



Religiosity, intrasexual rivalry, and mate retention behaviors in Iran

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ABSTRACT

Religiosity as a significant cultural aspect can impact an array of reproductive behaviors. In particular, religiosity can influence intrasexual rivalry as a competitive strategy and content of mate retention behaviors among men and women. However, a few studies have examined the relationship between religiosity, intrasexual rivalry, and mate retention behaviors in non-Western cultures. In Study 1, we examine the province-level relationship between religiosity and reproductive outcomes (i.e., fertility, divorce, family values, and sex ratio) in Iran, a non-Western understudied culture. In Study 2, we use a multi-item measure of religiosity, a new multi-dimensional measure to assess intrasexual rivalry (Intrasexual Rivalry Scale; two components of rival-derogation and self-promotion), and Mate Retention Inventory-Short Form (MRI-SF) in a community sample ($N = 211$). Results suggested that province-level religiosity in Iran is associated with male-biased sex ratio, lower degrees of divorce, and higher levels of fertility. Study 2's findings showed that religiosity is inversely associated with self-promoting intrasexual traits. We demonstrated that self-promotion is related to benefit-provisioning and rival-derogation attitudes in a same-sex individual or is associated with cost-inflicting mate retention behaviors. We demonstrated that religiosity can predict important mating outcomes in both province- and individual-levels in Iran.

Across cultures, men and women engage in a variety of behaviors to maintain their romantic relationships and to prevent defection from the relationship. Individuals engage in a large variety of behaviors meant to prevent their partner's infidelity and/or to prevent same-sex rivals from successfully mating (either short-term or long-term) with their partner (Buss, 1988). Humans have evolved specific psychological mechanisms to guard their partners against infidelity and defection. These tactics are often referred to as mate retention strategies (see Buss, 1988; Salkicevic, Stanic, & Grabovac, 2014). Although these tactics are universal across human societies, their manifestation is dependent upon cultural contexts (Lopes, Shackelford, Santos, Farias, & Segundo, 2016), attachment orientation (Barbaro, Sela, Atari, Shackelford, & Zeigler-Hill, 2019), personality traits (Atari, Barbaro, Sela, Shackelford, & Chegeni, 2017), and various hormones (Arnocky, Albert, Carré, & Ortiz, 2018). Recent factor-analytic studies have found that mate retention behaviors come in two distinct, but related components: benefit provisioning and cost inflicting (e.g., Atari, Barbaro, Shackelford, & Chegeni, 2017; Lopes et al., 2016; Miner, Starratt, & Shackelford, 2009).

Thornhill and Alcock (1983) suggested that mate retention behaviors serve as intrasexually-competitive strategies. Mate retention behaviors in heterosexual individuals can grant individuals consistent

access to a desired mate, thus resisting same-sex rivals' attempts to access that desired partner, or stopping a sexual partner from extrapair copulation. Mate retention has been considered as a component of intrasexual competition (Fisher & Cox, 2011), as it indirectly decreases same-sex individuals' access in the mating pool. Recently, Karimi-Malekabadi, Ghanbarian, Afhami, and Chegeni (2019) developed a two-component measurement strategy for assessment of intrasexual rivalry, based on Buss's (1988) conception of intrasexual rivalry and Atari's (2017) five-factor model of long-term mate preferences. According to Karimi-Malekabadi et al. (2019), intrasexual rivalry comes in two forms: rival-derogation (in which an individual directly derogates potential and actual same-sex rivals in four mating areas of kindness/dependability, attractiveness/sexuality, status/resources, and education/intelligence) and self-promotion (in which an individual promotes mate values in four mating areas of kindness/dependability, attractiveness/sexuality, status/resources, and education/intelligence).

Religion is an important aspect of cultures that can potentially shape the form and content of romantic relationship outcomes (e.g., Pazhoohi & Hosseini, 2014). Religious texts that are typically seen as moral guides by religious individuals, such as Quran or the Bible, instruct men to punish women who are suspected of extramarital sexual relationships. Some religious men may feel instructed, and feel morally

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obligated, to punish wives that commit infidelity and/or exhibit promiscuous behavior. Although in most cultures, women traditionally concealed their bodies, especially in social interactions, religious men encourage women to conceal their body from other males, particularly in Middle Eastern cultures (Pazhoohi & Hosseinchari, 2014; Sela, Shackelford, & Liddle, 2015). In such contexts, religious women are typically encouraged by religious scholars (e.g., Koleini, 1987) to make themselves “extra attractive” for their husbands (e.g., “It is considered a great merit for a woman to put on her make-up, wear jewelry, and perfume to charm her husband”; Koleini, 1987, p. 165).

