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Preliminary evidence for an aversion to atheists in long-term mating domains in the Southern United States

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Abstract

The centrality of religiosity in selecting long-term mates suggests atheism could be undesirable for that context. Given recent findings suggesting several positive stereotypes about atheists, a largely distrusted group, individuals could prefer atheists in mating domains not emphasizing long-term commitment (i.e., short-term mating). Two studies tasked U.S. participants with evaluating long-term and short-term mating desirability of theists and atheists while assessing perceptions of their personalities. Study 1 indicated atheists were more desirable in short-term mating than long-term mating, though this preference did not translate to being preferred over theists. The pre-registered Study 2 demonstrated this effect is specific to physically attractive targets. Atheists were further perceived as more prone to infidelity, especially when attractive. Results are framed from an evolutionary perspective while discussing anti-atheist prejudice.

Keywords

Atheism, mate preferences, evolutionary psychology, infidelity, stereotyping

Long-term mate selection requires awareness of others' capability to facilitate biparental investment and contribute to lasting relationships. Humans rely on various judgments of others to identify their reproductive interests, with certain information being utilized to infer mating intentions (Sng et al., 2020). Religious beliefs are one channel to infer prospective mates' capabilities for long-term relationships, given that religiosity is highly

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predictive of personality traits associated with monogamous intent (Schmitt & Fuller, 2015; Schmitt & Shackelford, 2008) and perceived as facilitating long-term mating interest (Moon et al., 2018). Heuristic stereotypes of theists could facilitate this desirability. Preference for long-term mates belonging to organized religion occurs cross-culturally, both for those on the mating market (Buss & Barnes, 1986; Thomas et al., 2020) and their parents (Dubbs & Buunk, 2010; Perilloux et al., 2011).

Preferences for theistic mates in monogamous pairbonds beg the question of the potential mate value of atheists. In addition to pervasive distrust toward atheists (Gervais et al., 2017), recent surveys suggest 49% of respondents would be upset if a family member married an atheist (Pew Research Center, 2014), with highly monogamous individuals being quick to condemn them (Moon et al., 2020). Despite this potential undesirability in long-term contexts, various benefits are nonetheless inferred in atheists implicating them as potentially desirable in other mating domains. Atheists are perceived as interested in short-term sexual encounters and regarded as fun (Moon et al., 2018, in press), suggesting atheists are desirable in these contexts. This research sought to identify how stereotypes of religiosity shape mate preferences.

Anti-atheist attitudes

The criticality of group living to human survival necessitates identification of those capable of facilitating reciprocal altruism. One route through which individuals signal this capability is adherence to intuitive beliefs disallowing interpersonal harm, thereby fostering trust between group members by individuals reflexively acting to facilitate common goods (e.g., Jordan et al., 2016; Sacco et al., 2017). Adherence can be signaled through religiosity, with theists being deemed trustworthy (Brown-Iannuzzi et al., 2021). Though not every culture subscribes to a "high God" typical of many Western cultures (Swanson, 1960), a cross-cultural consistency exists in stories invoking supernatural origins of humanity that forms the basis of ingroup identities with which individuals signal membership by affirming beliefs (Purzycki & Sosis, 2011). Such affirmations could have historically afforded access to expansive communities through shared identities wherein theism fostered cooperation (Henrich, 2009; Matthews, 2012; Van Vugt & Schaller, 2008). Even if individuals' religiosity differs, a mutual understanding of these identities could connote general interest in group rules. Espousing beliefs could therefore implicate one as trustworthy regardless of religion.

Non-adherence to institutions that ostensibly serve as the basis for social rules could implicate individuals as disinterested in participating in reciprocal altruism and more capable of exploiting others. Distrust is the basis of considerable anti-atheist prejudice. Cross-cultural evidence indicates an intuitive belief that immoral and deceptive behaviors are more typical of an atheist that does not extend to members of outgroup religions (e.g., Christians evaluating Muslims; brown-Iannuzzi et al., 2019; Gervais et al., 2011; Gervais et al., 2017). Though not as pronounced as the antipathy expressed by highly religious people (Edgell et al., 2006), anti-atheist prejudice even extends to other atheists, which could be rooted in the lack of shared identity between atheists. Atheists' moral calculus could be deemed more idiosyncratic than theists, implicating them as more unpredictable

than individuals with religious beliefs and consequently less trustworthy. This distrust could manifest as disbelief in atheistic mates to engage in monogamous behavior, thereby reducing their desirability as marital partners.

Despite the distrust, atheism in its various forms remains prevalent. Some estimates indicate as many as 26% of people identify as atheistic worldwide (Gervais & Naijle, 2018Gervais & Najle, 2018). Such prevalence implies benefits to their historical inclusion in groups despite potential costs (see Brown, 2021). Several positive atheist stereotypes exist, including perceptions of them as fun, open-minded, and analytic. These perceptions subsequently become the basis of atheists being desirable in relevant domains (Moon et al., 2021). Atheists' unconventionality may present downstream cues of benefits in other tasks. In mating domains, this could extend to perceptions of promiscuity common among those open to experience (Moon et al., 2018; Schmitt & Shackelford, 2008).

Contextual mate preferences

Individuals select mates exhibiting good genes and behaviors indicating investment potential. Given the improbability of selecting mates equally capable of providing both good genes and investment equally, individuals prioritize one set of traits over the other. Humans thus adopt both short-term (STM) or long-term mating (LTM) strategies, which facilitate pursuit of mates who could satisfy salient interests (Buss & Schmitt, 1993; Li et al., 2013). STM emphasizes acquiring multiple partners for uncommitted sexual encounters and prioritizes physical attractiveness (i.e., good genes; Li & Kenrick, 2006). Women prefer muscular men in STM (Frederick & Haselton, 2007), whereas STM-oriented men particularly value features of women's bodies purportedly connoting nubility (e.g., narrow waists; Singh et al., 2010). Women with a heightened interest in promiscuous mating strategies further prefer extraverted men whose mating goals would ostensibly align with theirs (Brown & Sacco, 2017; Schmitt & Shackelford, 2008). Heuristic associations of atheism with promiscuity could similarly facilitate identification of atheists as optimal mates for STM while reducing interest in theists given their LTM interest that would implicate them as disinterested in STM (Jonason & Buss, 2012; Moon et al., 2018).

