationship with parents is concerned. The idea that there is correspondence between the God image and the parents in terms of reliability and affect regulation thus receives support.

This correspondence hypothesis should be investigated in longitudinal studies that allow for direct assessment of attachment history. However, the Adult Attachment Interview (AAI) contains scales for “probable experiences” in childhood, and a recent study (Granqvist & Hagekull, 2002) showed that religiosity was clearly related to estimated childhood attachment to parents, as assessed by the AAI. It also found associations between religiosity and self-reported attachment history. Moreover, there was a substantial correlation between AAI experiences with parents and self-report attachment history ratings (the same continuous prototype ratings as used in the present study). The implication is that such aspects of childhood attachment that are important for religiosity are captured in the retrospective measures used in the present experiments.

The methodological strengths of the present study include the experimental design, a first in research on attachment and religiosity, which allows for causal inferences. Also, subliminal stimulation allowed us to investigate unconscious aspects of IWMs that are postulated in attachment theory (Bowlby, 1969, 1973), which has not been a focus in previous research.

The participants in the present study were relatively young. In time, individuals with insecure histories may learn to rely on God as a safe haven even unconsciously, internalizing this ability much like any well-learned skill. In the participants studied here, however, the compensation through God for insecure attachment history may not yet have reached that degree of automaticity.

In summary, the present article represents the first experimental evidence that subliminal activation of the attachment system has effects suggesting that God functions as an attachment-like figure. This result was obtained regardless of whether separation in relation to God or mother was provoked.

NOTES

1. However, a recent study (Granqvist & Hagekull, 2002) replicated essentially all of the above findings by means of a method of assessing attachment that is not subject to the general pitfalls threatening other interviews and self-reports (Hesse, 1999), namely, the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996). In that study, past experiences with parents (estimated by a blind and reliable interview coder) were linked to religiosity in the hypothesized manner, as were self-reports of attachment history with parents. The correspondence between the attachment and religiosity associations, based on AAI and self-report assessments of attachment, suggests that self-report measures of attachment history can be used without serious distortion in the strength or direction of associations with religiosity.

2. The question of whether humans can analyze, at phrase level, the meaning of a subliminal multiword stimulus is still under debate. Although counterarguments have been forwarded (e.g., Draine & Greenwald, 1998), there are numerous instances of indirect support for such a capacity (e.g., Hardaway, 1990; Patton, 1992; Sohlberg & Birgegard, 2003; Waller & Mijatovich, 1998).

3. To test for a possible confounding effect of the Attachment History difference between the groups, we recomputed the regression including, besides standardized Attachment History and the Attachment History × Stimulus product, baseline ratings for emotionally based religiosity (Emotionally Based Religiosity Scale [EBRS] pre) as well as the baseline EBRS × Stimulus product. This was because of the risk that the relation between predictor and baseline (affecting outcome) might be different at different levels of the predictor measure. Results were very similar: Std. Coeff. = −.62, t(18) = −2.88, p = .01. Also, excluding “People are walking” (PAW) group participants with Attachment History scores higher than the highest “God has forsaken me” (GOD) group participant’s score, the interaction was still significant, t(14) = −2.33, p = .03. This control analysis did not alter the EMT mood results either.

4. This participant’s score was more than 1 SD beyond the nearest observation on Attachment History, which indicates a possible disproportionate influence in small samples (see Sohlberg & Birgegard, 2003, for previous use of this method).

5. We are grateful to Staffan Sohlberg for suggesting this phrase.

6. Nine could either not be reached or were unable to make any of the laboratory session times and 1 participant was currently participating in a study similar to the present one.

7. For all three analyses, one outlier was excluded from the GOD group.

8. In each analysis, one formal outlier was excluded from the GOD group. A further outlier not fulfilling the a priori criteria was excluded in the GOD group, and one in the PAW group. These observations were more than 1 SD beyond the nearest observation on Attachment History (cf. Sohlberg & Birgegard, 2003) and disproportionately affected results. Shared variance between Attachment History changed from PAW $r^2 = .06$ to $r^2 = .15$ with the outlier removed, and GOD $r^2 = .01$ to $r^2 = .09$. With these observations included, no significant results were found, but each comparison followed the descriptive pattern outlined in the hypothesis.
REFERENCES