Considering the conceptual definition of mate retention behaviors, we conclude that religions provide teachings with regard to mate guarding, and religious individuals might be more likely to engage in a particular set of mate retention behaviors. Consistently, on a community-level of analysis, more religious communities are more likely to punish transgressions from long-term mateships, especially when the community has a male-biased sex ratio (see Moss & Maner, 2016) because in such communities, men tend to act consistently with women's preferred sociosexual attitudes and preferences, making men more likely to stay in long-term committed relationships (the more numerous sex would lower their standards/preferences, to facilitate acquisition of a partner of the less numerous sex) (Stone, Shackelford, & Buss, 2007). To our knowledge, no research has investigated community-level relationships between these variables in Middle Eastern countries. Such studies are important because there is substantial variation in religiosity across counties and provinces in countries such as Iran.

In a sample of Iranian men and women, Islamic religiosity was found to be associated with benefit-provisioning mate retention behaviors (e.g., appearance enhancement) among women, but not men (Atari, Barbaro, Sela et al., 2017; Atari, Barbaro, Shackelford et al., 2017). Cost-inflicting mate retention behaviors (e.g., violence against rivals) were not significantly associated with religiosity. In addition, Atari, Barbaro, Sela et al. (2017) and Atari, Barbaro, Shackelford et al. (2017) explained mate retention behaviors in Iranian culture using the concept of *Qeirat* (or *Gheirat*) which is hard or impossible to translate to English, indicating that religiosity, culture, and mate retention are very closely tied. Chaudhary, Al-Shawaf, and Buss (2018) found, in a Pakistani sample, that higher scores on religiosity was associated with higher frequency of cost-inflicting tactics for men while higher religiosity was associated with decreased use of cost-inflicting tactics among women. In this sample, religiosity was not associated with benefit-provisioning mate retention behaviors among men and women. It is worth noting that both of these studies in non-Western samples (with seemingly inconsistent results) used one-item measures of religiosity which is questionable in terms of reliability and validity (also see Afhami, Mohammadi-Zarghan, & Atari, 2017). In addition, these studies failed to control for intrasexual rivalry.

Although there is a body of research on the positive correlation between intrasexual rivalry and mate retention behaviors (Arnocky et al., 2018; Chaudhary et al., 2018), less is known regarding the relationship between lower-order facets of mate retention (cost-inflicting and benefit-provisioning; Miner et al., 2009) and intrasexual rivalry (rival-derogation and self-promotion; Karimi-Malekabadi et al., 2019), particularly in non-Western samples. In addition, there is a dearth of research on the relationship between Islamic religiosity, intrasexual rivalry, and mate retention behaviors in non-Western, Muslim-majority countries. Here, in Study 1, we examine the relationship between religiosity and important reproductive variables in Iranian provinces using existing sociological data. Study 2 uses psychometrically robust measures to examine the relationships between religiosity, intrasexual rivalry tactics, and mate retention behaviors in Iran. Due to lack of convergence in previous studies on the relationship between religiosity, intrasexual rivalry tactics, and mate retention behaviors, we treated this study as an exploratory investigation, i.e., we did not have any *a priori* hypotheses.

1. Study 1

In this study we use sociological data to examine the role of province-level religiosity on four reproductively crucial variables: sex ratio, divorce rate, family values, and fertility. This served as an observational study, showing that religiosity can be used on society levels to predict important reproductive attitudes and behaviors in societies and sub-cultures.