For LTM, in addition to physical attractiveness, individuals emphasize monogamous, committed pairbonds and those capable of providing that opportunity. To address the challenge of finding mates capable of satisfying these goals, individuals rely on signals to commitment and relational fidelity. Recent findings indicate reflexive adherence to social rules that signals commitment to moral conventions heightens perceptions of a prospective mate as interested in LTM and overall desirability (Brown et al., in press). Men and women perceive adherence as monogamous intent (Brown & Sacco, 2019). Theists' adherence to conventional morality elicits a heuristic association with interest in monogamy (Moon et al., 2018), which could augment LTM desirability like other signals to rule adherence. Cross-cultural evidence suggests religiosity is associated with greater interest in monogamous strategies (Schmitt & Fuller, 2015).

Acuity toward LTM interest would solve adaptive problems for men and women. Selecting monogamous women would heighten men's paternal certainty, whereas men's

fidelity indicates interest in committing resources to the current pairbond to increase offspring's inclusive fitness (Platek & Shackelford, 2006). Nonetheless, women's larger minimal reproductive costs (e.g., gestation, lactation) compared to men (e.g., sperm provision) would implicate preferences for theistic mates as larger for women (Trivers, 1972), particularly when considering women's relatively greater LTM interest (Schmitt, 2003). Religiosity is a necessity to many women when budgeting LTM traits (Thomas et al., 2020), with additional work suggesting reproductive benefits for selecting theistic mates, including access to extensive communal childcare opportunities (Shaver et al., 2019).

Current Research

The current research sought to identify social affordances of atheists within mating domains. More specifically, the purpose of this work was to determine the downstream consequences of stereotypes toward non-normative identities that evolved to identify group members (in)capable of reciprocal altruism could have consequently shaped relational decisions beyond selecting those most likely to cooperate. Although previous research suggests a general preference for theistic mates at the expense of those espousing atheistic beliefs (e.g., Thomas et al., 2020; Pew Research Group, 2014), it remains unclear which inferences of atheists' behavior could serve as an impetus to their derogation as mates, or whether specific mating contexts could see a benefit to selecting atheists.

I investigated whether individuals would invoke a tradeoff to prefer theists or atheists to facilitate salient goals for LTM and STM in two studies. Given this proposed tradeoff, I was further interested in determining whether physical cues diagnostic of additional benefits in STM (i.e., good genes, promiscuous intentions) would further invoke the tradeoff beyond the potential costs of an atheist mate akin to the interpersonal costs inferred through certain good genes cues (e.g., Gallup et al., 2007; Kruger, 2006; O'Connor et al., 2011). I conducted a pre-registered study considering preferences for theists and atheists that varied in physical attractiveness. All measures, manipulations, and exclusions are reported herein. Data, materials, and syntax are available at: https://osf.io/fekbr/?view_only=a5c99046554b4e85bae0ea24f86992c8

Study 1

Study 1 sought to identify tradeoffs individuals invoke to select mates. Given the lack of trustworthiness perceived in atheists, atheists were predicted to be less desirable in LTM contexts compared to theists whose behavioral repertoire (e.g., Gervais et al., 2011; Moon et al., 2018). Conversely, perceived interest in promiscuity led to the additional prediction of atheists being more desirable in STM compared theists. The considerably larger costs women face in reproduction necessitating both greater interest in LTM (Schmitt, 2003) and selecting mates whose behavior suggests greater capability to invest in offspring further led me to predict the emergence of sex differences in perceptions (Barclay, 2010; Brown et al., 2020a). That is, I predicted women's LTM preference for theism would be larger than men's preference.

I also tested peripheral hypotheses to extend previous findings investigating social affordances of (a)theism. The non-adherence to social rules inherent in atheism led me to predict atheists to be perceived as more prone to infidelity (Brown & Sacco, 2019). I predicted atheists' perceived infidelity proclivity would further be associated with their reduced desirability in LTM. Finally, participants provided perceptions of atheists and theists' personalities. Given findings suggesting atheists are perceived as open-minded (Moon et al., 2021), I predicted atheists to be perceived as more open to experience than theists, which would predict subsequent STM desirability. Conversely, I predicted theists would be perceived as more conscientious and agreeable than atheists, given their associations with monogamous intent (Schmitt & Fuller, 2015), which I predicted to be associated with theists' LTM desirability.

Method

Participants

A sample of 110 undergraduates from a public university Southeastern U.S. (i.e., Northwest Arkansas) participated for course credit. I excluded four participants from analyses for not reporting heterosexual attraction, as participants evaluated opposite-sex targets. Participants in both studies were specifically recruited for being in a typical reproductive window of 18–40 years of age, given the onset of menopause occurring as early as 41 (Brown et al., 2020b; te Velde & Pearson, 2002). The final sample was 106 (58 women, 48 men; M_{Age} = 19.31, SD = 1.93, Range = 18–35; 85.8% White, 9.4% Hispanic, 2.8% Black, 1.9% Other; 102 identified as heterosexual, 4 identified as bisexual). Eighty-four participants indicated believing in a god, 13 indicated being unsure, and nine indicated not believing. Given previous research suggesting anti-atheist prejudice exists even among other atheists (Gervais et al., 2011), participants were not excluded based on religiosity in final analyses and I collapsed across religiosity due to low numbers of nonreligious participants.[1]

A sensitivity analysis indicated sufficient power to detect small interactive effects in a design for two within-subjects factors and one between-subjects factor (Cohen's f = .11, 1-β = .80). Data were collected during the week before a midterm deadline for course credit and not analyzed until collection ended.

Materials and procedure

Participants evaluated two prospective mates on a fictitious dating site. Little information was presented about targets, with initial instructions indicating participants would only see a picture and a piece of demographic information while being told to do their best in assessing the targets with such little information. This methodological decision was to reduce the possibility of additional information possibly confounding participants' perceptions beyond the critical information about theism. Targets were represented by single images of neutrally expressive, White young adults from the Aging Faces Database

(Minear & Park, 2004), previously found to have average attractiveness (Sacco et al., 2017). Men evaluated female targets and women evaluated male targets.

One third-person statement accompanied each target indicating they were either theistic (i.e., *This person believes in God*) or atheistic (i.e., *This person does not believe in God*). I designed statements to mirror typical dating site statements where individuals would disclose their religious affiliation as part of a battery of demographics information presented for dating decisions, which were akin to the brief manipulations seen in other research assessing perceptions of atheists' costs and benefits (e.g., Moon et al., 2021). Theists' religious affiliation was intentionally nondenominational to reduce the likelihood of homogamy effects influencing preferences beyond the mere espousal of religiosity, given the considerable preferences individuals have for members of their own religious denomination in relationships that sees individuals typically being most interested in mates with the same religious views (e.g., Catholics preferring other Catholics, but not Protestants; Luo, 2009). I counterbalanced target identities and presented them in a randomized order to prevent order effects or demand characteristics (Christensen, 2012).

Contextual Desirability. Participants indicated how desirable they found both targets in STM and LTM. Contexts were represented with single-item measures operating on 9-point scales (1 = Not at All *Desirable*; 5 = Average; 9 = *Very Desirable*; Brown & Sacco, 2018). Wording was as followed: *A short-term (long-term) partner is someone whom you would desire for casual dating or a one-night stand (a long-term, committed romantic relationship). Overall, how desirable would you find this person as a short-term (long-term) partner?*

Trait inferences. Participants assessed targets' personality using a single-item measure assessing the extent participants perceived each target as prone to cheating on a partner, a relationship-relevant proxy for trustworthiness (1 = *Not at All*; 7 = *Very Much*; Brown & Sacco, 2019). Participants also indicated the extent targets appeared to exhibit Big Five traits using an other-report version of the Ten-Item Personality Inventory (Gosling et al., 2003) that considers perceptions of each trait (Brown et al., in press). Items operated along 7-point scales (1 = *Strongly Disagree*; 7 = *Strongly Agree*), with two items per trait. Split-half reliabilities were low (Spearman–Brown coefficients ranged from: .14–.57), though not atypical of such short measures (Jonason & Webster, 2012). This justified my subsequent aggregations of these items.

Results

Traits inferences

Initial analyses were six paired-samples *t*-tests comparing perceptions of both targets' personalities and proclivity toward infidelity. Participants perceived theists as more agreeable and conscientious while also perceiving atheists as more neurotic and prone to infidelity. No difference emerged in perceptions of openness and extraversion (Table 1).

Table 1. Mean (and standard deviation) ratings of trait inferences for theistic and atheistic targets (Study 1).

	Theist	Atheist	*t*	*d*
Extraversion	3.66 (1.12)	3.84 (1.37)	−0.89	−0.08
Agreeableness	4.10 (1.21)	3.48 (1.14)	3.41[a]	0.33
Conscientiousness	4.72 (1.09)	3.76 (1.12)	5.76[b]	0.56
Neuroticism	3.78 (1.03)	4.37 (1.07)	−3.85[b]	−0.37
Openness	4.05 (1.04)	3.98 (1.08)	0.49	0.05
Infidelity	2.65 (1.30)	3.92 (1.43)	−6.37[b]	−0.62

[a] $p < .010$.
[b] $p < .001$.

Mating desirability

I conducted a 2 (Participant Sex: Male vs. Female) × 2 (Target Religiosity: Theist vs. Atheist) × 2 (Mating Context: STM vs. LTM) mixed-model ANOVA with repeated factors over the latter two factors for desirability. Participants found theists more desirable ($M = 3.52$, $SD = 2.10$) than atheists ($M = 2.70$, $SD = 1.80$), $F(1, 101) = 12.03$, $p = .001$, $\eta_p^2 = .106$. Men found their targets more desirable ($M = 3.43$, $SD = 2.01$) than women ($M = 2.84$, $SD = 1.85$), $F(1, 101) = 5.16$, $p = .025$, $\eta_p^2 = .049$. No main effect emerged for Mating Context, $F(1, 101) = 0.03$, $p = .864$, $\eta_p^2 < .001$.

Effects were most superordinately qualified by a Target Religiosity × Mating Context interaction, $F(1, 101) = 18.77$, $p < .001$, $\eta_p^2 = .157$ (see Figure 1). Simple effects indicated atheists were more desirable in STM ($M = 2.94$, $SD = 1.92$) than LTM ($M = 2.46$, $SD = 1.68$), $F(1, 101) = 13.56$, $p < .001$, $\eta_p^2 = .118$. Theists were more desirable in LTM ($M = 3.75$, $SD = 2.18$) than in STM ($M = 3.29$, $SD = 2.02$), $F(1, 101) = 5.53$, $p = .021$, $\eta_p^2 = .052$. Viewed another way, theists were more desirable in LTM than atheists, $F(1, 101) = 21.99$, $p < .001$, $\eta_p^2 = .179$. Atheists and theists did not differ in STM desirability, $F(1, 101) = 2.13$, $p = .148$, $\eta_p^2 = .021$. No other interactions emerged, Fs < 2.35, ps > .128.