1.1. Methods

We used publicly available sociological data in a national project called “Examination of Values and Attitudes of Iranians” (Rastegar-Khaled & Mohammadi, 2015). We compiled data on religiosity, family values, and fertility using the mentioned source for secondary analysis. Religiosity was measured using an 8-item inventory based on a four-dimensional theory of religious commitment (belief, knowledge, experience, practice; Stark & Glock, 1968) developed for use in Iranian culture. Family values were measured using a 4-item inventory developed for use in Iranian culture (see Rastegar-Khaled & Mohammadi, 2015). Fertility rates were also taken from Rastegar-Khaled and Mohammadi (2015). We used publicly available governmental reports to compile male and female populations on province levels and calculated sex ratio accordingly. Province-level population and raw divorce counts were also used to calculate divorce per capita. Of note, Iran is home to one of the world's oldest continuous major civilizations, with historical and urban settlements dating back to 7000 BCE. The country has held its modern territory since 1857. From 1906 until 1950, Iran was divided into twelve provinces, but currently it has thirty-one provinces, with Caspian Sea in the north and the Persian Gulf in the south.

1.2. Results and discussion

All geo-spatial distributions of the variables in Study 1 are visualized in Fig. 1. We had complete data for 28 of 31 provinces (three provinces did not have data in Rastegar-Khaled & Mohammadi, 2015). The correlation coefficients are presented in Table 1. As can be seen, religiosity was significantly higher in male-biased provinces ($r = 0.64$, $p < .001$). In addition, more religious provinces had more fertility rate ($r = 0.62$, $p < .001$) and less divorce per capita ($r = -0.43$, $p = .023$), which are consistent with findings of Atari and Chegeni (2017) in Iran. Less religious provinces (e.g., Tehran province) are typically considered more Westernized (Rezvani-Naraghi, 2018), report higher rates of divorce (Aghajanian & Thompson, 2013), are more accepting of pre-marital sex, are more accepting of short-term mating (Honarvar et al., 2016), vote for more leftist candidates, and do not typically prioritize family values over individualistic ones.

It is important to note that our region-level investigation avoids common limitations in cross-cultural and community-level analyses reviewed by Pollet, Tybur, Frankenhuys, and Rickard (2014). These authors suggest exercising three cautions when conducting cross-cultural and region-level inferences: (1) the ecological fallacy, whereby associations observed at the region level do not represent individual-level processes; (2) non-independence of data points, which violates statistical assumptions used in hypothesis testing; and (3) cross-group non-invariance of measurement, whereby different measurement tools function differently across groups. Our analysis does not suffer from ecological fallacy as we do not generalize our region-level findings to individual-level processes. The present data were not nested (we only had single data points for provinces), so we could not exercise multi-level modeling (see Kandrik, Jones, & DeBruine, 2015). Finally, our analysis does not suffer from measurement invariance across regions because these measurement tools have been developed for Iranian culture and their psychometric properties have been confirmed in the parent project (i.e., Examination of Values and Attitudes of Iranians) and others have been extracted from independent official statistics (e.g.,