Bases of desirability

Subsequent analyses considered whether trait inferences were a basis for desirability. The differences between targets in agreeableness, conscientiousness, neuroticism, and infidelity proclivity led me to conduct bivariate correlations between these traits with STM and LTM desirability for theists and atheists. Perceived agreeableness was associated with greater LTM desirability for theists and atheists; the effect was magnitudinally larger for theists. Agreeableness was further associated with greater STM desirability in theistic targets, but not atheistic targets.

Perceived conscientiousness was associated with greater STM and LTM desirability for theists. It was also associated with greater LTM desirability among atheistic targets at a reduced magnitude; no association emerged for STM desirability. Perceived neuroticism

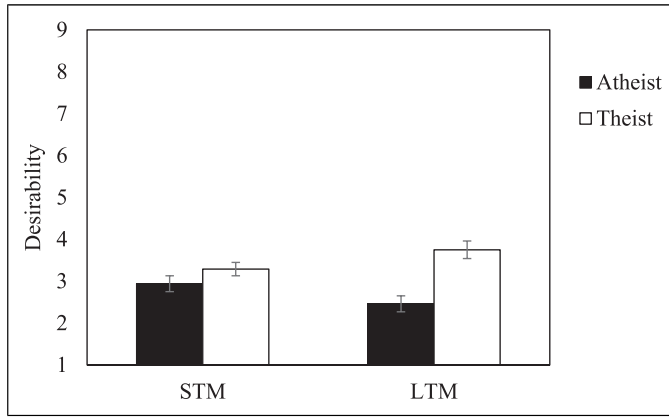

Figure 1. Contextual desirability of theist and atheists for Study 1 (with standard error bars).

was associated with less desirability of theists and atheists in both contexts. Perceived infidelity proclivity was not associated with theists' desirability in either STM or LTM. Infidelity proclivity was associated with less desirability of atheistic targets in LTM, but not STM (Table 2).

Discussion

This study partially supported hypotheses. Theists were more desirable in LTM than atheists, a desirability coinciding with perceptions of less infidelity proclivity (Moon et al., 2018). In fact, subsequent correlation analyses indicated the perceptions of atheists' infidelity proclivity were the basis for their subsequent derogation in LTM. This finding suggests individuals employ stereotypes specific to untrustworthiness when evaluating the mate value of atheists (Gervais et al., 2011), resulting in substantial discounting of atheists' valuation in LTM.

Interestingly, perceived infidelity proclivity was unrelated to theists' LTM desirability, suggesting individuals employ different affordance judgments on theists. The predicted, and observed, difference between targets in conscientiousness and agreeableness appeared to be the basis of affordance judgments for religious targets. LTM desirability for theists had considerable basis in perceptions of agreeableness and conscientiousness, findings aligning with research demonstrating greater religiosity and LTM interest among agreeable and conscientious individuals that suggest participants could have preferred targets for LTM based on inferences of their preferred strategy (Schmitt & Fuller, 2015; Schmitt & Shackelford, 2008). An association emerged for atheists' agreeableness and LTM desirability at a reduced magnitude. Despite prioritizing of benevolence in LTM, a prospective mate's atheism could have interfered with recognizing the benefits of agreeableness. The expected difference in openness perceptions also did not emerge. This could suggest perceptions of atheists are rooted in certain facets of openness (e.g.,

Table 2. Bivariate correlations between trait inferences with short-term (STM) and long-term mating (LTM) desirability (Study 1).

		Agreeableness	Conscientiousness	Neuroticism	Infidelity
Theist	STM	.30[b]	.28[c]	−.33[b]	−.05
	LTM	.44[c]	.35[c]	−.39[c]	−.07
Atheist	STM	.09	.03	−.22[a]	−.12
	LTM	.23[a]	.20[a]	−.27[b]	−.22[a]

[a]$p < .05$.
[b]$p < .010$.
[c]$p < .001$.

intellectual curiosity) rather than in general, necessitating future consideration to reconcile this discrepancy.

Atheists' STM desirability relative to LTM unexpectedly did not translate to overall desirability compared to theists. These findings could suggest both atheists' general undesirability could preclude individuals' willingness to invoke the proposed tradeoff entirely. Participants could have inferred unique costs from an atheistic mate differently from other non-normative epistemologies (e.g., utilitarianism; Brown & Sacco, 2019). Unlike utilitarianism, this non-normativity could have been regarded as immorality that would interfere with an interest in benevolence for STM (Brown-Iannuzzi et al., 2018; Li et al., 2002).

Perceptions of atheists as more neurotic could have also undermined their desirability in STM and LTM (Brown et al., in press), given neuroticism's association with undesirable mating behavior (Greengross & Miller, 2008). Associations between neuroticism and desirability provides context for this claim, in addition to how these perceptions undermined desirability of theists. Given this consideration of how various judgments facilitate desirability of theists and atheists, additional cues to mate value may facilitate greater interest in invoking tradeoffs beyond affordances specific to (a)theism. Study 2 sought to identify when individuals would be willing to incur perceived costs of atheists in STM by weighing benefits of physical attractiveness.