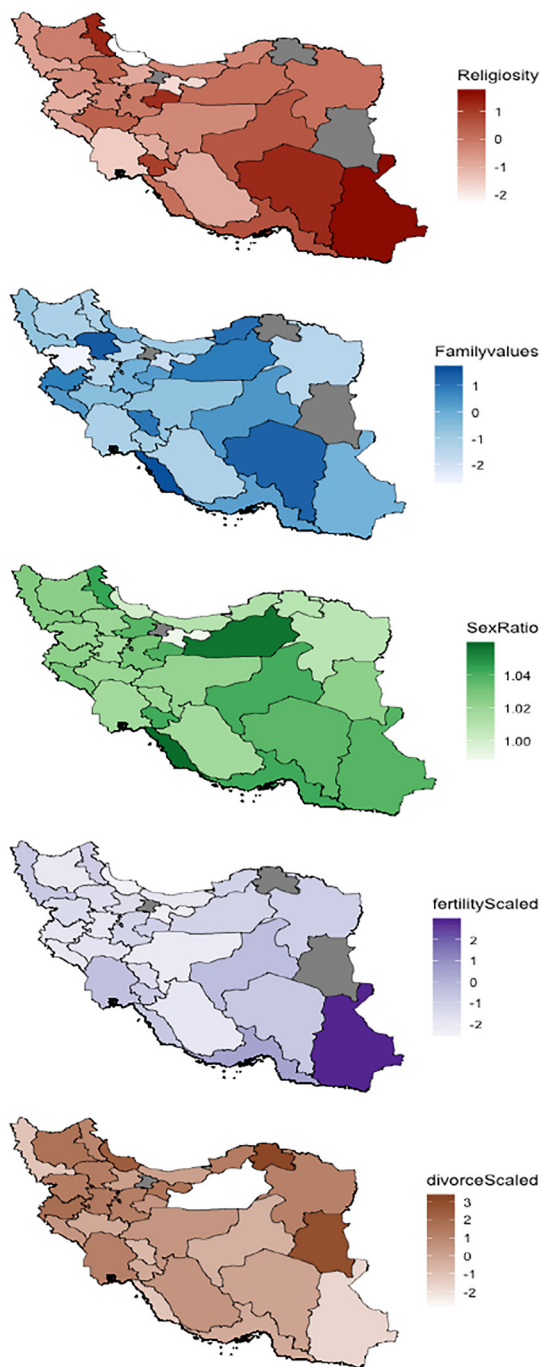


Fig. 1. Geo-spatial distribution of Study 1's variables in Iran (note that Persian Gulf is not visualized; grey provinces indicate missing values).

Table 1
Correlations between Study 1's variables.

Variables	Religiosity	Sex ratio	Divorce	Fertility	Family values
Religiosity	1				
Sex ratio	0.64***	1			
Divorce	−0.43*	−0.66***	1		
Fertility	0.62***	0.50**	−0.53**	1	
Family values	0.24	0.40*	−0.34	0.18	1

* $p < .05$.

** $p < .01$.

*** $p < .001$.

sex ratio).

2. Study 2

In Study 1, we found that more religious provinces have a lower divorce per capita, a male-biased sex ratio, and more fertility. In Study 2, we aim to examine individual-level correlates of religiosity and further investigate how individual-level religiosity contributes to mating outcomes. As mentioned, we especially focus on two crucial mating variables that have been linked to sex ratio, fertility, and relationship dissolution, namely, intrasexual rivalry and mate retention behaviors (see Arnocky, Ribout, Mirza, & Knack, 2014; Dollar, 2015; Kandrik et al., 2015; Stone et al., 2007).

2.1. Methods

2.1.1. Participants

The current sample included 211 participants who were recruited from public places (e.g., shopping centers, universities, cultural centers) by two researchers (one female and one male) in Tehran, Iran. The mean age of the participants was 31.4 years (min = 18, max = 65, $SD = 9.14$). The sample consisted of 110 men (age: $M = 31.6$, $SD = 9.83$; partner's age: $M = 29.2$, $SD = 8.57$) and 101 women (age: $M = 31.2$, $SD = 8.36$; partner's age: $M = 35.5$, $SD = 10.49$). All participants identified as Iranian and spoke Persian as their first language. Participation was voluntary and anonymous. Participants were not compensated for their participation.

2.1.2. Procedure

Ethical approval was received from the relevant ethics committee. Participation was voluntary, and participants provided oral consent before completing the measures. Volunteering participants who self-identified as heterosexual prior to participating were given a paper-and-pencil questionnaire package in which they were asked to provide their demographic information (i.e., age, marital status, and education), in addition to completing the scales/questionnaires and other measures whose results are reported elsewhere. It took participants 10 to 20 min to complete the questionnaires and return them. All participants were alone when approached and they did not confer as they completed the questionnaires. Potential questions and clarifications from participants regarding the study's aims were addressed after they returned the questionnaires by hand. All analyses were conducted in R programming language.

2.2. Materials

2.2.1. Intrasexual Rivalry Scale (IRS)

Participants answered to the gynophile-male version of Intrasexual Rivalry Scale (IRS; Karimi-Malekabadi et al., 2019). This scale consists of 16 items and has demonstrated a two-component structure in Iran, labeled Self-Promotion and Rival-Derogation. Eight items represented self-promoting tactics (e.g., "I do my best to become a kinder and more forgiving man") in four mating areas (i.e., kindness/dependability, attractiveness/sexuality, status/resources, and education/intelligence; see Atari, 2017) and eight items represented rival-derogatory tactics (e.g., "I look for negative points in successful and rich men") in the same mating areas. All items were rated on a 4-point rating scale. In the current study, Cronbach's α for self-promotion tactics was 0.82 and for rival-derogatory tactics was 0.88.

2.2.2. Mate Retention Inventory-Short Form (MRI-SF)

The MRI-SF (Buss, Shackelford, & McKibbin, 2008) consists of 38 items assessing 19 mate retention tactics. All participants reported on a 4-point Likert-type scale ranging from 0 (*Never*) to 3 (*Often*) how often they performed each behavior within the past year. Those participants whose marriage duration was less than a year were instructed to answer

the items based on their relationship length. Atari, Barbaro, Sela et al. (2017) and Atari, Barbaro, Shackelford et al. (2017) reported satisfactory psychometric properties of the Persian translation of the MRI-SF in Iranian context. Examples of Benefit-Provisioning and Cost-Inflicting items are “Took me out to a nice restaurant” and “Slapped a woman [man] who made a pass at me,” respectively. Composite scores of Benefit-Provisioning (Cronbach's $\alpha = 0.91$) and Cost-Inflicting (Cronbach's $\alpha = 0.88$) components were calculated by averaging the appropriate items.

2.2.3. Duke University Religion Index (DUREL)

The DUREL (Koenig, Meador, & Parkerson, 1997) is a five-item measure of religiosity developed to assess three main aspects of religiosity: Organized religious activities (1 item), non-organizational religious activities (1 item), and intrinsic religiosity (1 item). Intrinsic religiosity is characterized as religion that is an end in itself, therefore, individuals described as intrinsically religious view their religion as the framework for their everyday lives and try to consistently live the religion they affiliate with. The first two items are rated along a 6-point scale ranging from 1 (*Never*) to 6 (*More than once a week/day*). The last three items, however, are rated along a five-point Likert-type scale ranging from 1 (*Definitely not true*) to 5 (*Definitely true of me*). Total scores of the DUREL can range between 5 and 27. Previous research suggests that the DUREL has desirable psychometric characteristics (Koenig et al., 1997; Wang, Rong, & Koenig, 2014). The Persian translation of the DUREL has shown very good psychometric properties (Hafizi et al., 2013) and has been used in previous studies in Iran (Hafizi, Koenig, & Khalifa, 2015).

2.3. Results and discussion

As can be seen in Table 2, religiosity was significantly associated with lower levels of self-promotion ($r = -0.14, p < .05$). Rival-derogation was significantly associated with cost-inflicting mate retention behaviors ($r = 0.31, p < .01$), but not benefit-provisioning. In addition, self-promotion was significantly associated with benefit-provisioning mate retention behaviors ($r = 0.26, p < .01$). Considering the limitations in examining the relationship between intrasexual competition and mate retention behaviors (i.e., disregarding the lower-order facets of intrasexual rivalry and mate retention; Arnocky et al., 2018), we visualized the matrix of the relationships between intrasexual rivalry tactics and mate retention components in Fig. 2. Finally, we ran two regression analyses entering sex, religiosity, rival-derogation, and self-promotion as predictors of (1) cost-inflicting and (2) benefit-provisioning mate retention behaviors (see Table 3). As can be seen, sex (being male) ($B = 0.18, p < .01$), being more religious ($B = 0.01, p < .05$), and derogating rivals ($B = 0.25, p < .01$) significantly predicted cost-inflicting behaviors. Being male ($B = 0.19, p < .05$) and higher frequency of self-promoting tactics ($B = 0.26, p < .01$) predicted benefit-provisioning behaviors.

Table 2
Correlations between Study 2's variables.

Variables	Religiosity	RD	SP	MRI-BP	MRI-CI
Religiosity	1				
RD	−0.01	1			
SP	−0.14*	0.05	1		
MRI-BP	0.08	−0.11	0.26**	1	
MRI-CI	0.13	0.31**	0.08	0.41**	1

Note. RD = rival-derogation; SP = self-promotion; MRI-BP = mate retention inventory-benefit-provisioning; MRI-CI = mate retention inventory-cost-inflicting.

* $p < .05$.