Study 2

One possibility for individuals' unwillingness to prefer atheists entirely for STM could be perceptions of potential costs exceeding the benefits of atheist mates. The inferred untrustworthiness of atheism could have impeded their STM desirability despite having an interest in promiscuity. Invoking the tradeoff to prefer atheistic mates could necessitate consideration of other highly beneficial features in STM, the multimodal nature of mate preferences (Jonason et al., 2012). Prioritizing physical attractiveness in STM could be one such trait, as individuals are willing to incur perceived costs associated with certain traits given their potential good genes benefits in a short-term pairbond. Physically attractive mates are indeed more desirable in STM (Li et al., 2013), with individuals being

aware of the potential costs. For example, the sexiness of muscularity is concomitant to perceived dominance, implicating muscular men as an increased risk of physical exploitation given dominant men employ more aggressive interpersonal strategies while also enjoying the benefit of more lifetime sexual partners (Frederick & Haselton, 2007; Gallup et al., 2007). In fact, physically attractive features are perceived as diagnostic of another's promiscuity (Kruger, 2006; O'Connor et al., 2011), which can limit their desirability in LTM (e.g., Brown & Sacco, 2017; Jones et al., 2018). Similar parallels could exist for attractive atheists whose good gene cues could offset the inferred costs of an atheist mate that would implicate them as optimal for a short-term sexual encounter.

Study 2 sought to determine whether individuals would be more willing to invoke the proposed tradeoff of an atheist mate in STM in the presence of cues to physical attractiveness. In this pre-registered study, participants evaluated theistic and atheistic mates who varied in physical attractiveness with the prediction being atheistic mates would be more desirable in STM when also physically attractive. Additionally, women's considerable prioritization of physical attractiveness in STM further led to the prediction this preference would be more apparent for women than for men (Kenrick et al., 1993). Finally, I predicted atheist targets would be perceived as more prone to infidelity much like in Study 1, which was considered as a predictor of STM and LTM desirability for theistic and atheistic targets on an exploratory basis. The interactive effects of theism with attractiveness were further considered on an exploratory analysis to provide a more complete understanding of the available data.

Method

Participants

A sample of 134 undergraduates participated in exchange for course credit from the same public university in Northwest Arkansas. Two participants were excluded from final analyses for reporting no heterosexual attraction due to participants' evaluation of opposite-sex targets; one was excluded for not providing any responses. This resulted in a final sample of 131 (74 men, 57 women; M_{Age} = 19.50, SD = 1.85, Range: 18–36; 81.7% White, 9.9% Hispanic, 3.8% Asian, 2.3% Black, 2.3% Other; 124 identified as heterosexual, 7 identified as bisexual). Ninety-seven participants indicated belief in a god, 29 indicating being unsure, and five not believing in a god. No exclusions were made based on theistic identity.[2]

A sensitivity analysis indicated the study had adequate power to detect small interactive effects for a design, with three within-subjects factors and one between-subjects factor (Cohen's f = .09, 1-β = .80). Data were collected during the last week of data collection of a semester and not analyzed until completion, per the pre-registration plan that necessitated collection of at least 120 participants.

Materials and procedures

Participants engaged the same dating site paradigm as Study 1 to evaluate opposite-sex targets with the same STM and LTM desirability items and the item for infidelity. This version differed by tasking participants to evaluate four targets at differing levels of attractiveness.

Targets were selected from the Chicago Faces Database as neutrally expressive young White adults (Ma et al., 2015). I selected four faces of both sexes; two were among the most attractive and two the least attractive. Preliminary comparisons using previously normed data indicated attractive targets were more attractive ($M = 4.94$, $SD = 0.41$) than unattractive targets ($M = 1.79$, $SD = 0.13$), $t(6) = 14.61$, $p < .001$, $d = 10.33$. One-sample t-tests weighted against the scalar midpoint of 4 from the norming's 7-point scale, with higher scores indicating higher attractiveness, confirmed attractive targets were categorically attractive and unattractive targets were categorically unattractive, $|t\text{s}| > 4.60$, $p\text{s} < .020$, $d\text{s} > 2.30$. I included a manipulation check assessing attractiveness in this study (1 = *Very Unattractive*; 7 = *Very Attractive*).

Accompanying each target were the same religiosity statement from Study 1. Participants evaluated two atheistic and two theistic targets, with one being attractive and the other unattractive across categories. Unique identities were counterbalanced with information about their theism and presented in random order.

Results

The number of potentially unpredicted interactions that could emerge through complicated omnibus models led to primary analyses relying on an adjusted alpha to a more conservative $\alpha = .01$ to deflate Type I Error rates. The relatively small number of categorical and exploratory analyses resulted in the alpha for one-sample t-tests and correlations to remain $\alpha = .05$. Discrepancies in degrees of freedom reflect missing data.

Physical attractiveness

The first analysis was a 2 (Participant Sex: Male vs. Female) × 2 (Target Theism: Atheist vs. Theist) × 2 (Target Attractiveness: Attractive vs. Unattractive) mixed-model ANOVA with repeated factors over the latter two factors. Attractive targets were more physically attractive ($M = 4.22$, $SD = 1.47$) than unattractive targets ($M = 1.72$, $SD = 1.11$), $F(1, 129) = 394.85$, $p < .001$, $\eta_p^2 = .745$. No other main effects or interactions emerged, $F\text{s} < 3.31$, $p\text{s} > .071$. Confirmatory one-sample t-tests weighted against the scalar midpoint of 4 (i.e., neither attractive nor unattractive) indicated the attractive targets were categorically attractive, $t(130) = 2.03$, $p = .044$, $d = .17$. The unattractive targets were categorically unattractive, $t(130) = -25.49$, $p < .001$, $d = -2.22$.

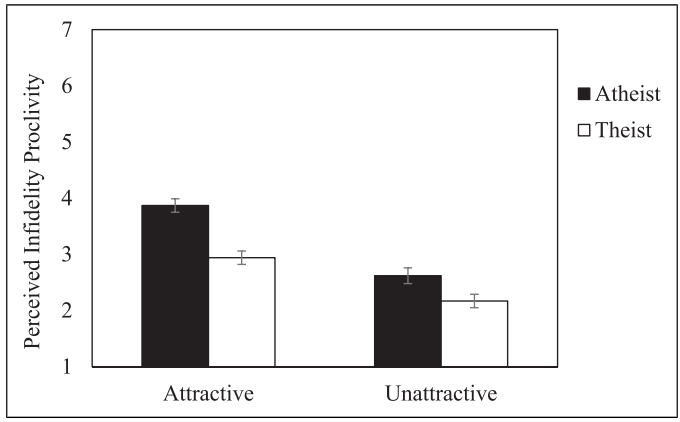

Figure 2. Perceived infidelity proclivity for attractive and unattractive atheists and theists for Study 2 (with standard error bars).

Infidelity

I assessed proclivity toward infidelity using a similarly dimensioned mixed-model ANOVA. Atheist targets were perceived as more prone to infidelity (M = 3.74, SD = 1.56) than the theist targets (M = 2.55, SD = 1.39), F (1, 128) = 41.94, p < .001, η_p^2 = .247. Attractive targets were perceived as more prone to infidelity (M = 3.40, SD = 1.46) than the unattractive targets (M = 2.39, SD = 1.49), F (1, 128) = 79.40, p < .001, η_p^2 = .383. Women (M = 3.28, SD = 1.44) further perceived their respective targets as more prone to infidelity than men (M = 2.61, SD = 1.42), F (1, 128) = 14.65, p < .001, η_p^2 = .103.

A Target Theism × Target Attractiveness interaction emerged, F (1, 128) = 8.05, p = .005, η_p^2 = .059 (see Figure 2). Simple effects indicated attractive atheists were perceived as more prone to infidelity (M = 3.87, SD = 1.54) compared to attractive theists (M = 2.94, SD = 1.38), F (1, 128) = 48.42, p < .001, η_p^2 = .274. Unattractive atheists were similarly seen as more prone to infidelity (M = 2.62, SD = 1.59) compared to unattractive theists (M = 2.17, SD = 1.39), albeit at a reduced magnitude, F (1, 128) = 9.93, p = .002, η_p^2 = .072. Viewed another way, attractive theists and atheists were both perceived as more prone to infidelity than their unattractive counterparts, Fs > 36.47, ps < .001; the perception was magnitudinally larger for atheists (η_p^2 = .333) than theists (η_p^2 = .222). No other main effects or interactions reached significance at my adjusted alpha level, Fs < 5.06, ps > .025.

Desirability

The primary analysis for this study was a 2 (Participant Sex: Male vs. Female) × 2 (Target Theism: Atheist vs. Theist) × 2 (Target Attractiveness: Attractive vs. Unattractive) × 2 (Mating Context: STM vs. LTM) mixed-model ANOVA with repeated factors over the latter three factors. Theists were more desirable (M = 3.38, SD = 1.99) than atheists

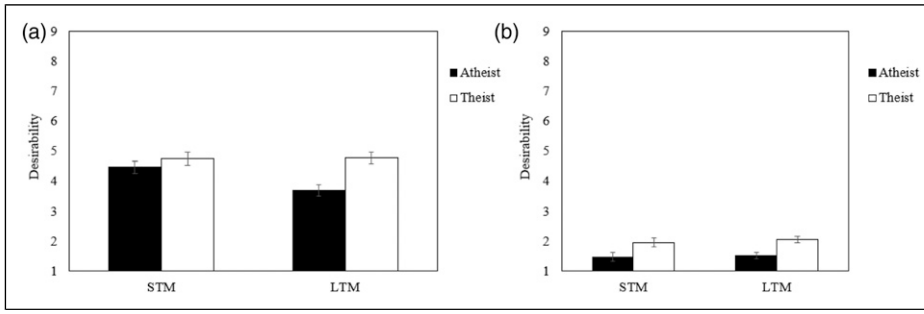

Figure 3. Desirability for attractive (a) and unattractive targets (b) as a function of theism in long-term (LTM) and short-term mating (STM) domains for Study 2 (with standard error bars).

(M = 2.79, SD = 1.64), F (1, 127) = 22.15, $p < .001$, $\eta_p^2 = .149$. Attractive targets were additionally more desirable (M = 4.42, SD = 2.24) than the unattractive targets (M = 1.75, SD = 1.40), F (1, 127) = 291.81, $p < .001$, $\eta_p^2 = .687$.

Effects were most superordinately qualified by a Target Theism × Target Attractiveness × Mating Context interaction, F (1, 127) = 13.92, $p < .001$, $\eta_p^2 = .099$ (see Figure 3). I decomposed this interaction by considering simple interactions for attractive and unattractive targets to mirror Study 1 (Howell & Lacroix, 2012). The simple interaction for unattractive targets was not significant and considered no further, F (1, 127) = 1.72, p = .192, $\eta_p^2 = .013$.

A simple Target Theism × Context interaction emerged for attractive targets, F (1, 127) = 16.61, $p < .001$, $\eta_p^2 = .116$. Simple effects from these models indicated participants found attractive atheists as more desirable in STM (M = 4.47, SD = 2.21) than in LTM (M = 3.71, SD = 2.15), F (1, 127) = 28.19, $p < .001$, $\eta_p^2 = .182$. No difference emerged for attractive theists when comparing STM (M = 4.75, SD = 2.26) with LTM (M = 4.77, SD = 2.34), F (1, 127) = 0.20, p = .651, $\eta_p^2 = .002$. Viewed another way, no difference emerged in comparing attractive atheists with attractive theists in STM, F (1, 127) = 2.24, p = .137, $\eta_p^2 = .017$. Attractive theists were more desirable in LTM than attractive atheists, F (1, 127) = 20.34, $p < .001$, $\eta_p^2 = .138$. No other main effects or superordinate interactions emerged at the adjusted alpha level, Fs < 4.10, ps > .044.