** $p < .01$.

3. General Discussion

The present study examined the relationships between religiosity and a number of mating-relevant variables in Iran, on two different levels of analysis: province-level and individual-level. In Study 1, we visualized geo-spatial distributions of religiosity along with sex ratio, family values, fertility, and divorce per capita in Iran's provinces. Our correlational analyses showed that in provinces with higher levels of religiosity, sex ratio tends to be male-biased and families tend to produce a larger number of children. In addition, rates of divorce (as the most common type of relationship dissolution, at least in Iran; see Sadeghi & Agadjanian, 2019) are significantly lower in more religious provinces which can be explained by the fact that divorce is discouraged in Islamic contexts and women tend to experience high levels of social stigma after divorce (Khodayarifard, Shahabi, & Zardkhaneh, 2013). For example, more religious Iranian men are more reluctant to be in a relationship with a divorced woman (see Atari & Jamali, 2016). In less religious provinces, such as Tehran or Fars, we observed higher rates of divorce and lower levels of family values which is consistent with findings of Honarvar et al. (2016) in southern Iran.

In Study 2, we examined the relationship between religiosity, intrasexual rivalry, and mate retention behaviors in an Iranian sample. The research literature was mixed on the relationship between religious experiences and mate retention behaviors. We found that religiosity is inversely associated with self-promoting intrasexual attitudes. This might be attributable to humility teachings in religions, especially Islam (Aghababaei, 2012), since explicitly “self-promotion” behaviors can be considered self-centered in religious contexts. Yet, humility in itself can be self-promoting in the sense that being humbler and/or more pious can increase one's opportunities in long-term mating contexts. It might be a good next step to control for honesty-humility, or more broadly, basic personality traits such as HEXACO, in the relationship between religiosity and mate retention (Holden, Zeigler-Hill, Pham, & Shackelford, 2014). Of note, the magnitude of the effect was small in Study 2, therefore the generalizations should be made with caution until future research can successfully replicate this link in other samples.

Our regression analyses suggested that after controlling for the role of sex and intrasexual rivalry, religiosity can predict cost-inflicting mate retention behaviors; however, this significant effect was small in magnitude. This is consistent with Chaudhary et al.'s (2018) findings in Pakistani men. As mentioned, more religious individuals can potentially be ready to impose difficulties on defecting mates or same-sex rivals. These “costs” can be in different forms such as violence and/or threats towards the mates, especially in the presence of perceived risk of infidelity. Of note, we successfully replicated sex differences in cost-inflicting and benefit-provisioning mate retention behaviors reported in Atari, Barbaro, Sela et al. (2017) and Atari, Barbaro, Shackelford et al. (2017). In fact, the current correlations between religiosity and mate retention are very close to those reported by Atari, Barbaro, Sela et al. (2017) and Atari, Barbaro, Shackelford et al. (2017). So, it might very well be the case that we did not have enough statistical power in the present investigation to detect a genuine, but small link. In addition, we demonstrated that only *some* facets of mate retention are linked to *some* intrasexual rivalry tactics. Specifically, we showed that self-promotion (e.g., making oneself more attractive) is associated with benefit-provisioning; whereas rival-derogation (e.g., identifying negative traits in a same-sex individual, or gossiping about a same-sex individual's promiscuity) is only associated with cost-inflicting mate retention behaviors.

Although we tried to address limitations of previous research by relying on a non-WEIRD sample (Western, Educated, Industrialized, Rich, and Democratic; Henrich, Heine, & Norenzayan, 2010), using a multi-item measure of religiosity, and incorporating a new multi-dimensional framework for assessment of intrasexual rivalry (Karimi-Malekabadi et al., 2019), we should note the limitations of the current