Bases of Desirability

I next considered whether perceived infidelity proclivity was the basis of STM and LTM desirability of atheistic and theistic targets. Given the desirability effects were specific to attractive targets in this study, I focused exclusively on them in this subsequent analysis. Perceived infidelity proclivity was associated with greater STM desirability for both theistic (r = 0.19, p = 0.027) and atheistic targets (r = 0.17, p = 0.046). No associations emerged for LTM desirability (|rs| < .11, ps > .104).

Discussion

This study provided mixed results for the pre-registered hypotheses that remained consistent with Study 1. Atheists were more desirable in STM compared to LTM, but only when they were attractive. This suggests participants were only interested in atheists in STM possessing cues to heritable fitness to offset perceived costs of an atheist. Nonetheless, and contrary to predictions, this preference did not translate into participants fully invoking the tradeoff for STM among individuals who appear socially costly.

Atheists and theists again did not differ in desirability in STM, suggesting participants likely considered the costs of both types of mates. Nonetheless, attractive theists were more desirable in LTM than atheists. These findings indicate the importance of perceived conventionality in LTM given inferences of their disinterest in promiscuity (Brown & Sacco, 2019). In fact, unlike Study 1, attractive theists were viewed as similarly desirable in STM as in LTM, possibly reflecting perceptions of such targets as satisfying both STM and LTM goals simultaneously without necessitating tradeoffs.

Atheists' desirability in STM over LTM was accompanied by perceptions of their infidelity proclivity, particularly among attractive targets. The perception of this proclivity could be a product of dual perceptions of atheists' interest in promiscuity and recognition of attractive targets' self-perceived mate value that could facilitate successful use of promiscuous strategies (Lukaszewski & Roney, 2011; Starratt et al., 2017). These findings are further consonant with work implicating physically attractive features being diagnostic of promiscuous intentions (e.g., O'Connor et al., 2011), which appeared to have compounded with stereotypes of atheists' typical mating strategies. Although unattractive atheists were perceived as more prone to infidelity than unattractive theists, the former's relatively low mate value could have shaped perceptions of promiscuity based on the degree of success in employing STM strategies beyond mere interest in infidelity. Two unexpected correlations emerged indicating perceived proclivity toward infidelity heightened both attractive atheists' and theists' desirability in STM. These findings provide continued evidence for a physical attractiveness premium in STM, particularly among those perceived as interested in promiscuous mating strategies, regardless of theism (Jonason & Buss, 2012; Kenrick et al., 1993; Moon et al., 2021).

General discussion

Consistent support emerged for a limited desirability of atheists across two studies. Though more desirable in STM than LTM, an effect potentially driven by inferences of an interest in promiscuity (Moon et al., 2018), this desirability did not translate to atheists becoming more desirable in STM than theists. Pervasive negative attitudes toward atheism could have undermined the value of any benefits in STM that would favor mates interested in promiscuity (Gervais et al., 2017). Attributing immortality to atheists could lead to perceptions of them being harmful. Even in STM contexts that frequently see individuals become willing to interact with riskier mates given the short duration of the interaction (e.g., Frederick & Haselton, 2007; Jonason et al., 2012), distrust toward atheists could reduce the possibility of any benefits from being inferred. Atheism could be

inferred as an absence of minimal benevolence nonetheless desired in STM (Li et al., 2002), with other non-normative behavioral repertoires that heighten STM desirability not connoting this absence. For example, prospective mates employing utilitarian decisional strategies are perceived as particularly interested in STM (Brown & Sacco, 2019). However, it is possible to infer benevolence based through an explicitly stated desire to contribute to a greater good albeit though allowing harm (Brown & Sacco, 2019).

Participants viewed theists as similarly desirable to atheists in STM across both studies. This lack of difference could reflect an inference of theists' potential LTM interest that would undermine their desirability in STM, given the need to dissolve pairbonds in STM more readily (Jonason & Buss, 2012). Theists could have been perceived as unwilling to do so, thereby muting their STM desirability to the level of atheists. Nonetheless, additional research would benefit from teasing apart specific bases of this effect by tasking participants to indicate whether they perceive theists as capable of dissolving a relationship. Additionally, findings further suggest an overall undesirability of atheists in LTM, which could reflect a downstream consequence of general distrust toward them that extends into relationship domains.

Both studies made predictions regarding sex differences. Women were expected to be particularly sensitive to the cost-benefit analysis of atheists, given their larger minimal reproductive costs compared to men and vulnerability to exploitation due to physical size asymmetries (Sell et al., 2012; Trivers, 1972). However, data suggest men and women responded similarly to theistic and atheistic mates, suggesting sex-specific costs of infidelity were equally salient. Perceived infidelity would heighten concerns of paternal uncertainty in men and concerns of resource diversion in women that would make avoidance of mates prone to infidelity advantageous in LTM (Platek & Shackelford, 2006). Attributions of immorality to atheists could be the basis of observed infidelity perceptions, resulting in downregulated interest to reduce the likelihood of exploitation across contexts.

Results provided evidence for relative preferences for atheists and theists, but evaluations of targets appeared based in varying degree of derogation and tolerance, given relatively low mean desirability across categories. Evaluations could reflect heightened judiciousness in mate selection to reduce the likelihood of a potentially costly mating mistake (Haselton & Buss, 2000). Indeed, many preferences for cues that facilitate mating goal acquisition could better be explained as an aversion to undesirable traits more than an interest in desirable traits (Brown et al., 2019a; Zebrowitz & Rhodes, 2004). Aversion to costly cues could have manifested as stringency in evaluating atheists, particularly when considering the pervasiveness of anti-atheist prejudice. Nonetheless, these results may not be a product of general anti-atheist prejudice, as participants did not uniformly derogate atheists. Rather, they could represent judicious weighing of costs and benefits of mate across contexts as a function of religiosity.