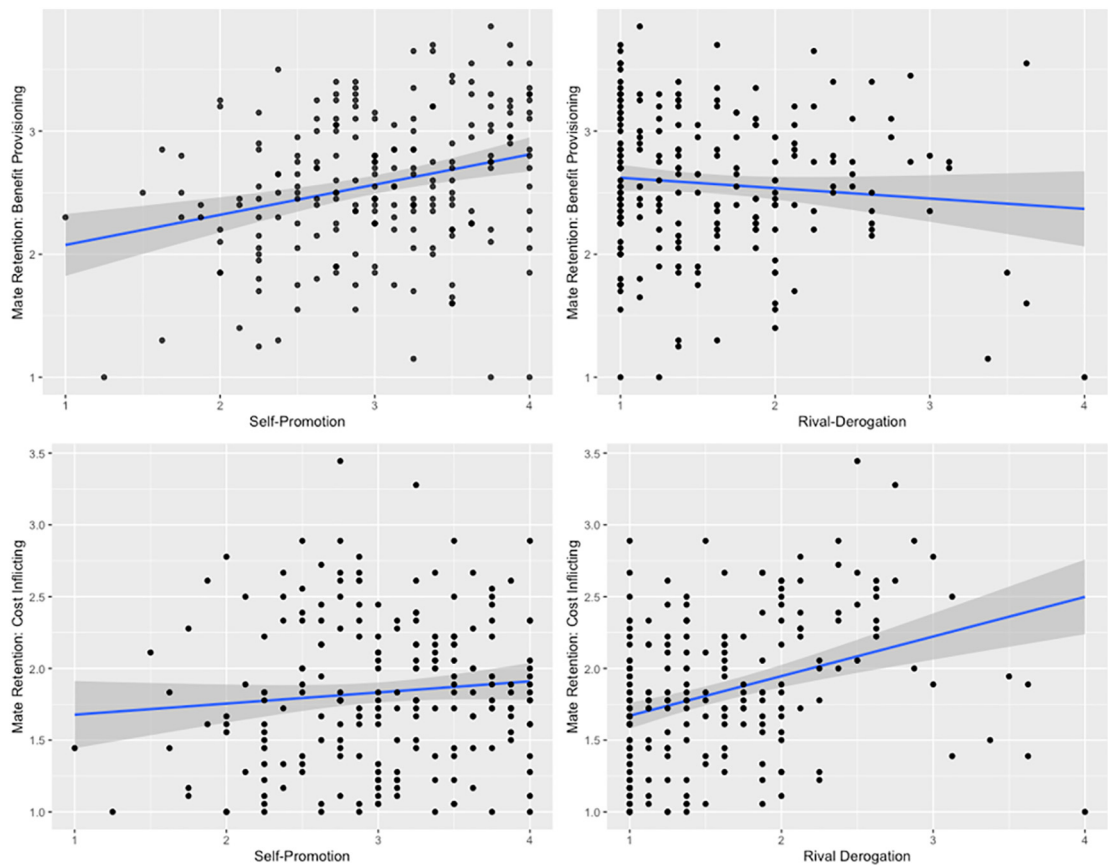


Fig. 2. The linear relationships between intrasexual rivalry tactics and mate retention behaviors.

Table 3
Results of regression analyses predicting mate retention behaviors.

Predictors	MRI-CI	MRI-BP
Sex (0 = female, 1 = male)	B = 0.18**	B = 0.19*
Religiosity	B = 0.01*	B = 0.01
RD	B = 0.25**	B = -0.11
SP	B = 0.07	B = 0.26**

Note. RD = rival-derogation; SP = self-promotion; MRI-BP = mate retention inventory-benefit-provisioning; MRI-CI = Mate retention inventory-cost-inflicting.
* $p < .05$.
** $p < .01$.

exploratory research. First, we did not assess mating-relevant self-concepts, personality, moral values, or culture-specific values such as Qeirat. It is recommended for future research to incorporate these important constructs into research on the relationship between religious experiences and mate retention behaviors. Second, our design was cross-sectional and based on correlational analyses and cannot be used to draw any causal relationships. Future research can use longitudinal designs as well as computational approaches (see Conroy-Beam, 2018; Lee, Jones, & DeBruine, 2019) to complement these results with temporal processes and real-world outcomes. Third, our geo-spatial analysis relies on zero-order correlations, which is adequate for our aims in Study 1. The type of data we had access to in Study 1 could not be analyzed using these more advanced methods or multi-level models. Indeed, future analyses are encouraged to use more advanced statistical methods (see Hoover & Dehghani, 2018) and collect more detailed data from smaller units such as counties, as more nationally representative data become publicly available.

To sum up, our studies provide novel data from a non-WEIRD

culture showing that in provinces where religion (Islam) is highly valued, there are lower divorce rates (which might be due to more frequent individual-level mate retention behaviors) and higher fertility (which is consistent with Islamic religious teachings on reproduction and may also be associated with higher mate retention behaviors). Our controlled survey results provided some evidence that Islamic religiosity may be inversely associated with self-promoting intrasexual rivalry and positively associated with cost-inflicting mate retention behaviors.

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