Limitations and Future Directions

Several limitations emerged warranting further investigation. Despite cross-cultural prevalence of anti-atheist prejudice even experienced by other atheists, this prejudice

is most prevalent among highly religious individuals (Edgell et al., 2006; Moon et al., 2020), a central concern for studies conducted in the U.S. with considerable anti-atheist prejudice in certain regions. These studies were conducted in the Southeastern U.S, a region colloquially deemed the "Bible Belt" that values and maintains religious normativity. Although likely for these prejudices to persist in other ecologies, atheism could be more aversive in this region than others with a higher atheist prevalence (Gervais, 2011). This lack of atheists in both samples ultimately precluded me from considering religiosity as a moderator, necessitating future work in understanding how religiosity shapes these mate preferences. Future research would benefit from replicating effects in areas with greater secularity in the U.S. (e.g., Northeastern U.S.) or countries with less anti-atheist prejudice (e.g., Finland, New Zealand), which could be compared to countries with particularly high anti-atheist prejudice (e.g., India; Gervais et al., 2017). In expanding the generalizability of findings, future work could additionally consider respondents with different mating goals across different ecologies and developmental stages. Many mate preferences are indeed cross-cultural (e.g., Li et al., 2013; Schmitt, 2003) and persist across various ecological constraints (e.g., Zhang et al., 2019), though different time periods across the reproductive window less typical of college students could lead individuals to valuate mates' epistemologies differently across ages of peak fertility (Krems et al., 2017). It becomes incumbent on future research to determine the degree to which this aversion to atheism could generalize to other populations. Doing so could further lead researchers to address how inferences of (a)theism facilitate same-sex relationships, particularly in light of recent investigations on the origins of sexual orientations (e.g., Bobrow & Bailey, 2001).

Despite preferences emerging toward religiosity and not a specific religion, theistic participants' preferences for religious mates in LTM could have some basis in the similarity effect, or attraction to mates whose views appear most similar to their own and could reinforce one's values (Byrne et al., 1967; Montoya & Horton, 2013). Compared to selecting mates for STM with no expectation of family planning, participants could similarly be considering whether the prospective mates in LTM who would be capable of fostering religious traditions to their offspring with a partner or to satisfy familial expectations for religious endogamy could motivate participants to have selected mates approximating their beliefs more than atheists (Dubbs & Buunk, 2010; Luo, 2009). This could be crucial to individuals who valuate religion considerably. Future work would benefit from considering this complementary explanation for the current findings investigating inferred affordances. A study could identify similarity-based affordances of theists, wherein participants evaluate the degree theists could foster familial traditions with offspring and whether those capabilities predict LTM desirability. Investigating how preferences are the product of similarity effects further provides an opportunity to consider whether atheists similarly prefer other atheists. Future studies could recruit participants in regions with greater prevalence of atheists to ensure adequate power for moderation.

Another limitation was the conceptualization of atheism as a simple binary of (dis) belief without addressing the potential bases for targets' atheism or theism. Future work would benefit from identifying whether various ontogenies of atheisms (e.g.,

inCREDulous, analytic) have different values across mating contexts (Norenzayan & Gervais, 2013). For example, analytic atheists cognitive disengagement from religion through could implicate them as undermining social rules and thus undesirable in LTM. Conversely, inCREDulous atheists are merely indifferent to religion, which could implicate them as unlikely to undermine institutions. Future research would further benefit from employing additional experimental manipulations that provide additional benefits to ecological validity beyond the simple dating site statements employed in these studies using subtler manipulations. A study could additionally have participants read about prospective mates' interests, which could include religious activities (e.g., volunteering for church) or those connoting atheism (e.g., being part of a secular society).

It is important to clarify the perceptions in these studies are based largely on stereotypes and may not reflect accurate inferences of their preferred reproductive strategies. Future studies could task atheists and theists with providing information regarding their preferred reproductive strategy from which perceivers could infer their interests. Individuals' interest in promiscuous mating strategies can be accurately inferred through physical appearance (Antar & Stephen, in press; Boothroyd et al., 2008), which could correlate with accurate perceptions of religiosity due to its association with sexual restrictedness (Brown-Iannuzzi et al., 2018; Schmitt & Fuller, 2015). Participants could evaluate the desirability of espoused atheists and theists. Future work could consider sociosexuality as a predictor of preferences for atheists based on this typical facial structure. Previous work suggesting sociosexually unrestricted women, or those dispositionally preferring STM, prefer male faces connoting personalities with similar mating interests (Brown et al., 2019b; Brown & Sacco, 2017). Inferring atheists' unrestricted sociosexuality through physical features could heighten preferences for atheists among unrestricted individuals in the service of identifying prospective mates employing consonant mating strategies.

Conclusion

Pervasive anti-atheist prejudice appears to have downstream consequences for identifying atheists as potential mates. This program of research found evidence for this aversion in favor of mates espousing a religious identity, particularly in long-term contexts. Results highlight how individuals valuate perceived costs and benefits of mates whose beliefs they infer as capable of undermining relational formation.

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Open research statement

As sole author of this manuscript, I (Mitch Brown) indicate to be in accordance with IARR guidelines of open science by providing open access to all materials in the link provided in the manuscript. This link provides a repository for all study materials, data, syntax, and a pre-registration plan for Study 2.

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Notes

1. When excluding agnostic and atheistic participants, results largely stayed the same, though the non-significant simple effect comparison between the atheist and theist for STM became significant demonstrating the atheist was more desirable in STM than in LTM.
2. Excluding non-theistic participants did not influence the critical omnibus interaction in a meaningful capacity. One omnibus interaction with Participant Sex emerged in that analysis using the adjusted alpha criterion, though such analyses may not be as reliable due to the considerable loss of power when excluding 34 participants from the analysis that would have been below the pre-registered sampling plan. This effect was also not conventionally significant when including these 34 participants.

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